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An Empirical Study Of The Relationship Between Accreditation Method And Institutional Performance

Thomas Garcia

Thomas A. Garcia
Candidate

Educational Leadership
Department

This dissertation is approved, and it is acceptable in quality and form for publication:

Approved by the Dissertation Committee:

Dr. Allison Borden, Chairperson

Dr. Arlie Woodrum, Committee Member

Dr. Alicia Chávez, Committee Member

Dr. Eliseo Torres, Committee Member

AN EMPIRICAL STUDY OF THE RELATIONSHIP BETWEEN ACCREDITATION METHOD AND INSTITUTIONAL PERFORMANCE

BY

THOMAS A. GARCIA

B.S., Engineering Technology, New Mexico State University, 1973
MBA., Business Administration, University of Denver, 1978

DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of

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DEDICATION

Among the most painful moments in your life is when you lose your beloved parents. There are no words to define the sorrow and ache I experienced at the moment of each of their passing. I felt as if I had lost a major part of my life, which can never, ever be replaced, by anything or anyone else.

Among their many attributes as my parents, was their uncompromising bias for education – in particular, the education of their own children. It is no wonder that each of their six children were so highly educated and gifted. My greatest sorrow is that I will not be able to share my doctoral program graduation with them by my side. It is with my abiding love and admiration that I dedicate this dissertation and my doctoral degree to the everlasting memory of Manuel and Carmen Garcia.

ACKNOWLEDGMENTS

Unbelievably, it has been 53 years since I started kindergarten in Los Alamos, New Mexico. All of us have heard of the concept of *life long learning*, but I suspect that few exemplify this concept more than myself. Throughout my educational pursuits and my careers in both the private and public sectors, I have been challenged by opportunities to improve myself through education. Similarly, I have had ample opportunity to compose documents of all varieties and topics; however, none of these have both challenged and excited me the way that this dissertation has. I have never been engaged at the level that I have in the research and compilation of this dissertation. With my preoccupation with this dissertation, many have had to adjust their lives as much or more than I. These individuals deserve my acknowledgement and appreciation – because without them I would not have been successful in completing this enormous undertaking.

My greatest supporter throughout this process has been my beautiful, sharing and caring wife, Dorothy. She has truly been the *wind beneath my wings*, not only through this process, but throughout our married life of 40 years. Dorothy has tolerated many days when my school work has taken priority over household chores and private time together.

Similarly, my children Rachelle Forbes and Vanessa Garcia have been incredible forces through their encouragement and uncanny ability to give me my regular *reality checks*, designed to keep me on track and focused on what is important. Vanessa, who will graduate a short six months after I do with her Doctorate in Veterinary Medicine, reminds me that, although I finished my doctorate before her, she will be a *real* Doctor.

I suppose that I am not unique in wanting to please my parents with my accomplishments. I only wish they were alive to celebrate my success with me. I know that most of my success in life is largely due to their nurturing, development and guidance throughout my life. My parents were not only my guardians, but they were my dearest friends in life.

Few individuals have demonstrated the ability to facilitate my learning as my Advisor and Dissertation Committee Chair, Dr. Allison Borden. Dr. Borden exemplifies the attributes that I and most committed educators strive to achieve. Dr. Borden's sharing and caring for all of her students is renowned at the University of New Mexico, along with her ability to instill more knowledge in a short amount of time than any other. Dr. Borden has been instrumental and essential in not only my Dissertation work and learning, but throughout my doctoral program. I am most appreciative of the opportunity to work closely with Dr. Borden.

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Many others are deserving of my acknowledgement during the pursuit of my doctoral degree. Among these individuals are the following:

My sister, Betty Sceery, has been an enormous asset in listening to my daily tirades and successes at work and school.

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My dearest friends, Sal and Liz Montano, and their children, Andrea and Kenny, have been so supportive of me, in so many ways. I especially thank them for allowing me to slip in my church choir duties during the days when I was attending classes. I thank Liz for providing me critical feedback on some of my early class papers and for providing me her expertise on APA style. But most of all I thank them for their unyielding love, support and encouragement.

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And last, but not least, I want to thank God for these many Spirit-anointed, compassionate individuals whose counsel and support was offered at the right time - discerning the needs of my heart and mind, and who helped usher in the grace of God to meet my needs, enabling and empowering me to give back to others in return.

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Thomas A. Garcia

BS, ENGINEERING TECHNOLOGY
MBA, BUSINESS ADMINISTRATION
EDD, EDUCATIONAL LEADERSHIP

ABSTRACT

The purpose of this research is to ascertain whether or not there is a relationship between accreditation method and institutional performance as measured by the institutions' graduation rates and retention rates. More specifically, this research will provide empirical evidence of the relative performance of institutions that are Academic Quality Improvement Project (AQIP) accredited with those institutions that are Program to Evaluate and Advance Quality (PEAQ) accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA) of Colleges and Universities. I accomplish this by investigating the relative effectiveness (graduation rates and retention rates) of institutions that are AQIP accredited versus those institutions that are PEAQ accredited by the HLC.

The research questions that guide this study are: Based on the institutions of higher learning that are accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA), controlling for a vector of institutional variables, is there a relationship between the institution's accreditation method (AQIP or PEAQ) and

the institution's graduation rates? Based on the institutions of higher learning that are accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA), controlling for a vector of institutional variables, is there a relationship between the institution's accreditation method (AQIP or PEAQ) and the institution's retention rates?

This research provides empirical evidence of a statistically significant, positive relationship between the question predictor accreditation method (*ACCR)* and the dependent variable graduation rate (*GRDRT)*. This research also provides empirical evidence of a statistically significant, positive relationship between the question predictor accreditation method (*ACCR)* and the dependent variable retention rate (*RETRT)*.

This research has provided empirical evidence that there is a positive relationship between accreditation method and institutional performance. And more specifically this research has revealed that institutions that are accredited under the AQIP method on average perform better that those that are accredited under the PEAQ method.

From the standpoint of the institutions, this empirical evidence might suggest an opportunity for institutions that are PEAQ accredited to reconsider their choice of accreditation method. This is dependent of course on where the particular institution is on the performance continuum, since some PEAQ accredited institutions are already performing very well – some even better than AQIP accredited institutions.

From the standpoint of the users and funders of institutions of higher education (i.e. students, parents, employers, and government funding entities), they now have empirical evidence that AQIP accredited institutions performed better on average, in terms of their graduation rates and retention rates, than do PEAQ accredited schools.

Evidence that schools that are AQIP accredited perform better than those that are accredited by a different method provides useful information to parents, students, businesses and governments as they select the school to attend, the school to employ from, and which schools to fund. Again, some PEAQ accredited institutions are already performing very well – some better than AQIP accredited institutions.

Some AQIP accredited institutions are performing below their AQIP accredited counterparts, which suggests that they may not be employing AQIP in an optimal way. This is clearly an area for additional research to ascertain why some AQIP institutions perform better than others.

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Overview of the Issues

The Academic Quality Improvement Program (AQIP) is a higher education accreditation process that was initiated by the Higher Learning Commission (HLC) in 2000. AQIP is based on the Malcolm Baldrige Criteria for Educational Excellence. The Malcolm Baldrige Criteria for Educational Excellence are based on the principles of Total Quality Management (TQM) (Deming, 1986). The HLC of the North Central Association (NCA) concluded that it needed to develop an alternative to the traditional Program to Evaluate and Advance Quality (PEAQ), a self-study accreditation process. This determination was the result of increasing demands from the public and from local, state, and federal governments for more accountability in higher education. AQIP methodology examines the context, processes, results, and improvements a higher education institution is making in nine criteria: helping students learn, accomplishing other distinctive objectives, understanding students' and other stakeholders' needs, valuing people, leading and communicating, supporting institutional operations, measuring effectiveness, planning continuous improvement, and building collaborative relationships (AQIP, 2007).

Institutions interested in participating in AQIP are required to develop a minimum of three action projects of six months to three years duration. The intent of the action projects is to identify opportunities for improvement where efforts would be focused and measurement and continuous improvement would be reported. After three years of AQIP membership, each institution submits a systems portfolio that describes the context,

processes, results, and improvement for each of the nine criteria. These portfolios are then reviewed by a panel of independent reviewers who assign a score to each criterion and develop a follow-up report identifying strengths and opportunities for improvement for each of the criteria.

Critical to the success of any higher education institution are its efforts to continually improve in all aspects, with a focus on student learning achievement. AQIP is designed and intended to integrate strategic processes that will enable such continuous improvement.

Graduation rates and retention rates

Title IV Programs are managed by the Office of Federal Student Aid within the U.S. Department of Education. All postsecondary education institutions participating in Title IV financial assistance programs are required by the Student Right-to-Know Act to make available to current and prospective students reports containing the graduation rate (IPEDS, 2008). The National Center for Education Statistics (NCES) of the U.S. Department of Education collects graduation rate and retention rate data with the Integrated Postsecondary Education Data System (IPEDS) Graduation Rate Survey (GRS). This survey collects the graduation rate and retention rate data required for disclosure. The requirement to disclose graduation rates and retention rates reflects the notion that graduation rates are an indication of quality (IPEDS, 2008).

Bailey (2006) has determined that graduation rates and retention rates are used extensively to review instructional programs throughout the United States. The North Central Association of Colleges and Schools – The Higher Learning Commission, which accredits over 1000 colleges and universities in twenty states, considers graduation rates

to be an indirect assessment of student learning (HLC, 2003, 2007b). Appendix E is a map of the Regional Accreditation Commissions and their Service Territory.

Graduation rates and retention rates are also used to rank colleges. To produce rankings, the U.S. News and World Report graduation rate performance indicator is calculated as the difference between an institution's actual graduation and retention rates and its predicted graduation and retention rates (Porter, 1999). Predicted graduation and retention rates can also be used to assess effectiveness (Astin, 1996b, 1997).

State legislatures view graduation rates as a measure of accountability. Most states using performance measures to allocate state funds to postsecondary education use graduation rates as a measure of institutional performance (Whigham, 2000). A graduation rate is one of the most common indicators for student success at community colleges Burke (2002). Other common indicators are retention, transfer, and job placement rates.

Nature of the problem

Since 1999 when AQIP was introduced as an alternative means by which institutions are accredited, numerous institutions of higher learning have opted for this alternative over the traditional PEAQ accreditation option. Although AQIP is intended to create opportunities to continually improve the performance of the participating institutions, there has been no empirical evidence that these institutions perform any better or worst than institutions that are not AQIP accredited. The absence of empirical evidence to support AQIP over PEAQ has left institutions without the knowledge they need to effectively evaluate one accreditation method over the other – at least as it relates to institutional performance.

From the standpoint of the users and funders of institutions of higher education (i.e. students, parents, employers, and government funding entities), it would be useful to know if AQIP accredited institutions performed better than PEAQ accredited schools and vice versa. Evidence that schools that are AQIP accredited perform better than those that are accredited by a different method would be advantageous to parents, students, businesses and governments as they select the school to attend, the school to employ from, and even which schools to fund.

Purpose of the study

The purpose of this research is to ascertain whether or not there is a relationship between accreditation method and institutional performance as measured by the institutions' graduation rates and retention rates. More specifically, this research will provide empirical evidence of the relative performance of institutions that are Academic Quality Improvement Project (AQIP) accredited with those institutions that are Program to Evaluate and Advance Quality (PEAQ) accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA) of Colleges and Universities. I accomplish this by investigating the relative effectiveness (graduation rates and retention rates) of institutions that are AQIP accredited versus those institutions that are PEAQ accredited by the HLC.

Research questions

The research questions that guide this study are: Based on the institutions of higher learning that are accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA), controlling for a vector of institutional variables, is there a relationship between the institution's accreditation method (AQIP or PEAQ) and

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Significance of the study

This research is important because of the enormous investment that students, parents, and governments make in the education of students. Students and parents seek education with positive outcomes in mind. They want to know if the investment of time and money they make in education provides an acceptable return on their investment. If students and parents know in advance that a particular school has a higher probability of graduating its students than another, this would be useful information when selecting a school. If a funding government agency knows that a particular school has higher retention and graduation rates than another, that agency is likely to be more favorably disposed to fund the better performing school. If there is a positive relationship between these variables, there will be evidence that institutions that are exercising Total Quality Management (TQM) perform better in terms of retention and graduation rates than institutions that do not. This evidence is not currently available and yet it is potentially quite valuable to students, parents, funding agencies, and to the school itself.

Limitations of the study

Even though IPEDS data are extensive, these data do not include all variables that are known to influence graduation rates and retention rates. Only IPEDS and HLC derived data will be used in this analysis. Schuh (2002) notes that the categories available

in IPEDS are very broad. IPEDS data are aggregate data at the institution level. This study was conducted at the institutional level and does not include individual and external variables that are known to influence graduation rates and retention rates. *Individual variables* include, but are not limited to, motivation, interests, self-efficacy, causal attributions, outcome expectancies, cognized goals, self-worth and academic self-concept (Atkinson, 1957; Bandura, 1993; Covington, 1984; Dweck, 1988; Hidi, 1990; Marsh, 1992; Weiner, 1990; White, 1959; Zimmerman, 1990). *External variables* include, but are not limited to, parental influences and societal influence (Eun-young, 1993; Holloway, 1988; Stevenson, 1990).

With regards to graduation rates, only fulltime, first-time, degree or certificate seeking undergraduate students enrolled in the 2007 fall term are reported. The graduation rates I will use in this study will not include students transferring into an institution or track students more than three years at two-year institutions or six years at four-year institutions. Walsh (1996) identified that the greatest limitation of the Student Right-to-Know definitions is that the IPEDS inventory of students is based on those students who graduate from the same institution in which they started.

While research supports the use of retention and graduation rates to evaluate the performance of four-year institutions, they may play a lesser role in the evaluation of performance at two-year institutions because most two-year institutions offer open access Bailey (2006). Given the diversity of students and their goals, utilizing graduation rates as a measure of an institution's success when the institution is a community college is made more difficult Bailey (2006).

Definition of terms

The following definitions will be used in this study:

Academic Quality Improvement Program (AQIP): An accreditation program for institutions of higher education that infuses the principles and benefits of continuous improvement into the culture of colleges and universities by providing an alternative process through which an already-accredited PEAQ institution can maintain its accreditation from the Higher Learning Commission (HLC, 2007b; Lozier & Teeter, 1996). AQIP is an alternative to the traditional self-study approach to reaccreditation, which is now identified as Program to Evaluate and Advance Quality (PEAQ).

AQIP methodology examines the context, processes, results, and improvements a higher education institution is making in nine criteria: helping students learn, accomplishing other distinctive objectives, understanding students' and other stakeholders' needs, valuing people, leading and communicating, supporting institutional operations, measuring effectiveness, planning continuous improvement, and building collaborative relationships (AQIP, 2007).

Assessment: Assessment involves the collection, review, and use of performance information about educational programs undertaken for the purpose of improving student learning and achievement (Palomba, 1999).

Full-time Enrollment (FTE): Full-time undergraduate enrollment headcount from the Higher Learning Commission's *Directory of Affiliated Institutions* (HLC, 2007b; IPEDS, 2008).

*Graduation Rates (*GRDRT*)*: This annual component of Integrated Postsecondary Education Data System (IPEDS) was added in 1997 to help institutions satisfy the

requirements of the Student Right-to-Know Legislation. Data are collected on the number of students entering the institution as full-time, first-time, degree/certificate-seeking undergraduate students in a particular year (cohort), by race/ethnicity and gender; the number completing their program within 150 percent of normal time to completion; the number that transfer to other institutions if transfer is part of the institution's mission. Prior to 2007, institutions that offered athletics-related student aid were asked to report, by sport, the number of students receiving aid and whether or not they completed within 150 percent of normal time to completion. Currently, when available, these institutions only need to report a URL where the athletic data are located on their website. The graduation rate automatically generates worksheets that calculate rates, including average rates over four years (IPEDS, 2008).

IES: The Education Sciences Reform Act of 2002 established the Institute of Education Sciences (IES) within the U.S. Department of Education to bring "rigorous and relevant research, evaluation, and statistics to our nation's education system" (IPEDS, 2008, pp. 1-2).

IPEDS: The Integrated Postsecondary Education Data System (IPEDS), managed by The National Center for Education Statistics (NCES), began in 1986 and involves annual institution-level data collections. All postsecondary institutions that have a Program Participation Agreement with the Office of Postsecondary Education (OPE) are required to report data using a web-based data collection system. IPEDS currently consists of: Institutional Characteristics (IC); 12-month Enrollment (E12); Completions (C); Human Resources (HR) composed of Employees by Assigned Position (EAP), Fall

Staff (S),and Salaries (SA); Fall Enrollment (EF); Graduation Rates (GRDRT); Finance (F); and Student Financial Aid (SFA) (IPEDS, 2008).

NCES: The National Center for Education Statistics (NCES), in the Institute of Education Sciences (IES), is the statistical agency of the U.S. Department of Education and the primary federal provider of education statistics on the condition of American education (IPEDS, 2008).

Program to Evaluate and Advance Quality (PEAQ): The Higher Learning Commission of the North Central Association of Colleges and Schools employs the PEAQ accreditation program for higher education institutions. The accreditation process involves a self-study approach that employs a five-step evaluation process to determine continued accredited status (HLC, 2007b). The five-step evaluation process includes the following:

1. The organization engages in a self-study process for approximately two years and prepares a report of its findings in accordance with Commission expectations.
2. The Commission sends an evaluation team of Consultant-Evaluators to conduct a comprehensive visit for continued accreditation and to write a report containing the team's recommendations.
3. The documents relating to the comprehensive visit are reviewed by a Readers Panel or, in some situations, a Review Committee.
4. The IAC takes action on the Readers Panel's recommendation. If a Review Committee reviewed the visit, the Review Committee takes action.

5. The Board of Trustees validates the work of IAC or a Review Committee, finalizing the action.

Retention Rate (RET): A measure of the rate at which students persist in their educational program at an institution expressed as a percentage. For four-year institutions, this is the percentage of first-time bachelors (or equivalent) degree-seeking undergraduates from the previous fall semester who enrolled the following fall semester. For all other institutions, this is the percentage of first-time degree/certificate-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall (IPEDS, 2008).

Chapter II

Review of the Literature

Introduction

The review of the literature is organized in six distinct sections including: *A Nation at Risk* – A publication that launched the assessment or accountability movement in education (NCEE, 1983); *Demands for Accountability* – Accountability has become the mantra of businesses, the public, and of course, public elected officials (Townsend, 2001); *Accreditation* – An in-depth review of accreditation agencies, methods, objectives and motivations; *Institutional Effectiveness (IPEDS)* - The most substantial database that captures the performance measures (institutional effectiveness) of higher education institutions is the United States Department of Education, Institute for Education Sciences - National Center for Education Statistics (NCES) database called the Integrated Postsecondary Education Data System (IPEDS) (IPEDS, 2008); *Graduation Rate Research* - Seminal work related to graduation rate and predictor variables appropriate for multiple regression analysis (Astin, 1970); and, *Dissenting Opinions* – A review of the authors who have challenged the appropriateness of self assessment and Total Quality Management in the evaluation of higher education (Scriven, 1984; Smith, 1984).

Although these sections are distinct, they nonetheless contribute to a thorough understanding of the current level of knowledge about the relationship between accreditation method and both graduation rate and retention rate. Given that the purpose of this research is to ascertain whether or not there is a relationship between accreditation method and institutional performance, this review of the literature demonstrates that there is a lack of empirical evidence of the relative performance of institutions that are

Academic Quality Improvement Project (AQIP) accredited and those institutions that are Program to Evaluate and Advance Quality (PEAQ) accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA) of Colleges and Universities.

Figure 1 illustrates the six broad categories of related literature that explain the relationships between accreditation methods and graduation rates and accreditation method and retention rates in institutions of higher learning. These categories are each explored in the remainder of this review of the literature.

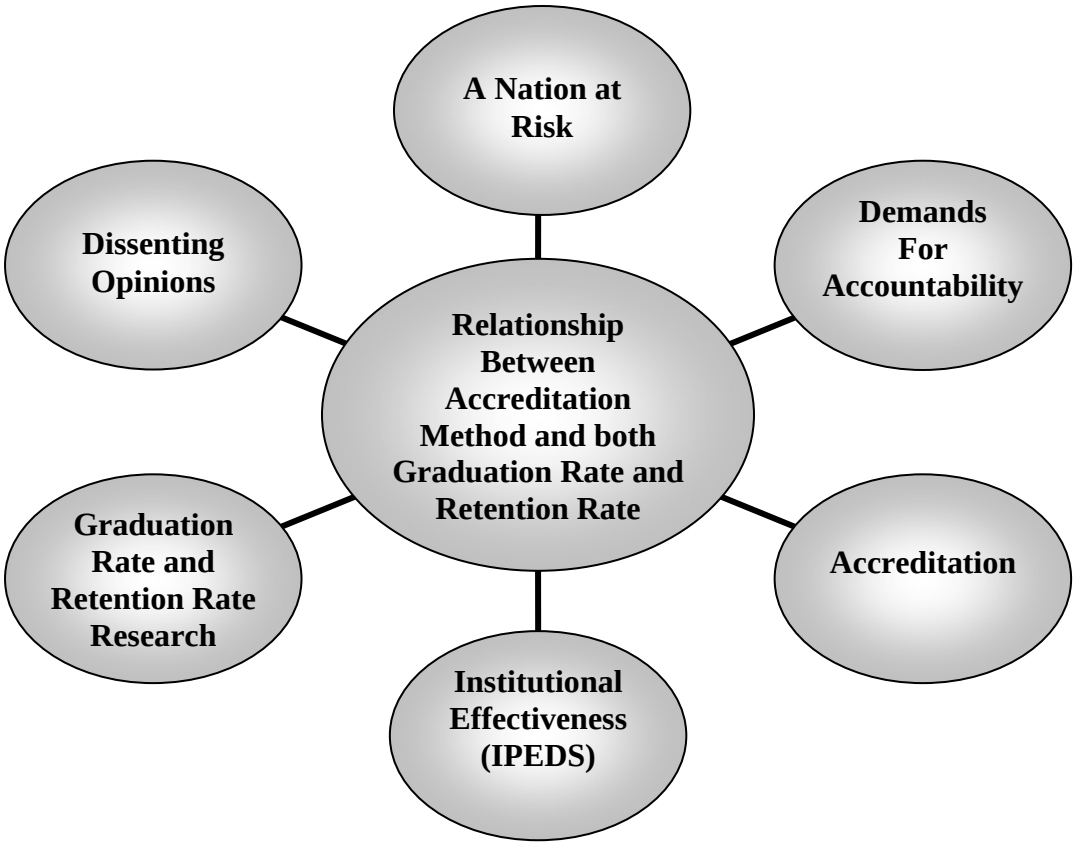


Figure 1
Bodies of literature that contribute to our understanding of the relationship

A Nation at Risk

The assessment or accountability movement in the U.S. began in earnest with the publication of *A Nation at Risk* (NCEE, 1983). This publication is considered by the education community to be a seminal study in K-12 and higher education assessment and accountability (Burke, 2002). It explored among other topics: Institutional effectiveness; accountability; governmental funding; assessment; student learning; and finally, an exploration of the national accreditation agencies.

In 1981, the Secretary of the Department of Education, Terrel H. Bell formed the National Center for Education Evaluation (NCEE) in response to negative public perception regarding the prevailing educational systems throughout the United States (NCEE, 1983). Secretary Bell reported the establishment of NCEE was his responsibility to provide leadership, constructive criticism, and effective assistance to schools and universities (NCEE, 1983). NCEE's charter required the assessment of the quality of teaching and learning in primary and secondary education as well as in colleges, and universities (NCEE, 1983). A recurring theme in the report was the concept of a *coherent continuum of learning*. The repercussions of *A Nation at Risk* were enormous, resulting in numerous higher education initiatives to assess institutional effectiveness throughout the United States. Burke (2002) described the prevailing feeling, indicating that criticism of higher education came from all quarters of the political spectrum, the federal administration, the Congress, and local and state governments as well.

Corporations in America in the late 1980s began to demand that higher education look to the benefits of Total Quality Management (TQM), not only in their curriculum

but in their own internal operations so as to advance the benefits of TQM in higher education:

> Towards the end of the decade the larger corporations were also exerting their influence on curricular developments in higher education. Beginning in 1989, such leaders as American Express, Ford, IBM, Motorola, Proctor & Gamble and Xerox have sponsored an annual meeting of the Total Quality Forum, to which they invited deans of leading schools of business and engineering along with their presidents or chief academic officers to hear the challenge of quality. Their message was: to be successful in their industries, graduates of these schools needed to be knowledgeable and practiced in the principles and tools of TQM. In an open letter published in late 1991 in the *Harvard Business Review* (Anon, 1991), the leaders of these corporations observed that academic institutions that are slow to embrace TQM, at best, miss the opportunity to lead change and, at worst, run the risk of becoming less relevant to the business world".
>
> Subsequently, these and other major corporations have established formal partnerships with universities to assist in the translation of these business concepts to higher education (Lozier & Teeter, 1996, p. 191).

Demands for accountability

Accountability became the mantra of businesses, the public, and of course, public elected officials. Every program offered by higher education institutions required justification for its existence, a demonstration of its value to the public, and assessments. Townsend (2001, p. 59) states law makers were, "…requiring that the value of programs and services be demonstrated." Some means of assessment were essential to measuring

the effectiveness of institutions of higher education in the United States (Angelo, 1993; A. M. Cohen, 1994; Ewell, 2001; Green, 1997; O'Banion, 1997). Accrediting agencies enacted more strict accountability standards including the assessment of student learning. Banta (2004, p. 4) reported, "…now the focus in assessment in two-year as well as four-year institutions has moved from institutional effectiveness to student learning."

Cross (1997) believes that assessment of student learning outcomes has become a potent means by which to bring attention to learning. Clearly, all institutions of higher learning need to be able to demonstrate to society that they are providing the public value for the taxpayers' money. Some means of assessing an institution's performance are necessary to accomplish this need.

Laanan (2001, p. 59) defines accountability as "*what* performance to measure and *how* to measure it." Green (1997, pp. 14-15) believes that, "a multitude of *knotty questions* surface with the issue of accountability: Who defines the measures of performance, and are the measures the same for different types of institutions?"

According to Resnick (1987, p. 20), "…without assessment there can be no accountability." Kuh (2001, p. 10) indicates, "State legislators, accreditors, parents, employers, and others want to know what students are learning and what they can do," cautioning, "some external entity will impose its own approach" to assessing student learning if colleges and universities do not.

Cohen (1994) indicates the need to document institutional efforts in higher education institutions to allow students, the public, and the professional community to understand how the institutions use their resources in fulfillment of their missions. Cress (1996, p. 1) cites McMillan who indicates that "higher education institutions have been

called upon to 'prove' their efficiency and effectiveness" to accreditation bodies, legislators, taxpayers, and parents.

Green (1997, p. 13), leaves little question about the need for public higher education institutions to be accountable to "taxpayers, who are usually represented by government officials." Cress (1996) cites McMillan in identifying four stakeholders of accountability: accreditation bodies, legislators, taxpayers, and parents. Kuh (2001, p. 10) on the other hand suggests that "State legislators, accreditors, parents, employers and others have a stake in knowing what students are learning." Whatever relationship exists between assessment and accountability, Richardson (1983, p. 186) expresses the inevitable: "Higher education institutions will not escape public pressures for accountability." The American Association of Community Colleges AACC (1997, p. vii) indicated that, "colleges had no choice but to yield to mandates of effectiveness reporting." Banta (2004, p. 8) when discussing the level of commitment for assessment by all stakeholders, reveals that such assessment needs to, "begin early and persist." The AACC (1997) and Roueche (1997) put forward the notion that accountability is associated with the institution's responsibility to its external publics in implementing its mission. In a survey of higher education institution presidents, Vaughan (1998, p. 143) identified accountability and understanding institutional mission "as the major issues facing the higher education institution in the next few years." With regard to the influence of outside entities on higher education, Dziech (1994, pp. 454-455) cites Keller:

> Three quarters of all change at most institutions of higher learning is now triggered by outside forces such as directives from the state board of higher education, an economic recession, migration patterns, a change in the supply of

gasoline, the wider use of records and cassettes, a governor's change of politics, a new law from Washington, a sweeping court decision about a major affirmative action case, and the shifts in job markets.

Legislatures are linking assessment to institutional effectiveness as a means of meeting accountability demands (Serban, 2004). Dugan (2006, p. 50) states that the "most visible stakeholders concerned with higher education institution accountability" may be the federal and state government. Dugan (2006) suggests that state performance-based funding could be used to target desired learning indicators, and could strategically shape institutional performance behaviors by affecting the allocation and application of resources across and within institutions. Laanan (2001, p. 69) suggests, "…accountability in higher education and, more specifically, in higher education institutions is definitely here to stay," and that "… states are in the process of developing, designing, and operationalizing their responses to the various federal initiatives."

It should not come as a surprise to most that accountability is coming from the public and public agencies. After all, higher education is highly dependent on funding from these public agencies. According to Ewell (2001, p. 1), "employers and elected officials are demanding higher order literacy and communications skills from college and university graduates." The public is not just looking "at price, but at the underlying quality of a college credential and what it will buy them in the employment marketplace" (Ewell, 2001, p. 1). Laanan (2001, p. 12) cites a 1988 California bill that requires the California Higher Education Institutions' Board of Governors to develop an "educational and fiscal accountability system," the purpose of which is to "maintain and improve the quality of the institution and enhance the higher education institutions."

O'Banion (1997, p. 95) reveals "a full one-percent of the instructional budgets of all of Missouri's public state universities and higher education institutions…were used to fund rewards for faculty designed projects to improve student outcomes." O'Banion (1997, p. 95) continued, "The idea that public colleges and universities should be funded, at least in part, upon their demonstrated performance in achieving student learning has circulated among state officials throughout the country, and a few have put funding where their mouths are." In the State of Tennessee, funding has been allocated for use by "public colleges and universities on the assessment of student competence" (Banta, 2004a, p. 7).

Accreditation

Assessment researchers concur that assessment must be tied to mission and that institutions must be accountable based on that mission (AACC, 1997; Boggs, 1997; R. E. Dugan, & Hernon, P., 2006). Accreditation agencies are chartered with the responsibility of influencing institutional effectiveness through the assessment process. Nevertheless, elected officials at all levels of government have pressed for greater efficiency and responsiveness on the part of higher education. The public has decreed that tax-supported institutions need to increasingly be held accountable for improvements.

Over the last 10 to 15 years, the emphasis on the assessment of student learning outcomes has come from regional and disciplinary accrediting associations (T. W. Banta, 2001; Ewell, 2001; Serban, 2004). Today, the regional accrediting agencies recognized by the Council for Higher Education Accreditation (CHEA) all include assessment criteria as a requirement for accreditation. According to Beno (2004, p. 3) most accrediting agencies have "altered their standards and evaluation processes to increase

the emphasis on student learning." A concise explanation of the specific requirements made by each accrediting agency follows the detailed accounting of the CHEA.

CHEA (2006, p. 1) describes itself as "a national advocate and institutional voice for self-regulation of academic quality through accreditation." More than 60 institutional and programmatic accrediting organizations represent approximately 3,000 colleges and universities (CHEA, 2006). CHEA furthers its description, indicating that it is the "primary national voice for voluntary accreditation to the general public, opinion leaders, students and families," and serves as "a representative of U.S. accreditation community to international audiences" (CHEA, 2006, p. 2).

A CHEA recognized accrediting organization is deemed to have met a series of standards that include demonstration of accountability. CHEA is the only nongovernmental higher education organization that undertakes this scrutiny. Accrediting agencies have standards that call for institutions and programs to provide consistent, reliable information about academic quality and student achievement to foster continuing public confidence and investment (CHEA, 2006).

According to O'Banion (1997, p. 93), "the Southern Association of Colleges and Schools (SACS) was one of the earliest to link the assessment process to learning outcomes." The remaining regional agencies followed with similar requirements as illustrated in Table 1 (Peterson, 2000, p. 449). The year the agencies included assessment of student learning outcomes language in their criteria and their reference to assessment are included.

Table 1
Year of assessment policy and assessment reference for regional agencies (Adapted from Peterson, 2000, p. 449)

Regional Association	Year of Initial Policy	Assessment of Student Learning Outcomes Requirement of Institution
Southern	1984	Calls for the "analysis of the effectiveness of the learning environment supporting student learning…" (SACS, 2004, p. 2).
Middle States	1985	Assesses "both institutional effectiveness and student learning outcomes and uses the results for improvement" (MSCHE, 2006, p. iv).
Western	1988	Calls for the "development and review…of assessment of learning" (WASC, 2004, p. 9).
North Central	1989	Provides "evidence of student learning and teaching effectiveness that demonstrates it is fulfilling its educational mission" (HLC, 2003, p. 117).
New England	1992	States "the institution implements and supports a systematic and broad-based approach to the assessment of student learning" (NEASC, 2005, p. 12).
Northwest	1994	States that "degree and certificate programs…are characterized by … the assessment of student learning achievement outcomes" (NCCU, 2005, p. 4).

The Higher Learning Commission links assessment directly to what students learn. Lopez (2006, p. 68) suggests that the Higher Learning Commission "remains committed first and foremost to the continuous improvement of student learning." O'Banion (1997, p. 94) indicates that The Higher Learning Commission has developed "a conceptual framework that insists on assessing what students learn as a direct outcome of their educational programs and experiences." HLC (2003, p. 48) Criterion Three indicates that an institution provides "evidence of student learning and teaching

effectiveness that demonstrates it is fulfilling its educational mission." O'Banion (1997, p. 94) explains that this has not been at the expense of other important outcome and productivity measures, such as student retention rates, degree completion rates, transfer rates, and job placement rates. He suggests that the recent shift to assessment of student learning has become the "principal means by which to demonstrate overall institutional effectiveness."

Although the assessment of student learning achievement is required by all of the aforementioned accrediting agencies and is of interest globally, the focus of this research is that of the Higher Learning Commission's region. Appendix E is a map of the Regional Accreditation Commissions and their Service Territory. There are nineteen states in the commission's region, with 1013 accredited higher education institutions. Each, by virtue of meeting accreditation criteria, must have an approved program to assess student learning (HLC, 2007b). Astin (1996a, p. 1) recognizes, "assessment is not an end in itself but a vehicle for educational improvement." As such, assessment of student learning achievement programs has become the process by which student learning is measured.

Banta (1996, p. 36) found that "institutions with long histories of successful assessment programs … all credit the importance of wide constituency participation for much of their success" and that "widespread involvement in assessment is a crucial factor" in successful assessment programs, and similarly, "planning, preparation, and the presence of a receptive institutional culture for assessment." Banta (2004, p. 10) concurs that institutional culture must have "deeply embedded" assessment programs that "are built on a foundation of sustained, committed leadership; an understanding that effective

assessment is essential to learning; and a sense that the responsibility for learning and assessment is shared by everyone at the institution."

The literature reveals a number of attempts to establish principles or characteristics of successful assessment of student learning achievement programs. In an effort to identify characteristics of successful programs, Huba (2000, p. Appendix B) examined the 9 Principles of Good Practice for Assessing Student Learning. From these principles, Huba (2000) derived key questions to establish or evaluate an assessment of student learning achievement program.

In a study of influences on institutional approaches to student assessment in higher education, Peterson (2000, p. 443) found that "institutional dynamics and accreditation region" were "primary influences on student assessment approaches" in research, doctoral, master's, baccalaureate, and associate of arts institutions. Further, Peterson (2000, p. 443) found that "…internal dynamics appear to be the driving force of all three approaches to student assessment." Although institutional dynamics may influence student assessment approaches, the question remains as to whether institutional dynamics, when viewed as characteristic behaviors of an administration, influence the success of an assessment of student learning achievement program.

According to (Field, 2006, pp. 27-28), in response to recommendations from the Commission on the Future of Higher Education, former Secretary of Education Margaret Spellings expressed the need for the following:

1. Federal funds for a new grant program that would reward colleges, states, and consortia that report on student learning.

2. The National Advisory Committee on Institutional Quality and Integrity could play a role in reforming the system.
3. A uniform "template" that accreditors could use to publicly report information about colleges' "inputs," such as curricula, faculty qualifications, and library holdings; "outputs," such as graduation and employment rates; and student-learning "outcomes," which measure what students have learned.

In September 2006, former U.S. Secretary of Education Margaret Spellings announced her Action Plan for Higher Education. This plan, based on the recommendations of her Commission on the Future of Higher Education, was designed to help keep America competitive and provide students and families with more information and more affordable access to higher education (Field, 2006). The Office of the Under Secretary is responsible for helping to implement the Secretary's Action Plan for Higher Education, which calls for expanding the accessibility, affordability, and accountability of higher education for more Americans (IPEDS, 2008, p. 1).

On October 2, 2008, Dr. Sylvia Manning, President of the Higher Learning Commission, indicated that from her perspective, “the September 2006, U.S. Secretary of Education Margaret Spellings’ Action Plan for Higher Education is very aggressive and yet doable…details surrounding implementation is still under development” (Manning, 2008). As of this writing, the new administration of President Barack Obama and Secretary Arne Duncan have not modified the 2007-2012 Strategic Plan for Education, which was signed by then Secretary Spellings on May, 2007 (USDOE, 2007).

As a result of the enormous pressures to improve accreditation processes, and due to the rapid changes occurring in colleges and universities, the Higher Learning

Commission has been challenged to respond with accreditation programs that address college and universities' needs, while maintaining a "capacity to provide credible quality assurance" (HLC, 2007b, p. iv). In 1999, The Higher Learning Commission introduced a program, the Academic Quality Improvement Program (AQIP), for maintaining accredited status based on the principles of continuous quality improvement. This effort, supported by a grant from the Pew Charitable Trust, resulted in an alternative process by which institutions are accredited (AQIP, 2007). Through a cycle of simultaneous events, actions, updates, and strategies—an institution "demonstrates it meets accreditation standards and expectations through sequences of events that align with those ongoing activities that characterize organizations striving to improve their performance" (AQIP, 2007, p. 1).

In January 2007, 75 higher education institutions were listed as AQIP institutions in the on-line "Participating Institution List." As of October 1, 2008 the number of AQIP institutions had grown to 196 higher education institutions – an increase of 121 institutions or a one hundred and sixty-one percent increase in only 21months. As of June 2, 2009 the number of AQIP accredited institutions has increased to 330 (AQIP, 2009).

Figure 2 illustrates the number of PEAQ vs. AQIP Accredited Institutions beginning in 2000 when AQIP was first introduced as an alternative accreditation process through the Higher Learning Commission. It appears that the AQIP accreditation method is increasingly the process by which higher educational institutions are electing to be accredited by the Higher Learning Commission.

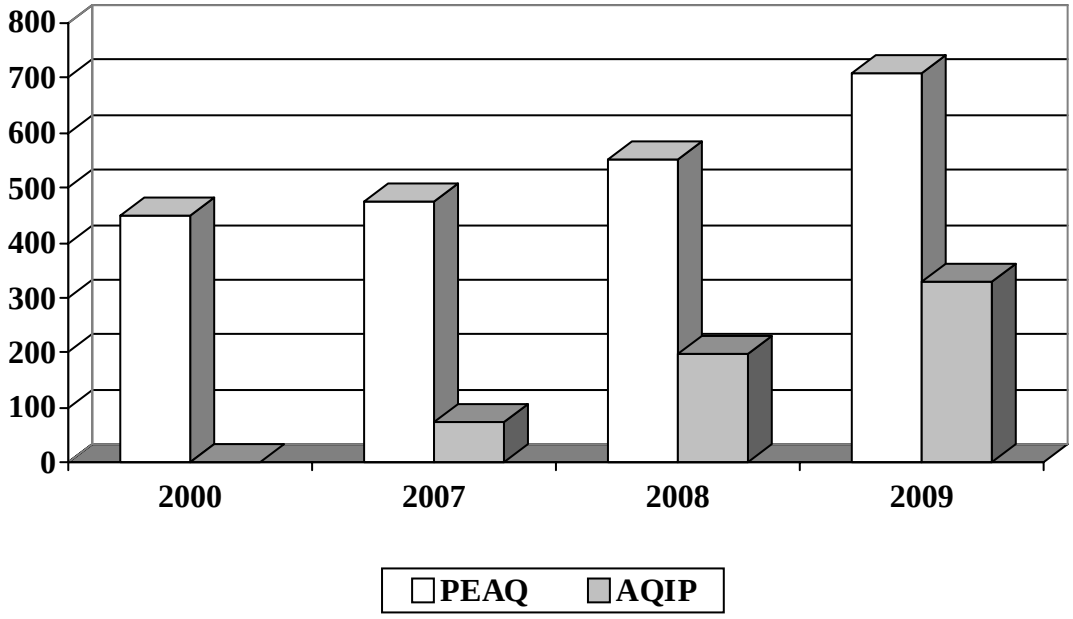


Figure 2
PEAQ vs. AQIP Accredited Institutions (AQIP, 2009)

Focusing on performance and incremental improvement over time is the direction that modern accreditation practices are taking. The Higher Learning Commission has arguably led the way as a result of the leadership of Stephen Spangehl, Executive Director of the Academic Quality Improvement Project:

> The Higher Learning Commission of the Northern Central Association of Colleges and Schools has developed and implemented an alternative accreditation process that supports institutions using continuous improvement systems. This process, named the Academic Quality Improvement Program (AQIP), shifts the focus of accreditation from inputs – such as SAT scores, faculty credentials, or

number of library volumes – to performance, or how well an institution meets the long-term need of its students and stakeholders (Spangehl, 2004, p.4).

Bolman (2008, p. 188) concludes that one of the most compelling means to engage the human resource elements of the institution is via total quality management (TQM):

> One example of a comprehensive strategy that combines structural and human resource elements is total quality management (TQM), which swept across corporate America in the 1980s. Total Quality Management gurus such as Cosby, Deming, Ishikawa, and Juran differed on specifics, but they all emphasized workforce involvement, participation, and teaming as essential components of a serious quality effort (Cosby, 1989; Deming, 1986; Ishikawa, 1985; Juran, 1989).

Institutional effectiveness – IPEDS

The most substantial database that captures the performance measures (institutional effectiveness) of higher education institutions is the United States Department of Education, Institute for Education Sciences - National Center for Education Statistics (NCES) database called the Integrated Postsecondary Education Data System (IPEDS). Table 2 presents the eight broad categories of data collected by IPEDS.

Table 2
Institutional Effectiveness Data Categories (IPEDS, 2008)

#	Data Category Title	Contents
1	Institutional Characteristics	Data collected in the institutional characteristics survey provide general information about the institution. Data collected include but are not limited to: -Institution name and address, telephone number, and web address; -Educational offerings and mission statements; -Control/affiliation, award levels, and calendar system; -Admissions requirements, including prior education and test

Table 2
Institutional Effectiveness Data Categories (IPEDS, 2008)

#	Data Category Title	Contents
		scores; and -Student charges, including tuition and fees, room and board, books and supplies, and other expenses.
2	Degree Completions	Degree completions data are collected for award levels ranging from postsecondary certificates of less than 1 year to doctoral degrees. Data include: -Demographic information on race/ethnicity, gender of recipient, and field of study. -For degree programs, data are collected by level or type of degree (i.e., associates, bachelors, masters, doctors, and first-professional). -For non-degree programs, data are collected by length of program.
3	12-Month Enrollment	-12-month enrollment data are collected for award levels ranging from postsecondary certificates of less than 1 year to doctoral degrees. The -12-month period used is selected by the institution and can range from July 1-June 30 or from September 1-August 31: -Data include demographic information on race/ethnicity and gender. -Data collected/calculated include: -Unduplicated headcounts and instructional activity (contact or credit hours); and -Full-time equivalent (FTE) enrollment (calculated based on instructional activity), which is used in computing expenses by function per FTE and revenues per FTE (which are reported on the IPEDS Data Feedback Report).
4	Human Resources	Employees by Assigned Position Data are collected on headcount information (as of November 1 of the current academic year). Institutions with medical schools (those that have M.D. programs) are required to report their medical school employees separately. Data are collected by: -Full- and part-time status; -Function or occupational category; and -Faculty status and tenure status (if applicable). Fall Staff This component is required biennially (in odd-numbered years) from institutions with 15 or more full-time employees. Data are collected on the numbers of full and part-time institutional staff (as of November 1 of the current academic year) and include demographic information on race/ethnicity and gender. Specific

Table 2
Institutional Effectiveness Data Categories (IPEDS, 2008)

#	Data Category Title	Contents
		data elements include: -Number of full-time faculty by contract length and salary class intervals; -Number of non-faculty employed full time by primary occupational activity and salary class intervals; -Number of part-time employees by primary occupational activity; -Tenure of full-time faculty by academic rank; and -Number of new hires by primary occupational activity. **Salaries** Beginning with the 2004 data collection, this component is required of degree-granting institutions only. The primary purpose of this section is to collect data (as of November 1 of the current academic year) on the number of full-time instructional faculty by: -Rank, gender, and length of contract; -Total salary outlay; and -Fringe benefits information.
5	Fall Enrollment	Fall enrollment data are collected for all students enrolled in credit-bearing courses/programs which could potentially lead to awards ranging from postsecondary certificates of less than 1 year to doctoral degrees. Data include demographic information on race/ethnicity and gender. Data collected include: -The number of full and part-time students enrolled in the fall; -Students enrolled in courses creditable toward a degree or other formal award, students enrolled in courses that are part of a vocational or occupational program (including those enrolled in off-campus centers), and high school students taking regular college courses for credit; -Residence and high school graduation status of student (in **even** years for first time, first-year students); -Age (in odd years); and -Cohort numbers to compute retention rates.
6	Finance	This collection is used to describe the financial condition of postsecondary education in the nation, to monitor changes in postsecondary education finance, and to promote research involving institutional financial resources and expenditures. Specific data elements include: -Revenues by source (e.g., tuition and fees, government grants and contracts, private gifts); -Expenses by function (e.g., instruction, research, academic support, institutional support);

Table 2
Institutional Effectiveness Data Categories (IPEDS, 2008)

#	Data Category Title	Contents
		-Physical plant assets and indebtedness; and -Endowment investments.
7	Financial Aid	-Financial aid data are collected for full-time, first-time degree- and certificate seeking undergraduate students. Data are collected regarding federal grants, state and local government grants, institutional grants, and loans. Data collected include: -Number of students receiving each type of financial assistance; and -Average amount received by type.
8	Graduation Rates	Graduation data are collected for award levels ranging from postsecondary certificates of less than 1 year to doctoral degrees. Data include demographic information on race/ethnicity and gender. Data include: -Number of students entering the institution as full-time, first-time degree or certificate-seeking students in a particular year; -Number of students completing their program within a time period equal to one and a half times the normal period of time; and -Number of students who transferred to other institutions and who received athletically related student aid.

Those data most frequently mentioned by the literature as the most relevant higher education performance measures are: Degree completions; graduation rates; retention rates; fall enrollment; cost per student (FTE); and staff per student (FTE) (Astin, 1997; T. Bailey, 2005; Carter, 2002). In a quantitative study, Mezick (2007) presented research employing the IPEDS database of the National Center for Education Statistics (NCES). By coupling the IPEDS database with data on libraries collected by the Association of Research Libraries (ARL) and the Association of College and Research Libraries (ACRL), Mezick was able to produce significant research findings. This study revealed that the strongest relationships found were those between *student retention* and total library expenditures, total library materials costs, and serial costs for institutions

categorized as baccalaureate colleges within the Carnegie Classification System. The most significant relationship between *persistence* and number of library professional staff was discovered to occur at doctoral-granting institutions. Mezick's use of IPEDS data and alternatively sourced data demonstrates the potential for establishing statistical significance between these differently sourced data for analysis and confirms the IPEDS data as being indicative of higher education performance.

Similarly, Volkwein (2006) conducted a quantitative study that examined the variables that are most strongly associated with institutional prestige and reputation and developed an exploratory model to measure these relationships. This research expands earlier efforts by including more recent data on larger populations of public and private universities, as well as on liberal arts colleges. The analysis draws upon data from U.S. News & World Report (USNWR), the Institute for Scientific Information Web of Knowledge, IPEDS, AAUP, and four college guidebooks: Barron's, Peterson's, the Princeton Review, and the Fiske Guide. Finding general support for the model, the robust regression results explain about 90% of the variance in USNWR peer reputation score. This study also confirmed that IPEDS data are statistically relevant and indicative of higher education performance.

Schuh (2002, pp. 8-9) acknowledges the reliability and applicability of IPEDS data for the purpose of comparing the effectiveness of institutions of higher education:

> While the methods that institutions develop and implement to demonstrate their accountability vary widely, all effective programs should include the collection and interpretation of reliable data. When governing boards ask administrators to provide comparative data on room and board rates for similar colleges in the

region, for example, the administrators could make numerous telephone calls to colleagues at peer institutions; develop, distribute, and collect questionnaires; or spend an extensive amount of time searching the World Wide Web. While these approaches may once have been the best methods for gathering comparative data, the Integrated Postsecondary Education Data System (IPEDS) provides a more readily accessible and comprehensive approach to accessing institutional data for benchmarking with appropriate institutional peer groups than other methods of data collection. IPEDS is a comprehensive federal database that includes enormous amounts of information about higher education institutions in the United States. When it's used appropriately, IPEDS can provide administrators with a wealth of data to help conduct research and influence their decisions.

Graduation rate and retention rate research

Seminal graduation rate and retention rate research has been conducted by Astin (1970), Pascarella (1985), and Tinto (1975). In analyzing citation frequencies of these authors' work, it becomes clear that these three are among the most frequently cited authors in higher education literature related to graduation rate research (Budd, 1990).

Utilizing the Cooperative Institutional Research Program's (CIRP) annual survey data, Astin (1987, 1993, 1996a, 1996b), was successful in hypothesizing and fitting multiple linear regression models for graduation rates. The research conducted by Astin and his colleagues commenced in 1995 and continues today. The variables they found that predict graduation rates included high school grades, SAT scores, gender, and race. Subsequently, these same researchers produced more complex prediction formulas using a stepwise regression on 145 CIRP freshman variables (Astin, 2005). Their most

significant findings were that modified use of environmental and student variables enhanced the predictive capabilities of their models. Among the environmental variables were: First year living arrangements; institutional selection; institutional size; and institution type. Among the student variables were: Background; academic scores; sources of financial aid; undergraduate student majors; activities in the past year; self-ratings; reasons for attending college; student opinions; activities; goals and values.

According to Bowen, Chingos, and McPherson (2009, p. 235), "There is no substitute, at the end of the day, for addressing completion rate and time–to-degree issues…semester to semester patterns of persistence across large numbers of institutions are, however, directly relevant to the question of how institutions should think about improving graduation rates." Based on the foregoing, Bowen, Chingos, and McPherson (2009) recognizes the role retention rates play in predicting graduation rates.

Perhaps the most comprehensive multiple regression analysis to determine possible predictor variables for the estimation of graduation rates employing only IPEDS data, was conducted by Bailey (2006) who mined data for over 1000 predictor variables. Table 3 provides an excerpt from Bailey (2006, p. 54) that represents a chronological listing of completed research on graduation rates and graduation rate predictor variables.

Table 3
Research on graduation rates, retention rates and significant predictor variables

Researcher, year	Source of data	Category of predictor variable (Student Level, Institution Level, or External)	Graduation rate and retention rate predictor variables
Astin, 1970		Student level	Input-Environment-Output Model

Table 3
Research on graduation rates, retention rates and significant predictor variables

Researcher, year	Source of data	Category of predictor variable (Student Level, Institution Level, or External)	Graduation rate and retention rate predictor variables
Tinto, 1975		Student level	Student Integration Model: Student characteristics, academic system, and social system
Astin, 1985		Student level	Student involvement model
Pascarella, 1985		Student level	Institutional characteristics, student characteristics, institutional environment, student
Astin, 1987	CIRP	Student level	Retention predicted by average grade in high school and SAT or ACT scores
Astin, 1993	CIRP	Student level	Predicted retention rates: average high school grades, SAT or ACT, gender, and race
Windham, 1994	Student Record System	Student level	Age, GPA, college prep classes, full-time/part-time status, type of HS diploma, employment
Astin, 1996a	CIRP	Student level	Estimated degree completion rate: Average high school grades, SAT or ACT, gender, and race
Walsh, 1996	IPEDS Minter data Barron's Guide U.S. News and World Report	Institution level	Traditional/non-traditional student, academic ability, academic focus of institution, public/private institution, minority student dimension
Adelman, 1999	NCES High School and Beyond	Student level	High school background of student & attendance pattern
Sjoberg, 1999	IPEDS College Entrance Examination Board (CEEB)	Institution level	Institutional classification size and wealth, complexity/diversity, campus location, quality/selectivity, SAT. midpoint tuition and fees/FTE, percentage commuting, library monies/FTE
Walsh, 2000	CEEB U.S. News IPEDS	Institution level	Student academic ability, Non-traditional students, disadvantaged students,

Table 3
Research on graduation rates, retention rates and significant predictor variables

Researcher, year	Source of data	Category of predictor variable (Student Level, Institution Level, or External)	Graduation rate and retention rate predictor variables
			institution, sector, institution mission
Whigham, 2000	NCES Beginning Postsecondary Students Study (BPS)	Student level	Risk factor - student integration
Hayek, 2001	IPEDS College Student Experiences Questionnaire (CSEQ) U. S. News and World Report Barron's Profiles	Institution level	Dependent variable -high performance graduation rate. independent variables: scholarships, student services, institutional support, student-faculty ratio, tuition, room and board, undergraduate enrollment, library holdings
Stephenson, 2001	Student records	Student level	Highest level of mathematics, Years of foreign language, type of HS diploma, location of HS
Council for Education Policy, 2002	Student records	Student Level	HS academic preparation, family income, full-time attendance, high school GPA
Titus, 2003	IPEDS BPS	Student level and Institution level	Living on campus, size, selectivity
Gansemer-Topf, 2004	IPEDS American's Best Colleges Barron's Profiles	Institution level	Expenditures per student, Percentage of expenditures
Hamrick, 2004	IPEDS - U.S. News and World Report	Institution level	Instructional expenditures, library expenditures and institutional classification
Ryan, 2004	IPEDS	Institution level	Instructional expenditures, academic support expenditures
Goenner, 2004	IPEDS U.S. News and World Report	Institution level	Percentage of students in top 10% of HS class, 25th percentile

Table 3
Research on graduation rates, retention rates and significant predictor variables

Researcher, year	Source of data	Category of predictor variable (Student Level, Institution Level, or External)	Graduation rate and retention rate predictor variables
			SAT, Percentage out-of-state students, Average age Student-faculty ratios, Percentage full-time faculty, total E & G expenditures, tuition and fees
Astin, 2005	CIRP	Student level	145 CIRP freshman variables used to calculate predicted graduation rates
Bailey, 2005	IPEDS National Education Longitudinal Study (NELS)	Student level and Institution level	Predicted graduation rate calculated: college location, state historically Black college, federal aid/FTE enrollment size, percentage part-time faculty, Pell Grants
Bailey, 2006	Model to explain IPEDS graduation rates at Minnesota public two-year colleges and four-year universities using data mining.	Student level and institution level	Reoccurring predictor variables: Adjusted GRS cohort, total GRS completers within 150% of normal time, full year undergraduate white enrollment, state of institution, Carnegie classification of institution, and name of regional accrediting agency
Bowen, Chingos, and McPherson, 2009	Model to explain graduation rates and persistence (retention rates) at public flagship universities	Student level and institution level	Reoccurring predictor variables: Test scores and high school grades; overmatching and under-matching students to programs; transfer pattern discontinuity; money matters (financial aid); institutional selectivity; and persistence (retention rates)

As illustrated in Table 3, a notable amount of research on graduation rates has occurred since 1970. Of interest is that none of the quantitative investigations have

sought to determine if accreditation method is a statistically significant predictor variable for graduation rates, retention rates or other accepted measures of institutional performance.

Dissenting opinions

According to Scriven (1984) and Worthen (1997), the most contemporary accreditation systems include the following distinctive features: Published standards; institutional self study; a team of external assessors; a site visit (usually by peer reviewers); a site team report on the institution; a review of the teams findings and recommendations by the accrediting body; and, a final report and accreditation decision by the accrediting body. Not all academic and scholarly treatments of the topic of accreditation in higher education are favorable. In fact, many authors have challenged the appropriateness of Self Assessment and Total Quality Management in the evaluation of higher education.

House (1980, p. 238) indicates that, "Despite the broad utilization of the accreditation process described, many feel it fails to adequately police itself and goes further to suggest that it is an incestuous system. At one time it was sufficient for an institution to be accredited by the proper agency for the public to be assured of its quality – but no longer. Parents are not always convinced that the school program is of high quality when it is accredited by the North Central Association. In addition, political control of accrediting activities is shifting to state governments."

The concept of professionals judging the efforts of other professionals has been an integral part of accreditation in higher education since the 1930s (Worthen, 1997). However, despite its relatively high acceptance within higher education, not all

accreditation practitioners agreed with the practice. Flexner (1960, p. 71) had a unique approach to accreditation, "time and time again it has been shown that an unfettered lay mind, is …best suited to undertake a general survey….The expert has his place, to be sure; but if I were asked to suggest the most promising way to investigate teacher training, the last person I should think of employing would be a professor of education."

As indicated earlier, accreditation systems have evolved and they have developed highly sophisticated and well tested methods for their implementation. However, critics of this approach suggest that it often allows evaluators (peer reviewers) to make judgments that reflect little more than personal opinions or even bias, and even worse, that the presumed expertise of the peer reviewer is frequently its greatest weakness (Worthen, 1997).

Scriven (1984, p. 73) has gone so far as to call accreditation, "an excellent example of what one might, with only slight cynicism, call a pseudo-evaluative process, set up to give the appearance of self-regulation without having to suffer the inconvenience." Perhaps the harshest critic of higher education accreditation is Smith (1984, p. 1) who said, "Educational criticism will be esteemed more for its quality as literature and as a record of personal response than for its correct estimates of educational value."

The appropriateness of Total Quality Management or AQIP in higher education has its scholarly dissenters as well. Feminist scholarship has been transformative not only because it has gendered a new paradigm for inquiry, but because it has resulted in a marginalized group challenging core beliefs about the nature and purpose of the knowledge production process and has dislodged a dominant and deeply rooted

traditional academic culture (Safarik, 2003). Unfortunately, the mainstream literature in higher education has, for all intents and purposes, overlooked feminist scholarship and feminist theory as a source of insight regarding the multifaceted process of transformation (Safarik, 2003). When discussing the ramifications of subculture and countercultures in higher education due to ideological shifts brought on in part by initiatives like Total Quality Management, Safarik (2003) observed:

> The study's theoretical framework was based on a critical, feminist poststructuralist perspective on how organizations change. This critical lens encompasses the larger social and historical context of institutional transformation, allowing for deeper insights about how individual change agents are simultaneously constrained by and resist normative, dominant culture. This critical perspective is guided by the assumption that organizational reality is neither similarly understood nor interpreted by all of the organization's participants. Subcultures and countercultures can create struggles and tensions within organizations that may be functional or dysfunctional. Attending to these cultural tensions in universities generates questions about how culture and ideology affect knowledge production processes, roles, and structures. (pp. 431-432)

Another source of dissent regarding the use of any economic base having primacy over society comes from the Structural Marxist movement (Althusser, 1971). Structural Marxism is a theoretical strain of Marxism associated with Althusser and his disciples. The leading alternative theoretical Marxist strain in France at the time of Althusser was called Humanist Marxism (Althusser, 1971). Humanist Marxism focused on the role of

the individual actor in the road to socialism. Althusser and other Structural Marxists claimed that what was critical were the deep structures of society. Structural Marxists expanded ideology much further than at anytime before by claiming that the structure is all-encompassing and permeated with ideology (Althusser, 1971).

The structuralist vision of Marxism suggested that numerous areas throughout society were assigned causal importance, instead of the economic base having primacy over the superstructure (Althusser, 1971). Some contemporary TQM dissenters reference this as the effect of the attempt of large businesses to force TQM onto higher education (Bensimon, 1995; Lozier & Teeter, 1996; Miranda, 2003; Safarik, 2003).

Koch and Fisher (1998) donned their helmets and pads and aggressively took on Total Quality Management in higher education:

> Those who advocate the use of total quality management (TQM) in higher education issue strong promises that it will unite campuses, increase employee satisfaction and improve nearly any process that it touches. Unfortunately, the empirical evidence in favor of TQM in universities is mostly anecdotal and surprisingly sparse. The evidence that does exist relates primarily to administrative tasks such as bill collection, check writing, financial aid and registration. But, the truly significant problems facing higher education today relate to the nature of the curriculum, uses of faculty time, how to restrain cost increases, distance learning and the use of technology, cooperative relationships with business, and governance and leadership arrangements. TQM has precious little to say about these things and even erects subtle roadblocks to change in these areas because of its strong emphasis upon meetings, consensus and process

> over product. Further, it turns out to be a costly approach to decision-making because it is so time-intensive. Thus, while TQM appears to have been quite helpful to some business firms, it is only marginally useful in the rapidly changing, indeed revolutionary, environment that universities inhabit today (p. 659).

Koch's (1998) research reveals that while TQM has been demonstrated to help improve the business aspects of higher education (i.e. copy centers; business office functions; admissions; financial aid; physical plant maintenance; construction; etc.), there is little evidence that TQM has improved academics at these same institutions. Koch (1998, p. 663) reports, "when some reputable observers including Ford & Sheridan, 1992; Rozenzweig, 1992 (interview with the author, Koch); Trachtenberg, 1992 (interview with the author, Koch) scan the higher education environment today, they conclude that faculties are the problem."

According to Koch (1998, p. 663), the problems posed by faculties in most institutions have rendered TQM in the academic aspects of the institutions ineffectual:

> … Faculties may vote for Karl Marx in the next election, but are profoundly conservative in their approach to their own bailiwick. Faculty comfort is usually a function of long familiar academic departments, highly specialized courses, credit hours, conventional lectures and academic terms such as semesters. Also, they elevate employment security mechanisms such as faculty or public servant tenure (*beamte* status in Germany) to almost mystical status, with the end result that significant change is difficult on most campuses. Campus leadership that questions these sacred cows is subject to attack, strikes and no confidence votes.

> Only the most optimistic individuals can believe that TQM has, or will, affect these fundamental power relationships in any meaningful fashion. Unfortunately, these relationships are at the very heart of the problems facing higher education in the developed countries today, and that is why TQM has proven to be so weak an instrument when real change is the order of the day.

Although the literature supports TQM more frequently than it rejects it, there is nonetheless a reoccurring negative theme that is best described by Miranda (2003, p. 36):

> The diffusion of TQM to the management of the universities themselves, both in the United States and elsewhere, is also part of a process of breaking down notions of public service and of submitting the production of knowledge to the exigencies of the market. This undermines the concepts of academic freedom and universal knowledge traditionally cherished by academics. It is important for universities to resist this and to defend their right to remain independent institutions dedicated to the ethos of public service, critical reflection, and universal knowledge.

The reoccurring theme appears to be that the faculties of the institutions of higher learning, under the guise of protecting *academic freedom*, may be the greatest obstacles to TQM integration within higher education.

Summary

The preponderance of literature supports the desirability of having assessment and accreditation programs, including those that incorporate continuous improvement concepts, as a means of improving effectiveness, improving quality of student learning, and meeting accountability demands of stakeholders. There nonetheless exists a minority

opinion in the literature that represents dissenting opinions regarding the appropriateness of TQM in higher education. What is also clear is that there exists only nominal empirical evidence that supports the use of TQM in higher education.

The Higher Learning Commission's (HLC) Academic Quality Improvement Project (AQIP) exemplifies total quality management principles (HLC, 2003, 2007a, 2007b). Administration and faculty backing of a clear mission is necessary to achieve not only a successful assessment of student learning achievement program, but for identifying opportunities to improve these programs over time. The literature supports the fact that many events, concepts, and initiatives have dramatically influenced contemporary assessment practices in higher education, including: The publication of A Nation at Risk; the emphasis on institutional effectiveness; the specific emphasis on student learning and student achievement; demands from the public and governmental agencies for greater accountability by institutions of higher learning; means and methodology to accomplish institutional accountability; the unique and *potentially* effective method of assessment and institutional accountability by the Higher Learning Commission of the North Central Association called the Academic Quality Improvement Project (AQIP); the apparent consensus that faculty and administration must cooperate and participate in the assessment process, including its design, implementation and ongoing improvement. Collectively, the literature provides substantial evidence for both the need for my research and the conceptual framework or methods for conducting it.

What is not apparent through the literature review is whether or not the AQIP approach to accreditation is more effective than the traditional PEAQ approach as measured by traditionally accepted measures of an institution's success. Through this

research, I sought to ascertain whether or not the performance of higher educational institutions is related to the accreditation method, either AQIP or PEAQ. The literature supports the fact that several measures of institutional effectiveness are used by the United States Department of Education and by most states within the United States (IPEDS, 2008). This research systematically tested whether these measures of institutional success are related to an institution's accreditation status as either an AQIP or PEAQ accredited institution.

Chapter III

Methods

Introduction

This study employs an empirical approach to investigate the relationship between a higher education institution's accreditation method and the institution's performance as measured by graduation rates (GRDRT) and retention rates (RETRT). The accreditation methods are the North Central Association's Program to Evaluate and Advance Quality (PEAQ), and the Academic Quality Improvement Program (AQIP). AQIP is an accreditation program for institutions of higher education that are interested in infusing the principles and benefits of continuous quality improvement into the culture of their institution by providing an alternative accreditation process. This new accreditation process is only available to institutions that are already accredited by the Higher Learning Commission (HLC, 2007b). PEAQ is an accreditation program for institutions of higher education that utilizes a five-step evaluation process to determine continued accredited status with the HLC (HLC, 2007b). The federal government's higher education institution performance measurements employed in this study are graduation rates (GRDRT) and retention rates (RETRT). Graduation rates and retention rates are annual components of the Integrated Postsecondary Education Data System (IPEDS), tracked since 1997, to help institutions satisfy the requirements of the Student Right-to-Know legislation (IPEDS, 2008).

Problem and purpose

The problem this research addresses is that, although AQIP is intended to create opportunities to continually improve the performance of the institutions participating,

there has been no empirical evidence that these institutions perform any better or worse than institutions that are not AQIP accredited. The absence of empirical evidence to support AQIP over PEAQ has left institutions without a key piece of information they need to effectively evaluate one accreditation method over the other.

The purpose of this quantitative research is to ascertain the relative effectiveness of the Academic Quality Improvement Project (AQIP) among the institutions accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA) of Colleges and Universities. This will be accomplished by investigating the graduation rates and retention rates of institutions that are *AQIP accredited* versus those institutions that are *PEAQ accredited* by the HLC.

Research questions

According to Creswell (2003, p. 165), in good quantitative research questions and hypotheses, "the use of variables…is typically limited to three basic approaches: the researcher may *compare* groups on an independent variable to see its impact on a dependent variable. Alternatively, the investigator may *relate* one or more independent variables to a dependent variable. And finally, the researcher may *describe* responses to the independent, mediating, or dependent variables."

As further discussed in the research design section, this study treats graduation rate (GRDRT) and retention rate (RETRT) as separate dependent or outcome variables. The institutions' accreditation method (AQIP or PEAQ) is treated as a dichotomous, independent question predictor. Additional independent variables that are supported by literature serve as control predictors.

The two questions that guided my research were:

1. Based on the institutions of higher learning that are accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA), is there a relationship between institutions' method of accreditation and their performance as measured by the institution's graduation rate, controlling for a set of institutional predictor variables?
2. Based on the institutions of higher learning that are accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA), is there a relationship between institutions' method of accreditation and their performance as measured by their retention rate, controlling for a set of institutional predictor variables?

Research design

This research design includes two separate analyses: one treats graduation rate (GRDRT) as the dependent variable and the second, treats retention rate (RETRT) as the dependent variable. Both analyses use accreditation method (AQIP or PEAQ), a dichotomous independent variable, as the question predictor. Both analyses use a set of independent variables that are supported by the literature to serve as control predictors. For each analysis I fit taxonomy of multivariate regression models composed of the variables presented in Table 4 to data I obtained from the Higher Learning Commission (HLC) and Integrated Postsecondary Education Data System (IPEDS) databases.

The reason for conducting two sets of analyses is the fact that both graduation rates (GRDRT) and retention rates (RETRT) are considered separate and distinct measures of higher education institutional performance (IPEDS, 2008). Also, Table 4 shows how both of these dependent variables are also predictor variables of the other in the literature. The remaining predictor variables I used in the analysis where graduation

rate (GRDRT) is the outcome are also used in the analysis where retention rate (RETRT) is the outcome - all of which are supported by the literature. Although graduation rates (GRDRT) and retention rates (RETRT) measure entirely different performance facts, it is logical and statistically relevant to use one to predict the other as will be seen in the findings presented in Chapter IV.

Table 4
Literature support for dependent and independent variables

Variable	Coding ID	Variable type	Description	Literature support for variables
Y_1'	GRDRT	Dependent	Graduation rate - % of students who graduate within 150% of normal program time	Astin 1970, 1985, 1987, 1993, 1996a, 2005; Tinto, 1975; Pascarella, 1985; Windham, 1994; Walsh, 1996, 2000; Hamrick, 2004; Ryan, 2004; Goenner, 2004; Bailey, 2005; Bailey 2006; Adelman, 1999; Sjoberg, 1999; Whigham, 2000; Hayek, 2001; Stephenson, 2001; Council for Education Policy, 2002; Titus, 2003; Gansemer-Topf, 2004; Bowen, 2009
Y_2'	RETRT	Dependent	Retention rate – % of full time students who continue from Fall Semester to Spring Semester in target year	
X_1	ACCR	Question predictor	Accreditation method (Where 0=PEAQ and 1=AQIP)	None
X_2	STATE	Control predictor	State abbreviation code of institution	Stephenson, 2001; Walsh, 2000; Bailey, 2006
X_4	GRDRT	Used both as dependent variable and predictor variable of RETRT	Graduation rate - % of students who graduate within 150% of normal program time	Astin 1970, 1985, 1987, 1993, 1996a, 2005; Tinto, 1975; Pascarella, 1985; Windham, 1994; Walsh, 1996, 2000; Hamrick, 2004; Ryan, 2004; Goenner, 2004; Bailey, 2005; Bailey 2006; Adelman, 1999; Sjoberg, 1999; Whigham, 2000; Hayek, 2001; Stephenson, 2001; Council for Education Policy, 2002; Titus, 2003; Gansemer-Topf, 2004; Bowen, 2009

Table 4
Literature support for dependent and independent variables

Variable	Coding ID	Variable type	Description	Literature support for variables
X_5	RETRT	Used both as dependent variable and as control predictor for GRDRT	Retention rate – full time, % of students who continue from Fall Semester to Spring Semester in target year	Astin, 1987, 2005, 1993; Bailey, 2006; Bowen, 2009
X_6	YRSAQIP	Control predictor	Years accredited by AQIP	None
X_7	STUDENTS	Control predictor	Number of degree-seeking, full-time students	Windham, 1994; Council for Education Policy, 2002; Astin, 2005; Bailey, 2006; Bowen, 2009
X_8	FACSAL	Control predictor	Faculty salaries and benefits – as a % of total expenses	Ryan, 2004; Bailey, 2006
X_9	TUITION	Control predictor	Tuition and fees paid by students	Windham, 1994; Council for Education Policy, 2002; Astin, 2005; Bailey, 2006
X_{10}	FINAID	Control predictor	Percentage of students receiving financial aid	Bailey, 2005, 2006; Bowen, 2009
X_{11}	DEGREES	Control predictor	2-year or 4-year degree institution	Bailey, 2006
X_{12}	OWNER	Control predictor	Public or private institution	Bailey, 2006
X_{13}	PROFIT	Control predictor	For non-profit or profit institution	Bailey, 2006

Population

The population for this study is all postsecondary institutions responding to the IPEDS Graduation Rate Survey (GRDRT) in 2007 and that are accredited by the North Central Association of Schools and Colleges. As of June 2009, there were 1013 higher education institutions that met these criteria. Of the 1013 institutions, 922 of these institutions reported all of their IPEDS data of interest for 2007. I contacted another 51

institutions and asked them to provide me with their missing IPEDS data. This meant that I would have complete 2007 IPEDS data for 973 of the 1013. These 973 institutions make up the sample I analyzed in this study.

The IPEDS universe of institutions can be divided into sectors based on ownership. *OWNER* is the variable name for the classification of how an institution is operated, as a public or private entity. The levels of control are non-profit, and for-profit. The variable name for level of control is *PROFIT*. The *DEGREES* variable indicates if an institution's programs are four-year or higher, two-year, or less than two-year.

Dependent variables and data acquisition method

For the purposes of this study, the dependent variables are graduation rate and retention rate. The graduation rate and retention rate are annual components of Integrated Postsecondary Education Data System (IPEDS). The dependant variables graduation rate (GRDRT) and retention rate (RETRT) data are available to the general public via the United States Department of Education (DOE), National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS). The IPEDS database is available on-line at http://nces.ed.gov/ipedspas/.

Independent variables and data acquisition method.

For the purposes of this study, the independent dichotomous variable that serves as the question predictor is the accreditation method (ACCR). This variable includes the North Central Association's Program to Evaluate and Advance Quality (PEAQ), and the Academic Quality Improvement Program (AQIP) where ACCR = 1 (AQIP) and ACCR = 0 (PEAQ). These data are also available to the general public via the North Central Association (NCA), Higher Learning Commission (HLC) list of affiliated institutions of

higher education. Specifically, the HLC has a public accessible database on-line at the following address: http://www.ncahlc.org/index.php?option=com_frontpage&Itemid=113.

The remaining independent predictor variables that I used to build and fit the multivariate regression models are those that are supported by research and available from the IPEDS database. As such, both the independent and dependent variables are available for download from their respective databases into Microsoft Excel spreadsheets. I cleaned up the data, eliminating unnecessary information, and imported the data set into SPSS 17 for analysis, taking care to match the institutions across the two databases. Appendix C presents the steps I took to acquire the data and construct the analytic dataset.

Data analysis

I have conducted two sets of data analyses to answer my research questions, one where graduation rate (GRDRT) is the dependent variable, and the other where retention rate is the dependent variable. I selected both of these dependent variables because they represent the two most frequently mentioned measures of institutional performance in the literature (Astin 1970, 1985, 1987, 1993, 1996a, 2005; Tinto, 1975; Pascarella, 1985; Windham, 1994; Walsh, 1996, 2000; Hamrick, 2004; Ryan, 2004; Goenner, 2004; Bailey, 2005; Bailey 2006; Adelman, 1999; Sjoberg, 1999; Whigham, 2000; Hayek, 2001; Stephenson, 2001; Council for Education Policy, 2002; Titus, 2003; Gansemer-Topf, 2004). In each of these separate data analyses, I calculated descriptive statistics for all the variables of interest. I conducted correlation analysis and partial correlation analysis to uncover potential problems with colinearity of the predictors. I examined

scatterplots of each predictor against the outcome variables and transformed variables as needed to linearize their relationship with the outcome variables. I fit a hierarchy of nested multiple regression models to the data, treating graduation rates as the continuous, dependent variable for one set of analyses and retention rates for the other. I tested interactions and I examined the residuals for the final models to ensure that I did not violate the assumptions that underlie regression.

Hypothesis testing utilizing multiple linear regressions

My purpose for utilizing multiple linear regressions for hypothesis testing was to allow me to make rational decisions about the effect of adding additional information to improve the accuracy of the predictive model. The basic idea is to sequentially compare the accuracy of prediction of a more complex regression model with subsets of the model. Because each of the increasingly complex models contains the variables from the previous models, they will *always* provide a prediction of the dependent variable that is equal to or better than previous models. The critical question is whether the gain in predictive accuracy with the addition of subsequent predictors is large enough to attribute the gain to something other than chance or random effects.

Control variables

According to Nelson (1998, p. 2), "the process of introducing one or more *control variables* into such analysis is sometimes called *elaboration* because it allows us to 'elaborate,' or expand upon, the relationship between two variables by investigating how that relationship is influenced by other variables." The fact that two variables in a table are related does not necessarily mean that one is a cause of the other, even if the

relationship is statistically significant and we are willing to reject the possibility that the relationship is due to chance (Nelson, 1998).

The variables in Table 4 that I defined as control variables were included in the model in order to isolate the relationships between the dependent variable graduation rates (*GRDRT*) and the dichotomous question predictor variable, accreditation method (*ACCR*). This was also the case for the relationship between the dependent variable retention rate (*RETRT*) and the dichotomous question predictor variable accreditation method (*ACCR*).

Chapter IV

Findings

Introduction

The purpose of this research is to ascertain whether there is a relationship between accreditation method and institutional performance as measured by the institutions' graduation rates and retention rates. More specifically, this research provides empirical evidence of the relative performance of institutions that are Academic Quality Improvement Project (AQIP) accredited with those institutions that are Program to Evaluate and Advance Quality (PEAQ) accredited by the Higher Learning Commission (HLC) of the North Central Association (NCA) of Colleges and Universities. I accomplished this by investigating the relative effectiveness (graduation rates and retention rates) of institutions that are AQIP accredited versus those institutions that are PEAQ accredited by the HLC.

Descriptive statistics

The higher education institutions that were candidates for this study are the 1013 institutions that, as of June 2009, were accredited by the North Central Association of Schools and Colleges - The Higher Learning Commission. Of the 1013 institutions, 922 reported all of their IPEDS data of interest for 2007. I contacted an additional 51 to obtain their missing IPEDS data of interest for 2007 to construct a dataset for a sample of 973 institutions. The variables I included are those supported by research as being statistically relevant predictor variables for graduation rate and retention rate.

Comparisons of AQIP vs. PEAQ accredited institutions.

The descriptive statistics for this sample are presented in Table 5. Table 5 contains side-by-side descriptive statistics for all of the 973 institutions, AQIP only institutions, and PEAQ only institutions.

All institutions

With regards to all institutions, the average graduation rate for institutions in this sample is 43.91%, and the minimum and maximum are 2% and 100% respectively. The median is 44%; and the standard deviation is 21.56. The average retention rate for institutions in this sample is 67.76% - considerably higher than the graduation rate. The minimum and maximum are 5% and 100% respectively. The median retention rate is 69%; the standard deviation is 15.67%. Noteworthy is the fact that institutional performance is better on average for retention rate than for graduation rate by 23.85 percentage points.

Graduation rate (GRDRT)

There are 213 institutions that are AQIP accredited and 760 institutions that are PEAQ accredited. Because there are only 213 institutions that are AQIP accredited in the sample of 973 institutions, the descriptive statistics are highly influenced by the remaining 760 institutions that are PEAQ accredited (78% of the institutions in the sample). For example, the AQIP institutions' mean graduation rate is 48.91 while the mean graduation rate for PEAQ institutions is 42.51. The AQIP institutions' mean retention rate is 75.50, while the mean retention rate for PEAQ institutions is 65.92. Even though the means for both graduation rate and retention rates are higher for AQIP institutions than for PEAQ schools, the overall means for this sample for graduation rate

and retention rate are 43.91 and 67.76 respectively, which are much closer to the PEAQ institution means for graduation rate and retention rate.

Noteworthy is the total sample's range of 10 years for the number of years an institution has been under AQIP (YRSAQIP), indicating that the maximum number of years that any institution has been accredited under AQIP is 10. Institutions with 0 are those institutions that are accredited under PEAQ and do not have any years under AQIP.

Table 5

Descriptive statistics for all institutions, AQIP institutions, and PEAQ institutions

		Graduation rate (GRDRT) (%)			Retention rate (RETRT) (%)		
		ALL	AQIP	PEAQ	ALL	AQIP	PEAQ
N	Valid	973.00	213.00	760.00	973.00	213.00	760.00
	Missing	0.00	0.00	0.00	0.00	0.00	0.00
	Mean	43.91	48.91	42.51	67.76	75.50	65.59
	Std Err	0.69	1.34	0.79	0.50	0.82	0.58
	Median	44.00	47.00	43.00	69.00	76.00	66.00
	Std Dev	21.56	19.51	21.91	15.67	12.03	95.00
	Range	98.00	84.00	98.00	95.00	64.00	95.00
	Minimum	2.00	16.00	2.00	5.00	36.00	5.00
	Maximum	100.00	100.00	100.00	100.00	100.00	100.00

Table 5 (Continued)

Descriptive statistics for all institutions, AQIP institutions, and PEAQ institutions (continued)

		Years accredited under AQIP YRSAQIP (years)			Number of students attending STUDENTS (#)			Faculty Salary as a percent of Budget FACSAL (%)		
		ALL	AQIP	PEAQ	ALL	AQIP	PEAQ	ALL	AQIP	PEAQ
N	Valid	973.00	213.00	760.00	973	213	760	973.00	213.00	760.00
	Missing	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0.00
	Mean	1.41	6.43	0.00	7407	8411	7125	75.94	73.15	76.72
	Std Err	0.09	0.16	0.00	301	582	349	0.34	0.85	0.36
	Median	0.00	7.00	0.00	3500	5218	3218	77.00	74.00	78.00
	Std Dev	2.88	2.33	0.00	9409	8497	62600	10.53	12.41	68.00
	Range	10.00	9.00	0.00	62600	43944	62600	86.00	86.00	68.00
	Minimum	0.00	1.00	0.00	22	108	22	14.00	14.00	32.00
	Maximum	10.00	10.00	0.00	62622	44052	62622	100.00	100.00	100.00

Table 5 (continued)

Descriptive statistics for all institutions, AQIP institutions only, and PEAQ institutions only

		Tuition and fees paid TUITION ($)			% of students receiving financial aid FINAID (%)		
		ALL	AQIP	PEAQ	ALL	AQIP	PEAQ
N	Valid	973	213	760	973.00	213.00	760.00
	Missing	0	0	0	0.00	0.00	0.00
	Mean	9441	5994	10407	81.07	75.81	82.00
	Std Err	261	416	304	0.60	1.26	0.67
	Median	5572	3386	7098	85.00	80.00	87.00
	Std Dev	8151	6080	35620	18.61	18.32	18.44
	Range	35620	28320	35620	100.00	85.00	100.00
	Minimum	430	720	430	0.00	15.00	0
	Maximum	36050	29040	36050	100.00	100.00	100.00

Number of students (STUDENTS)

In this sample, the average number of students per institution is 7,407 students; however, the range is 62,600, from a minimum of 22 students to a maximum of 62,622 students, with a median number of students at 3,500. At 8,411, the AQIP institutions' average number of students is higher than the mean for the entire sample. The range for the AQIP institutions is 43,944, from a minimum of 108 students to a maximum of 44,052 students, with a median number of students at 5,218.

Faculty salaries (FACSAL)

The values for faculty salaries and benefits as a percentage of total budgets have a mean of 75.94%, which is very close to the median of 77.00%. The range is 88 percentage points with a minimum of 14.00% and a maximum of 100.00%. In AQIP institutions, faculty salaries and benefits as a percentage of total budgets have a mean of 73.15%, which is very close to the median of 74.00%. The range is 86 percentage points with a minimum of 14.00% and a maximum of 100.00%. Faculty salaries vary little between AQIP and PEAQ institutions, a phenomenon perhaps unique to this sample, and not consistent with the findings of Ryan (2004) and Bailey (2006), who both saw small, but nonetheless statistically significant, relationships between faculty salary and graduation rates. In this study, I did not find faculty salaries as a percentage of total budgets to be a statistically significant predictor in the models I fit.

Tuition and fees (TUITION).

Tuition and fees paid annually by students average $9,441.42; however, the range of tuition and fees is $35,620.00, from a minimum of $430.00 to a maximum of $36,050.00. Tuition and fees paid annually by students in AQIP institutions average

$5,995.00; however, the range of tuition and fees is $28,320.00, from a minimum of $720.00 to a maximum of $29,040.00. While tuition and fees paid by students at AQIP institutions are lower on average than for students at PEAQ institutions, the range for both types of institution is similar. Consistent with the findings of Windham (1994), The Council for Education Policy (2002), Astin (2005), and Bailey (2006), based on the multiple linear regression models I fit to the data, the amount of tuition and fees paid by students are related to both graduation rates and retention rates.

Students receiving financial aid (FINAID)

For all institutions, the percentage of students receiving financial aid averages 81.07%, with a median of 85.00%. The range is 100 percentage points with a minimum of 0% and a maximum of 100%. The percentage of students receiving financial aid in AQIP institutions averages 75.8%, with a median of 80.00%. The range is 85 percentage points with a minimum of 15% and a maximum of 100%. The percentage of students receiving financial aid in PEAQ institutions averages 82%, with a median of 87.50%. The range is 100 percentage points with a minimum of 0% and a maximum of 100%. Consistent with the findings of Bailey (2005) and Bailey (2006), based on the multiple linear regression models I fit to the data, the percentage of students receiving financial aid is related to graduation and retention rates.

Descriptive statistics for categorical variables

The descriptive statistics for the categorical variables I included in this study are presented in Table 6. They include: the accreditation method (ACCR); the state where the institution is located (STATE); the degrees offered (DEGREES); the ownership of the institution (OWNER); and whether the institution is non-profit or for-profit (PROFIT).

Table 6
Descriptive statistics for the categorical question predictor and controls

		Frequency	Percent	Valid Percent	Cumulative Percent
ACCR	PEAQ = 0	760	78.11	78.11	78.11
	AQIP = 1	213	21.89	21.89	100.00
	Total	973	100	100	
DEGREE	2yr degrees = 0	384	39.47	39.47	39.47
	4yr degrees = 1	589	60.53	60.53	100.00
	Total	973	100	100	
OWNER	Private = 0	416	42.8	42.8	42.8
	Public = 1	557	57.2	57.2	100.0
	Total	973	100.0	100.0	
PROFIT	for profit = 0	45	4.6	4.6	4.6
	non profit = 1	928	95.4	95.4	100.0
	Total	973	100.0	100.0	

AQIP vs. PEAQ Institutions.

Table 6 reveals that this sample includes a total of 973 institutions. Of these, 760 or 78.11% of them are PEAQ accredited institutions and 213 or 21.89% are AQIP accredited institutions.

Degrees offered by institutions (DEGREES).

Notice in Table 6 that of the 973 institutions studied, 384 of them offer two-year degrees and 589 offer four-year (plus) degrees. Consistent with Bailey (2006), I found that degree programs offered by institutions (two-year vs. four-year) is a strong predictor of graduation rates (*GRDRT*), and to a lesser degree of retention rates (*RETRT*).

Ownership of the institution (OWNER).

We can see in Table 6 that of the 973 institutions studied, 416 of them are private institutions, and 557 are public institutions. Consistent with Bailey (2006), I found that the ownership of institutions (private or public) is a strong variable of graduation rates (*GRDRT*), and to a lesser degree of retention rates (*RETRT*).

Profit motive of institution (PROFIT).

Of the 973 institutions studied, only 45 of them are for profit institutions, and 928 are non-profit institutions (see Table 6). Furthermore, unlike Bailey (2006), I found that the profit motive of institutions (non-profit vs. for-profit) is a weak predictor of graduation rates (*GRDRT*); however, it is a strong predictor of retention rates (*RETRT*).

States included in study.

There are 19 states that are accredited by the North Central Association of Colleges and Schools and all are included in this research. The states are coded with numbers 1 through 19 as follows: 1=Arkansas, 2=Arizona, 3=Colorado, 4=Iowa, 5=Illinois, 6=Indiana, 7=Kansas, 8=Michigan, 9=Minnesota, 10=Missouri, 11=North Dakota, 12=Nebraska, 13=Ohio, 14=Oklahoma, 15=New Mexico, 16=South Dakota, 17=Wisconsin, 18=West Virginia and 19=Wyoming. A map illustrating the states accredited by each of the six regional accrediting agencies is contained in Appendix E.

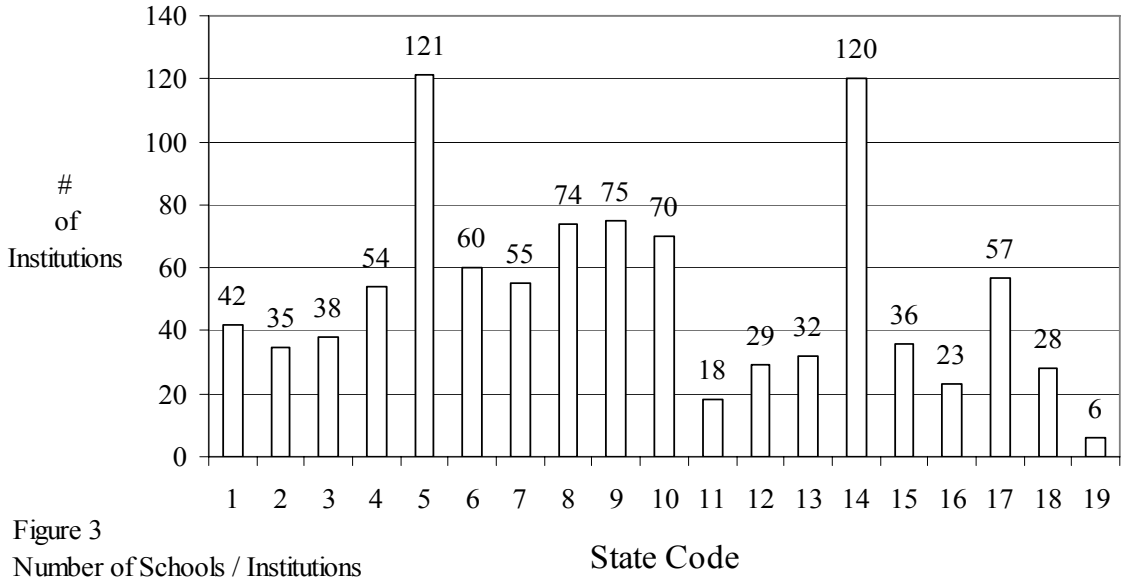


Figure 3
Number of Schools / Institutions

As can be seen in Figure 3, Illinois and Ohio account for 241 or 24.7% of all of the institutions in the study. Wyoming has the fewest number of institutions at 6, and Illinois has the largest number of institutions at 121.

Growth of AQIP institutions.

As I indicated earlier in this paper, the growth rate of AQIP accredited schools has been notable (see Figure 2), reaching 330 as of June 2009. I predict that this growth rate, assuming it continues, will have an impact on these statistics over time. The data I analyzed came from those institutions that reported their IPEDS data as of 2007, which is the most recent data available for this analysis. Although additional institutions have become AQIP accredited since 2007, they are not included in this study.

Examination of bivariate relationships

Scatterplot examinations.

I examined scatterplots to assess the relationships between all continuous variables, looking for relationships that were possibly non-linear. My visual examination revealed possibly positive linear relationships between graduation rate (GRDRT) and the following independent variables: retention rate (RETRT) and faculty salaries (FACSAL). However, the relationship between graduation rate and TUITION appeared to be non-linear, due to the high degree of clustering in the low TUITION range. As evidenced in Appendix A, *GRDRT* vs. *TUITION*, the predictor variable tuition required transformation to its Log10 equivalent because of the nature of the distribution of data. The log10 transformation linearizes the relationship between the *GRDRT* and log10*TUITION* variables, permitting me to include it in a linear regression model. The graduation rate

(GRDRT) appears to have a slight negative linear relationship with the number of students (STUDENTS).

My visual examination revealed possibly positive linear relationships between the dependent variable retention rate (RETRT) and the following independent variables: graduation rate (GRDRT); number of students (STUDENTS); the percent of students receiving financial aid (FINAID) and, tuition and fees (TUITION). The retention rate (RETRT) appears to have a slight negative linear relationship with faculty salaries (FACSAL).

Correlation Analysis

Table 7 presents the estimated correlation coefficients for all dependent and independent variables used in this study.

Table 7

Estimated correlation matrix for all dependent and independent variables used in this study

	GRDRT	RETRT	ACCR	STUDENTS	FACSAL	TUITION	LOG10 TUITION	FINAID	DEGREES	OWNER	PROFIT
GRDRT	1										
RETRT	.684**	1									
ACCR	.123**	.262**	1								
STUDENTS	-.066*	.111**	0.057	1							
FACSAL	0.022	0.003	-.140**	-0.003	1						
TUITION	.574**	.425**	-.224**	-.233**	.219**	1					
LOG10 TUITION	.584**	.416**	-.226**	-.213**	.185**	.935**	1				
FINAID	.312**	.180**	-.150**	-.351**	0.001	.392**	.430**	1			
DEGREES	.455**	.313**	-.284**	-0.051	0.045	.640**	.757**	.388**	1		
OWNER	-.424**	-.227**	.231**	.369**	-.292**	-.825**	-.837**	-.399**	-.587**	1	
PROFIT	.083**	.196**	.069*	.063*	-0.059	-.072*	-.130**	.141**	-.088**	.255**	1

*p<.05, **p<.01, ***p<.000

These estimated correlation coefficients indicate that there may be collinearity between two pairs of variables: accreditation method (ACCR) and years under AQIP (YRSAQIP), with an estimated Pearson correlation (r) value of 0.926 ($p < .01$); and, between ownership (OWNER) and tuition and fees (TUITION) with an estimated Pearson correlation (r) value of -0.825 ($p < .01$).

The next highest absolute value of an estimated Pearson correlation (r) value between predictor variables was 0.640 ($p < .01$), between degrees offered (DEGREES) and tuition and fees (TUITION).

The strongest estimated correlations between graduation rate (GRDRT) and the predictor variables were with the following variables: retention rate (RETRT) at r= 0.684 ($p < .01$); tuition and fees (TUITION) at r=0.574 ($p < .01$); degrees offered (DEGREES) at r=0.455 ($p < .01$); owner (OWNER) at r=-0.424 ($p < .01$); financial aid (FINAID) at r=0.312 ($p < .01$); and accreditation method (ACCR) at r=0.123 ($p < .01$).

The strongest estimated correlations between retention rate (RETRT) and the predictor variables were with the following variables: graduation rate (GRDRT) at r=0.684 ($p < .01$); tuition and fees (TUITION) at r=0.425 ($p < .01$); degrees (DEGREES) at r=0.313 ($p < .01$); accreditation method (ACCR) at r=.262 ($p < .01$); owner (OWNER) at r=-0.227 ($p < .01$); non-profit vs. for-profit (PROFIT) at r=0.196 ($p < .01$); and, students receiving financial aid (FINAID) at r=0.180 ($p < .01$).

Partial correlation analysis

Finally, I conducted partial correlation analyses of all variables to determine the relationship between the simple correlation (r) and the partial correlation ($r_{partial}$) for each of the dependent variables graduation rate (GRDRT) and retention rate (RETRT) and the

question predictor accreditation method (ACCR). The results of this analysis are contained in Appendix D. When the dependent variable is GRDRT, and I controlled for the predictor variables RETRT, YRSAQIP, STUDENTS, FACSAL, TUITION, FINAID and DEGREES, the question predictor variable ACCR has a simple estimated correlation of r=0.123 ($p < .000$) and a partial estimated correlation of $r_{partial}$=0.051. According to Warner (2008, pp. 396-399), when $r > r_{partial}$, then the *Causal Inference* to be made is that the question predictor ACCR provides *Partial Explanation* of the dependent variable GRDRT.

Similarly, when the dependent variable is RETRT, and I controlled for the predictor variables GRDRT, YRSAQIP, STUDENTS, FACSAL, TUITION, FINAID, DEGREES, and OWNER the question predictor variable ACCR has a simple estimated correlation of r=0.262 ($p < .000$) and a partial estimated correlation of $r_{partial}$=0.033 ($p < .000$). According to Warner (2008) when $r > r_{partial}$, then the *Causal Inference* to be made about the relationship is that the question predictor (ACCR) provides *Partial Explanation* of the dependent variable RETRT.

Multiple linear regression analysis - predicting graduation rates (GRDRT)

Table 8 presents a nested taxonomy of fitted multiple regression models in which graduation rate (*GRDRT*) is predicted by accreditation method (*ACCR*), and by each of the literature supported independent predictor variables.

Table 8
Nested taxonomy of fitted multiple regression models in which graduation rate (GRDRT) is predicted by accreditation method (ACCR), and a set of control variables (n = 973)

Predictors	MODELS				
MODEL>>	M1	M2	M3	M4	M5
	β	β	β	β	β
Intercept	42.509***	43.699***	37.291***	-82.850***	-87.110***
Question Predictor					
ACCR	6.402***	6.616***	6.915***	13.628***	13.994***
Control Predictors					
STUDENTS		0.000*	0.000*	0.000*	0.000***
FACSAL			0.084	-0.151*	-0.113*
LG10TUITION				34.962***	32.709***
FINAID					0.133***
DEGREES					
OWNER					
PROFIT					
RETRT					
R^2	0.015	0.02	0.022	0.417	0.427
df	971	970	969	968	967

*p<.05, **p<.01, ***p<.000

Table 8 (Continued)
Nested taxonomy of fitted multiple regression models in which graduation rate (GRDRT) is predicted by accreditation method (ACCR), and a set of control variables (n = 973)

Predictors	MODELS				
MODEL>>	M6	M7	M8	M9	M10
	β	β	β	β	β
Intercept	-81.009***	-107.747***	-107.626***	-73.885***	-82.905***
Question Predictor					
ACCR	14.347***	14.123***	13.913***	4.609***	4.540***
Control Predictors					
STUDENTS	0.000**	0.000*	0.000*	0	
FACSAL	-0.101	-0.062	-0.078	-0.062	
LG10TUITION	30.641***	36.191***	34.590***	17.743***	19.021***
FINAID	0.127***	0.126***	0.086*	0.066*	0.091**
DEGREES	2.371	2.174	2.47	2.123	
OWNER		5.869**	2.926	0.017	
PROFIT			12.544***	2.116	
RETRT				0.680***	0.682***
R^2	0.428	0.432	0.445	0.59	0.587
df	966	965	964	963	963

*p<.05, **p<.01, ***p<.000

Interactions

I tested interactions between the question predictor accreditation method (ACCR) and each of the control variables; however, none of these interactions were statistically significant and I did not include them in the final model.

Model with graduation rate as the outcome

I selected Model 10 as my final model because it includes my question predictor (accreditation) and a set of statistically significant control predictors that are supported by the literature. Model 10 has an R^2 statistic of 0.587, which means that, taken together, the variables in this model explain 58.7% of the variation in graduation rate (*GRDRT*).

Accreditation method (ACCR) has estimated betas that range from a low of 4.540 ($p < .000$) in my selected Model 10, to a high of 14.347($p < .000$) in Model 6. The estimated betas for accreditation method (ACCR) are statistically significant at the $p < .001$ level in every model.

The control predictors in model 10 are well supported by the literature: *LOG10TUITION* (Windham, 1994; Council for Education Policy, 2002; Astin, 2005; Bailey, 2006); *FINAID* (Bailey, 2005 and Bailey, 2006); and *RETRT* (Astin, 1970, 1985, 1987, 1993, 1996a, and 2005; Tinto, 1975; Pascarella, 1985; Windham, 1994; Walsh, 1996; Hamrick, 2004; Ryan, 2004; Goenner, 2004; Bailey, 2005; Bailey, 2006; Adelman, 1999; Sjoberg, 1999; Hayek, 2001; Stephenson, 2001; Council for Education Policy, 2002; Titus, 2003, and Gansemer-Topf, 2004). *STUDENTS*, *DEGREES*, *FACSAL*, *OWNER* and *PROFIT* were excluded from the final model because they were not statistically significant. Furthermore, there is no theory to support their inclusion as

important controls even though they were not found to be statistically significant predictors of graduation rate.

The equation for Model 10 where graduation rate (GRDRT) is the outcome:

$$\hat{\boldsymbol{GRDRT}} = \hat{\beta}_o + \hat{\beta}_1 (ACCR) + \hat{\beta}_2 (\log 10 TUITION) + \hat{\beta}_3 (FINAID) + \hat{\beta}_4 (RETRT)$$

$$\hat{\boldsymbol{GRDRT}} = -82.905 + 4.540\,(ACCR) + 19.021\,(\log 10 TUITION) + 0.091\,(FINAID) + 0.682\,(RETRT)$$

Residuals

I examined the residuals and the plot of the residuals to help me determine if the assumptions underlying my selected linear model for GRDRT were violated. Appendix B, Figure 1 contains the standardized residuals distribution plot, where *GRDRT* is the dependent variable and the independent variables include *ACCR*, *LG10TUITION*, *FINAID*, and *RETRT* (model 10). As illustrated in Appendix B, Figure 1, the distribution of the standardized residuals is a normal one with over 95% of the residuals falling within plus or minus two standard deviations.

Interpreting GRDRT Model 10

When all other variables are held constant, on average, the estimated graduation rate at AQIP accredited institutions is 4.540 percentage points higher than for PEAQ accredited institutions.

When all other variables are held constant, a 0.091 change in graduation rate is related to a one-percentage point change in the number of students receiving financial aid. This positive relationship suggests that institutions might consider working proactively to increase the number of students who have access to financial aid. By doing so, the institution may see a slight rise in graduation rates on average. According

to Bowen (2009, p. 230), money matters, "…and there is clear evidence that such aid boosts both the numbers who attend such institutions and their graduation rates."

On average, for every percentage point change in the number of students that continue from the fall semester to the spring semester, this model predicts a 0.682 percentage points change in graduation rate. This positive relationship tells us that institutions should be working to increase their retention rate because of the positive effect retention rates have on graduation rates.

Figure 4 presents the plot for Model 10 where financial aid is set at its minimum and maximum values, accreditation is set at 1 and 0, and the control predictors (LOG10TUITION, and RETRT) are set at their means. We can see in Figure 4 that at all levels of financial aid, controlling for tuition and retention rates, graduation rates at AQIP accredited institutions will be 4.54 percentage points higher on average than at PEAQ accredited institutions.

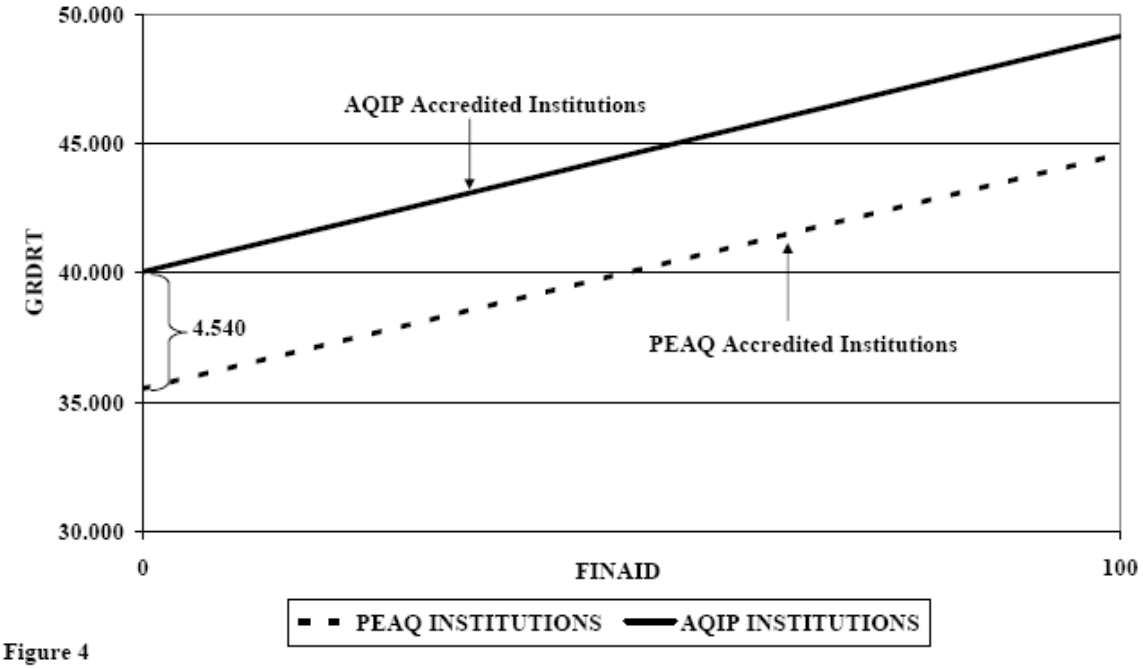


Figure 4
Plot for Model 10 where financial aid is set at its minimum and maximum values, accreditation is set at 1 and 0, and the control predictors (LOG10TUITION, and RETRT) are set at their means.

Figure 5 presents the plot for Model 10 where retention rate is set at its minimum and maximum values, accreditation is set at 1 and 0, and the control predictors (LOG10TUITION, and FINAID) are set at their means. We can see in Figure 5 that at all levels of retention rate, controlling for tuition and financial aid, graduation rates at AQIP accredited institutions will be 4.54 percentage points higher on average than at PEAQ accredited institutions.

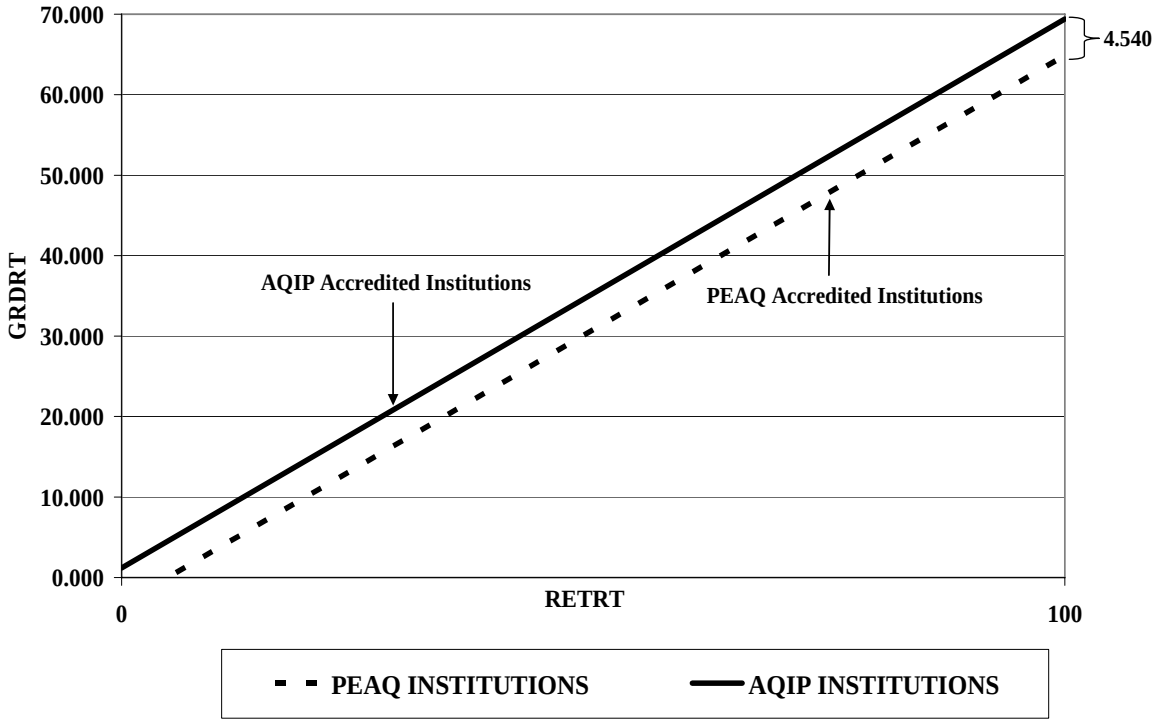


Figure 5
Plot for Model 10 where accreditation and retention rate are allowed to vary and log10tuition and financial aid are held at their means

In sum, based on the estimated coefficients in the equation for Model 10, we can say that, on average, graduation rates at AQIP accredited institutions are 4.54 percentage points higher than for institutions that are PEAQ accredited, controlling for tuition and fees, financial aid, and retention rates.

Multiple linear regression analysis - predicting retention rates (RETRT)

Table 9 presents a nested taxonomy of fitted multiple regression models in which retention rate (*RETRT*) is predicted by accreditation method (*ACCR*), and by each of the literature supported independent predictor variables.

As discussed by Warner (2008), "When more than two predictor variables are included in a regression, the basic logic remains similar to the logic in regression with only two predictors: The slope and proportion of variance associated with each predictor variable is assessed controlling for other predictor variables (p. 591)."

Table 9

Nested taxonomy of fitted multiple regression models in which retention rate (*RETRT*) is predicted by accreditation method (ACCR), a set of control variables, and two interaction terms (n = 973)

Predictors	MODELS					
MODEL>>	M1	M2	M3	M4	M5	M6
	β	β	β	β	β	β
Intercept	65.587***	64.437***	59.810***	59.432***	50.654***	50.039***
Question Predictor						
ACCR	9.911***	9.703***	9.919***	13.933***	14.250***	14.758***
Control Predictors						
STUDENTS		0.000**	0.000**	.000***	.000***	.000***
FACSAL			0.06	-0.104**	-0.090*	-0.076
TUITION				0.001***	0.001***	0.001***
FINAID					0.098***	0.083**
DEGREES						2.925*
OWNER						
PROFIT						
GRDRT						
InterACCR*PROFIT						
InterACCR*GRDRT						
R^2	0.068	0.078	0.079	0.365	0.375	0.38
df	971	970	969	968	967	966

*p<.05, **p<.01, ***p<.000

Table 9 (Continued)

Nested taxonomy of fitted multiple regression models in which retention rate (*RETRT*) is predicted by accreditation method (ACCR), a set of control variables, and two interaction terms (n = 973)

Predictors MODEL>>	M7 β	M8 β	M9 β	M10 β	M11 β	M12 β
Intercept	37.244***	32.951***	29.798***	28.437***	27.984***	28.818***
Question Predictor						
ACCR	14.643***	14.404***	8.797***	27.775***	33.121***	32.064***
Control Predictors						
STUDENTS	.000***	.000***	.000***	.000***	.000***	000***
FACSAL	-0.018	-0.032	0.002	.001***	.000	
TUITION	0.001***	0.001***	0.001***	.001***	.001***	.001***
FINAID	0.087***	0.049	0.006	0.000	.002	
DEGREES	4.241***	4.488***	1.367	1.523	1.710	
OWNER	8.596***	5.079**	0.934**	4.308**	4.267**	3.820***
PROFIT		12.113***	8.931***	10.742***	10.534***	10.500***
GRDRT			0.376***	.369***	.390***	.396***
InterACCR*PROFIT				-19.325***	-20.107***	-19.779***
InterACCR*GRDRT					-.097*	-.089*
R^2	0.399	0.42	0.567	0.573	0.575	0.573
df	965	964	963	962	961	960

*p<.05, **p<.01, ***p<.000

Interactions

I tested the interactions between the question predictor, accreditation method (ACCR), and each of the control variables; however, only two of the interactions were statistically significant, InterACCR*PROFIT and InterACCR*GRDRT. I included them in Model 12, the final model.

Model with retention rate as the outcome

I selected Model 12 as my final model because it includes my question predictor (accreditation) and a set of statistically significant control predictors that are supported by the literature, as well as two interaction terms.

Model 12 has an R^2 statistic of 0.573, which means that, taken together, the variables in this model explain 57.3% of the variation in retention rate (*RETRT*).

Accreditation method (ACCR) has estimated betas that range from a low of 8.797 ($p < .001$) in Model 9, to a high of 33.121 ($p < .001$) in Model 11. The estimated betas for accreditation method (ACCR) are statistically significant at the $p < .001$ level in every model.

The control predictors in Model 12 are well supported by the literature: *STUDENTS* (Windham, 1994; Council for Education Policy, 2002; Astin, 2005 and Bailey, 2006); *TUITION* (Windham, 1994; Council for Education Policy, 2002; Astin, 2005 and Bailey, 2006); *OWNER* (Bailey, 2006); *PROFIT* (Bailey, 2006); and *GRDRT* (Astin, 1970, 1985, 1987, 1993, 1996a; Tinto, 1975; Pascarella, 1985; Windham, 1994; Walsh, 1996; Hamrick, 2004; Ryan, 2004; Goenner, 2004; Bailey, 2005; Bailey, 2006; Adelman, 1999; Sjoberg, 1999; Hayek, 2001; Stephenson, 2001; Council for Education Policy, 2002; Titus, 2003; and Gansemer-Topf, 2004). *FACSAL*, *FINAID* and *DEGREES* were excluded from the final model because they were not statistically significant. Furthermore, there is no theory to support their inclusion as important controls even though they were not found to be statistically significant predictors of retention rate.

The equation for Model 12 where retention rate RETRT is the outcome includes the question predictor (ACCR), four predictor variables (TUITION, OWNER, PROFIT and GRDRT), and two interaction terms (InterACCR*PROFIT and InterACCR*GRDRT):

$$\hat{\boldsymbol{RETRT}} = \hat{\beta}_o + \hat{\beta}_1 (ACCR) + \hat{\beta}_2 (TUITION) + \hat{\beta}_3 (OWNER) + \hat{\beta}_4 (PROFIT) + \hat{\beta}_5 (GRDRT) + \hat{\beta}_6 (InterACCR*PROFIT) + \hat{\beta}_7 (InterACCR*GRDRT)$$

$$\hat{\boldsymbol{RETRT}} = 28.818 + 32.064\,(ACCR) + .001\,(TUITION) + 3.820\,(OWNER) + 10.500\,(PROFIT) + .396\,(GRDRT) - 19.779\,(InterACCR*PROFIT) - .089\,(InterACCR*GRDRT)$$

Residuals

I examined the residuals and the plot of the residuals to help me determine if the assumptions underlying my selected linear model for RETRT were violated. Appendix B, Figure 2 contains the standardized residuals distribution plot, where *RETRT* is the dependent variable and the independent variables include *ACCR, TUITION, FINAID, OWNER, PROFIT and GRDRT* and two interaction terms (Model 12).

As illustrated in Appendix B, Figure 1, the distribution of the standardized residuals is a normal one with over 95% of the residuals falling within plus or minus two standard deviations.

Interpreting RETRT Model 12

Unlike the estimated regression equation for graduation rate, the estimated regression equation for retention rate includes two interaction terms, (*InterACCR*PROFIT*) and (*InterACCR*GRDRT*). These interactions tell us that the effect of accreditation method (ACCR) on retention rate (RETRT) depends on both PROFIT (whether or not the institution is for profit) and GRDRT (the graduation rate).

Figure 6 presents a prototypical plot of retention rates as a function of graduation rates for public, non-profit AQIP and PEAQ accredited institutions where graduation rate (GRDRT) is set to its minimum and maximum values and tuition is set at its mean.

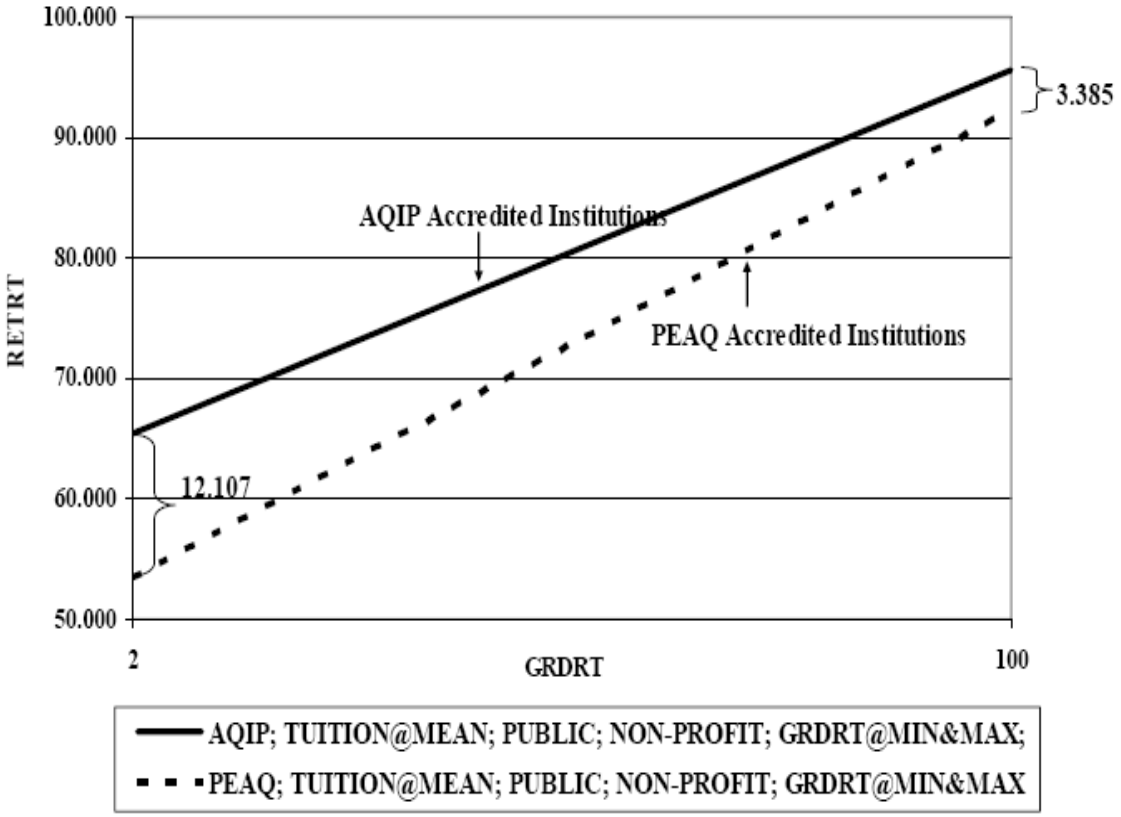


Figure 6

Prototypical plot of retention rates as a function of graduation rates for public, non-profit AQIP and PEAQ accredited institutions where graduation rate (GRDRT) is set to its minimum and maximum values and tuition is set at its mean

Public, non-profit institutions

We can see in Figure 6 that public, non-profit institutions' retention rates are higher on average for AQIP accredited institutions than for PEAQ accredited institutions regardless of the institutions' graduation rate. However, the difference in retention rate between AQIP and PEAQ accredited institutions varies from a 12.107 percentage point difference at the minimum graduation rate (2%), to 3.385 percentage point difference at the maximum graduation rate (100%).

Figure 6 illustrates that although AQIP accredited institutions have higher retention rates than PEAQ accredited institutions at all levels of graduation rate (GRDRT), the higher the institutions graduation rate (GRDRT), the smaller the estimated retention rate (RETRT) difference between AQIP and PEAQ accredited institutions.

The implication of Figure 6 is that the higher the institution's graduation rate, the less accreditation method is predicted to affect the retention rate. However, the lower the institutions graduation rate, the greater the predicted effect of accreditation method on retention rate, where the difference between the predicted retention rate for AQIP and PEAQ institutions is 12.107 percentage points. Institutions with low graduation rates have a greater opportunity to increase their retention rates by being AQIP accredited, than do institutions that have high graduation rates.

Public, for-profit institutions

Public, for-profit, institutions' retention rates are higher for AQIP accredited institutions than PEAQ accredited institutions, regardless of the institutions' graduation rate. However, the predicted difference in retention rate between AQIP and PEAQ accredited institutions varies from a difference of 31.886 percentage points at the

minimum graduation rate to a difference of 23.164 percentage points at the maximum graduation rate.

Figure 7 presents a prototypical plot of retention rates as a function of graduation rates for public, for-profit AQIP and PEAQ accredited institutions where graduation rate (GRDRT) is set to its minimum and maximum values and tuition is set at its mean.

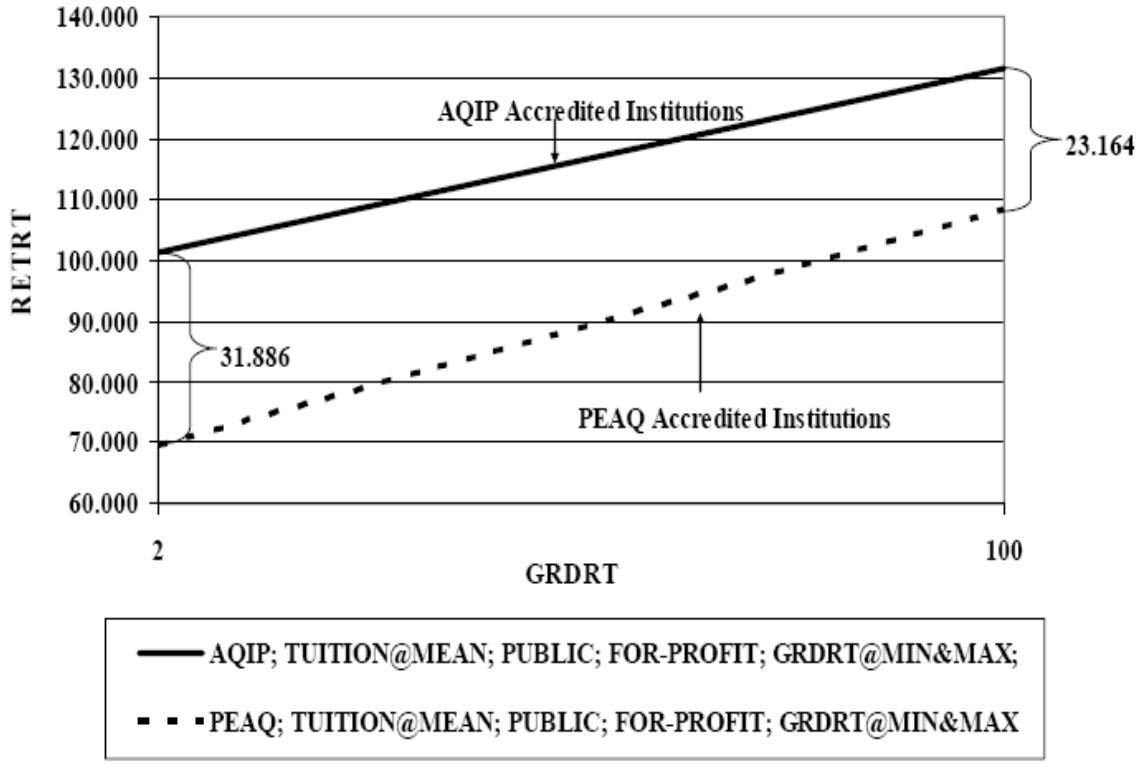


Figure 7

Prototypical plot of retention rates as a function of graduation rates for public, for-profit AQIP and PEAQ accredited institutions where graduation rate (GRDRT) is set to its minimum and maximum values and tuition is set at its mean

Figure 7 illustrates that although AQIP accredited institutions have higher predicted retention rates than PEAQ accredited institutions at all graduation rates (GRDRT), the larger the institutions graduation rate (GRDRT), the smaller the predicted retention rate (RETRT) difference between AQIP and PEAQ accredited institutions.

When comparing Figure 6 to Figure 7, the difference in predicted retention rates between AQIP and PEAQ accredited institutions is larger for for-profit institutions than it is for non-profit institutions at all levels of graduation rates, controlling for tuition.

We can see in Figure 7, that based on Model 12, we would predict that AQIP accredited institutions have higher retention rates on average than PEAQ accredited institutions; for-profit institutions that are AQIP accredited are predicted to have a larger retention rate advantage over PEAQ accredited institutions than do non-profit institutions; and finally, the larger the institution's graduation rate the smaller the predicted effect of accreditation method on the retention rate. However, the lower the institutions graduation rate, the larger the predicted effect of accreditation method on the retention rate. This suggests that institutions with low graduation rates should consider examining the benefits of changing their accreditation method from PEAQ to AQIP.

Public, non-profit institutions

Public, non-profit institutions account for 557 out of the 973 total institutions included in this study. Public, non-profit institutions that are AQIP accredited, on average, have higher retention rates than do institutions that are PEAQ accredited, regardless of the amount of tuition and fees assessed to students who attend or their graduation rates.

Figure 8, reveals that, at all levels of tuition holding graduation rate constant, retention rates for non-profit, public institutions that are AQIP accredited, are predicted to be 8.377 percentage points higher than at non-profit, public institutions that are PEAQ accredited.

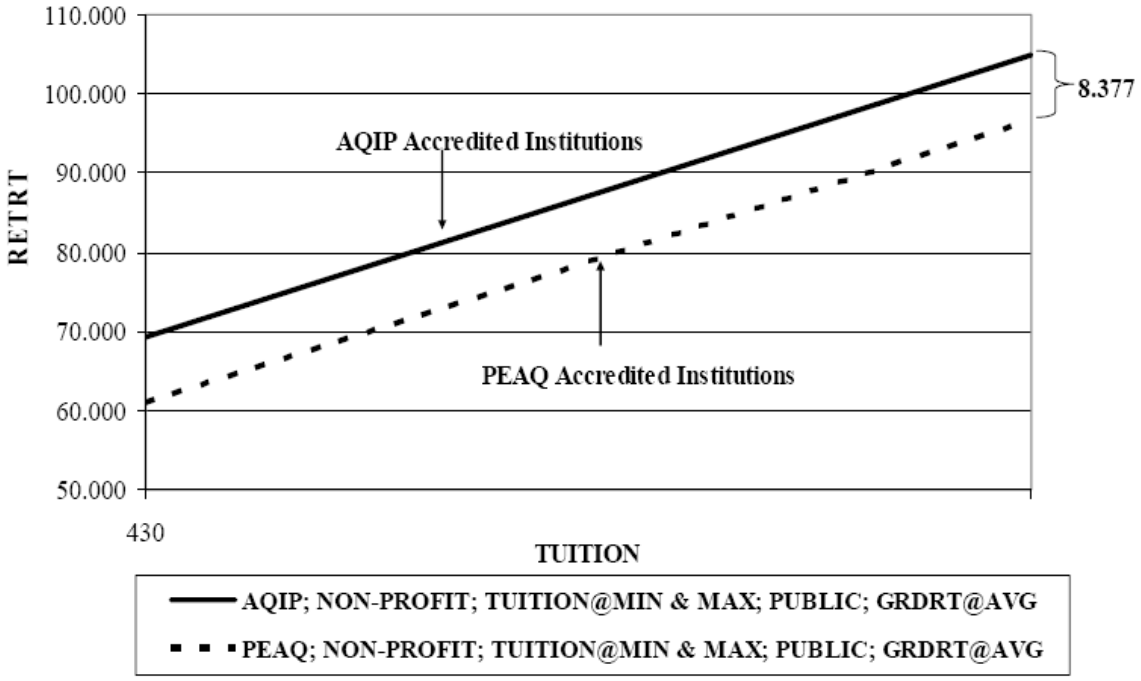


Figure 8
Prototypical plot of retention rates as a function of graduation rates for public, non-profit AQIP and PEAQ accredited institutions where tuition is set to its minimum and maximum values and graduation rate is set at its mean

The prediction lines in Figure 8 suggest that, holding graduation rate constant, regardless of the level of tuition and fees assessed to students, public, non-profit institutions may be able to improve their retention rates by transitioning to AQIP accreditation.

Chapter V

Discussion

Restatement of the problem

Since AQIP has been introduced as an alternative means by which institutions are accredited, numerous institutions of higher learning have opted for this alternative over the traditional PEAQ accreditation option. Although AQIP is intended to create opportunities to continually improve the performance of the institutions participating, until now, there has been no empirical evidence that these institutions perform any better or worse than institutions that are not AQIP accredited. The absence of empirical evidence to support AQIP over PEAQ has left institutions without the knowledge they need to effectively evaluate one accreditation method over the other – at least as it relates to institutional performance measured by graduation rates or retention rates.

From the standpoint of the users and funders of institutions of higher education (i.e. students, parents, employers, and government funding entities), it would be useful to know if AQIP accredited institutions performed better than PEAQ accredited schools and vice versa. Evidence that schools that are AQIP accredited perform better than those that are accredited by a different method would be advantageous to parents, students, businesses and governments as they select the school to attend, the school to employ from, and even which schools to fund.

Limitations of the Study

Even though IPEDS data are extensive, these data do not include all variables that are known to influence graduation rates and retention rates. Only data from IPEDS and HLC were used in these analyses. Schuh (2002) notes that the categories available in

IPEDS are very broad categories. IPEDS data are aggregate data at the institution level. Because I conducted this study at the institution level, it did not include individual and external variables that are known to influence graduation rates and retention rates. *Individual variables* include, but are not limited to, motivation, interests, self-efficacy, causal attributions, outcome expectancies, cognized goals, self-worth, and academic self-concept (Atkinson, 1957; Bandura, 1993; Covington, 1984; Dweck, 1988; Hidi, 1990; Marsh, 1992; Weiner, 1990; White, 1959; Zimmerman, 1990). *External variables* include, but are not limited to, parental influences and societal influence (Eun-young, 1993; Holloway, 1988; Stevenson, 1990).

With regards to graduation rates, only fulltime, first-time, degree or certificate seeking undergraduate students enrolled in a particular fall term are reported. The graduation rates I used in this study did not include students transferring into an institution or track students more than three years at two-year institutions or six years at four-year institutions. Walsh (1996) identified that the greatest limitation of the Student Right-to-Know definitions is that the IPEDS inventory of students is based on those students who graduate from the same institution in which they started.

While research supports the use of retention and graduation rates to evaluate the performance of four-year institutions, they may play a lesser role in the evaluation of performance at two-year institutions because most two-year institutions offer open access (B. Bailey, 2006). Given the diversity of students and their goals, utilizing graduation rates as a measure of an institution's success when the institution is a community college is made more difficult (B. Bailey, 2006).

Discussion of findings

This research provides empirical evidence of a positive, statistically significant relationship between the question predictor variable accreditation method (ACCR*)* and the dependent variable graduation rate (GRDRT), when controlling for the independent variables including: log10 of the tuition and fees assessed students (LG10TUITION), the percent of students who have access to financial aid (FINAID*)*, and the institutions' retention rates (RETRT). This research also provides empirical evidence of a positive, statistically significant relationship between the question predictor variable accreditation method (ACCR) and the dependent variable retention rate (RETRT), when controlling for four predictor variables: tuition and fees assessed students (TUITION), whether the institution is a privately owned or a publicly owned institution (OWNER), whether the institution is for-profit or non-profit (PROFIT), the institution's graduation rate (GRDRT), and two interaction terms (InterACCR*PROFIT and InterACCR*GRDRT).

Implications of research

Since AQIP has been introduced as an alternative means by which institutions are accredited, numerous institutions of higher learning have opted for this alternative over the traditional PEAQ accreditation option. Although AQIP is intended to create opportunities to continually improve the performance of the institutions participating, there has been no empirical evidence that these institutions perform any better or worst than institutions that are not AQIP accredited. The absence of empirical evidence to support AQIP over PEAQ has left institutions without the knowledge they need to effectively evaluate one accreditation method over the other – at least as it relates to institutional performance. This research has provided empirical evidence that there is a

positive correlation between accreditation method and institutional performance. And more specifically this research has revealed that institutions that are accredited under the AQIP method perform on average better than those that are accredited under the PEAQ method. Where this relationship is true on average over the first few years (10 years) in which AQIP has existed as an alternative, it is not clear whether this relationship will continue over time.

From the standpoint of the institutions, this empirical evidence might suggest an opportunity for institutions that are PEAQ accredited to reconsider their choice of accreditation method. This is dependent of course on where the particular institution is on the performance continuum, since some PEAQ accredited institutions are already performing very well – some even better than AQIP accredited institutions. Some PEAQ institutions are performing at notably higher levels than other PEAQ institutions, which is worth exploring.

From the standpoint of the users and funders of institutions of higher education (i.e. students, parents, employers, and government funding entities), they now have empirical evidence that AQIP accredited institutions performed better on average, in terms of their graduation rates and retention rates, than do PEAQ accredited schools. Evidence that schools that are AQIP accredited perform better than those that are accredited by a different method provides useful information to parents, students, businesses and governments as they select the school to attend, the school to employ from, and which schools to fund.

When all other variables are held constant, on average, we can predict that there is a 4.54 percentage point difference between institutions that are AQIP accredited and

those that are PEAQ accredited. The implications of this relationship are that schools that are currently PEAQ accredited may see, on average, a positive change in graduation rate of 4.54 percentage points.

When all other variables are held constant, for every one-percentage point difference in the number of students receiving financial aid, there is a 0.091 percentage point difference in graduation rates. Although the difference is relatively small, this relationship between the number of student receiving financial aid and graduation rates suggests that institutions might consider working proactively to increase the number of students who have access to financial aid. Bowen, Chingos, and McPherson (2009, p. 230), tells us that money matters, "…and there is clear evidence that such aid boosts both the numbers who attend such institutions and their graduation rates."

When all other variables are held constant, for every one-percentage point difference in the number of students that continue from the fall semester to the spring semester, there is a 0.682 percentage point difference in graduation rates. This relationship between the retention rates and graduation rates of institutions suggests that institutions might work proactively to increase their retention rates, as one way to have a potentially positive impact on their graduation rates.

Public, non-profit, institutions' retention rates are predicted to be higher for AQIP accredited institutions than for PEAQ accredited institutions regardless of the institutions' graduation rate. However, the difference in the predicted retention rate between AQIP and PEAQ accredited institutions varies from 12.107 percentage points at the minimum graduation rate, to 3.385 percentage points at the maximum graduation rate. AQIP accredited institutions are predicted to have higher retention rates than PEAQ accredited

institutions regardless of the institutions graduation rate (GRDRT), but at the same time, the higher the institutions graduation rate (GRDRT), the less the predicted retention rate (RETRT) difference between AQIP and PEAQ accredited institutions. The effect of accreditation (ACCR) on retention rate (RETRT) is related to a negative .089 percentage point difference for each positive percentage point change in graduation rate (GRDRT). The implication is that the higher the institution's graduation rate the less accreditation method is predicted to affect the retention rate. However, the lower the institutions graduation rate, the more accreditation method is predicted to affect the retention rate. This suggests that institutions that are currently PEAQ accredited and experiencing lower graduation rates might consider changing their accreditation method to AQIP.

Public, for-profit, institutions' retention rates are higher for AQIP accredited institutions than PEAQ accredited institutions regardless of the institutions' graduation rate. However, the predicted difference in retention rate between AQIP and PEAQ accredited institutions varies from a 31.886 percentage point difference at the minimum graduation rate to a 23.164 percentage point difference at the maximum graduation rate. The same relationship we see between accreditation rate, graduation rate, and retention rate that we see for the public non-profit institutions remains, although the predicted percentage point differences are predicted to be larger for the public for-profit institutions.

AQIP accredited institutions are predicted to have higher retention rates on average than PEAQ accredited institutions; for-profit institutions that are AQIP accredited are predicted to have a larger retention rate advantage over PEAQ accredited institutions, than do non-profit institutions; and finally, the higher the institution's

graduation rate the less the predicted impact of accreditation method on the retention rate. However, the lower the institution's graduation rate, the greater the predicted impact of accreditation method on the retention rate. Institutions with low graduation rates might consider changing their accreditation method to AQIP. These data suggest that for-profit institutions may have a better understanding of how to function effectively under AQIP than do non-profit institutions. For-profit institutions may be more experienced in the implementation and operation of the business based continuous improvement processes inherent in AQIP accreditation. Institutions that are for-profit and not AQIP accredited may benefit the most by transitioning to AQIP accreditation.

Some AQIP accredited institutions are performing significantly below their AQIP accredited counterparts, which may suggest that those institutions may not be employing AQIP in an optimal way. It might also be caused by the culture of the institutions not being conducive to AQIP. This is clearly an area for additional research to ascertain why some AQIP institutions perform better than others.

Public, non-profit institutions that are AQIP accredited on average, are predicted to have higher retention rates than institutions that are PEAQ accredited regardless of the amount of tuition and fees assessed to students who attend. Figure 8 reveals that when all other control variables are held constant, non-profit, public institutions that are AQIP accredited are predicted to have, on average, higher retention rates by 8.377 percentage points than institutions that are PEAQ accredited at all tuition levels.

Regardless of the level of tuition and fees assessed to students, institutions may have an opportunity to improve their retention rates by transitioning to AQIP accreditation from PEAQ accreditation. This is potentially beneficial since many

institutions with higher tuition and fees have traditionally felt that their higher tuition and fees preclude lower income individuals from attending, which may in turn minimize their student loss from semester to semester. Even though lower income students have a higher propensity to drop out of college than do students from high income households, institutions with higher or lower tuition and fees can still benefit by transitioning their accreditation to AQIP.

I am a bit cautious about the apparent higher performance of AQIP accredited institutions as compared to PEAQ accredited institutions. Especially when I consider that AQIP accreditation has been available as an alternative for only 10 years, that there are only 213 institutions that are AQIP accredited (as opposed to 760 that are PEAQ accredited), and finally, AQIP accredited institutions have an average experience with AQIP of only 6.43 years. These facts make me wonder if there might be some other phenomena at play which is causing these differentials in performance between AQIP and PEAQ accredited institutions.

I can only speculate about the role that organizational culture plays in whether one institution might be better suited to PEAQ than to AQIP, or whether or not the administration of one institution is more favorably disposed to PEAQ than to AQIP. Some leadership and followers are likely to be more accepting of this accreditation method than are others. These phenomena are also subjects worthy of further study.

Recommendations

I have identified several recommendations based on my findings:

I recommend that PEAQ accredited institutions consider converting their accreditation method to AQIP for the following reasons:

- On average, graduation rate is predicted to be 4.540 percentage points higher when the institution is AQIP accredited than when it is PEAQ accredited.
- For public, non-profit, institutions, the higher the institution's graduation rate the less accreditation method is predicted to affect the retention rate. However, the lower the institution's graduation rate the greater the predicted impact of accreditation method on the retention rate. Institutions with low graduation rates may find the utilization of the AQIP accreditation process beneficial in efforts to increase their graduation rates.
- Public, for-profit, institutions' retention rates are predicted to be higher for AQIP accredited institutions than at PEAQ accredited institutions regardless of the institutions' graduation rate; however, the lower the institution's graduation rate greater the predicted impact of accreditation method on retention rate.
- Institutions that are for-profit and not AQIP accredited, appear to have the most to benefit by transitioning to AQIP accreditation.

Institutions should be working proactively to increase the number of students who have access to financial aid. In doing so, on average, the institution's graduate rate may rise by 0.091 percentage points for each one percentage point increase in the number of students receiving financial aid.

On average, for every percentage point change in the number of students that continue from the fall semester to the spring semester, the graduation rate is predicted to

change by 0.682 percentage points. I recommend that institutions consider working to increase their retention rate, because of this positive relationship between retention rates and graduation rates.

I recommend that the Higher Learning Commission (HLC) of the North Central Association of Schools and Colleges (NCA) consider making these findings available to their accredited institutions. These data provide evidence heretofore not available, but highly useful to institutions who might be considering a change from their current method of accreditation.

I recommend that the other regional accrediting agencies consider implementing an accreditation method similar to AQIP, to the extent that they have not already. The success that has accrued to the institutions that have adopted AQIP as their method of accreditation should be made available to institutions that are accredited by the other accrediting agencies nationally and internationally. The Higher Learning Commission only accredits institutions of higher learning in 19 of the States and Provinces located within the United States.

I recommend that institutions that are AQIP accredited and are performing better in terms of their graduation and retention rates consider utilizing this information to promote themselves to students, parents, employers, and government funding entities – so as to demonstrate their focus on continuous improvement. As institutions of higher learning compete for students, it is useful to point to statistics that differentiate their institution from others. These data will serve that purpose well, while promoting the use of AQIP by other institutions that are desirous of this distinguishing market advantage.

I recommend that students, parents, employers, and government funding entities

encourage institutions of higher learning to explore AQIP accreditation as an alternative to the more traditional self-study methods of accreditation. Some institutions will not respond to opportunities for improvement until they realize that it is important to their customers or their funders.

I recommend that the HLC explore the differences in how AQIP is being implemented by higher education institutions whose performance on these dependent variables differs in order to identify opportunities for improvement in the AQIP processes. As with any organization, some institutions are more successful than others in implementing and functioning under a process such as that contemplated by AQIP. It would be advantageous to share best practices among institutions that are known to be doing better than others, at least as measured by their graduation and retention rates.

I recommend that all higher learning institutions make graduation rates and retention rates among the *critical few* performance measures that they seek to improve over time. If the objective is worthwhile it needs to be tracked, communicated and the topic of continuous improvement by the institution. It is not enough that the government agencies have identified these objectives for higher education, the higher education institutions need to embrace these objectives themselves.

Additional Research

Opportunities for additional research abound. Among those that I have identified as a result of this research are the following:

Integration of individual and external variables

This study explains approximately 59% of the variation in graduation rates across these 973 institutions, and 57% of the variation in retention rates. The remaining

variation in graduation and retention rates, 41% and 43% respectively, is left unexplained by the models I fit in this study. As previously discussed, this research excludes individual and external variables that are known to influence graduation rates and retention rates. I recommend further research that includes *individual variables* such as motivation, interests, self-efficacy, causal attributions, outcome expectancies, cognized goals, self-worth and academic self-concept, and *external variables* such as parental and societal influences. Together, institutional, individual, and external variables will most certainly account for much of the variation in the graduation and retention rates of these institutions.

This research has increased our knowledge about the role accreditation method can play in institutional performance. As with most research it has also raised a host of other questions as to why these relationships exist. Perhaps this will be the topic of future research as well.

Causal operational differences – AQIP vs. PEAQ

What are the causal operational differences between AQIP accredited institutions and those that are PEAQ accredited? In other words, what operational differences account for why AQIP institutions generally perform better than PEAQ accredited institutions?

Causal operational differences – high vs. low performing AQIP institutions

What are the causal operational differences between higher performing AQIP accredited institutions and those that are lower performing AQIP accredited institutions? In other words, what operational differences account for why some AQIP institutions are performing better than the lower performing AQIP accredited institutions? AQIP review

processes uncover large amounts of potentially relevant data that might be useful in deriving best practices by AQIP institutions.

Causal operational differences - high vs. low performing PEAQ institutions

What are the causal operational differences between higher performing PEAQ accredited institutions and those that are lower performing PEAQ accredited institutions? In other words, what operational differences account for why some PEAQ institutions are performing better that the lower performing PEAQ accredited institutions – and even better than some AQIP accredited Institutions?

Variables employed in selecting accreditation method

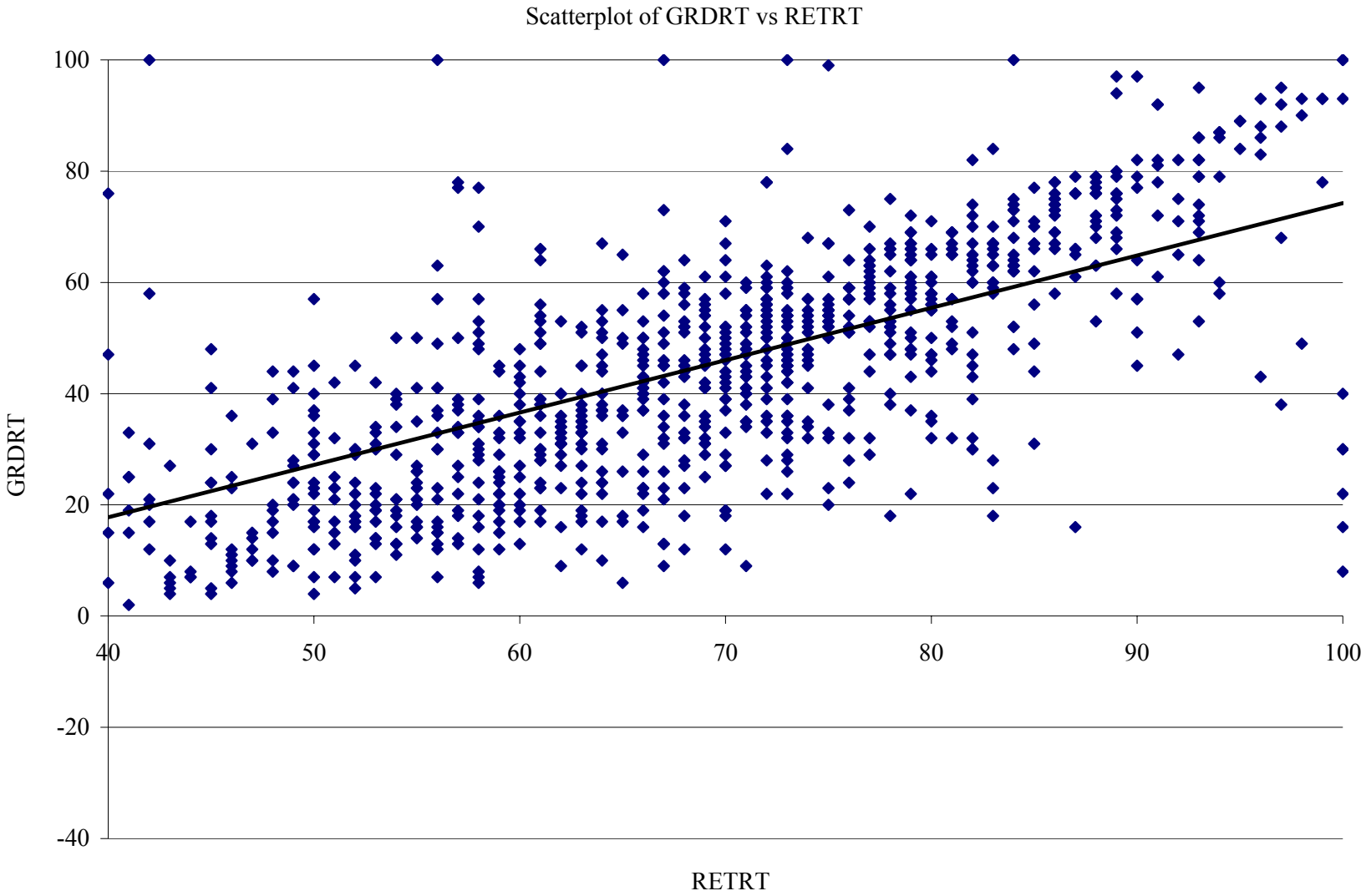
It would be useful to know what variables and processes higher education institutions employ in deciding which accreditation method is best for their institutions. What are the variables that higher education institutions employ in deciding which accreditation method to select for their institutions? And, will this empirical evidence now weigh into their decisions, and to what extent?

Summary

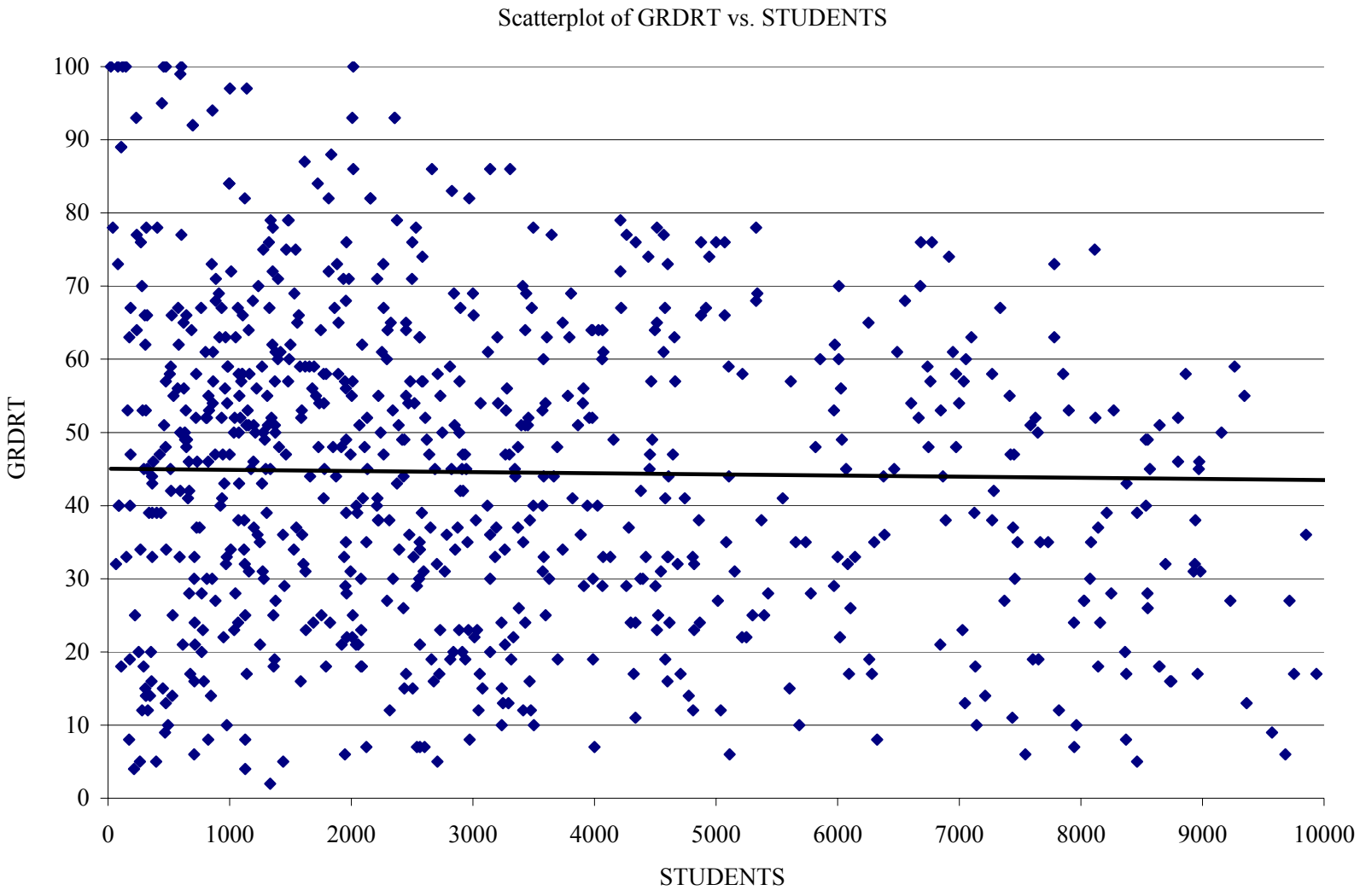
This research has increased our knowledge about the role accreditation method has in understanding and predicting institutional performance. This research provides empirical evidence of a positive relationship between accreditation method and graduation rate. This research also provides empirical evidence of a positive relationship between accreditation method and retention rate.

This research will serve to further enhance the knowledge and decision making capacity of institutional administrations; federal, state and local governments; faculty, parents and students.

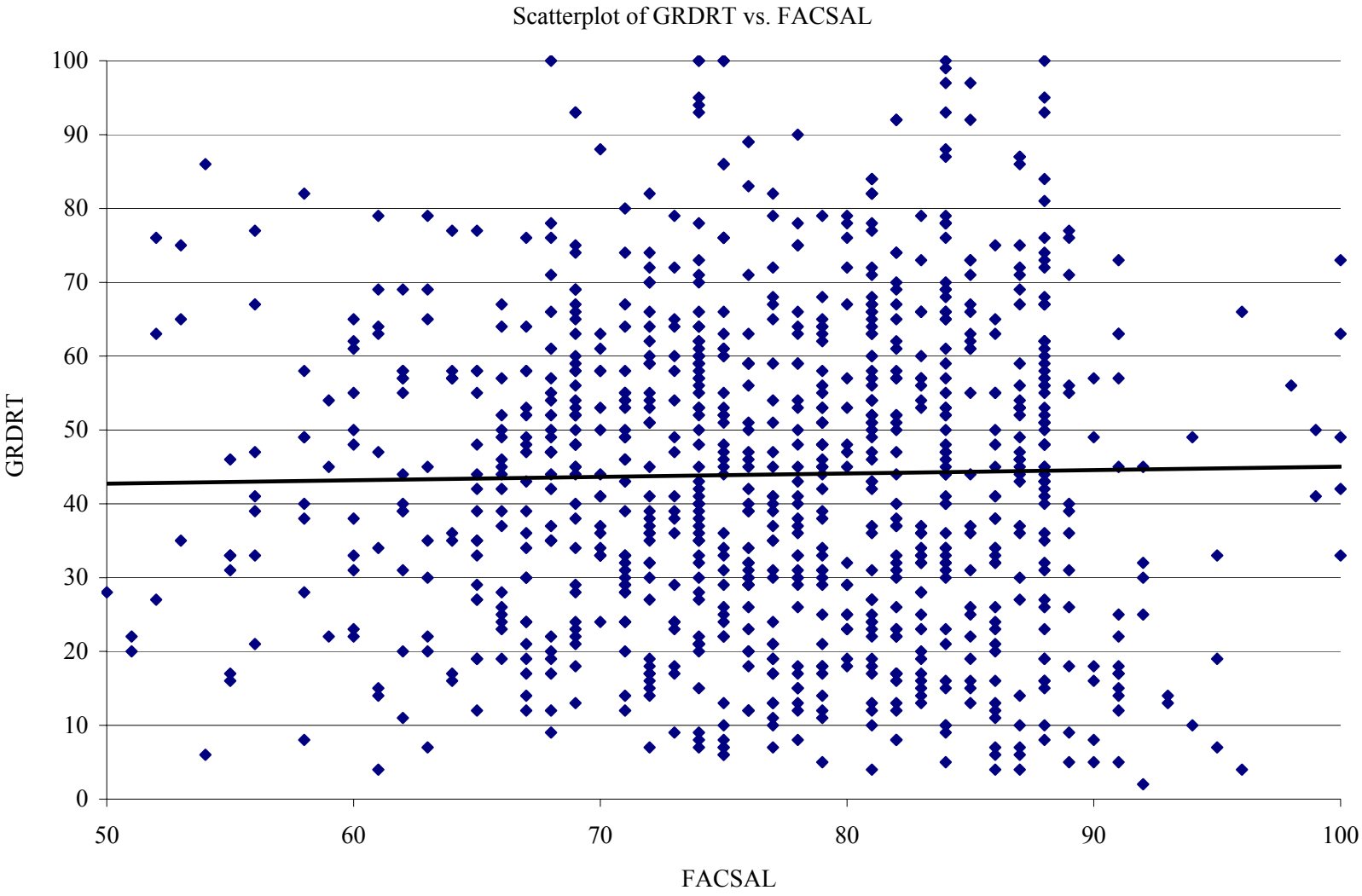
Appendix A
Scatterplot diagrams
(Graduation Rate (GRDRT) = Dependent Variable)



Appendix A
Scatterplot diagrams
(Graduation Rate (GRDRT) = Dependent Variable)

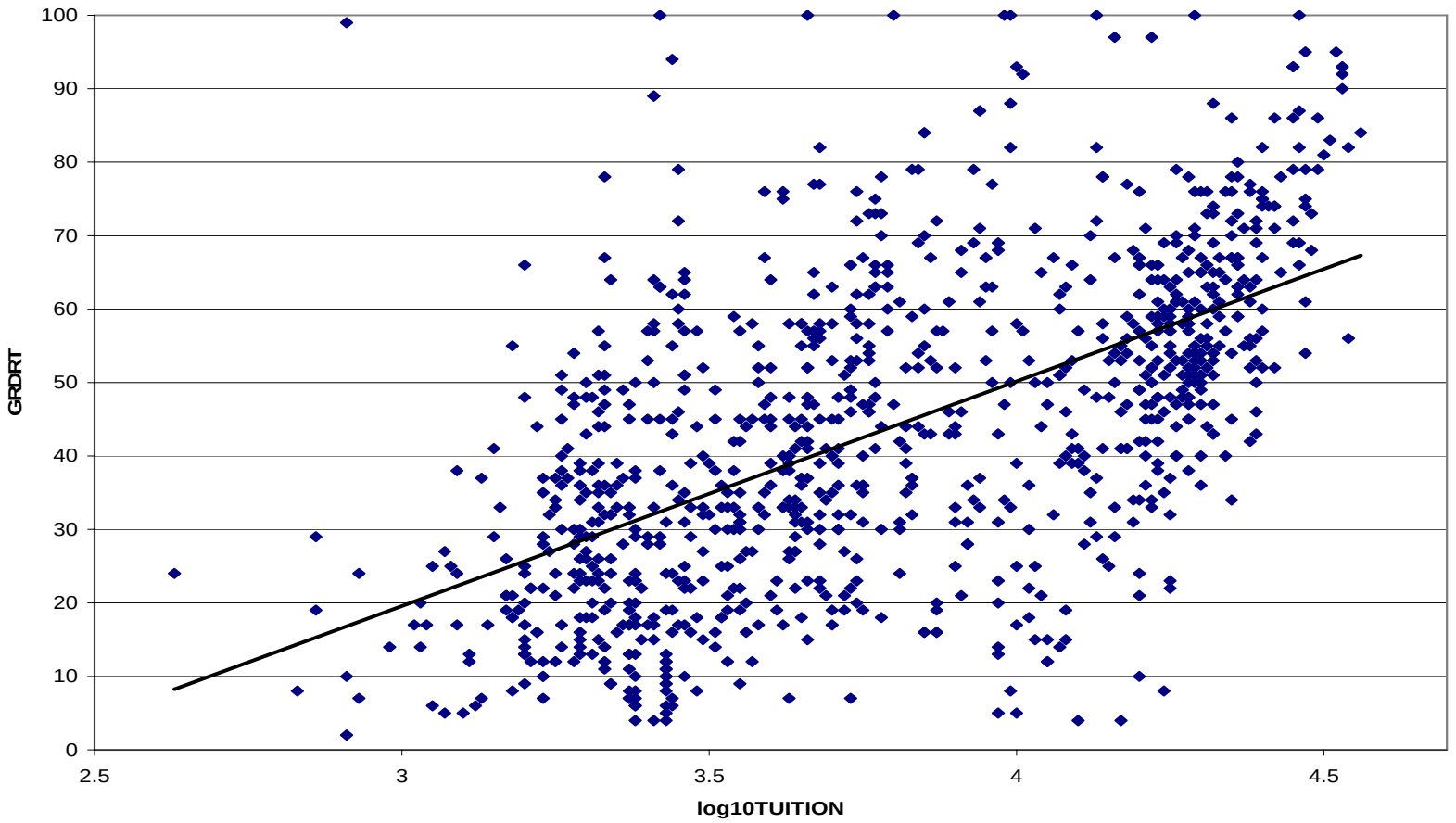


Appendix A
Scatterplot diagrams
(Graduation Rate (GRDRT) = Dependent Variable)

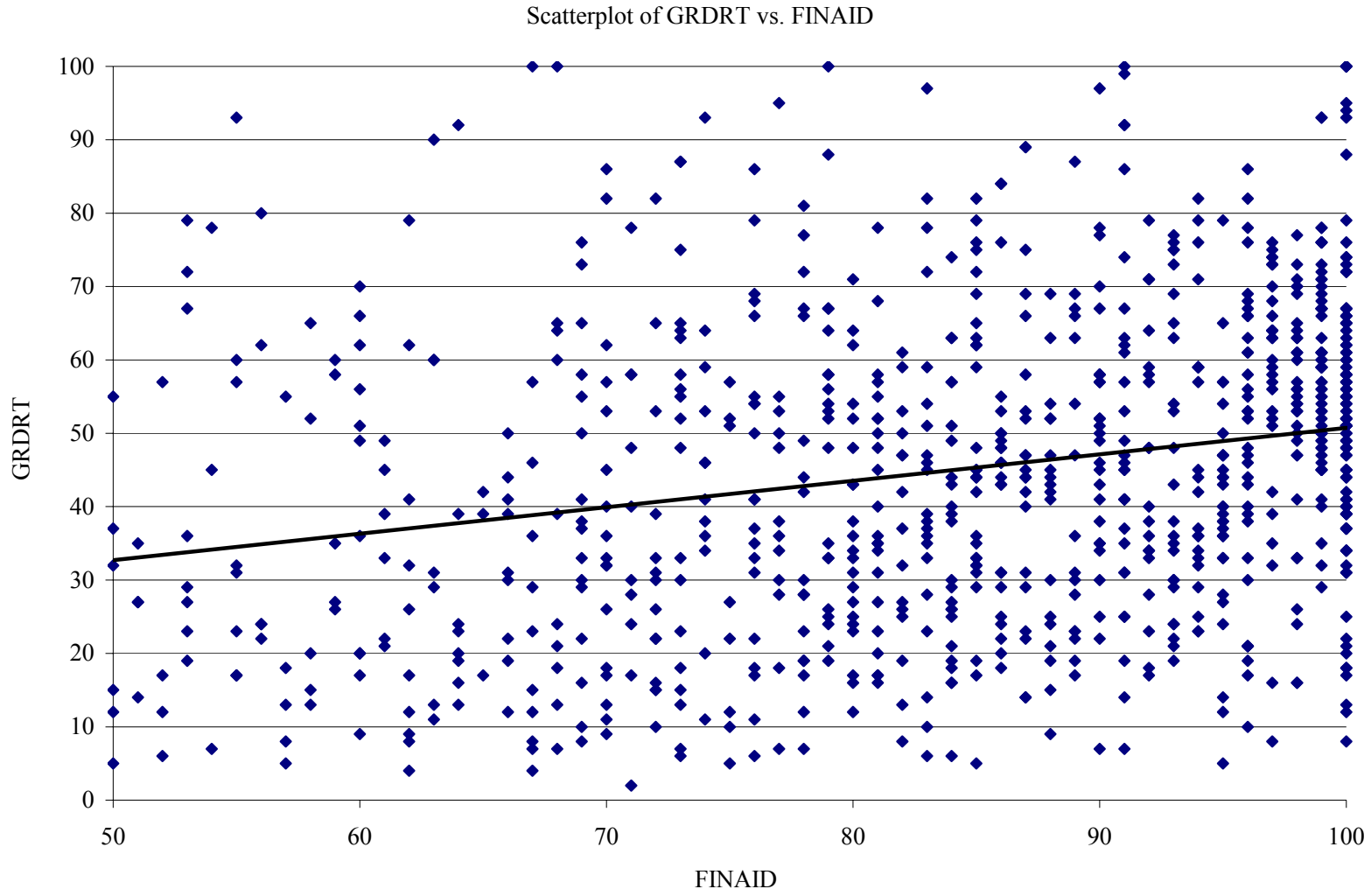


Appendix A
Scatterplot diagrams
(Graduation Rate (GRDRT) = Dependent Variable)

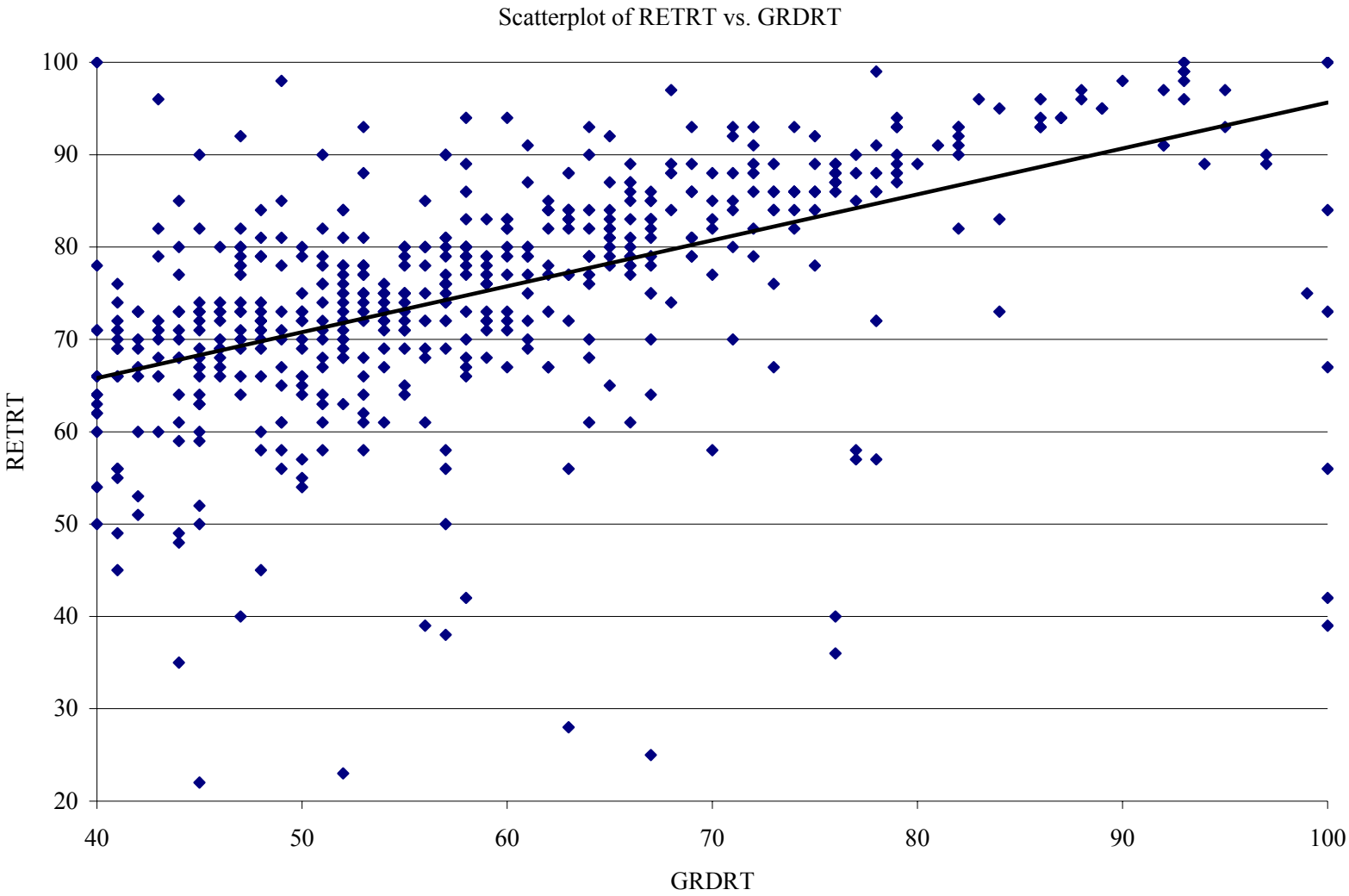
Scatterplot of GRDRT vs. log10TUITION



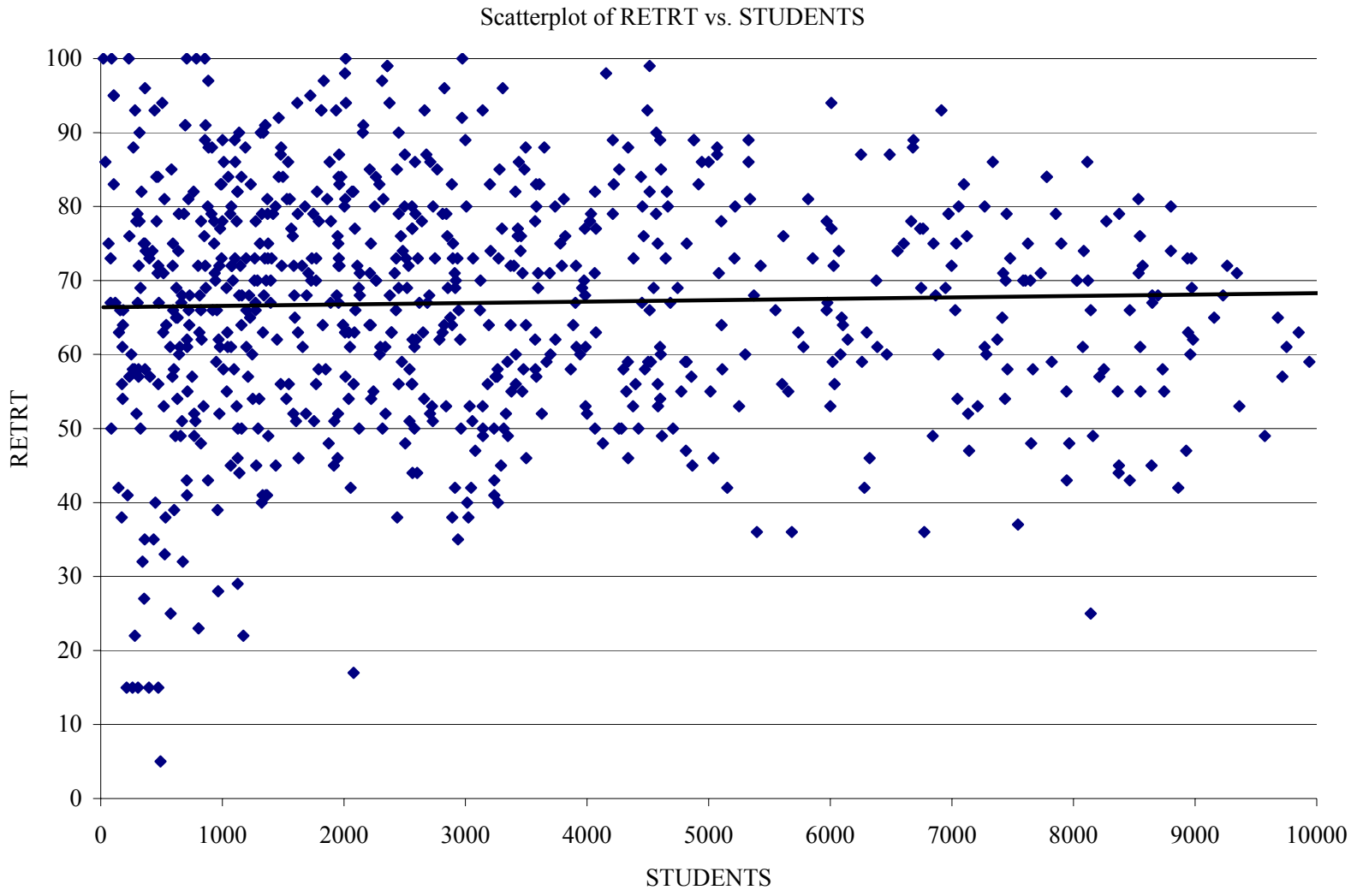
Appendix A
Scatterplot diagrams
(Graduation Rate (GRDRT) = Dependent Variable)



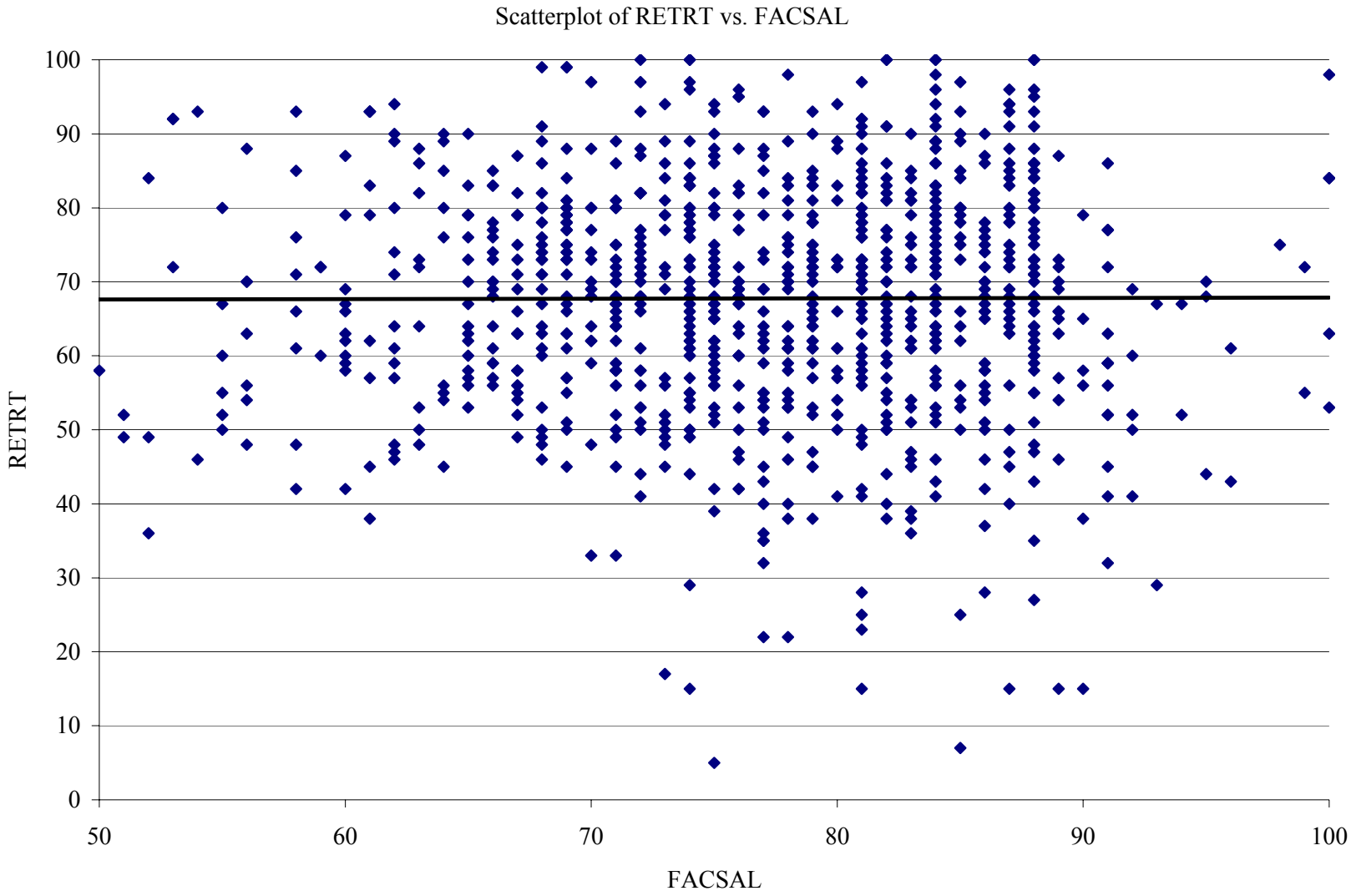
Appendix A
Scatterplot diagrams
(Retention Rate (RETRT) = Dependent Variable)



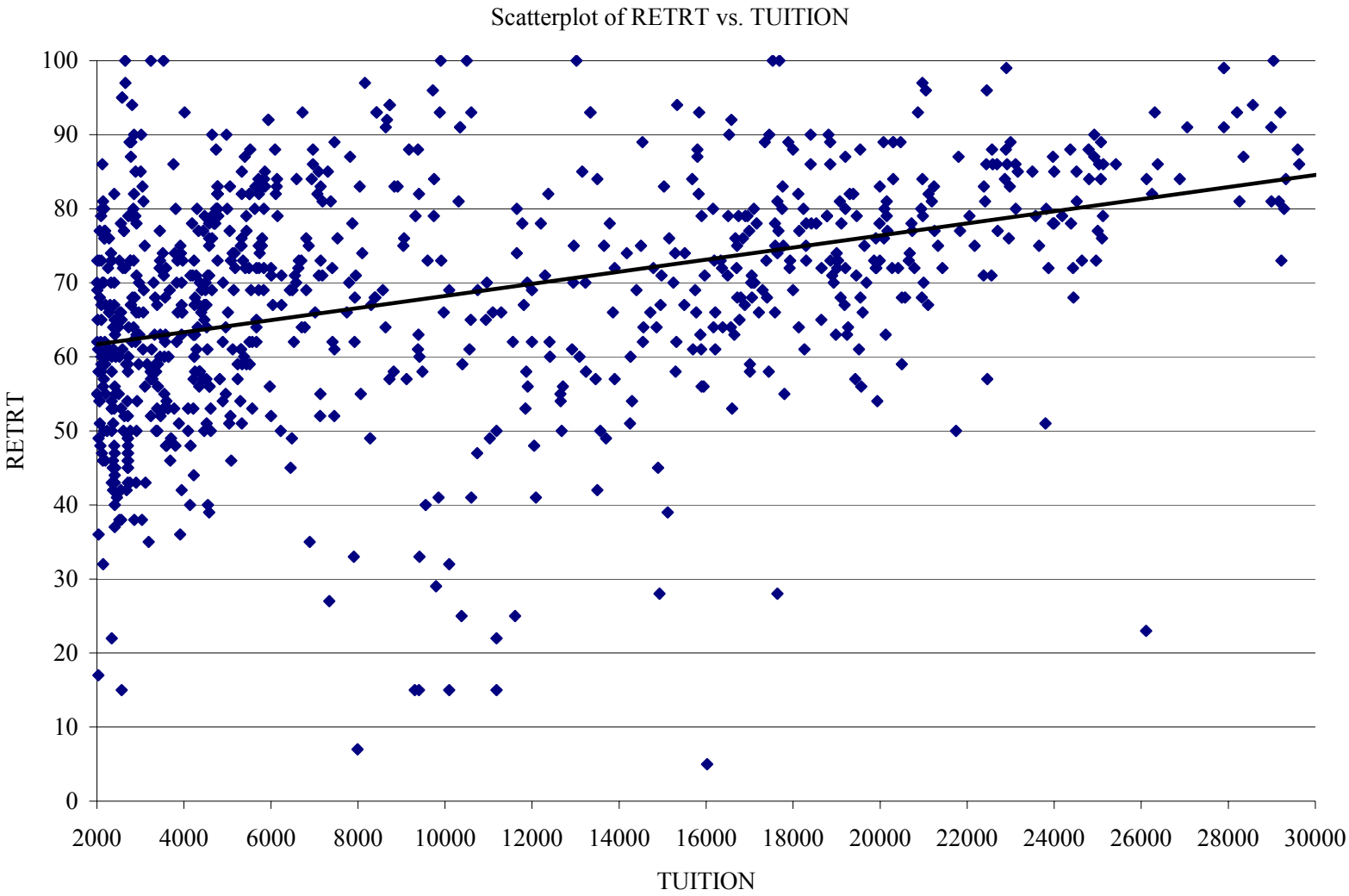
Appendix A
Scatterplot diagrams
(Retention Rate (RETRT) = Dependent Variable)



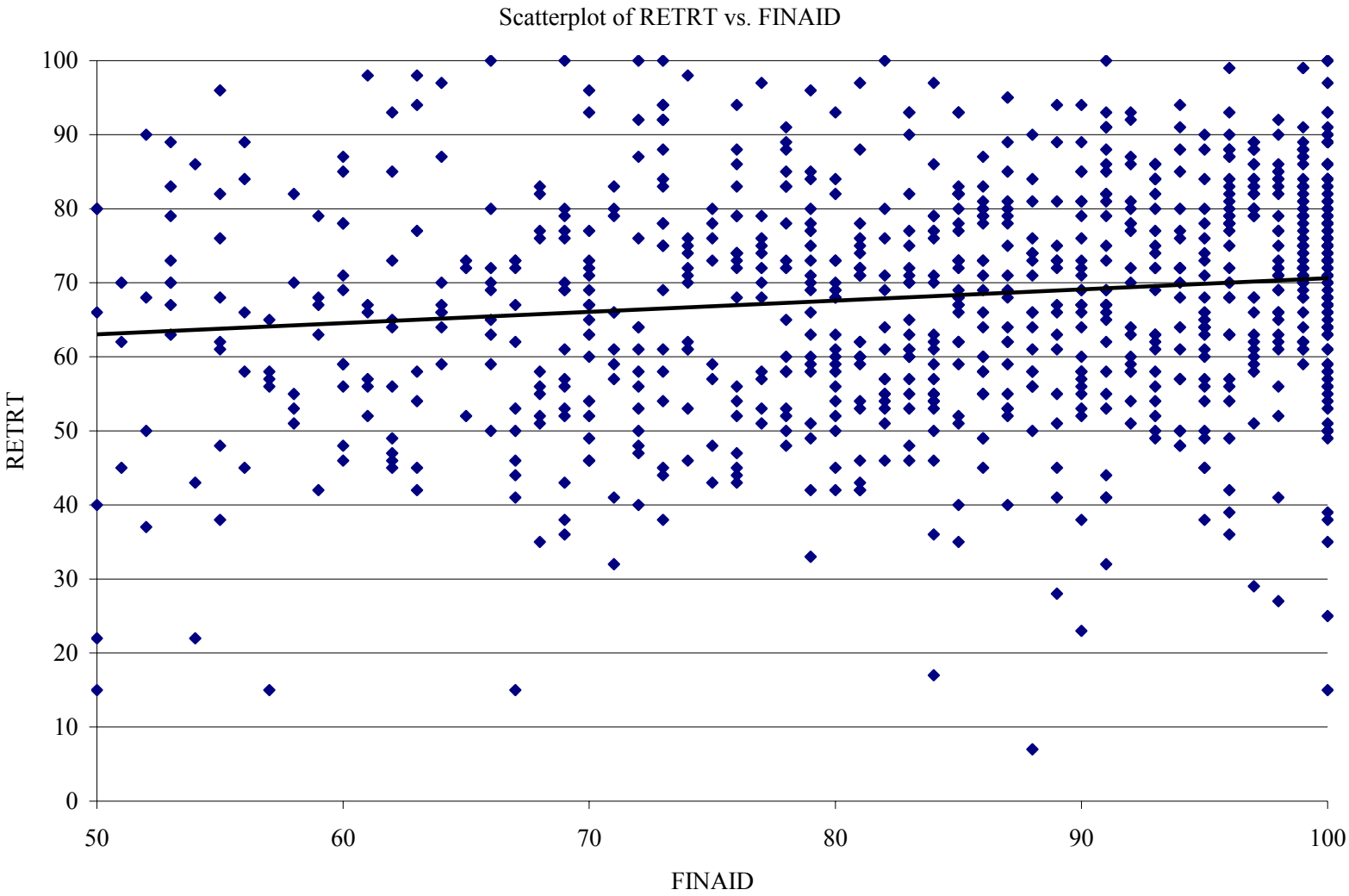
Appendix A
Scatterplot diagrams
(Retention Rate (RETRT) = Dependent Variable)



Appendix A
Scatterplot diagrams
(Retention Rate (RETRT) = Dependent Variable)

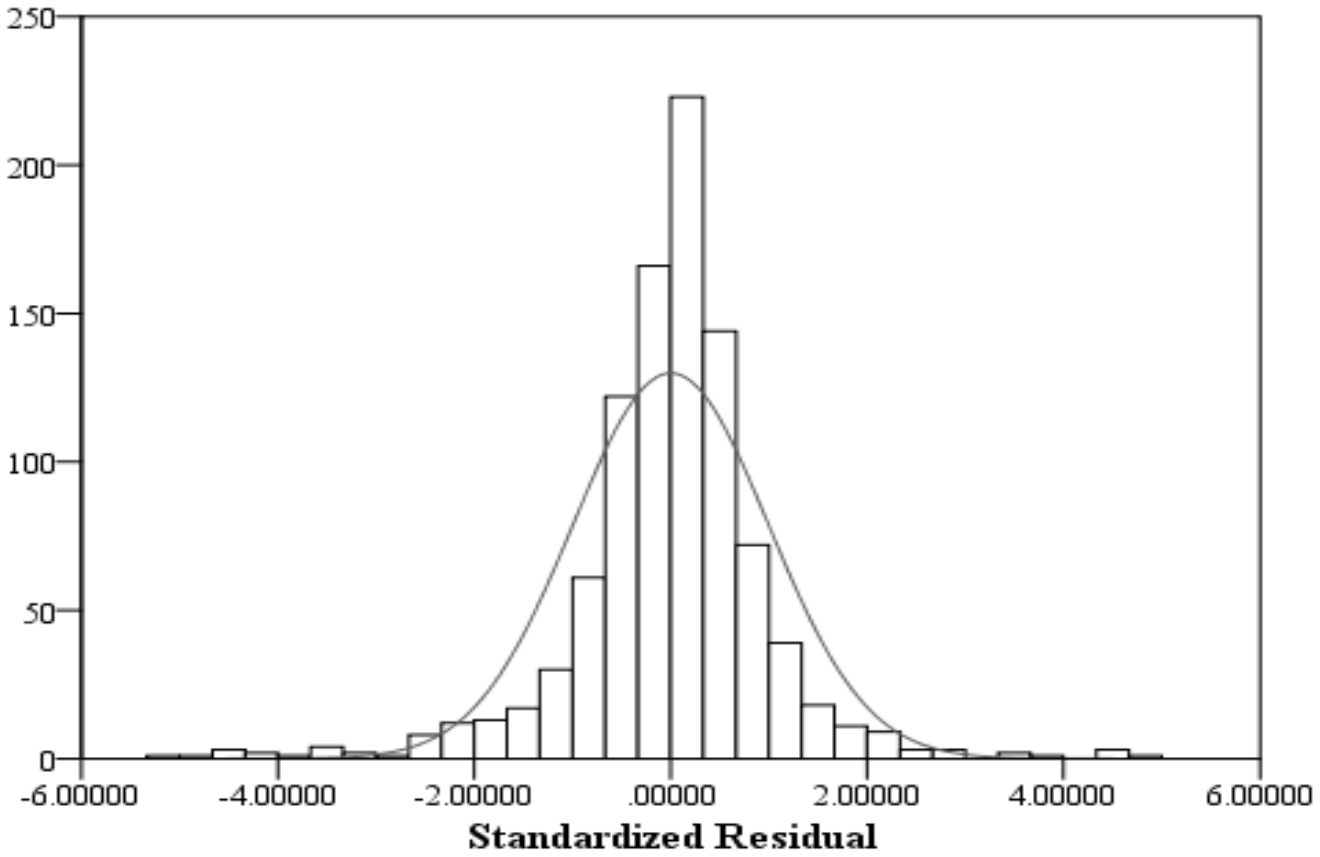


Appendix A
Scatterplot diagrams
(Retention Rate (RETRT) = Dependent Variable)



Appendix B
Standardized residuals distribution charts

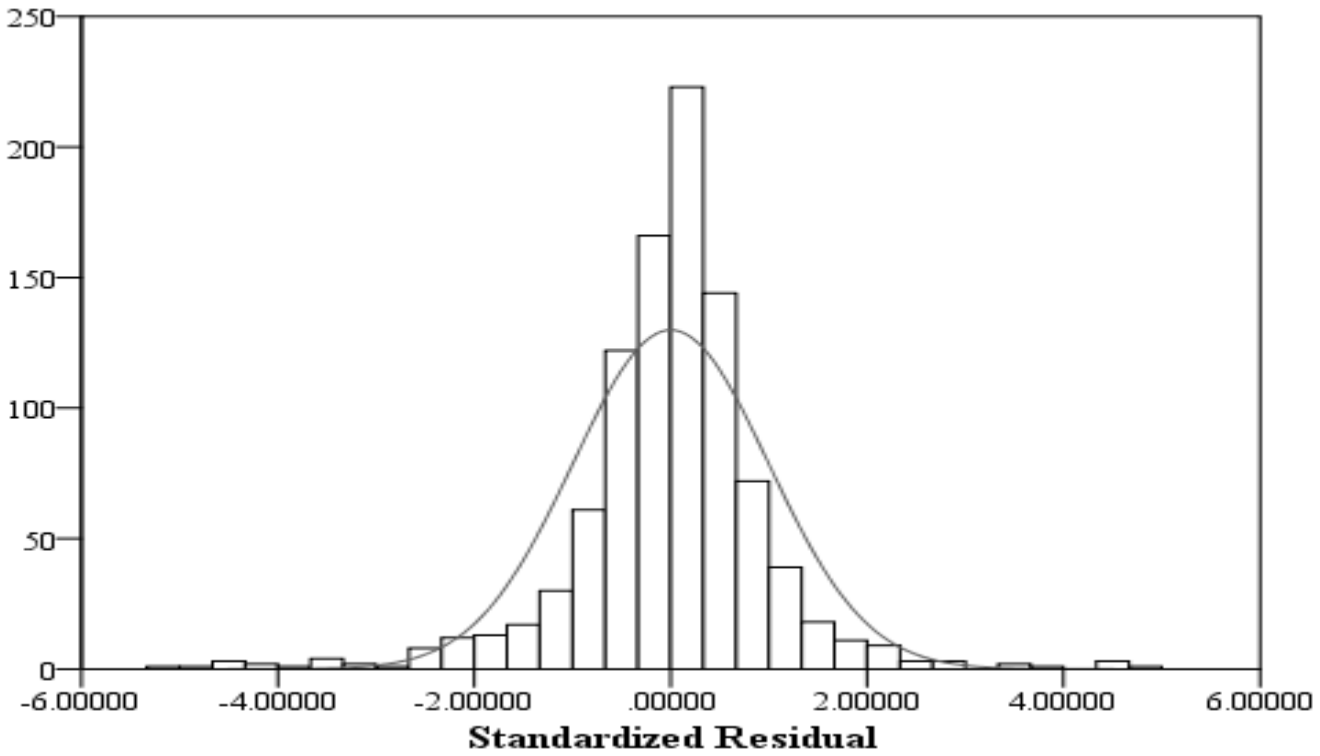
Figure 1



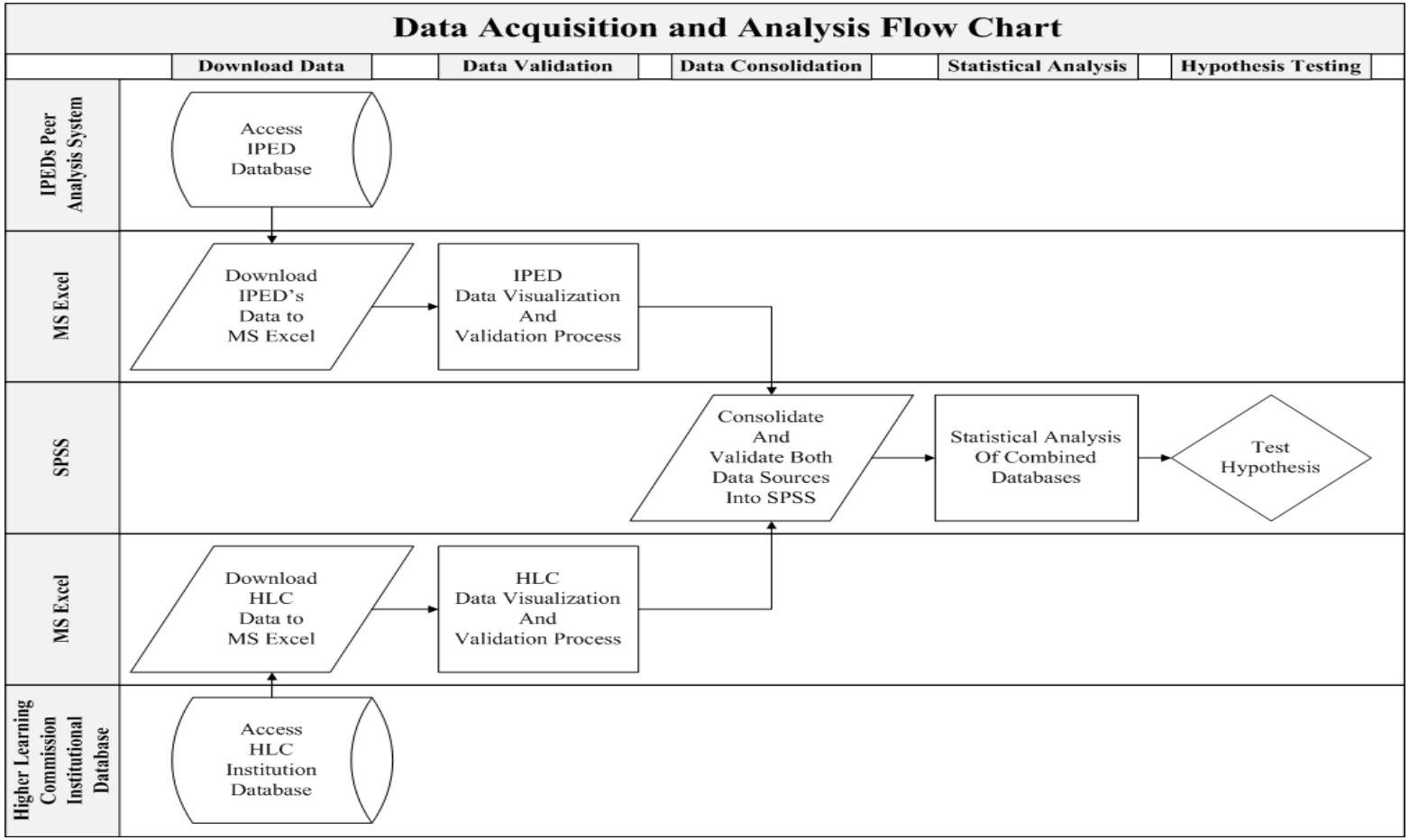
Appendix B
Standardized residuals distribution charts

Figure 2

Standardized residuals distribution chart,
where *RETRT* is dependent variable



Appendix C
Data Acquisition and Analysis Flow Chart



Appendix D
Cohen's Effect Size

Cohen (1988) defined effect sizes through the use of a table that illustrated d, *r* and r^2 values against a judgment of *effect sizes*, stating that "there is a certain risk inherent in offering conventional operational definitions for those terms for use in power analysis in as diverse a field of inquiry as behavioral science" (p. 25). Appendix D contains my Cohen's Effect Size analysis. Despite the risk of using these definitions of effect sizes, it has become commonplace among many researchers to employ Cohen's Effect Size, along with causal inference and statistical significance when concluding the relevance of a question predictor.

My research revealed that, where the dependent variable is *GRDRT*, the question predictor *ACCR*'s $r = 0.123$ and $r^2 = 0.015$, thereby explaining 1.5% of the dependent variable *GRDRT*. Using Cohen's Effect Table, ACCR's statistics are considered to have a MEDIUM effect, the causal inference is considered to be a partial explanation of the dependent variable (since $r > r_{partial}$) with a significance of .000, and the models overall $r^2 = 0.587$, thereby explaining 58.7% of *GRDRT*.

Where the dependent variable is *RETRT*, the question predictor *ACCR*'s $r = 0.262$ and $r^2 = 0.069$, thereby explaining 6.9% of the dependent variable *RETRT*. Using Cohen's Effect Table, ACCR's statistics are considered to have a LARGE effect, the causal inference is considered to be a partial explanation of the dependent variable (since $r > r_{partial}$) with a significance of .000, and the selected model's overall $r^2 = 0.566$, thereby explaining 56.6% of the dependent variable *RETRT*.

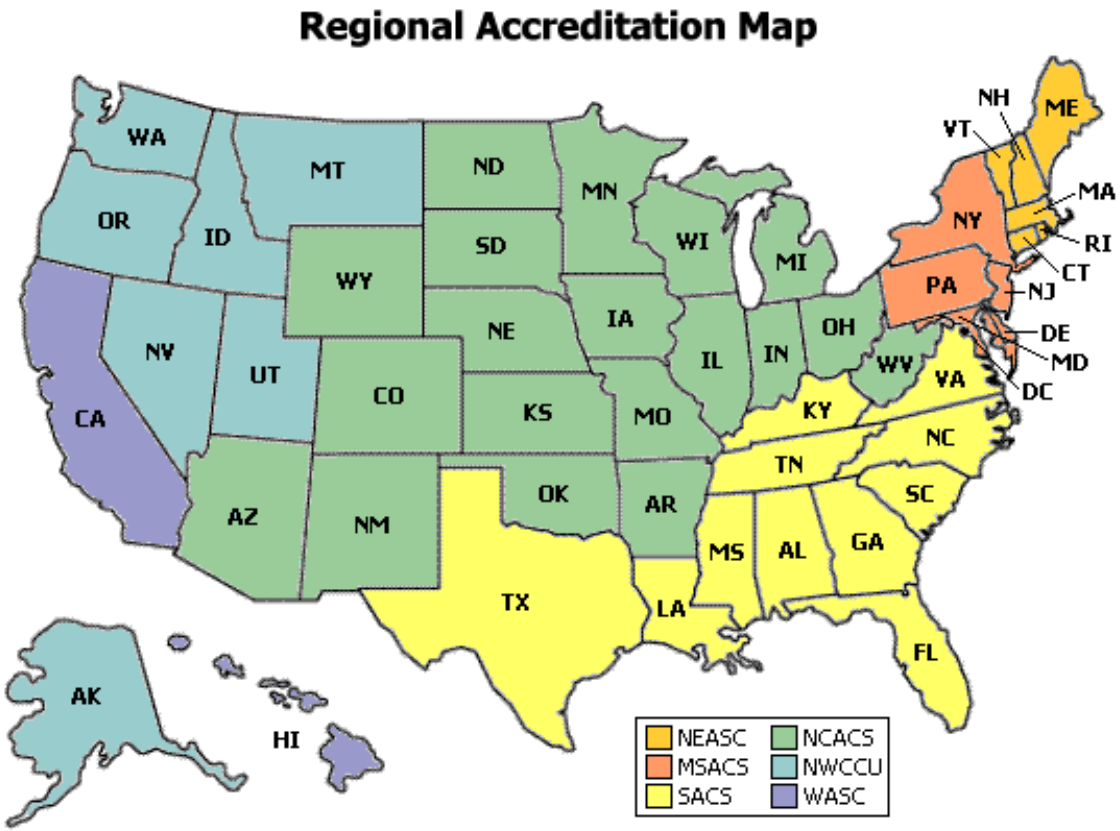
Cohen's Effect Size Table follows:

Appendix D
Cohen's Effect Size

Interpretation of effect size, causal inference and statistical significance for dependent variables grdrt and retrt, with statistically significant control variables

Cohen's Effect Size			Correlations: Question Predictor (accr)		Dependent Variable	Control Variables	Interpretation of Results: Cohen's Standard	Partial Correlation, Causal Inference & Significance				**Selected Model r^2**
Cohen's Standard	r	r^2	r	r^2			LARGE MEDIUM SMALL	$r_{partial}$	r relation to $r_{partial}$	**Causal Inference**	**Statistical Significance**	
LARGE	>0.330	>0.109										
LARGE	0.287	0.083										
LARGE	0.262	0.068	0.262	0.068	**RETRT**	GRDRT, YRSAQIP, STUDENTS, FACSAL, TUITION, FINAID, DEGREES, OWNER	**LARGE**	0.033	r > $r_{partial}$	**Partial Explanation**	**0.000**	**0.560**
MEDIUM	0.243	0.059										
MEDIUM	0.196	0.038										
MEDIUM	0.148	0.022										
MEDIUM	0.140	0.020										
MEDIUM	0.130	0.017										
MEDIUM	0.123	0.015	0.123	0.015	**GRDRT**	RETRT, YRSAQIP, STUDENTS, FACSAL, TUITION, FINAID, DEGREES	**MEDIUM**	0.051	r > $r_{partial}$	**Partial Explanation**	**0.000**	**0.589**
MEDIUM	0.120	0.014										
SMALL	0.100	0.010										
SMALL	0.050	0.002										
SMALL	0.000	0.000										

Appendix E
Regional Accreditation Commissions and their Service Territory
(NCACS is the North Central Association of Colleges and Schools / The Higher Learning Commission)



Source: http://www.mba-options.com/regional-accreditation.html

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