

CRISES IN DENTAL EDUCATION  
AN INSTRUMENTAL CASE STUDY EXAMINATION

by

Roger Willson Cooper

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As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Roger W. Cooper entitled Crises in Dental Education: An Instrumental Case Study Examination and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy

\_\_\_\_\_ Date 4/17/07  
Gary Rhoades PhD

\_\_\_\_\_ Date 4/17/07  
John Cheslock PhD

\_\_\_\_\_ Date 4/17/07  
Alma Maldonado-Maldonado PhD

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

\_\_\_\_\_ Date 4/17/07  
Dissertation Director: Gary Rhoades PhD

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SIGNED Roger Willson Cooper

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## DEDICATION

This dissertation is dedicated to Robie Willson. With rifle slung over her shoulder and trekking into the mountains of Wyoming every fall, or tilling an ever larger garden each spring, she assured sustenance in her household. Taking in sewing made ends meet. While some would consider hers' a hard life, she would no doubt disagree and wonder why she was so blessed each and every day for nearly 107 years. Her life has brought perspective to mine. I was honored to have her as a Grandmother for so many years.

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## ABSTRACT

This study illuminates the perceptions of dental school administrators and faculty of a new, non-traditional dental school and the extent to which these perceptions influence the processes of dental education within their school as well as their perceptions of crises in dental education.

Using an instrumental case study approach, an intrinsic case study examines perceptions that developed a non-traditional dental school. The case study is then instrumental in examination of the influences of the new economy and networks within the theory of academic capitalism that influence the formation and operation of this new school as well as influences on perceptions of crises in dental education as defined by organized dentistry.

All characteristics of the new economy (globalization, knowledge as raw material, non-Fordist manufacturing, educated/tech savvy workers) are perceived as profoundly influencing the processes of dental education at the new school. Of four networks within the theory of academic capitalism (new circuits of knowledge, interstitial organization emergence, intermediating networks, extended managerial capacity) only new circuits of knowledge are perceived to have profound influence on the formation and operation of the school.

The perceptions of characteristics of the new economy and networks of the theory of academic capitalism have established a dental school decidedly distinctive in the approach to dental education with the crises in dental education perceived as real and influencing this distinct approach taken by this school in providing dental education.

Salient characteristics of the new economy and networks within the theory of academic capitalism, when operationally defined, serve as powerful tools as explanatory vehicles to define the extent of their influence on the foundations and operations of this dental education institution and the extent to which these foundations and operations may influence the crises in dental education.

## CHAPTER ONE

### THE NATURE AND PURPOSE OF THE STUDY

When written in Chinese, the word “crisis” is composed of two characters. One represents danger, and the other represents opportunity.

-John F. Kennedy

“Crises” is the ubiquitous descriptor in US dental education during these early years of the new millennium. The word “crisis” is often referenced in higher education, whether professional journals and conferences or daily newspapers and news magazines, both domestic and international. The crises in US dental education have two distinctive characteristics, however. One, the crises have been explicitly defined and agreed upon by organized dentistry and US dental educators and two, the magnitude of the crises are so staggering they separate dental education crises from the crises facing many other higher education institutions.

This chapter provides an overview of this dissertation research conducted as an instrumental case study. The words and actions of administrators and faculty of the case study are utilized to examine four issues, including the crises in dental education. Also, the problems identified by the study are defined, as is the significance of the study for higher education. Theoretical foundations are reviewed as well.

#### Organization of the Dissertation

This dissertation is comprised of six chapters. Chapter One identifies the problems being addressed, the purpose of the study, the research questions, the significance of the

study and an overview of the theoretical frameworks that guide the design of the study. Chapter Two is a review of related literature and Chapter Three addresses the research design and methodology as well as sampling, data collection and data analysis. Chapter Four provides findings of the case study. Chapter Five continues with findings and analysis of the issues examined as an instrumental case study. Chapter Six provides the conclusions derived from this study.

### The Problem

Dramatic changes in higher education over the previous 25 years have been copiously documented, especially the influences of the marketplace and the new economy on institutions of higher education. Dental education institutions have not been exempt from these changes. In mid-2004, dental education was described as on the brink of a crisis so severe that only immediate and bold action can secure the future of the profession (ADA News, 2004, June 7). Shortly thereafter, stakeholders in the future of dental education, including professionals from dental education institutions, clinical practice, research, professional organizations, specialty groups, insurers, and industry, gathered to examine issues defining the crises in dental education. From these efforts, the American Dental Association (ADA) and American Dental Association Foundation<sup>i</sup> cited challenges, the crises in dental education, as faculty shortages, aging facilities, the cost of dental education, funding cuts, and student indebtedness (ADA News, 2004, July 12).

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<sup>i</sup> The American Dental Association (ADA) is the national organization representing the US dental profession. The American Dental Association Foundation is the charitable arm of the ADA. The Foundation secures contributions and provides grants for programs in dental research, education, access to care and assistance for dentists and their families in need.

Faculty shortages in dental education institutions are common and adversely affect the quality of dental education. The aging infrastructure at many dental institutions exacerbates the already high operating costs of dental school. The median cost to a dental school to educate one dental student for one year exceeds \$80,000 with these costs continuing to increase (Dugoni, 2004). Upon graduation from dental school, dental students have school debts that average over \$100,000 with debts well over \$200,000, or more, increasingly common.

Dental education literature is rich in descriptions that quantify the magnitude of the crises in dental education. Little scholarly work has been done to illuminate the perceptions of dental professionals and the influences these perceptions have on policies and procedures in dental education that may prompt or precipitate these crises or, on the other hand, perceptions that may preclude or diminish the crises in dental education.

Dental schools are often small, free-standing facilities that are physically distant from their parent university. These institutions have been “under the radar”, that is, researchers have missed the influences and implications of an ever-changing higher education system on dental education. There is a gap in the understanding of the perceptions of administrators and faculty in these often isolated, non-contiguous, institutions of higher education and how these perceptions may influence the processes of dental education in their schools as well as the crises in dental education.

### The Purpose

The purpose of this study is to illuminate the perceptions of dental school administrators and faculty at a new private, non-profit dental school in the southwestern sector of the US, specifically, the extent to which these perceptions influence the processes of dental education as well as perceptions of the crises in dental education.. An instrumental case study approach is used in this endeavor. In this approach, the case study is central to this effort but serves to refine understanding of one or more issues (Stake, 1995). The case retains importance but the issues become dominant.

The administrators and faculty of the new school have all trained at other traditional dental schools throughout the US. The dental school is a fully accredited US dental school yet has multiple distinct characteristics strongly suggesting a non-traditional dental education institution. These traditionally trained administrators and faculty of this dental school developed and now operate a dental education institution very different from their own education. The case study examines the perceptions of these administrators and faculty and the influences these perceptions have on the processes of dental education at their school, that is, attributes that have created a dental school distinctive from traditional dental schools. Chapter 4 reviews the findings of the case study.

The case serves to refine the understanding of several issues, that is, the case is instrumental in this effort with understanding of the issues having dominance over the understanding of the case. The issues converge around perceptions of the administrators and faculty of several salient characteristics of the new economy and intertwined

networks within the theory of academic capitalism that influence the processes of dental education at their school as well as perceptions of the crises in dental education. Chapter 5 reviews the findings of these issues. The perceptions of these issues are the research questions of this study.

### The Research Questions

1. To what extent do dental school administrators and faculty believe that there are crises in dental education?
2. To what extent do dental school administrators and faculty perceive the salient characteristics of the new economy and how are the processes of dental education influenced by these perceptions?
3. To what extent do dental administrators and faculty perceive major networks within the theory of academic capitalism and how are the processes of dental education influenced by these perceptions?
4. How does this case shed light on the larger state of dental education?

To summarize, this study examines administrator and faculty perceptions that influence the processes of dental education that have produced a dental school with distinctive differences from traditional dental education. This case study, in turn, is instrumental in examination of issues borne of the convergence of a new school operated in a non-traditional manner, perceptions of characteristics and networks within the theory

of academic capitalism and the influence these perceptions have the processes of dental education as well as the crises in dental education.

### Theoretical Frameworks

The theoretical frameworks that guide this study are the theory of academic capitalism and institutional theory. The theory of academic capitalism informs this study to a greater degree than institutional theory; however, both play a role in the research design, data collection and analysis, and conclusions drawn from this study.

#### *Institutional Theory*

Institutional theory holds that changes in formal organizational structures are explained as responses to changes in the institutional environment (Rhoades, 1992). Within educational organizations, formal structure is more a response to the environment and less to providing instruction. Furthermore, these organizations must have both the confidence and legitimacy of their environment to be beneficiaries of the social resources that bring both success and stability (Meyer & Rowan, 1978). This aspect of institutional theory informs this study as the administrators of the dental school act with external suppliers of resources and legitimacy far beyond organized dentistry. The work of DiMaggio & Powell (1983) also influences this study, specifically the concepts of mimetic and normative isomorphism. They define mimetic isomorphism as the tendency of organizations to model themselves after organizations that face similar problems and normative isomorphism as the tendency of professionals to exhibit similarity to their

counterparts in other organizations. The case study becomes intriguing as legitimacy has some reliance on concepts of DiMaggio & Powell (1983) but hinges on the conceptualizations of Meyer & Rowan (1978) and Rhoades (1992). Institutional theorists also perceive formal organizational structures as, in some measure, myths. The structures are, in fact, adaptations to external expectations that may have little effect on the work performed within the organization. This concept has reliance on organizational culture, not formal coordination, as a force that integrates the activities of the organization (Rhoades, 1992). Several cultures described within the case study have substantial structural influences that affect the school.

### *The Theory of Academic Capitalism*

The basic theme of academic capitalism is that globalization of the political economy is destabilizing patterns of university professional work (Slaughter & Leslie, 1997). The predominant theory that surfaced to better understand academic capitalism was resource dependency theory which broadly states that organizations deprived of critical revenues will seek new resources (Pfeffer & Salancik, 2003). The 1980s and 1990s brought diminishing state block grants and increasing interest by policy-makers in higher education development that increased national competitiveness in the global markets. With this stagnation of government funding, market-like behaviors, that is, academic capitalism, emerged.

Academic capitalism, as introduced by Slaughter & Leslie (1997), is a model with differences from the theory of academic capitalism. The model has a focus on research

universities in four differing English-speaking countries with the theory of academic capitalism having a focus on varied US institutions, not just research universities.

Academic capitalism also focuses on patents and technology transfer with the theory of academic capitalism focusing on a broader range of commercialization such as copyrights, software and courseware, and other educational materials. Academic capitalism delves into the encroachment of the profit motive in the university whereas the theory of academic capitalism refers to an internal profit motive that leads to networks that create structural changes within the university. Academic capitalism has predominant reliance on resource dependency and economic behaviors with the theory of academic capitalism retaining an economic component but adding political and social components to better understand structural changes and the impact on higher education institutions.

Academic capitalism has a focus on public research universities in pursuit of resources from basic and applied research endeavors. This case study, a new, non-traditional dental school, does not seek resources from basic or applied research. This emphasis of academic capitalism does not, therefore, apply to the case; however, the theory of academic capitalism consists of networks and associate characteristics of the new economy with applicability to this case.

Upon re-evaluation of academic capitalism, the theory of academic capitalism was published in 2004 (Slaughter & Rhoades, 2004). A significant difference from academic capitalism was an emphasis on analysis of interorganizational relationships and an actor-centered approach to revenue generating behaviors. Resource dependency theory was

abandoned with actors seen not exclusively as respondents to revenue loss but also as active participants in the formation of new sources of revenue.

The concept of the new economy is central to the theory of academic capitalism. The authors of the theory of academic capitalism define the salient characteristics of the new economy that are applicable to the theory. The characteristics of the new economy are that it is global, knowledge is treated as a raw material to be marketed and sold at market price, and that it embraces a non-Fordist production process such as just-in-time input/output or flexible personnel, time, or scheduling. The final characteristic is that the new economy requires educated workers and consumers. The theory of academic capitalism explains the process of college and university integration into this new economy (Slaughter & Rhoades, 2004).

A triad of networks provides a platform for the theory of academic capitalism. As developed by Slaughter & Rhoades (2004) these networks are new circuits of knowledge, the emergence of interstitial organizations and intermediating networks. These networks lead to a fourth network defined as extended managerial capacity. New circuits of knowledge refers to knowledge transfer that is no longer the exclusive province of faculty members working with students or through their departments and professional associations. The emergence of electronic standardized teaching, partnerships with industry, shared peer review, and external ratings of colleges and universities all serve as examples of new circuits of knowledge. As higher education organizations embrace activities for generation of external resources, new organizations can emerge from the interstices of the university to manage these activities, such as technology licensing or

economic development offices. This is the emergence of interstitial organizations. The third network is intermediating networks. Differing sectors, academic and nonacademic, become part of organizations, intermediating networks, that have interest in solving problems that stem from opportunities found in the new economy. These networks can lead to a fourth network, extended managerial capacity. Engaging the market simply requires more people as the capacity for market engagement increases.

Two themes are predominant within this theory. The first is a shift from a public good knowledge/learning regime to an academic capitalist knowledge/learning regime. The former refers to academic freedom with an emphasis on basic research and well defined boundaries between the public and private sectors with the latter referring to a private good that derives its value via creation of profitable products. The second theme emanates from the first; an emphasis on the blurring of boundaries between the public and private sectors.

The theory of academic capitalism provides four salient characteristics of the new economy that are central to the theory as well as four networks within the theory. They are presented by the authors as distinct but often intertwined. In conversation with one of the authors (GR), I inquired about the use of these characteristics and networks as tools, hopefully powerful tools, to examine perceptions of dental school administrators and faculty and to what extent these perceptions influence the processes of dental education as well as perceptions of the crises in dental education. The use of the characteristics and networks intrinsic to the theory of academic capitalism as tools for examination of these dental education issues serves as another avenue of research utilizing the theory of

academic capitalism. I was assured that this approach would be both interesting and acceptable (G. Rhoades, personal communication, April 19, 2006). Figure 1.1 illustrates the operational approach adopted for this study.

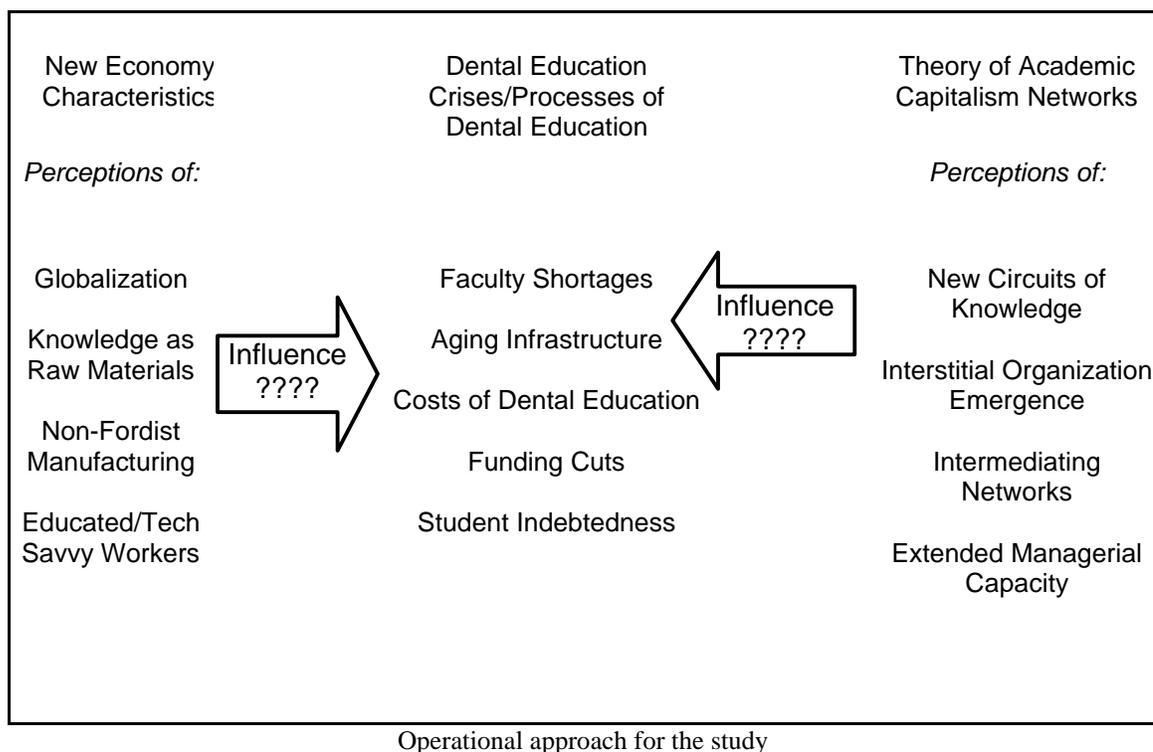


FIGURE 1.1

### Significance of the Study

This study contributes to scholarship research and literature in higher education in several ways. The theory of academic capitalism was introduced in 2004 to explain the processes by which universities integrate with the new economy (Slaughter & Rhoades, 2004). The introduction of this theory is so recent that the implications of this theory in

higher education research have barely scratched the surface. Certainly the use of this theory in the study of dental education serves as an inaugural study of this type.

Salient characteristics of the new economy are central to the theory and intertwined with the networks within the theory of academic capitalism. This study utilizes these characteristics and networks as tools to examine and better understand dental education but this need not be limited to dental education institutions. For example, the American Dental Association established and centralized a corporate relations center in 1994 to simplify interactions with the private sector. The Journal of the American Dental Association used to list the editor and associate editors but now includes, in addition, a large listing of corporate advisors. The ADA is not an educational institution but is intrinsically tied to all US dental schools and whether partnerships between public and private sectors, or corporate philanthropy, market values continue to influence organized dentistry as well as educational institutions. Application of the theory of academic capitalism could benefit the understanding of these relationships and assist in defining relationships that could become opportunities.

Finally, this study also examines the perceptions of dental administrators and faculty through all the lenses of the theoretical frameworks to see where they are taking their dental education institution in an uncertain era of dental education.

## CHAPTER TWO

### LITERATURE REVIEW

#### The Context

On March 9, 1849 the legislature of the state of Maryland chartered the Baltimore College of Dental Surgery. This was the first institution of its type and introduced institutional dental education to the world. This was followed by the opening of many other dental schools, most proprietary and, unfortunately, many were saddled with dubious faculty, staff, facilities, and curriculum (DePaola, Slavkin, 2004). Many medical schools of this era were also producing poorly trained and poorly educated practitioners. In the early 20<sup>th</sup> century, the Carnegie Foundation for the Advancement of Teaching supported a series of reports directed toward teaching and educational improvements in the United States. The fourth of these reports, the Flexner report, addressed medical education and resulted in the closing of many medical schools and quality improvements in those that remained open (Flexner, 1910). The tenth of this series of reports became known as the Gies report and addressed dental education. William Gies, a Columbia University biochemistry professor, produced this report in 1926 after five years of effort. This 650 page document produced results similar to medical education (Gies, 1926). At the time the report was released, 57 proprietary dental schools existed in the United States. Just three years later, in 1929, the last proprietary dental school had disappeared (Meskin, 1996). Dental schools were built, others consolidated, with all dental schools becoming part of a parent university and under the umbrella of higher education.

In the 1960s, federal government perception of a national dentist shortage initiated capitation programs that doubled the number of graduates from dental schools (Dugoni, 2004). The Health Professions Educational Act of 1963 and the Comprehensive Health Manpower Act of 1971 committed millions of dollars for expansion of dental schools. New schools were built and others were refurbished or enlarged. These costs of dental education were borne largely by these capitation programs. However, within two decades this government funding had all but evaporated with, for example, the \$85.6 million in federal support in 1975 dwindling to \$9.7 million by 1997 (Kennedy, 1999). The adverse effects of this eight-fold decrease in federal support included class size reductions, several schools closing, a lesser number opening, with all remaining under the umbrella of a parent university. Over this same time period, revenues from state governments increased from \$117.6 million to \$413.1 million, however, this represented a net decrease in dental school revenues as the percentage of revenues required to run the schools, that is, the percentage of revenues from state governments decreased from 37.9% of dental school revenues to 35.6% of dental school revenues (Kennedy, 1999). Student tuition and fees as well as clinic income jumped from 27% of dental school revenues in 1975 to 51% of revenues in 1997 ( ADA Survey, 1999, Vol. 5). The last 10 years of this time period saw clinic revenues increasing at a rate of 7.7% a year but with this rate of increase was showing signs of decline (Douglass & Fein, 1995).

At the beginning of this new millennium, university-based dental education has become the most costly professional degree within the entire university portfolio (DePaola & Slavkin, 2004). The average annual cost to dental schools for training one

dental school student for one year was \$78,763 in 2002 (Brown & Meskin, 2004). The new millennium has ushered an increase of these costs of 10% or more per year, a decline of state support of nearly 25% annually, and an aging infrastructure at many dental schools that exacerbate the costs of dental education (Dugoni, 2004).

The cascading effects of plummeting government support of dental schools and a declining rate of clinical revenues has been accompanied by an increase in student tuition and fees. The average educational debt of dental school seniors in 2002 was \$107,503. This represented a 92.3% increase from ten years earlier (Brown & Meskin, 2004). Concurrently, an increased demand for dental services has surfaced at a time when the huge influx of dentists trained during the years of capitation programs are beginning to enter their retirement years. This supply/demand change has contributed to a significant disparity in dental income from private practice versus income as dental school faculty. Dental school faculty vacant positions have increased with low dental faculty salary the primary reason for a lack of interest in an academic career (McNally, Dunning, Lange & Gound, 2002).

As the landscape of dental education has changed, emerging issues have precipitated that are both current and dramatic; this is illustrated by a survey of dental school deans in 1999 that was repeated in 2002. In 1999, the workforce needs within dental schools were of concern by only six dental school deans. By 2002, this became a concern by sixteen deans (Chmar, 2004). This increase in concern extended into infrastructure needs and resource management as well. In 2004, stakeholders in the future of dental education, including professionals from dental institutions, clinical practice, research, professional

organizations, specialty groups, insurers, and industry, gathered to examine issues in dental education. In June, 2004, the ADA News, the monthly newspaper published by the American Dental Association, stated that dental education was on the brink of crises so severe that only immediate and bold action can secure the future of the profession (ADA News, 2004, June 7).

### The Crises in Dental Education

In July, 2004, the crises in dental education were delineated by the ADA and ADA Foundation as faculty shortages, aging facilities, costs of dental education, funding cuts, and student indebtedness (ADA News, 2004, July 12).

#### *Faculty Shortages*

Over the next ten years, an estimated 3,400 dental faculty positions will be vacated as a result of faculty retirement alone (DiMatteo, 2005). With US dental schools graduating 4,000 dentists a year, and less than 1% traditionally pursuing academic careers, faculty shortages become daunting. The 2003/04 academic year had 291 budgeted positions vacant with 43% of these vacant less than 7 months; a decline of 55% from the previous year (Weaver, Chmar, Haden, & Valachovic, 2005). It is taking longer, then, to fill vacated faculty positions. The turnover of dental faculty has remained steady for more than three decades with a rate of approximately 33% every five years (Kennedy & Hunt, 1999). The rate of turnover during this time due to retirement has increased from 17% to 37%. This is consistent with the “graying” of dental faculty. Another 27% leave

academics for private practice and an equal percentage tends to jump from one institution to another.

Approximately 1200 basic science faculty within dental schools are joined by nearly 3,600 clinical faculty in staffing US dental schools. This full time faculty is complimented by 1350 full-time equivalents that are provided by 6,450 part-time faculty that, on average, contribute a half-day a week (Kennedy & Hunt, 1999). Approaching the new millennium, part-time faculty constituted about 27% of the total of FTE for clinical faculty.

The type of academic appointment has been changing in dental education as well. The percentage of full-time clinical faculty either tenured or on a track leading to tenure has decreased from 92% in 1980 to 72% in 1996 (ADA Survey, 1999, Vol. 3). While dental schools have historically followed US academic institutions in seeking to recruit faculty that excel in teaching, research, and service, a 15 year trend, or shift, has continued that makes use of more nontenure track appointments (Kennedy, 1995).

The recruitment, development, and retention of dental school faculty is the primary crisis facing dental education (Hutchinson, Haden, & Valachovic, 2000). Dental schools simply do not have respondents to their searches for faculty. It is not atypical to have two or three budgeted clinical faculty positions go unfilled at the beginning of an academic year. This number often represents 5% of the faculty that devotes 50% or more of their effort to teaching (Kennedy, 1990). The number of active private practitioners has peaked and is now in decline, that is, the large number of dentists produced during the capitation program years are retiring. Dental schools have been graduating about 4,000 dentists a

year with this number having been stable, and anticipated to remain stable. With an increasing population, the demand for dental services has been increasing with a resultant decline in the dentist to population ratio. An incentive to enter private practice, as opposed to academics, is especially positive and expected to continue to be so. The income differential between those choosing an academic career and private practice is significant. For example, in 1997, the average academic salary in dental school was \$77,300 (American Association of Dental Schools, 1997). During this same time, the average income in private practice averaged \$134,590 (Brown & Lazar, 1998). The ongoing trend in salary differentials during this new millennium has been an ever-increasing disparity. Data from 2005 demonstrates the salary of veteran dental faculty professors having increased to an average of \$146,826 annually (Wells, 2006) and the private practice salaries of dental specialists averaging \$287,190 (Valachovic, 2006). Even with increases in both academic and private practice salary averages, the gap between the two continues to widen. This substantial income differential is further compounded by expectations that faculty members will generate a portion of their own incomes. This is borne of the expectation by the parent university that dental schools function as independent financial units, with their faculty contributing to education, research, and patient care, and generating financial resources to support their educational programs of their schools and a share of their own compensation (Kennedy & Hunt, 1999). This is, then, the “tub-on-their-own-bottom” theory taken to both the institutional and personal level. This changing expectation from academic dentistry serves as a deterrent to an academic career.

The shift in academic appointments with an increased number of full-time clinical faculty in positions that do not lead to tenure emphasizes a reluctance to make long-term commitments to academic disciplines that are perceived to be expensive and serves as a major change in dental academics over a span of two decades (ADA Survey, 1999, Vol.3). To those contemplating an academic career, this must be a concern, especially to junior faculty who have their financial future dependent on an academic appointment and may not have reasonably available alternatives.

Preparation for a career in academic dentistry requires five to seven years after graduation from dental school. The most sought after individuals have completed specialty training; this two to five years of residency training, followed by additional formal training in basic or behavioral sciences and preferably a PhD. The time and expense of this additional training is often in conflict with the ever-increasing level of debt by dental students and a sense of urgency to enter private practice to address these debts. Thus, reluctance develops to expend the time and dollars needed for an academic career.

The deterrents to pursuit of a dental academic career have served to develop strategies to create a more favorable environment for an academic career. The American Dental Association, along with allied national organizations such as the American Association for Dental Research and the American Dental Education Association, have developed strategies, some still conceptual, others functional, that address needed changes in this environment.

An Institute of Medicine comprehensive review of dental education called for greater flexibility in the use of types of faculty appointments as a means of better achieving educational, research, and patient care objectives (Institute of Medicine, 1995). This has served as a springboard for a conceptual change that begins with a shift in the unit of measure of productivity from the individual to the department and entire school (Kennedy & Hunt, 1999). The concept is premised on faculty members making a contribution to the goals and achievements of the institution, the contribution by any given faculty member may be quite different, but the contribution will be valued and rewarded equally as based on the quality of that contribution. Faculty tracks have been conceptualized as clinician scholar, dentist scholar, research scientist, full-time clinician, research development specialist, administration, and emeritus status, each having their distinctive description and criteria for evaluation. These descriptions and methods of evaluations have been derived from existing efforts in some medical education institutions in combination with efforts of a few dental schools to synthesize these descriptions with tenure and non-tenure track appointments that reflect an emphasis on research versus teaching (Kelly & Stross, 1992).

A more positive environment to encourage a dental academic career includes a concept that re-defines the meaning of full-time faculty. This concept defines full-time as three or four days a week with a full range of benefits. With a trend toward non-tenure full-time positions in dental schools and the ever-increasing disparity in salaries between an academic career and private practice, faculty would have the time and opportunity to

participate in the private sector. If an academic appointment is not renewed, the faculty member retains a means of financial support.

This concept also encourages faculty to focus on their greatest strengths. Clinical faculty, largely with non-tenure appointments, could concentrate on clinical teaching and patient care, their areas of expertise, and avoid the requirements of research, grant writing, and publication. This would precipitate two types of separate, well-defined, faculty: research and clinical. The research faculty would be expected to generate external funding with the clinical faculty expected to generate funds via increased student productivity.

Debt Forgiveness is another concept in which a portion of student loans are forgiven in exchange for pursuing a full-time dental academic career. Such programs are available to dentists who provide treatment in underserved populations. This concept, as a debt forgiveness vehicle, would require aggressive legislative pursuit from organizations representing both practitioners and academicians alike.

Restrictions on licensure regarding dentists trained in other industrialized countries have proved a barrier in consideration of these dentists as faculty members in the US. Another concept, then, is an effort to mobilize legislative efforts to remove restrictions on foreign trained dentists so that a US academic career would be possible. Licensure policy changes would reverse the present restrictions that inhibit qualified foreign faculty from accepting appointments at US dental schools.

The Health Resources and Services Administration (HRSA), an agency under the auspices of the US Department of Health and Human Services, has moved from the

conceptual stage to a functional program that assists in addressing dental faculty shortages. HRSA administrates the Health Professions Faculty Loan Repayment program (FLRP). Dentistry is among health professions eligible for up to \$20,000 annually in the FLRP program. When an applying dental school graduate enters a contract with a dental school to teach for two years, the federal government agrees to repay a portion of the principal and interest of the participants educational loan for each year of eligible faculty service with the dental school required to pay an equal amount to what the federal government pays (Health Resources & Services Administration, 2006).

Four dental specialty organizations also have functioning programs that address faculty shortages in their specific specialty. The American Association of Endodontists, through their Foundation, offer an Endodontic Educator Fellowship Award as well as awards supporting endodontic research, including endodontic education (American Association of Endodontists, 2006). The American Academy of Periodontology, through its Foundation, offers several awards for faculty as well as students who have expressed an interest in dental education. These focus on areas such as teaching and research, visiting scholar education grants, and teaching fellowships (American Academy of Periodontology, 2006). The American Association of Oral and Maxillofacial Surgeons have faculty educator development awards, awards for predoctoral teaching, and outstanding educator awards (American Association of Oral and Maxillofacial Surgeons, 2006). The American College of Prosthodontists Education Foundation provides up to \$20,000 annually in support of education and research in the form of scholarships (American College of Prosthodontist Education Foundation, 2006).

The American Dental Association Foundation, a charitable arm of the American Dental Association, has provided the financial support to launch a faculty recruitment program through the joint efforts of the American Association of Dental Research and the American Dental Education Association<sup>ii</sup> called the Academic Dental Careers Fellowship Program, it consists of two complementary efforts. In one, informational seminars are presented at ADEA and AADR annual sessions, which are expected to be attended by more than 800 dental students. Several seminars cover faculty roles, loan repayment programs and the importance of dental education. The other part is a year-long learning and networking experience for ten students during their third year of training. Pre-clinical teaching, work in research labs, and interviews with their faculty and administrators as well as problem-based learning exercises and case presentations form the core of the experience. They will receive a \$2000 stipend. This program became a functioning program in July, 2006 (ADA News, 2006, Aug 21).

Another resource available to both dentists and dental students considering a career in academic dentistry is a program sponsored by the American Dental Education Association. The Academic Dental Careers Network matches individual interests with the needs of dental schools seeking to fill vacant positions (American Dental Education Association, 2006).

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ii The American Dental Education Association (ADEA) is the leading national organization for dental education. The mission of the ADEA is to lead individuals and institutions of the dental education community to address contemporary issues influencing education, research, and the delivery of oral health care for the health of the public. Since 1923 the ADEA has worked to promote the value and improve the quality of dental education.

The Academy for Academic Leadership is a collaboration of scholars, educational specialists, and program managers that provides professional development and personal enrichment programs to academic health professions faculty and administration for the purpose of improving job performance, career satisfaction and institutional success. Within this academy is the Program for Dental School Faculty. This is a three phase program designed to prepare dentists and dental educators for successful academic careers (Academy for Academic Leadership, 2006).

Isolated efforts are also being initiated by individual dental schools. University of Texas-San Antonio has introduced a three-elective series of courses for students to explore facets of an academic career. Similarly, fourth year students at Harvard School of Dental Medicine have an elective two-month elective rotation in a Dental Educator program in which coursework in the Harvard Graduate School of Education is supplemented by course preparation and evaluation exercises. The University of Illinois/Chicago College of Dentistry has provided flexibility in the curriculum to allow time to pursue educational opportunities in the Chicago area.

Deterrents to a career in academic dentistry are formidable and, without conceptual changes and subsequent programs, the faculty shortfall will continue and be significant. Dental associations and dental school programs have created interest in a small number of dental students; this laudable but not capable of producing nearly the number of faculty needed. Future faculty will need the positive environment and incentives to accommodate personal goals and allow professional growth.

*Cost of Dental Education & Funding Cuts*

Trends in the financial aspects of dental schools provide the background for the crises in the cost of dental education and funding of dental education. Aggregate data sets from the 1973-1992 time span and again for the 1993-2002 time span illustrate important shifts in the sources of revenue that support dental education. Within data sets, categories of sources of fund revenues are divided into federal support, state/local support, student tuition & fees, clinic income, and “other”, which represents sponsored education, research & training, and endowment funding. The clinic income category refers to income to the school as a result of dental students providing dental services to people in the community.

A review of the trends in sources of revenue for dental schools over 19 years, beginning in 1973, reveals substantially different proportions of total dental school revenues among categories. In 1973, dental education represented a \$238 million sector of higher education. Federal government contributions to dental education were \$71.2 million, which represented 29.9% of dental school revenues. State government contributions were \$85.9 million; 36% of dental school revenues. Student tuition and fees were contributing \$41.1 million which represented 17.3% of revenues, clinical revenues generated another \$21.8 million, representing 9.1% of revenues and the “other” category (sponsored education, research/training, endowments) produced \$18.2 million; this 7.7% of revenues (American Association of dental schools, 1995). The 1991/92 data reveals a fairly linear increase in dental school revenues over time with dental schools now representing a \$1.1 billion sector of higher education. Over these 18 years, however, two

significant changes take place. At the federal level, the percentage of funding as a source of revenue to the dental schools has dropped to 10.5%, that is, during this time period, contributions by the federal government decreased by 19.4%,. During this same time period, state/local government support increased by 6.4%, student tuition and fees provided an increase of 4.7%, clinic income increased an average of 6.2%, and “other” sources provided 22%.(American Association of Dental Schools, 1995). Analysis of trends from 1973 to 1992 with the effects of inflation removed by consumer price adjustments and calculated in 1991 dollars reveals that federal support of dental education had declined by 50%, state/local support remained level, student tuition and fees had doubled, clinic revenues had doubled, and the “other” revenues had increased 80% (ADA Department of Educational Surveys, 1993).

When the latter half of the 1973-1992 time period is evaluated separately, additional trends are delineated that bring clearer perspective to trends from the early 90s to the millennium. From 1985 to 1992, state revenues to public schools increased however, state support as a percentage of public dental school revenues decreased. A slow but steady decline in support of dental schools is evident with declining annual increases up to 1989, then annual negative increases continuing through the 1992 time span (Douglass & Fein, 1995).

Data sets from 1993-2002 continue the trends of the previous two decades. By 2002, dental schools had become a \$1.8 billion sector of higher education with annual expenditures exceeding revenues for all but three of these years. A comparison of two divergent years, 1975 and 1997, demonstrates the financial trends that set the stage for

dental school revenue and funding crises. In 1975, the federal government contributed \$85.6 million to dental schools with this representing 27.6% of dental school revenues. By 1997, this had been reduced to \$9.7 million; this representing 0.8% of dental school revenues. Contributions by state governments increased from \$117.6 million in 1975 to \$413.1 million in 1997; however, this represents a decrease in dental school revenues, as a percentage of revenues, from 37.9% to 35.6%. Student tuition and fees totaled \$51.6 million in 1975 and increased to \$353.9 by 1997 with this representing an increase from 16.6% of revenues in 1975 to 30.5% in 1997. Clinical services revenue was \$32.2 million in 1975 and increased to \$241.3 million in 1997. Clinical services, as a percentage of revenues, increased from 10.4% to 20.8%. The “other” category also increased from \$23.4 million to \$141.2 million; this representing an increase from 7.5% to 12.3% of revenues (Kennedy, 1999). This data demonstrates only modest increases in state/local funding and an eightfold decrease in federal government support that had been offset by more than 500 percent in tuition and fees, clinical services, and other sources (ADA, 1999, Vol.5). In 1975, tuition/fees and clinic revenues together accounted for 27% of dental school revenues. By 1997, revenues from these same two sources accounted for 51% of dental school revenues (ADA Survey, 1999, Vol.5).

A synopsis of these trends demonstrates a precipitous decline in federal contributions to dental schools, a slight decline of state and local support with increases in revenue due to increases in tuition and fees, clinical revenue, and “other” sources of revenue. In 2002, nearly \$1.8 billion was expended by dental schools with 33.6% attributed to instructional expenses, 23.2% to patient care expenses, 10.2% to sponsored research and training,

8.4% to general university overhead, and 7.8% to administrative costs (ADA Survey, 2004, Vol. 5)

The trends in the sources of revenue for dental schools frame the crises in the cost of dental education and the funding of dental education. The average cost to train one dental student for one year in 2002 was \$78,763 with preliminary data through 2004 suggesting that each succeeding year has increased another 10% per year and, concurrently, state and local funding continues to decrease (Dugoni, 2004). The traditional avenues of revenue that have been propping up dental education in recent years are clinical revenues, student tuition/fees and the “other” category, i.e., research dollars and gifts/endowments. These revenue streams have limiting factors, however, that will limit the rate of increase that may be possible in future years.

Three factors will adversely affect the rate of increase in clinical revenues. The first of these is the capacity of the physical facilities. The building of new facilities or acquisition of existing structures could provide additional capacity but the expense needs to be less than the potential for income. This dovetails with the second factor, that is, the patient population seeking dental services at a dental school frequently have limited financial means or are part of an underserved population. The reduced fees could be offset by a larger volume of dental services but this could put dental institutions in direct competition with community practitioners. The third factor limiting clinical revenues is the ratio of general dentistry students and students in specialty programs. An increase in graduate positions within dental schools generates more revenue (Kennedy, 1999). The problem is that this would be counter to maintaining the current balance of generalists to

specialists. All three factors would be efforts to increase access, often to underserved populations, but increased access without adequate funding would only compound the problem (Institute of Medicine, 1995).

Increased dental school revenues could also be realized by a continuation in increases in tuition and fees. Two factors place limitations on these increases. One, dental schools have been institutions that make dental education available to those with academic ability and the interest to pursue dentistry as a profession. Ongoing increases could change this criterion so that admission to dental school is based on the ability to pay for dental school. Another factor is the high level of student debt due to high tuition which could strongly influence student decisions to pursue graduate education (Weaver, 1999).

The primary source of federal derived research funding in dental education is through a component of the National Institutes of Health (NIH). The NIH is the national medical research agency under the US Department of Health and Human Services that coordinates nearly \$28 billion in research funding. The National Institute of Dental and Craniofacial Research (NIDCR) is one of 27 institutes and centers within NIH. The mission of NIDCR is to support basic and clinical dental research, conduct and fund research training and career development programs to insure an ongoing pipeline of well-prepared researchers, coordination of research among all sectors of the research community, and promote the transfer of knowledge from research to the public, health professionals, researchers, and policy-makers (National Institute of Dental and Craniofacial Research, 2006). The mission is broad as are the types of research activities supported by NIDCR grants. For example, Howard University College of Dentistry has a

NIH-based grant to explore innovative molecular genetic research approaches toward head and neck cancer in collaboration with Johns Hopkins University (Inside Dentistry, 2006, May). The University of North Carolina School of Dentistry, in collaboration with dental schools at Maryland, Florida, and Buffalo, have a NIDCR grant for research regarding causes and treatments of temporomandibular joint disorder (Inside Dentistry, 2006, March). The NIH has a set aside of 3% of its extramural budget dedicated to research focused on new products or technologies. The bulk of this (2.5%) is funding for a program called the Small Business Innovation Research (SBIR) program and the remainder (0.5%) is for the Small Business Technology Transfer Research (STTR) program. In 2004, NIDCR set aside \$6.7 million for these programs for the funding of proposals for development of 44 new products (Rossomando, 2004). These serve as examples of a broad range of research grants such as basic science cancer research at Howard, clinical research by a consortium of dental schools in the eastern US, or technology development and transfer by multiple schools.

Two major circumstances may adversely impact federal funding for research that serves as a revenue stream for dental schools. Established in 1948, NIDCR has been the only institute within the NIH that serves to improve oral, dental and craniofacial health through research, research training, and the dissemination of health information. The new millennium has ushered annual discussion by policy makers regarding NIDCR. The discussion is the possible future merging of NIDCR into another institute or institutes within NIH. The dental profession, educational community, and public must ensure that policy makers maintain the integrity of NIDCR as a separate institute according to the

American Dental Education Association (Hutchinson, Haden & Valachovic, 2000). The second circumstance is more recent and concrete. Funding for NIH in 2006 increased by 0.7%, the smallest increase in 36 years and well short, another 2.5%, of what will be needed by NIH to sustain research efforts. Within that budget, NIDCR fared worse with a 0.9% decrease from the FY 2005 budget (Valachovic, 2006).

There is a lack of parity in research dollars from the federal government to dental schools as a revenue stream with about 20% of dental schools receiving the bulk of these funds (ADA Survey, 2004, Vol.5). While all schools may be impacted by decreased research funding, those schools with a history of large research grants could find funding shortfalls disturbing if not devastating.

Dental school endowments are historically low (ADA, 2004). The most recent year of aggregated data of all dental schools was 2002 when the endowment for all schools was \$65,262,161. This is the total for all 56 dental schools. Thus, alumni giving to dental schools is historically low; representing just fractions of annual revenues (Douglass & Fein, 1995). The ADA Board of Trustees and the American Dental Association Board of Directors have agreed to pursue a campaign to launch in 2007 that addresses endowment/gift fundraising (ADA News, 2004, June 7). An initial direction at the time of this announcement was a National Endowment of Dental Education with donations funneled through the ADA Foundation. In 2006, a nationwide collaborative effort was established to raise the awareness of the needs of dental education. The goals of this initiative are to raise awareness of the challenges facing dental education, to promote a culture of philanthropy within dentistry, and deliver a call to action to support dental

education ( ADA News, 2006, July 10). The program, Dental Education Our legacy—Our Future, serves as a support role for fundraising efforts.

### *A Cultural Conundrum*

The following two excerpts are from “letters to the editor” by practicing dentists. The first as follows: “Instructors insulted, denigrated, abused, and misused me. . . . the bells and whistles should have been sounding years ago about this kind of education. Dental schools also complain that they do not have the funding they need. They are always asking for money. But I stop and think: Do I want to give to an institution that treated me so poorly? I think not. You reap what you sow” (Inside Dentistry, March, 2006, p. 12).

The second as follows: “When my friends and colleagues and I get together and reminisce about our dental school experiences, they are, for the most part, reliving of a nightmare. As I recall, most of the instructors were belligerent and difficult and often abusive. Many seemed to literally relish being insulting and demeaning to the student, and from my many discussions with my colleagues, their experiences are notably similar. For most of us, graduation was about survival and liberation from the horrors of our purported educators. Why then would any of us consider returning to that environment we so loathed?” (Inside Dentistry, July/August, 2006, p.14).

These excerpts represent fairly typical letters to the editor of many of the dental journals, magazines, and dental newspapers from many generations of dentists. This has not been lost on the chair of the Dental Education Our Legacy—Our Future initiative. In his introduction of this initiative, he states in part: “I understand that some may carry

negative memories about their experience at a particular dental school, and know that those are difficult to let go of. What Our legacy—Our Future represents is beyond the individual experience” (Dugoni, 2006 , p.12).The negative comments are pervasive in dentistry as is the historically low level of endowment and gift revenue to dental schools.

### *Ongoing Trends*

The trends in the cost of dental education and funding of dental education have suggested pending financial crises over time that became several defined crises in 2004. In 1995, the Institute of Medicine issued a report that addressed perceived pending problems. This report outlined several strategies such as the consolidation of courses, departments, programs, and even suggested the possible merging of schools. Regional schools with sharing of faculty via electronic education and regional consortiums to increase purchasing power as methods of cost savings were strategies suggested as well (Institute of Medicine, 1995). These strategies focused on the costs of dental education, not funding sources, but initiated dialogue regarding ideas that seemed quite radical just prior to the new millennium (Kennedy, 1999).

Dental schools, as with other academic institutions, have had increasing interest in university-industry relationships to address their financial crises. Dental schools were generally disdainful of working with industry back in the 1960s, preferring perceived less tainted dollars from government sources, however, these relationships with industry have been evolving over time (Ross, 1988). Opinions have changed and, at the beginning of the new millennium, it is common for industry and academic institutions to interact in a

variety of ways. Industry has the need to conduct clinical research and dental schools have the clinical facilities, the ability to recruit subject populations, and the expertise to conduct clinical trials. In addition, clinical trials at schools with good reputations result in enhanced credibility which is projected to the product tested and to regulatory agencies. Better guidelines for clinical trials and development of new and better technologies have served to drive an increase in clinical trials at a time when dental schools are seeking additional avenues of revenue as other sources of funding have diminished. Faculty also benefit from publications and presentations that may ensue from these efforts. This can be a win-win opportunity for both partners, the dental schools and industry, however, potential exists for conflicts and less salutary outcomes (Blumenthal, 1992, Thompson, 1993, Korn, 2000). The concern relates to the potential for financial relationships to create conflicts of interest and influence individual or institutional behavior as well as decision-making. Dental schools, as institutions, have potential to succumb to conflicts of interest that can impact both educational and research activities. Faculty could become too heavily involved in these activities at the expense of academic responsibilities. In some cases, commercial goals of research can subordinate untargeted basic research. As sources of revenue of dental schools dwindle, royalties and/or licensing fees can become increasingly important to the financial well-being of the schools and upset any sense of balance in the research arena. Alignment of faculty or the institution also has some potential for influencing curriculum and can alter the objectivity of research efforts.

These concerns are echoed throughout higher education. The ongoing contest between the values of the market and those of the commons, discovering/sharing and passing of

knowledge versus hoarding and selling of knowledge, and the maintenance of a community of scholars versus balancing of the books are all similar themes (Kirp, 2003). Similarly, Derek Bok, the former president of Harvard, summed up these concerns as he wrote: “it will take very strong leadership to keep the profit motive from gradually eroding the values on which the welfare and reputation of universities ultimately depend” (Hunnewill, 1994, p. 35). Dental schools, like their medical counterparts, are often the test beds for new products, devices, and pharmaceuticals. As such, concerns elaborated in higher education become acute in the health care arena as uneasy alliances may develop that create struggles to separate education from marketing that could impact patient populations (Belman, 2001 Blumenthal, 1996, Wazana, 2001 Bodenheimer, 2000).

Dental schools, in response to diminishing revenues, are participating in dental institution-industry relationships, some representing subtle shifts as a changing paradigm, others bold and controversial. Dental education is a collaborative enterprise that includes the dental schools, dental industry, provider organizations, and dental governmental agencies. The dental industry has been providing dental schools and their students instrumentation, devices, and materials, typically discounted, to gain exposure to the dentists of the future. Advancements in devices and materials are often the result of research supported by institutes such as NIDCR. Recommendations for change in dental education are often derived from sources such as the ADA, the American Dental Education Association (ADEA), and NIDCR. A paradigm shift in dental education since the new millennium is a call to promote technology transfer, management, and entrepreneurship as core competencies of new dental faculty members. This conclusion

by NIDCR has been followed by funding for a pilot project to determine if this will turn ideas into products (Rossomando, 2004, June). This melding of a dental governmental agency, industry, and dental education continues with a call to include industry in developing dental curriculum. The rationale is the need to stay current with the latest products, technologies, and services in an era when time for clinical research and continuing education by dental faculty is declining. The source of this new information, then, becomes the province of dental industry (Rossomando, 2005, Aug). NIDCR has provided a grant to study a new technologies and products course that is also sponsored, in part, by dental companies. The American Dental Education Association, in a future of dentistry summary, has called for new partnerships between oral and dental investigators and industry and foundations, emphatically stating that these “must emerge to meet the research agenda of the future (Hutchinson, et al, 2000, p.705). A bold and controversial dental school-industry partnership has been contracted between three dental schools and a private orthodontic company. A 30 year contract with one dental school includes a 50,000 square foot facility and expenditure of \$3.5 million by the private company to build, supply, and train orthodontic residents. The dental school obtains an orthodontic program and can provide orthodontic treatment for an underserved population, however, the orthodontic students have a seven year commitment to the private company upon completion of their training and the training is controlled by the private company. This concept is new to dental education, controversial, and has generated several formal complaints (ADA News, 2004, June 7).

With a precipitous decline in federal funding, slight declines in state support, dramatic increases in tuition and fees, a declining percentage of revenues from clinical production by students, a decline in research dollars, persistent low endowments and gifts, and shifts in partnerships with industry, the costs of dental education and traditional funding cuts loom large as crises in dental education.

### *Student Indebtedness*

Aggregated data is available regarding dental student indebtedness through 2004. In 2004, 54% of entering dental students had no previous educational debt; a decrease of 8% from just two years earlier (Weaver, Chmar, Haden, Valachovic, 2005). Of those who had educational debt prior to dental school, the average amount of that debt was \$42,830. The average educational debt for dental students graduating in 2004 was \$122,263 and, for those who entered dental school with previous educational debt, the average debt was \$135,721. Of those with student debts, nearly 2/3 had debts of \$100,000 or greater and another 37% had debts over \$150,000. Debt forgiveness programs blunt the effects of student debt for 10% of dental students (Chmar et al, 2005) and the median salary of a new dental graduate in 2005 was \$152,880 for those entering private practice (Valachovic, 2006). This level of compensation can also serve to blunt the effects of these large educational debts; however, educational debts of \$200,000 have been reported; a remarkable increase from student debt 20 years prior, which averaged \$26,000 (Dugoni, 2004).

As the cost of dental education continues to increase, dental school tuition and fees continue to rise. This results in increases in financial assistance and student indebtedness. In FY 2003/04, 90.1% of dental students received financial assistance in the form of loans, grants, scholarships, or work-study programs (Chmar, Weaver, Valachovic, 2005). Of the 9 out of 10 dental students receiving financial aid in 2004, the average amount of annual assistance was \$43,191. The amount of assistance typically exceeds tuition and fees in order to cover additional expenses, such as materials and instrumentation, the costs of which are unique to dental education. Data from FY 2002/03 provide average costs for first year dental students, beyond tuition, that include \$5,022 for instruments, \$1232 mandatory general fees, \$1423 for textbooks, and \$851 for health service fees (ADA Survey, 2004, Vol. 2). In addition to tuition, then, first year students paid an average of \$8528 in additional expenses. Second year students paid an average of \$7333, with third and fourth year students paying \$5176 and \$4228 respectively. In 2004, the average tuition was \$21,141 which represented a 21.4% increase over the 2001/02 rate.

89.6% of financial assistance to dental students is in the form of loans. Grants and scholarships are another 10.2 % and work-study programs make up 0.2% in 2004. This represents a two percent decrease in grants/scholarships from 2001 and a two percent increase in loans (Chmar et al, 2005).

#### *Loans*

Of the 9 out of 10 dental students receiving assistance in 2004, 75% of the loans were Stafford loans. Subsidized Stafford loans are determined by needs analysis, are limited by

the cost of attendance, and have a maximum of \$8,500. The unsubsidized Stafford loans are also limited by cost of attendance and are available up to \$30,000. Dental students in 2004 averaged \$8500 in subsidized loans and \$23,615 in unsubsidized loans.(Chmar at al, 2005).

Students demonstrating financial need are eligible for the Perkins Loan Program. The loan amount is up to \$6000, however, this is a revolving loan program and the average loan amount in 2004 was \$4000 with the percent of student usage being 26%.

Within the US Department of Health and Human Services, the Bureau of Health Professions, Health Resources, and Services Administration administer the Health Professions Student Loan Program. This low interest revolving fund has funding available equivalent to the amount repaid each year by previous recipients. This is another needs-based loan and, in 2004, 25.3% of financial aid recipients received an average loan of \$10,720. The same agency administers the Loans for Disadvantaged Students program which requires, in addition to the Health Professions Student Loan Program requirements, the recipient come from a disadvantaged background. The average loan value in 2004 was \$10,734 with 1.8% of loan recipients receiving loans through this program.

The remaining loans, about 14%, come through private providers. Private sources of loans can be divided into the ADEAL loan program and other private loan programs, that is, private lenders providing loans that are not affiliated with a specific program of educational lending. The Alternative Dental Education Assistance Loans (ADEAL) program is a cost-base program in which dental students are able to borrow up to the cost

of attending dental school minus other financial assistance received. The average loan value in 2004 was \$14,938 with 4.2% of students participating in this program. The percent of student usage of other private lender programs was 20.2% with an average loan of \$23,935. These are private lender programs, outside of the ADEAL program, that have increased from 5.2% to 12.5% from 2001 to 2004, thus a trend toward more lending by private sources. Loans from state loan programs and school loan programs were nearly 1% of loan programs in 2004. State programs accounted for 0.1% of loan programs averaging \$8,246 with the percentage of student usage 0.6%. The percentage of student usage of school loan programs was 5.9% with loans averaging \$5,187.

Loans, then, are the largest source of financial assistance for dental students with Stafford loans, a federal loan program, accounting for 75% of the total loan amount in 2004. In 2001, Stafford loans comprised 83% of loans. The decrease in Stafford loans from 2001 to 2004 corresponds to an increase in loans from private lenders (5.2% to 12.5%) and an additional 1.6% through the ADEAL program. The Health Professions Student Loan Program accounts for 7% of all loan funding with the remaining programs, Perkins, Disadvantaged Students, state/school loan programs each account for 3%, or less, of loan funding.

#### *Grants/Scholarships*

Financial assistance in the form of student grants and scholarships is received by 10% of dental students. These forms of assistance include both obligated and unobligated funding. Although both are available, the percentage of unobligated grants/scholarships

has declined. Unobligated funding was 64.4% in 2004, down from 81.8% in 1997 (Chmar et al, 2005).

Grants and scholarships without a service obligation after graduation includes school-funded grants/scholarships, unobligated non-school funded grants/scholarships, and scholarships for disadvantaged students.

The school-funded grants/scholarships are the largest source, comprising 40% of all grants and scholarships. In 2004, the average award was \$6,184 to 28.4% of students receiving aid who received grants/scholarships of this type.

Unobligated non-school-funded grants/scholarships are funded by states, foundations, and public or private organizations. The average award was \$4782 with 13.7% of aid recipients receiving such grants and/or scholarships. These represent 14.9% of all grants and scholarships.

The Scholarships for Disadvantaged Students accounts for 6.6% of all grants and scholarships, are received by 4.5% of students receiving aid with the average being \$6473 in 2004. These grants differ in that dental schools must apply for this funding for their eligible students.

The remaining grants and scholarships, 38.6%, require some form of service after graduation. The Army, Navy, Air Force, Indian Health Service, and National Health Service Corps comprise 33.6% of all grants/scholarships with 4.3% of students participating in one of these programs and receiving an average of \$34,567 in scholarships. Another 4% of grants and scholarships were awarded to 1.6% of students in the form of state funding with subsequent service obligation to the state. The average

award was \$10,417. Another 1.1% of grants/scholarships were awarded by individual organizations; these typically having unique eligibility requirements. The average award was \$12,113.

#### *Work/Study Programs*

Work-study programs comprise only 0.2% of financial assistance with an average of \$2608 of support from federal programs and \$1662 from school programs. Not quite 3% of students participated in this type of program.

#### *Programs Summary*

As the cost of dental education continues to rise, the need for financial assistance has increased with 90% of students requiring assistance. Loans are the major source of assistance with the Stafford loans predominating. The dollar amount of Stafford loans has not changed over several years and, with the increasing cost of dental education, an increase in private loans by dental students, at higher interest rates, has been the norm. After federal, state, and school programs have been tapped, private loans provide the additional resources to meet the cost of dental education.

The consequences of dental student indebtedness define this crisis in dental education. Dentistry, as a profession, does not want the time to ever come when being able to afford dental school becomes the criterion for admission ((Kennedy, 1999). The trend is not promising, however. With the costs continuing to rise, the number of students from

families with incomes above \$100,000 also continues to rise, this number approaching 42% in 2004 (Weaver, Chmar, Haden, & Valachovic, 2005).

The debt of the dental school graduate is accelerating at a rate faster than the net income of dentists, this rate so significant that practice options are limited (Dugoni,2004). The cascading effects include an inability to pursue careers as dental educators, in public health sectors, federal services, or to purchase a private practice (Dugoni,2004). Extraordinary debt also can influence career choices regarding graduate education, where to live and practice, and patient care decisions ( Hutchinson et al, 2000). Trends from 1979 to 1995 reveal that fewer graduates can afford to go directly into solo practice, more expect to be employee dentists, and military or government sponsored positions are not affordable alternatives (Douglass & Fein, 1995). Whether extraordinary debt has influenced the delivery of unnecessary services has been suggested but studies are not available regarding this issue.

Extraordinary dental student debt is an urgent concern of dental educators. These concerns focus on reductions in the cost of dental education to both the student and the school along with student debt management. As dialogue continues, so does the trend toward ever-increasing student debt.

### *Aging Facilities*

The literature regarding aging facilities is often generic, e.g., “dental school operating costs are among the highest on university campuses, and investment by universities in their schools has failed to keep pace with need. The aging infrastructure of many dental

schools will further exacerbate the problem” (Dugoni, 2004, p. 4). The aging infrastructure problem can be expanded upon and quantified, however. Dental schools are already expensive to run and have become even more expensive as dental schools strive to keep pace with the latest technology. The majority of dental schools are approaching 40 years of use with both the facilities and infrastructure for learning in desperate need of upgrades (ADA News, 2006, July 10). Dental schools need to invest in newer and better tools, such as simulation labs, and provide necessary wide-ranging clinical experiences, such as multiple systems of intra-oral implants, to answer the demands of a broadly based dental education ( Glick, 2006).

Expenses related to an aging infrastructure are available from 1993-2003 that provide insight into the trends in the cost of physical plant and university overhead. From 1993 to 2003, these costs have increased 25.7% and, in 2003, represent an average of 13.4% of all dental school expenditures. In 1993, the physical plant and university overhead costs, per dental student, averaged \$8441. By 2003, this had increased to \$10,614 (ADA Survey, 2004, Vol 5).

### *Crises Summary*

The shortage of faculty, costs of dental education, lack of funding , student indebtedness, and aging infrastructure define the crises in dental education. If current trends continue in these crises and the issues affecting dental schools are not immediately addressed, the impact on the American dental education system will be major within 10 years (Crozier, 2006). With lack of resources, escalating costs, outdated facilities, lack of

interest in becoming dental faculty, and extraordinary student debt, dental education is facing more challenges than ever before.

### Theoretical Frameworks

#### *Institutional Theory*

Conceptualizations of how organizations within the same field respond to their environments are the foundations of institutional theory. Institutional theory holds that changes in formal organizational structures are explained as responses to changes in the institutional environment (Rhoades, 1992).

Organizations have a system of values and beliefs, that is, a normative environment to which they will respond structurally. The normative environment, however, is subject to a wide pattern of influence. Government regulations and policies, commissions addressing societal and economic issue, corporations, foundations, and other actors influence the normative environment; the environment changing and filled with uncertainty. Institutional theory suggests that conformity is the response to uncertainty. To maintain legitimacy, and subsequent sustaining of resources, organizations must adapt to the normative order (Meyer & Rowen, 1978, Dimaggio & Powell, 1983). Organizations must have the confidence and legitimacy of their environment to both receive social resources and provide success and stability.

Dimaggio and Powell (1983) asked why there was so much homogeneity of organizational forms and practice, that is, they sought to explain this homogeneity as opposed to variation. They describe institutional theory as a vehicle for external

legitimacy with several mechanisms of institutional isomorphism offered as an explanation. The mechanisms of institutional isomorphism are coercive, mimetic, and normative. Coercive is defined as formal and informal pressures that are exerted on organizations by others on which they are dependent or due to cultural expectations of the society in which they function. A formal pressure, for example, would be a change due to a specific state mandate, a law or statute. An informal pressure could be a change predicated on, for example, affirmative action; the expectation is that this will induce change, but the method of change not mandated. Mimetic isomorphism is defined as an intentional or unintentional way in which organizations imitate other organizations that they model after – modeling a key word. The inference is that modeling is a response to uncertainty, that modeling produces structural changes that are observable, and that organizations model themselves after organizations perceived to be legitimate or successful. This is the tendency of organizations to model themselves after organizations that face similar problems. Normative isomorphic change stems from professionalization; the tendency of professionals to exhibit similarity to their professional counterparts in other organizations. This includes a number of cognitive and socialization functions with this most easily identified with movement of professionals from one institution to another and the subsequent transfer of ideas. Coercive, mimetic, and normative isomorphism need not be pure or exclusive with all serving as methods of external legitimacy (DiMaggio & Powell, 1983).

That organizational structures are adaptations to external expectations that may/may not have an effect on the work performed in the organization is held by institutional

theorists. Formal organizations are, then, myths. The nidus of this concept is organizational culture as a force that integrates the activities of the organization (Rhoades, 1992).

Some theorists see organizational culture as something produced and manipulated while others see it as a relationship between the organization and environment. This study adopts both. Drawing upon the tradition of organization and environment, the words and actions of dental school faculty have an expectation of multiple mechanisms of isomorphism. Cultural analysis is expected to raise issues of both content and meaning as well as dissect out underlying values operating within that analysis.

### *The Theory of Academic Capitalism*

The theory of academic capitalism explains the process of college and university integration into the new economy (Slaughter & Rhoades, 2004). The concept of the “new economy” is central to the theory of academic capitalism. Characteristics of the new economy are globalization, knowledge treated as a raw product to be marketed and sold at market price, the embracing of a non-Fordist production process, for example, just-in-time input/output, flexible personnel, time and scheduling, and the new economy also requires educated workers and consumers. The theory draws from the concept of academic capitalism as delineated by Slaughter and Leslie (1997).

A fundamental theme of academic capitalism is that globalization of the political economy is destabilizing patterns of university professional work (Slaughter & Leslie, 1997). Globalization, in turn, is defined as the interpenetration of economic activities and

national economies at a global level in which multinationals are key vehicles of the globalization. The infrastructure of this entire system has dependence on university trained people. Multiple theories are utilized in understanding of academic capitalism, such as macro-economic theory and process theories of professionalism. Resource dependence theory surfaced as the predominant platform to better understand changes taking place in colleges and universities. Broadly, resource dependence theory states that organizations deprived of critical revenues will seek new resources (Pfeffer & Salancik (2003).

Historically, university faculties were positioned to be protected from the market but this has changed over time as some faculty involvement with the private sector emerged during the second half of the twentieth century. By the 1980s, increasing market activity emerged as a result of a declining share of revenues from government sources combined with institutional and faculty desires for more or new revenues and private sector desires for new products. Institutional and faculty competition for revenues became “marketlike behavior” and included competition for external grants, contracts, endowments, university/private sector partnerships, institutional investment in the private sector, and increasing student tuition and fees. “Market behaviors” are defined as profit activities on the part of universities. From this, academic capitalism is defined by Slaughter & Leslie (1997) as institutional and professorial market or marketlike efforts to secure external moneys. The effect on colleges and universities is a restructuring of higher education which is defined by the same authors as substantive organizational change and associated change in internal resource allocation. This restructuring can take multiple forms such as

department reductions or closures, changes in academic labor such as establishment of research parks, and new administrative structures.

The impact or restructuring at the higher education level tends to reward departments that can build external funding but with concurrent declines in collegial governance as responses are directed toward external constituents, primarily by central administrators. At the department level, those close to the market, such as engineering, gain power while others lose influence which leads to salary differentials, teaching load differentials, decreasing quality as time is allocated from students to external constituents and more part-time faculty are brought on board. At the faculty level the pressure is on to produce external revenues, a shift from public service to personal gain can take place and more time may be allocated to maintenance of external relationships at the expense of students and other faculty roles, such as committees. In addition, a decrease in campus collegiality and declining allegiance via a self-perception as an independent contractor may occur. At the research level, activities become application oriented, not basic research, and external constituents can dictate the research agenda. At the student level, tuition can only increase, knowledge is reduced to a commodity, and access is threatened.

Academic capitalism has been justified as a link with the external community, that is, the perception of the lack of engagement with social issues by higher education and public concerns with the cost of higher education are offset by higher education's contribution to prosperity. Universities are prestige maximizers and research differentiates universities, therefore, faculty will embrace academic capitalism to maintain their research and sustain prestige maximization (Slaughter & Leslie, 1997).

Academic capitalism is global; resulting structural changes are not temporary, and continue to evolve.

Slaughter & Rhoades (2004) noted that resource dependency theory was insufficient to fully describe entrepreneurial behaviors originating in the academy. Universities are not seen as passive pawns or victims of corporations but as active participants that act to change regulations to enhance opportunities to engage in market and marketlike behaviors. The commercialization of higher education is seen throughout the academy and by diverse constituencies within colleges and universities. Multiple actors within higher education are aggressively pursuing revenues. The theory of academic capitalism addresses entrepreneurial behaviors originating in the academy.

A triad of networks provides a platform for the theory of academic capitalism. As developed by Slaughter & Rhoades (2004) these networks are: 1. new circuits of knowledge, 2. the emergence of interstitial organizations and, 3. intermediating networks. These three networks lead to a fourth network defined as extended managerial capacity. These networks, in turn, link all members within higher education institutions to the new economy, leading to both mechanism and behaviors that constitute an academic capitalist knowledge/learning regime (Slaughter & Rhoades, 2004, p.15).

The concept of the new economy is intrinsically intertwined with the theory of academic capitalism. The new economy, also called the information age, is a post-industrial organization of production. It is defined by creation of a service economy, a pre-eminence of professional/technical class, primacy of theoretical knowledge, planning and

control of technological growth, and the rise of intellectual technology (Bell, 1973). The new economy has brought changes to higher education.

Slaughter & Rhoades (2004) have identified specific characteristics of the new economy that are “salient characteristics of the new economy for colleges and universities” (p.16). Globalization is one of these salient characteristics. This is manifested in higher education institutions via production processes, technological innovation, and dependence upon those innovations (Levin, 2001). Slaughter & Rhoades (2004) enlarge upon the global scope-higher education processes of this characteristic of the new economy.

Another salient characteristic is the framing of knowledge as raw material. This has been described as ideas and intellectual capital replacing natural resources and mechanical innovations as the raw material of economic growth (Florida, 1999). The opportunity to supply education, advice, and knowledge in exchange for money, a continuation of a series of steps over time, is now seen as accelerated, that is, a surge in commercial activity as the sum of money has become extraordinary (Bok, 2003). Slaughter and Rhoades (2004) expand upon these themes with higher education involvement in patents, copyrights, trademarks, equity positions, and distance education services.

The third salient characteristic of the new economy influencing higher education is non-Fordist manufacturing. Slaughter & Leslie (1997) define Fordism as mass production that is highly standardized, this consistent with the industrial revolution (p. 27). In the new economy, this has been largely replaced by the non-Fordist methodology.

Application to higher education includes flexible work force (increased number of part-time faculty), unbundling of professorial work, and an expanded middle management (Slaughter & Rhoades, 2004).

The final characteristic of the new economy is the need for educated workers and consumers. The increased opportunities for consumption by students, the use of the university as test beds for commercial products, the use of students for product improvement, and students as savvy consumers of products are delineated as the fourth salient characteristic of the new economy (Slaughter & Rhoades, 2004).

The theory of academic capitalism addresses the dynamic, ongoing changes with US higher education institutions, not from a singular dimension, but from intertwining political, social, economic, and cultural consequences as the pattern of change moves from exchange to partnerships at colleges and universities. Although not discrete, the authors of the theory of academic capitalism offer discrete networks and intertwining salient characteristics of the new economy that provide a platform from which an enhanced understanding of the theory, and implications for higher education, can be better examined, evaluated, and applied. The theory of academic capitalism is especially well suited for this research. In this study, an attempt will be made to examine the extent to which each of these networks and characteristics may influence processes of dental education at a new, non-profit school and the crises in dental education.

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

#### Introduction

This study developed from observations that dental education may be at a crossroads. Confirmation came with a 2004 ADA report defining the crises in dental education explicitly, The convergence of this defined set of crises with the introduction of a new dental school in 2003/2004, run and staffed by traditionally trained dental administrators and faculty yet with multiple distinctions from traditional dental schools, and the concurrent introduction of the theory of academic capitalism in 2004, providing a set of tools to examine the school and the issues, provided the setting and interest for this study. About the same time (2004), I was having a casual conversation with a long-time and respected dean of a dental school. During our conversation, he stated “dental schools are really isolated icebergs floating in the sea of higher education. The ongoing changes in higher education really don’t apply to us at all in dental education”. As a student of higher education, I knew I was on to something.

My diverse engagement with dental education influences every aspect of this research. The following section is my positionality statement that addresses these levels of engagement, bias I bring to this study, and how I address this bias in this research.

### Positionality Statement

I have been a recipient of a dental education, having received a DDS (Doctor of Dental Surgery) degree in 1974. In 1978 I was hired as a full-time dental faculty member and later resigned this position to begin a residency in periodontics. While a resident, I was the resident representative on the graduate committee for two years. After receiving my diploma in periodontology I began a thirty year history in private practice; however, I concurrently served as an adjunct dental faculty member for several years in the early 1980s. My engagement with dental education therefore spans across many positions from student status to full time faculty, resident and resident representative, and adjunct faculty.

The bias I bring to this study is the memory of dental education as an unhappy experience. I was blessed with supportive classmates and the goal of training a competent general dentist was realized; however, the memories of dental education by intimidation and embarrassment occasionally linger.

I bring several attributes that address this bias, however. I have served as both a full-time and part-time dental assistant professor and have diverse experiences as both student and teacher in the dental environment, that is, I've lived both sides of the dental education coin. In addition, I was one of five founding members of a higher education institution, now a very large community college and, although no longer affiliated with this school, I gained insights and knowledge of administrative perspectives while serving on the board of this school, that is, my perceptions of processes of higher education are

now much broader than as a student many years ago. Competencies in reflection and analysis have developed over many years with these processes both accelerated and honed while enrolled in a graduate program in teacher education. Another graduate program in professional counseling not only improved listening skills but introduced the concept of facilitator. I am equally as comfortable wearing the hat of facilitator as that of authoritarian, the typical role of a dental professional. Others have voices that need to be heard and I need not have the last word. Bias is therefore diminished through increased understanding by listening because these attributes are in place. I am a white, Protestant, high SES male and I assume that those interviewed will be similar. This could be a disadvantage by my anticipating similar values, beliefs, goals, and education; the anticipation serving as a built-in bias and my parroting anticipated similarities. The effects of this anticipation are negated by framing my inquiry within the theories used in this study and listening carefully to the voices of those being addressed.

#### An Instrumental Case Study

This research is an instrumental case study. With this format, a case study is used to study an issue or issues. The interest in a case study is to learn about a particular case as opposed to learning about a general problem or to learn about other cases. When the use of a case is to understand something else, that is, when the case study is instrumental to accomplishing something other than understanding the particular case, the inquiry is an instrumental case study (Stake, 1995).

In this research, the case study is a new dental school. The interest is in learning about this new dental school, specifically, this case as a dental education institution and distinctions this school may have from traditional dental schools. The use of this case is to understand something else, that is, issues which are the research questions of this study. The case becomes instrumental in understanding these issues which defines this research as an instrumental case study. The interest, intrigue, importance and understanding of the case remain central to this study; however, understanding the issues becomes dominate. This approach provides the avenue for development of this area of inquiry as well as acknowledgement of the nuances and complexities of the issues.

#### A Qualitative Research Design

Qualitative research and analysis techniques are adopted to address the questions of this study. The techniques of naturalistic inquiry are employed in the study.

Naturalistic studies emphasize the use of humans as instruments. The human instrument “has the ability to respond to personal and environmental cues, can collect information about multiple factors, is capable of processing data immediately and generating hypotheses, can feed data back to respondents for clarification or correction, and can explore responses that are atypical in order to achieve a deeper understanding of what is occurring” (Lincoln & Guba, 1985, p. 193-94). Naturalistic inquiry takes place in a natural setting; in this study, on campus and within the comfort of a personal office. The researcher serves as the primary data gathering instrument as opposed to the use of a

formal survey instrument. This inquiry is framed as a case reporting mode and not as a technical report.

In this study, using myself as an instrument, I bring my own experience and knowledge regarding the setting and people in the study. I bring an understanding of how dental education has functioned in the past and the information that can be gained from various sources. Previous residency training within a dental education institution adds to tacit knowledge that serves as a platform from which I'm able to build insights and build hypotheses.

In order to meet the goals of this study, several qualitative methods are utilized. These include semi-structured interviews, record analysis, and participant/observation. With the use of these multiple methods (triangulation) "researchers obtain a better, more substantive picture of reality, a richer, more complete array of symbols and theoretical concepts, and a means of verifying many of these elements" (Berg, 1989, p. 4).

There is a well established tradition of interview research. Research questions lend themselves well to interrogation via interviews that, in turn, can be substantiated by other means, such as record analysis and observation (Burgess, 1984). Qualitative interviews have characteristics that distinguish them from other forms of data. The qualitative interview is an extension of ordinary conversation that "is invented each time it occurs and can be wonderfully unpredictable" (Rubin & Rubin, 1995, p.7). Beyond words, attention is paid to nonverbal cues that signal emotion. Hearing the meaning and interpretations of those being interviewed by focusing on details and clarifications creates an opening into the world of the interviewee, creating a depth and richness referred to as

“thick description” (Rubin & Rubin, 1995). Attention to symbols and metaphors describing the interviewees’ world take on meanings dependent upon the experiences of the interviewee. In qualitative interviews, both parties are active conversational partners, not a researcher and research object. Both have active roles in shaping discussions, a cooperative and congenial experience that promotes a thorough, in-depth “thick description” that initiates an understanding behind the symbols, metaphors, words, and emotions used to describe the interviewees’ world-view (Rubin & Rubin, 1995).

The collection and analysis of written materials is utilized in this study as data collection and methodological techniques respectively. Both documents and records are used with differing modes of analysis consistent with the differing purposes of these written materials. Documents are “any written or filmed material other than a record that was not prepared specifically in response to some request from the investigator (Guba & Lincoln, 1981, p. 228). They can include letters, diaries, position papers, newspaper articles, speeches, government publications, and photographs. Documents provide insight into the values, sentiments, intentions, and beliefs of the source or authors of the documents (Guba & Lincoln, 1981). Records are “any written statement prepared by an individual or agency for the purpose of attesting to an event or providing an accounting and form an official chronicle that is part of a larger work” (Guba & Lincoln, 1981, p. 228,230). These can be annual reports, business records, financial records, school directories. Background information, the tracking or tracing of relationships, or events under scrutiny are well suited to analysis. The analytic assumption is actions leave tracks and these can be compared with other sources. Both documents and records serve as

“repositories of well-grounded data on the events or situations under investigation” (Guba & Lincoln, 1981, p. 232).

Observation was encouraged by multiple administrators during the course of this study. This was often a personal tour of an area of their interest or responsibility. I was able to observe interactions with students and faculty. I was able to observe behaviors and reactions, continue ongoing dialogue with them, and better understand their worldview. These opportunities allowed interpretation of the meaning and experiences of the administrators. This qualitative methodology brought a part of their daily life to the study. “The researcher can obtain accounts of situations in the participants own language which give access to the concepts that are used in everyday life” (Burgess, 1984, p. 79). Multiple individual tours were not anticipated, but welcomed and added insights and interpretations to the study. Observations substantiated data gathered through interviews and record/document analysis.

In this study, the qualitative methods utilized were particularly well suited for “understanding the meaning for participants in the study, of the events, situations, and actions they are involved with and of the accounts that they give to their lives and experiences” (Maxwell, 1996, p.17).

### The Research Questions

Four overarching questions are investigated:

1. To what extent do dental school administrators and faculty believe that there are crises in dental education?

2. To what extent do dental school administrators and faculty perceive salient characteristics of the new economy and how are the processes of dental education influenced by these perceptions?
3. To what extent do dental school administrators and faculty perceive major networks within the theory of academic capitalism and how are the processes of dental education influenced by these perceptions?
4. How does this case shed light on the larger state of dental education?

The theoretical frameworks and research methods employed are chosen so that the study may add meaning to these questions.

### The Setting

The setting for this study is a new dental school in the southwestern region of the United States. “Saguaro” dental school is part of a parent university with the context for starting a new dental school important in understanding the utilization of this specific school for this study. The following sections provide the historical context and philosophical environment in which the school has been transformed from “an idea and two piles of dirt” in 2002, to a free-standing, state-of-the-art facility ready to graduate their first class in 2007.

The parent university has been in existence for 114 years as a private, non-profit institution. It began as a college of osteopathic medicine in a small town in the Midwest region of the United States. Over time, the university created sister schools to address the

need for a variety of health care providers. The school of health sciences was developed to train audiologists, occupational therapists, physical therapists, sports health care specialists, and physician assistants. The original school is located in a town of 20,000 people. Because of this small population base, the parent university created regional training centers with the largest of these centers in the southwestern United States. For many years, the students of both the osteopathic medical school and health sciences school served as students and residents at many southwest clinics, these often clinics within the prison system, tribal clinics, and clinics dedicated to treating underserved populations, such as community clinics.

In 1995, the parent university created another sister school, the school of health management. Utilizing available technology, this was initiated as, and continues to be, an on-line set of programs. Students enrolled in this school prepare for health management positions with three graduate programs offered: Master of Public Health, Masters in Health Management, and Masters of Geriatric Health Management.

The southwest clinics being served by the students and residents over time expressed appreciation and gratitude for the services provided by a great number of differing health care providers, however, the parent university heard a persistent plea for one type of health care professional that was not available: they really wanted and needed dentists.

Shortly after the beginning of the new millennium, the board of trustees of the parent university voted to initiate a new dental school. To get started, a prominent public health dentist was asked to create a blue ribbon panel to initiate the new dental school. A fourth sister school, then, became part of the parent university; the school of dentistry.

The parent university has approximately 700 students enrolled, all studying to become health care providers such as osteopathic physicians, dentists, physician's assistants, and physical therapists or health care management providers working in geriatric facilities, hospital administrative posts, and state or federal public health agencies. The largest of the sister schools remains the osteopathic medical school. Two unique characteristics can be assigned to the university. One, the president is a PhD physicist, not an osteopathic physician. Two, the president has defined a vision for the entire university that permeates every sister school. Every program of every school has a focus on teaching, researching, and treating the whole person. It is a mission to investigate and explain the structures and functions of the body, mind, and spirit of individual human beings. This holistic approach is defined as the key to true healing. In 2005, the tagline "defining whole person healthcare" was added to all university correspondence and materials for public dissemination to summarize their special way to contribute to mankind.

The body, mind, spirit model of the parent university became incorporated into the mission of the new dental school. The mission is to educate caring, technologically adept dentists who become community and educational leaders serving those in need. In addition, the mission incorporates individual leadership in lifelong education of community responsive general dentists, graduates with a strong foundation of critical inquiry, evidence-based practice, cultural competency, an orientation to prevention, and an interdisciplinary approach to healthcare. Lastly is the promotion of optimum care and the transfer of newly acquired knowledge, skills, and technology to the profession and to the community.

The blue ribbon panel consisted of representatives of public health dentistry and several deans, or ex-deans, of dental schools. Over a long weekend, the panel ironed out a plan for a new dental school. The plan was framed by the mission. The public health dentists contributed ideas from the perspective of community clinics and the underserved, the deans contributed ideas uninhibited by traditions of their schools in some aspects and embraced traditions of their schools in others. The school opened in 2003, adhering to both the mission developed for the dental school by the parent university and protocols developed by the blue ribbon panel.

The dental school is on a 50 acre campus in a suburban area of 400,000 which, in turn, is part of a 1.5 million population area in the southwestern region of the United States. In 2003, an existing building housed administration offices and classrooms for the osteopathic medical and school of health sciences students and refurbishing of the facility created room for the incoming, inaugural dental school class of 54 students. By 2005, a new 48,000 square foot building had been built adjacent to the original building. The new dental school occupies 28,000 square feet of this building with the anticipated use of the other 20,000 feet being a new osteopathic medical school. A new hospital and mental health facility have been proposed for the 50 acre parcel as well. . Three classes of 54 dental students are currently enrolled in the dental school; the first class is to graduate in 2007. A fourth class of 54 students has been selected. With the class beginning in 2008, enrollments are anticipated to be increased to 80 students.

This study focuses on the words, actions, and events of the dental school staff in examination of the crises in dental education.

### The School as a research vehicle

The announcement of a new dental school in the southwestern sector of the US in 2002/03 prompted regional speculation in newspapers and state dental journals regarding the structure and methodologies of the school. The initial perception was a dental school with a focus on producing dentists committed to public service. This was accompanied by the perception that this was going to be an on-line or “virtual” dental school. The physical location of the school also created angst among local private practice dentists in the immediate area. This “not-in-my-backyard” angst contributed to negative perceptions of the school.

The school responded to the local dentists and regional community by emphasizing their commitment to producing dentists who have a background in community service and a desire for their dental graduates to participate in community service. The students would not be contractually obligated to participate in community service, however. In addition, the students were going to be trained in a systems-based approach as opposed to a discipline-based approach as much as possible; this differing from the approach of traditional dental schools. The response from the spokesperson of the dental school was not well received by the local dental community. For instance, the use of technology was not well differentiated from on-line education with this further promoting an erroneous assumption that this was some form of virtual dental education institution. In spite of persistent negative feelings by practicing dentists in the immediate geographical area and missed opportunities for more effective communication, the board of dentistry in the state

in which the school resides had been supportive, the school received accreditation as a US dental school, and the first class began in the Fall of 2003.

As the school began functioning, misconceptions dissipated somewhat with increasing community involvement; primarily volunteer efforts by practicing dentists within the state. What did persist was the labeling of the school as a non-traditional dental school. The opening of a non-traditional dental school at a time nearly coincident with the explicit defining of crises in dental education provides the ideal vehicle for studying the issues of this research. Traditional dental education was not replicated and the staff of this dental school often refer to this dental school as “pioneering” a new path in dental education. Chapter 4 delves into traditional dental education and multiple distinctions, the pioneering paths, within this non-traditional dental education institution. This pioneering spirit and non-traditional dental education, framed and examined through the theoretical frameworks, create a good choice of institution to address the research questions of this study.

#### Sampling and Selection

Sampling in this study was both purposeful and strategic. Data collection began in the summer of 2006. I wanted to interview those people in positions of authority, especially those present from the initial concept of the dental school to the present functioning of the school. Being a new school, every administrator and faculty trained elsewhere at a traditional dental school, yet this was a school purported to be providing dental education in a non-traditional manner. I needed access to the decision-makers to explore this non-

traditional approach to dental education and the rationale for taking a new road in the training of dentists.

The history of this dental school is short, but “bumps in the road” probable with the start-up of a new school. As a faculty member many years ago, I’m aware of disconnects that can take place between didactic courses and clinical procedures. The faculty would be the first in line to witness these disconnects in a new, non-traditional system of dental education as well. My strategy was to interview several faculty members initially. The intent was to gain insights into the functioning of the school to date, both favorable and unfavorable, so that I would be armed with knowledge to better prepare probing questions for the decision-makers, the administrators. The rationale for the strategy can be summarized as “the object of the game is not to focus on the similarities that can be developed into generalizations, but to detail the many specifics that give the context its unique flavor” (Lincoln & Guba, 1985, p.201).

Sampling for interview data focused on full-time faculty and administrators. The school has 16 full-time administrators and faculty supplemented by well over 100 adjunct faculty. The full-timers included eight administrators and eight faculty with several of these individuals holding dual appointments. I was able to obtain interviews with 13 of the full-time staff. The school was in the process of creating co-directors in each dental specialty (this equates to co-chairs in a department) and five of these individuals were interviewed. I was also able to interview one contract professor. Of the co-directors interviewed, several had been with the school since inception. This sample was selected

to best examine the inception and evolution of the school through their voices and actions.

### Data Gathering

Methods of analysis of qualitative data are not well codified but this problem is minimized by using multiple data collection techniques. This process, triangulation, provides a variety of contexts from which data can be both confirmed and understood. Each technique is reviewed as follows:

#### *Interviews*

Interviews were the primary method of data collection in this study. As sampling was purposive, likewise the interviews were purposive. Conversations with a purpose have greater value than a strict question and answer format (Burgess, 1984). My decision rules for interviews focused on two criteria. One, I wanted to follow my strategy to interview faculty initially to develop a baseline of understanding of this new school prior to interviewing administrators. Two, I wanted to interview those who had been with the school since inception as much as possible. Generally, this led to interviews primarily with full-time staff that could provide a broad picture of the unfolding of events as the school progressed from a concept of dental education to a working, operational dental education institution.

Semi-structured interviews describe a blend of the interviews; the interviews initially structured (as described below), but punctuated by comment, thematic issues, and conversation as the number of interviews increased.

The interviews averaged 60 minutes in length and provided the opportunity to meet with faculty and administrators directly, establish rapport, and probe their careers in dental education as well as their development of perceptions and opinions of dental education over time. All interviews were audiotaped with all interviewees agreeing to this format and aware that all interviews would be transcribed verbatim. In two cases, I went back to the administrator interviewed to clarify a perception or opinion. These clarifications were not audiotaped, but field notes were taken. The information gathered during the interviews provided a depth to the data, details and insights for the rationale for a non-traditional approach to dental education, and their assessments of how this approach was working compared to the traditional approach from which all had come previously.

Following my planned strategy, interviews were initiated with several faculty members. Faculty perspective provided the short historical context of the “bumps in the road” as the school progressed from ideas, to words and strategies, to action, to reaction, and to pro-action. Perspectives and opinions regarding differences and distinctions of the dental school and influences for these differences and distinctions were probed. This led to insights, perspectives, and topics that enabled me to formulate questions and obtain sufficient background information to better interview the dental school administrators.

Interviews of faculty were followed by interviews of administrators, including the business manager, all assistant deans, associate deans, and the dean of the school. A listing of specific faculty titles and administrative titles is provided in figure 3.1 . Interview questions were prepared and used in a fairly structured manner initially, however, the questions became less structured, serving as guidelines, as the content area altered with the emergence of insights, perceptions, distinctions, differences, and priorities. The initial questions are provided in Appendix A.

FIGURE 3.1: Interview list: administrative and faculty titles

<b>Title</b>	<b>Position/Comments</b>
Dean	Reports to the Provost and President
Vice Dean	Chair of Council of Deans
Associate Dean	Associate Dean for Clinical Activities
Associate Dean	Associate Dean for Curriculum Management and Integration
Associate Dean	Associate Dean for Academic Assessment
Director	Director of Clinical Education
Assistant Dean	Assistant Dean of Pre-clinical Education

Director	Chair, Dept of Periodontics
Director	Chair, Dept of Pediatric Dentistry
Director	Assistant Director, CCU (1 of 3)
Faculty	Comprehensive Care Unit
Faculty	Comprehensive Care Unit
Business Manager	Human Resources, Contracts
Faculty	Prosthodontist, clinical faculty
Faculty	Prosthodontist, clinical faculty & simulation lab
Faculty	General Dentist, clinical faculty & simulation lab
Faculty	Periodontics, clinical faculty
Faculty	Restorative, clinical faculty
Faculty	Adjunct, modular instructor

*Interview questions: genesis and rationale*

Understanding the case requires knowledge of traditional dental education as well as the distinctive traits of this non-traditional dental education institution. Questions were developed to explore the level of entrenchment of both administrators and faculty in traditional dental education. With the staff now employed in a non-traditional school, subsequent questions focused on comparing and contrasting these differing methods of dental education and the strategies utilized to implement this non-traditional system of dental education.

With understanding of the case, the issues can be examined. In this study, the issues are examined through the lenses of institutional theory and the theory of academic capitalism. The lexicon and concepts underpinning these theories proved foreign in several pilot interviews so vignettes were developed which served as a platform from which further questioning could be pursued. The vignettes provided operationally defined concepts, such as partnerships between schools and the private sector, which were readily recognizable and set the stage for further questioning that enabled examination of the issues.

Appendix A represents the initial questions developed and used for the interview data. These were not static, that is, modifications were made as needed to fully explore the case and issues. The exception was the use of the vignettes, which were used in every interview.

### *Documents*

Documents serve to supplement and validate the interview data. The documents gathered were those available for public dissemination. Documents include the following:

Full color magazines published quarterly by the parent university. The contents include activities of faculty and students from the sister schools with a focus on how these activities meld with the mission statement of the parent university.

Full color brochures with the philosophy of the parent university and sister schools, listing of academic programs, the university environment, communities served by the sister schools, and credentials.

Each sister school has brochures with the mission, goals, and objectives listed along with program description, admission requirements, class size, number of applicants, GPAs, clinical placements, faculty, tuition and expenses, financial assistance, accreditation

The parent university publishes blended brochures with descriptions, mission, goals, objectives of the sister schools.

A monthly newsletter published by the parent university. Articles within are focused on student/faculty awards and recognition, university/community projects, and organization honors.

Internet downloads: The parent university and each sister school has internet sites. The dental school site covers brochure materials and adds a variety of other features such as community-based education opportunities, integrated community service partnerships, student services, dental clinic frequently asked questions, community frequently asked questions, and the leadership team.

Analysis of this documentation corroborates the place and scope of authority, role of the mission, goals, and objectives of the parent university and sister schools, strategic planning by the parent university and sister schools, agendas and direction of the parent university and all sister schools. In addition, historical context, present and emerging concerns, as well as initiatives serve as significant sources in this study that corroborate interview data and add data not obtained in the interviews. The addition of the document data provides for supplementary analysis, adds depth to the interview data, and serves to verify interview data.

#### *Participant/Observation*

“The value of being a participant observer lies in the opportunity that is available to collect rich detailed data based on observations in natural settings. Furthermore, the researcher can obtain accounts of situations in the participant’s own language which gives access to the concepts that are used in everyday life” (Burgess, 1984, p. 79).

Observation often took the form of the interviewee’s area of interest or expertise. An interview with a prosthodontist would end with a walk to the simulation lab, an area of

his expertise, where I would observe the interaction between pre-clinical students and several other prosthodontists and restorative dentists talking, instructing, and demonstrating procedures with first year dental students. These were often extended observations, that is, activities in simulation labs often continue for 90 minutes to two hours and observations continued for the duration of these activities.

Dentists curious about this new school often call and request a tour of the facilities according to an administrative assistant. When available, the dean would guide a walking tour of classrooms, laboratories, and clinics. These tours would continue for an hour or slightly longer. I accompanied two of these tours where I saw extended interaction between the dean and students as well as the dean and faculty. At another time I was having a casual conversation with the dean and a significant private benefactor of the school arrived unexpectedly. I suggested that I excuse myself, but was encouraged to stay. Observation of the dean and benefactor became conversation with the dean and benefactor before the meeting concluded. For over an hour I not only observed the interactions of the dean with a benefactor but was encouraged by the dean to be a participant in this unexpected and informal discourse.

Observation of the prosthetic laboratory revealed the teaching relationship between the laboratory personnel and dental students. Extending this observation opportunity, I observed this relationship to include faculty members with the laboratory personnel and dental students. As a periodontist, my input was requested thus becoming a part of this activity. The observations were typically of short duration, no more than 10 or 15 minutes

although one observation period was more extended with the role I adopted depending on the context of the setting; at times my role was that of an observer and at others, such as the meeting with the benefactor or the prosthetic laboratory, I was an active participant. “The investigator must become so much a part of the context that he or she can no longer be considered a disturbing element” (Lincoln & Guba, 1985. p. 192).

Being a specialist seen on multiple occasions in the school environment appeared to assist in my blending in when observing or functioning as a participant/observer. Whether an observer or participant/observer, I was able to observe events in their natural setting, obtained a view of these events as students, faculty, or administrators view them, and capture the culture of a specific setting.

#### Data Management and Analysis

Data analysis was ongoing from the first interview. I personally transcribed each interview which served as the initial analysis of this data. This also provided a critical review of my interview style and ability as well as provoking changes in format, themes, or issues as needed. At no time did I feel that the audiotaping of the interviews, or the interviewee’s awareness that they would be transcribed verbatim, had any adverse effect on their comments and responses.

Review of the transcripts was an iterative process with the following serving as a foundation for analysis:

First: Initially counting events, occurrences, or phrases. This was a frequency tabulation.

Second: Looking for patterns or themes. Differing from frequency, this has focus on repetitive events, patterns, or themes.

Third: Chunking or grouping. Looking for commonalities among events, patterns, or themes.

Fourth: Building: The process of inductive analysis as built on the three prior steps.

These steps are guidance in general qualitative analysis (Miles & Huberman, 1984, Glesne & Peshkin, 1992). While generic, these steps are well suited to this study. For example, perceptions of partnering between the school and the private sector have importance in examination of several networks within academic capitalism. Analysis began with noting how often this was mentioned and the degree to which it seemed to be repetitive. Analysis of commonalities within the theme of “partnering” then lead to the inductive process which is the catalyst for increased understanding. In this example, partnering was mentioned, became thematic, and then became understood as essential for economic survival of the dental school. This instrumental case study analysis requires these, and additional methodologies, to provide a comprehensive examination of the research questions. Strategies for data analysis included both categorical aggregation and direct interpretation. Both interpretation of the single instance and meanings derived

through aggregation of instances until something can be said about them as a class are strategies in intrinsic and instrumental case studies. The case tends to favor direct interpretation as issues are probed and relationships teased out with a focus on an understanding of the case. In the instrumental case study categorical aggregation is favored as the complexity of the case give way to the issues of the research questions. A reliance on both strategies is required in this study.

The search for meaning in this study is predicated on correspondence, that is, a search for patterns, for consistency, and consistency within certain conditions (Stake, 1995). Patterns are both immediate when reviewing the data (direct interpretation) and when coding data and aggregating frequencies to find patterns (categorical aggregation). These strategies, along with general qualitative analysis, serve as formal analysis in this study.

Chronology has strategic importance in this study. Chronology refers to the initial understanding of the methods of dental education and those attributes that are distinctive to Saguaro dental school, that is, understanding the case is essential to understanding the issues. Chapter 4 addresses the case. With this understanding and analysis, Chapter 5 then addresses the issues.

#### Limitations of the study

I chose a qualitative approach in this study to understand the case and examine the issues as defined by the research questions. This approach enabled understanding of perceptions that influence dental education as well as the nuances and complexity of the

issues. Dentistry is historically a bastion of quantitative measurements of variables and outcomes and, although qualitative studies have gained increasing acceptance, the use of this qualitative approach may be seen by some in the dental profession as a limitation, that is, too subjective. This is addressed by the use of well documented techniques in data collection, management, and analysis. Both quantitative and qualitative research share these structural components.

Another limitation is the inability to generalize the findings of this study. A private, non-profit dental education institution was used in this study and generalizations, if any, would be limited to similar institutions. This limitation does not preclude refining of understanding, however. While new generalizations may not be possible, a refinement, a new look, a new perspective of previous held generalizations can emanate from this study.

Biases that I bring to the study can be a limitation. Self-awareness of this potential, the host of lifetime experiences and educational opportunities previously addressed, the strategies adopted, and the use of well documented techniques in data analysis all serve to minimize the effects of bias in this study.

Even with acknowledgement of these limitations, examination of the case and the issues provides an in-depth look at the changing face of dental education.

This chapter has outlined the research design, data gathering, and data analysis used in this study. In addition, the numerous techniques used to create increased

trustworthiness of the study and best address the research questions are elucidated.

Finally, limitations of this study have been addressed.

The next chapter, Chapter 4, reviews traditional dental education in the US and multiple characteristics of this non-traditional dental school that set this school apart, that is, characteristics that are distinctive and distinguish this school from others.

CHAPTER FOUR  
FINDINGS: THE CASE

Introduction

Dental education progresses over four years from the basic sciences, to pre-clinical sciences, to clinical application. In this introduction, I review the rationale of this sequencing of dental education, introduce the universal goal of this education, and provide a platform that serves as a springboard for analysis of Saguaro dental school.

The basic science foundation of dental education parallels that of medical education. Basic science courses such as anatomy, biochemistry, physiology, histology, genetics, pathology, microbiology, and pharmacology are core courses that medical and dental students alike take when entering school. These courses are foundational and, although many students may take similar courses prior to entering dental school, these are cohort classes which provide continuity of course content. When completed, students take Part 1 of National Boards. This is a series of tests that evaluate the level of knowledge of the basic sciences. All states have clinical examinations for licensure but none have specific written tests on the basic sciences. Instead, states rely on Part I of the National Boards. When passed, a requirement for graduation from dental school, all states accept these written results for state licensure.

The first 3-4 semesters are not restricted entirely to basic sciences. Students spend some time performing basic non-invasive procedures on each other to develop skills in a variety of endeavors that serve as a pre-clinical introduction to future clinical skills.

Pre-clinical sciences are courses and labs specific to dentistry. The fundamentals of specific procedures in varying clinical specialties are learned and practiced in the lab, either bench lab procedures or on manikins in simulation labs. This covers a broad spectrum of activities from handling a great variety of dental materials and devices to a variety of surgical procedures. These are courses and labs that begin in the first year and predominate in the second year.

The final two years are dedicated to development of clinical skills. The basic sciences and pre-clinical sciences have provided the foundation to develop the clinical skills of a competent dentist. Students take Part II of the National Boards prior to graduation; passing Part II a requirement for graduation. This is a written examination with a focus on foundational knowledge of pre-clinical and clinical sciences. As with Part 1, this serves as the written portion for pre-clinical and clinical sciences accepted by all states for licensure requirements.

Upon graduation, all students take a clinical examination, demonstrating clinical skills in several areas of dentistry in order to gain licensure in any given state. Over four years, dental students average 4890 hours of instruction. Of this 3900 hours are clinical training, and the remainder dedicated to basic, pre-clinical, and behavioral sciences (ADA Survey, 2003, Vol.4).

This sequence of learning in dental education represents a building-block approach in which competencies are acquired and culminates with assumption of the mantle of responsibility in treating human patients. This approach is the avenue which meets the goal of dental education; to produce clinically competent general dentists.

Two specific characteristics of dental education have special importance in this analysis. One, the basic sciences are traditionally taught by a specific set of professors, the pre-clinical sciences by another set, and clinical instructors by yet another set. Two, the building-block approach not only makes sense intuitively, but fulfills accreditation requirements. All US dental schools must be accredited by the Commission on Dental Accreditation (CODA). CODA, in turn, receives recognition through the US Department of Education, specifically the National Advisory Committee on Institutional Quality and Integrity (ADA News, 2006, June 19).

The remainder of this chapter provides analysis of Saguaro dental school. The first three sections of this analysis review the mission of the school, the students, and the faculty. This is followed by an overview of the operation of the school and concludes with several sections delineating approaches to dental education that are distinctive to this dental school. Pseudonyms have been used with the words of the administrators and faculty of Saguaro dental school in this analysis.

### The Mission

The parent university promotes a holistic approach to health care and this permeates all sister schools, including the dental school. The mind, body, spirit model is incorporated into the mission and goals of the dental school. Central to analyses in this study, the mission and goals are reproduced in Appendix B.

The words of the administrators and faculty of the dental school reflect the belief in the mission of the school. From Dean Scholler, who was involved in formation of the school:

This is the most mission driven organization I've ever been with. We came up with an idea and a mission and we've really stuck to it.

The mission is more than a belief system that guides the function of the school. It is represented symbolically within the name of the school as well. In the words of Dr.

Harrison, an associate dean:

Our mission is so critical that, in fact, we are the only dental school, the only dental school in the country with the words "oral health" in our title. [xxxxxx School of Dentistry & Oral Health]. Part of that "oral health" leads back to the mission of serving and going out to the community health centers and trying to meet the needs of the underserved. What would happen if every school in the country had our mission, that you produce 4,000 dentists a year who have the idea: hey, "I want to give back something". That would make a huge difference.

The mission and goals of the dental school share some characteristics of other dental schools, such as an emphasis on evidence-based practice, critical inquiry, and an orientation on prevention of disease. For purposes of this study, distinctive characteristics of this school are the emphasis on production of dentists having cultural competencies, dentists not only familiar with the private practice model but models of non-profits and the public health sectors, serving in leadership positions as community responsive dentists, dentists participating in an interdisciplinary healthcare system, and serving as a resource in public health issues. In addition, the mission emphasizes technologically adept students. The need and emphasis on technology, an important component in the

new economy and academic capitalism, is a recurring theme throughout the analysis of Saguaro dental school.

Graduating dentists pass multiple examinations for state licensure and the majority begin practicing in a “cottage” practice, either by themselves or as an associate of an established dentist. The mission and goals, in part, address the traditional isolation of dental practitioners in the health care arena. Dean Scholler succinctly summarizes this isolation:

Many dentists, when they graduated started practicing, never working in hospitals as part of general practice residencies and learning about poverty and health care decisions, and so on; so physicians get it, dentists never have the opportunity and its not their fault, its just that they were never exposed to it either in dental school or the initial period right after dental school.

The mission and goals of the dental school address the isolation of dental health practitioners by both recognition and educational processes that emphasize the interdisciplinary nature of healthcare, that dental healthcare is not a limited to the cottage practice but is part of a larger community, that knowledge of and participation in non-profits and public health facilities is essential to provide opportunity for access to dental healthcare for part of that larger community, and many in the larger community may present with cultural differences that need to be recognized and honored by those providing health care.

The mission and goals serve as the foundation for the dental school educational experience, meet and exceed the code of conduct and principles of ethics that guide dentistry as a profession, and provide guidance early in the educational experience of these dental students. While the mission and goals are lofty, perhaps appearing utopian,

the administration sustains a solid and realistic expectation of their students upon graduation. This is pragmatically described by Dr. Berkut, a clinical director:

[The mission and goals] raise some doubts within the local community and also throughout the rest of the country saying “well, ok, we know that’s part of your mission, we know your dean is totally devoted a lot of his life to that mission and goal, but will our students truly, when they graduate, will they go out to the Indian Health Center and be a dentist for a third of the income, or half the income they might make in the private sector”. To the person who says that we say “no, we really don’t expect that, we can’t guarantee that, nobody has any papers saying they’re going to do that”. What we want to foster is that that would be a really good thing, that it would be something that would help yourself, and your fellow man. You might say, “well, I’m going to go into private practice, but I’m going to devote a day a week to St. Vincent DePaul or the Cass Homeless Center and I’m going to devote or volunteer or donate, whatever you want to call it, not to get any remuneration for that at all. I’m going to donate because my school taught me that being involved in the community is a good thing. I agree with that, I want to be a good alumnus, and I want to follow through with that”. So, hopefully, each of our students will do that in their own way. It certainly doesn’t have to be going off to a reservation.

Dr. Harrison, another associate dean enlarges upon this theme:

We’re not going to produce 54 dentists a year who are going to go out and sign up with the Indian Health Service. Some are going into that arena, but probably the majority, they’re going into private practice but at least they’ll have the mind set that one night a week they’ll go work at a homeless shelter or a shelter for battered women. Even if they don’t do dentistry, they’ll go volunteer somewhere.

Dr. Simms, an associate dean, echoes the commitment to the mission and the expectations of students upon graduation:

The big thing that sets us out is our mission and that we want our students to be community service oriented and public health oriented. We try to hold our mission in front of us with everything we do. We’re very mission driven and it’s good. With our students, the way they behave toward their patients, the way they do community service now, what their mind set is for the future. We don’t expect everybody to be in a community health center but we do expect them to be a

leader in their community and know their resources and volunteer an amount of time for their community. That's how we're different.

This is further elucidated by faculty member Roberts:

We need people who know more than dentistry out there. [Dentists] to work with other disciplines, to work with medicine, to work with communities, to maintain and increase the quality of the health of our public. We believe in the approach, we believe in its worth; that there is a change that needs to happen in dental education, an evolution.

The mind, body, spirit model permeates the dental school as manifested in its mission and goals. Both faculty and administrators invariably reference the effort to strive to maintain the mission and goals as objectives of the school. The pervasiveness of this model was summarized by associate dean Elim:

“Mind, body, spirit; that's who we are as a university”.

### The Students

Admission to dental school is highly competitive. All applicants must take biology, inorganic chemistry, organic chemistry, and physics as entry requirements. This establishes a science GPA which, in conjunction with overall GPA and results from the Dental Admissions Test (DAT is analogous to the more familiar MCAT taken by medical school candidates), forms the nucleus of data to evaluate candidates for admission. US dental school aggregated data place general GPA, science GPA, interview results, and recommendations as having greater importance than manual dexterity and non-science GPA in admission criteria (ADA Survey, 2002/3, Vol. 2). DAT scores are used by all dental schools as well. An academic average score on the DAT is supplemented by scores

in perceptual activity, science, quantitative reasoning, reading comprehension, biology, inorganic chemistry, and organic chemistry. Although all scores are used, weighting of the scores in aggregated data suggests that the academic average score and perceptual ability are of greater importance to most dental schools than the others. The most recent aggregated data does not include Saguaro dental school so comparable scores of this school with others are not available. An undergraduate degree is not a requirement, however, the competition for admission is intense and an undergraduate degree is nearly universal.

With the mission of the school framing the philosophy and policies of Saguaro dental school, an additional admission requirement, consistent with the mission, distinguishes this school from others. Students seeking admission must have a history of community service or they are simply not considered.

Both administration and faculty express a profound belief that this policy does set the school apart, that this requirement is unique, that it makes the school different, that this additional requirement supports and enhances the mission of the dental school, and the students are demonstrating a dedication to service both within the school and in their activities outside the school as well.

A history of community service as an imperative for admission is strongly verbalized by

Dean Scholler:

You got to have a community minded, service-oriented, caring, compassionate person that has demonstrated community service; that's part of getting in here. That is one of the mission criteria that we stuck with and it still exists and is critically important.

Dr. Wright, a faculty member corroborates and accentuates this message from the dean:

I'm well aware of the fact that there are students who apply to the school who are academically first rate, I mean, you would say this is a person who has an absolutely stellar academic background, but have no community involvement- they won't get into the school. I think it does make a difference. I think that the demographic profile of the students changes the school. Yes, I do.

A desire for students who meet the academic requirements and have a history of community service fits with the mission of the dental school and, as previously reviewed by Dr. Simms, "we hold our mission in front of us with everything we do".

The selection process is not only mission-driven but considered unique; a belief that the process distinguishes this school from others The description of this process and admitted students by associate dean Elim:

The way we select them; every student comes with experience, whether they're 21 or 40. We really look at what they've done with their lives and who they are, some of their ethical and moral perspectives and take that into consideration and who we are bring in. What we're doing is taking where they've come and helping to guide where they go. We've come to the realization that we can make students aware of ethical and moral issues but we can't change their ethics while they're here. They come here with those things in place. [Admitted students] have had more life experiences and whether that's through being a parent, through having a different career, or different education, it's more diverse. Very few of our students come to us at age 21 or 22, just out of undergraduate school. Most of them have had something else in between and in that experience they've brought service. They still come in with those wide eyes that they can change the world and we try to give opportunities to actually do that, to focus on effective interventions. Its not just about doing stuff, it's about doing stuff that makes a difference. Our admissions process, I think, is unique on how we select.

The benefits of a history of community service and the resulting type of admitted student is corroborated by Dr. Harrison, associate dean:

[Admitted students] that we get in here truly have a deep, heartfelt desire to serve those who are underserved, just because they have been doing it. Anytime you require that they have done community service, some of that is bound to have rubbed off at some point.

Three classes of students (2003, 2004, 2005) have been admitted with the objectives of the community service requirement having come to fruition. On balance, the students demonstrate their belief in service to others, both within the school and outside as well.

Dr. Grist, a faculty member, summarizes his perceptions about the first three classes of dental students as observed within the dental school environment:

There is no question that [the dental school] has a stronger relationship, a feeling toward community service and volunteering than any other schools. They teach that there is a need to give back to society; we're not just out there to help the people that can afford to drive up to your office in a Mercedes. There are also people out in areas that can't get to your office. There is a need for that and the school definitely promotes that and the type student they take in is the type that will do that. No question in my mind that the students brought in are much more community minded than students that go to other schools and it's by design.

Dr. Wright, another faculty member, speaks about his perceptions of the dental students that he has seen within the dental school:

I find that, at this dental school, something that is remarkable; that all the students, I would say without exception, are very, very helpful of each other. I don't see any competition among the students. It's remarkable and it's very, very gratifying to see how supportive they are of each other. Whether its knowledge, whether it's helping out with patients, whether it's helping out with lab work, helping out with certain kinds of projects that they have, the students get along very, very well.

Dr. Simms, an associate dean, related a short story about the comments of a visiting professor who, after spending a half day in the classroom with the dental school students, took a brief break and commented to several faculty and administrators:

Wow, where did you get these guys [the dental students]. These students are different from mine. My students want me to talk about anything that's going to make them money.

The associate dean suggested to the visiting professor that the students have a predilection for thinking about their community.

Outside the halls of the dental school the students display a sense of community service as well. In the words of assistant dean Lamb:

I do get a strong sense from the majority of the students that, while they all want to get out and have a pretty good life and make a good living, for many of them that's not the only goal. It really is to try and give back and reach out in some way. There is very much an awareness, and a passion, by a lot of our students, particularly now as I see the new seniors coming back and many of them have been to Africa, to China, and so forth, over their 5 week break. They have been doing a lot of things and they do them all the time and they can't wait to go.

This sense of service by the students is corroborated by Dr. Simms, an associate dean, during a separate interview:

These students are so concerned about serving the community and they are the ones spearheading all these different trips to go to Mexico. They go to all different places, it's amazing; I think it makes the students a lot different.

Both administration and faculty have a heartfelt belief that the method of selection of students and the subsequent service activities of the students, both within and outside of the dental school, create a dental school that is distinctive; the type of student sets the school apart from other schools and creates an environment that fits the mission of the school. This is expressed in the words of administrator Sandstone and faculty member Robbins:

At this school particularly, it's not so much about the money, it's more about what you're going to do with your degree. The majority of them [students] are here with a purpose. They support the mission and enhance the mission. I think they're all great; they're doing it for all the right reasons. [Working with the students] is

basically just paying you forward. It's not all going to be about the money when they graduate. It's going to be how they can help people.

There are a lot of students from a lot of different places with a lot of different cultural backgrounds. What I see in the students is a real interest and a real passion to reach out and I do think that sets us apart.

These thoughts are corroborated by Dr. Harrison and assistant dean Lamb:

The mission of serving and going out to the community health centers and trying to meet the needs of the underserved might sound like a lofty goal; I think of the students see that, see that it's part of not only admission but the title of the school. I think they want to get behind that.

The most unique thing, I think, is the way we choose our students. We have the most amazing students. We have the most wonderful; it comes from the heart. I've never worked with such an amazing group.

The student selection criteria fit the mission, impacts both administrators and faculty, and creates educational modifications to enhance student success. Two specific modifications support both public service and private practice. The words of Dr. Scholler and associate dean Elim best describe these modifications, the first with a focus on public health, the second with a focus on private practice:

We made a commitment that we wanted our students well versed in core public health principles. Ergo, we have this certificate program that our students take on-line; five courses on-line, some of which are biostatistics, that will help students with their evidenced-based understanding of journal articles, and epidemiology, where they understand what's going on in their communities where they are practicing, and what is the necessity and why there is a necessity to interact with their medical counterparts, so they can improve the overall health and wellness of their patients.

Maybe you're not volunteering at all, maybe you're funding the local fluoride mouth rinse program to make an impact on the children of our community. Maybe they'll volunteer, maybe they'll do other things. We've given them the opportunity to see the diversity and ways they can impact health in the

community and we are beginning to work with them to say, “as you put together a business plan, as you start to think about that [private] practice, where is your piece of service”.

The dental school is mission-driven, administrators and faculty that have incorporated the mission into their belief system, and students are selected that fit the mission.

Application of the mission and goals fits accreditation, creation of competent general dentists, a heartfelt sense of community service, and a place for private practice.

#### Saguaro Dental Faculty

Sixteen full-time administrators and faculty are supplemented by over 100 part-time faculty. The administrative full-timers generally have dual appointments as faculty. The school is located in a favorable climate and is the home of many semi-retired and retired dentists. Saguaro dental school easily fills part-time faculty positions in most dental specialties. For those living in proximity to the school, this is a voluntary endeavor and those living farther away and teaching more than a day a week are provided with a hotel room and meal vouchers to accommodate an overnight stay.

All part-time faculty are provided an orientation to review the mission and goals of the school. In addition, the faculty are “calibrated”. They are made aware of the clinical competencies expected of the students with the calibration providing a method of feedback and grading criteria when evaluating the clinical activities of the students.

As an example, both Drs. Grist and Roberts were part-time faculty and often stayed overnight to teach two days. Both were retired, one a generalist and the other a specialist. During interviews, they both indicated knowledge of the mission and goals of the school,

the culture established by the school, and both had been calibrated when first volunteering at the school. They both looked forward to teaching and felt that they were contributing to the education of the students.

The selection process at Saguaro dental school for faculty begins with a perceived need. As a specific position is desired one or more candidates are contacted and then accepted for a position after a committee review. Other than clinical competency, the committee criteria were not elaborated. The protocol for dismissal for faculty that did not work out was not discussed during the interviews but two administrators expressed a generic theme that if a faculty member “did not work out, they were let go”. My impression was that dismissal was infrequent but, when necessary, it was not due to clinical incompetence but more to an inability to teach effectively or an inability to treat the students with dignity.

The use of part-time faculty as a significant percentage of total dental school faculty is not unprecedented. Aggregated data from 2003 reveals the national US dental school percentage of full-time to part-time faculty is 42.1 % full-timers and 57.9 % part-timers (ADA Survey, 2002/3, Vol.3). US dental schools reported a broad range of part-time utilization from a low of 8.3 % of part-timers to a high of 78 % of part-timers. Saguaro dental school was not included in this data. The percentage of part-timers would exceed the highest percentage in 2003 by several points, however.

In this next section, I provide an overview of dental education from the student perspective, i.e., the educational methodology as they progress through the basic

sciences, pre-clinical sciences and finally to clinical application of that knowledge. I also review how Saguaro dental school is distinctive from other dental schools in this endeavor. Following this overview, I examine the educational methodology, organization and administration, use of technology, financial resources, partnerships, and the culture of Saguaro dental school. These components all have characteristics that are innovative and separate this school from others. Concurrent with examination of these characteristics, I review the rationale for specific innovative changes within these characteristics using the words of those intimately involved in the formation and operation of the school.

### An Overview

Instruction of Saguaro dental students has characteristics that differ from traditional dental education. Basic sciences are taught over a semester in traditional dental education. In Saguaro dental school, all basic sciences are taught in a modular or pod format. A basic science course is given over a one week or two week period of time, eight hours a day. The courses are taught by medical school professors brought in from other university medical schools to teach that specific course. When possible, the basic science courses are a systems-based curriculum instead of a science discipline-based curriculum. For example, when observing at the school, a neuromuscular expert was teaching the dental students. He had written textbooks on the subject, was extremely well qualified, and presented his topic from an anatomical, physiologic, histological, and pathological perspective. This is a systems-based approach that promotes integration of

basic science information with clinical application of that information. This is not always the case however. For example, biochemistry is discipline-based; an accommodation to the need for specific knowledge in that basic science to pass the biochemistry portion of Part I of the National Boards.

The pre-clinical sciences are specific to dental education and are taught similarly to the basic sciences. Coursework is presented as a module over a one or two week period of time with instruction provided by dental professors from other dental schools across the US. On occasion, a professor from Saguaro dental school may teach a specific topic embedded in the pre-clinical science but the corpus of the course is generally taught by a faculty member brought in from another school.

Another distinction at Saguaro is the use of simulation labs very early in the education of Saguaro dental students. For example, these students pick up and use the dental handpiece in a simulated setting the second day of dental school. In most institutions, this does not begin until the second year of classes. Students in traditional dental schools also devote a great deal of laboratory time to learning the same skills as dental laboratory technicians, for example, the making of a denture from beginning to end or making of a gold crown from the initial waxing of a crown to the final polished product. At Saguaro dental school, a private dental laboratory within the dental school teaches the students each step of the laboratory process as they observe technicians fabricating dental appliances designed specifically for that dental students' patient. The emphasis, then, is not to make technicians out of the dental students, but to foster how to effectively work with dental technicians.

Clinical dentistry is taught by Saguaro dental school faculty members but with several distinctions from other schools. The students at this school begin their clinical training in a comprehensive care unit. In most schools, students start in specific departments such as endodontics (root canal work) or removable prosthodontics (dentures) and, after demonstrating competency in these specific disciplines, they transition to comprehensive care units where they treat the full spectrum of dental diseases. Comprehensive care units mimic the setting of dental practice after graduation. Saguaro students begin in the comprehensive care units immediately with faculty having specific areas of expertise brought to them, and their patients, as needed. As previously reviewed, the majority of dental faculty teaching the students in these units are not only part-time faculty but also volunteers.

Another distinction in clinical teaching is the fourth year students leaving for clinical training at outside clinics every other month, that is., they spend one month in the dental school comprehensive care unit, then leave for a month at an outside facility, and alternate each and every month until graduation. Clinical experience outside the dental school is distinctive to this school because all teaching is by adjunct faculty at the outside facilities who have been brought to the school for calibration. Each adjunct, then, is aware of the expectations of the school and the competencies that must be demonstrated by the students.

To summarize, a student at a traditional dental school, if touring Saguaro dental school, would see significant differences. Instead of full semester discipline-based basic sciences taught by full time, in-house basic science professors, the basic sciences would

be one or two week courses, largely systems-based, and taught by part-time adjuncts from outside medical schools. The pre-clinical sciences would be much the same as the basic sciences, except that simulation labs would begin a year earlier and be taught by part-time faculty. Pre-clinical laboratories dedicated to laboratory technician's skills would be replaced by a course of instruction within a private laboratory located within the dental school with an emphasis on corroboration with the technicians in patient care. In the clinic, working through competencies in individual departments would be replaced by direct placement in a comprehensive care unit with specific specialists brought to the student and patient as needed. By any measure, these would be perceived as major differences from traditional dental education.

The next several sections examine Saguaro dental school as perceived by the administration and faculty. The distinctive changes, and the rationale for those changes, include the modular method, organization and administration of the school, the use of technology, resources, partnerships, and the culture of the school.

### The Modular Method

The genesis of the modular method of instruction of both the basic and preclinical sciences can be found in the mission of the school as delineated by the blue ribbon panel assembled to initiate the new dental school. The panel was composed of innovative thinkers in dental education and public health who were challenged to come up with a model that responded to dental needs of the community that would be successful and cost

effective. The idea adhered to is summarized by Dean Scholler, a participant and blue ribbon panel member:

We said we wanted just a very core full time faculty and a large cadre of adjunct and part-time faculty, we didn't want tenure, we didn't want to have a lot of basic science folks, we didn't have an emphasis on science research. We wanted policy research. All those core elements are in place today.

The rationale for the modular model is multidimensional, that is, cost savings is embedded in the model but does not stand as a singular, dominant plank in the platform of this model. The multidimensional rationale was succinctly summarized by Dean Scholler:

This is a viable model that can produce a quality dental practitioner, a caring, compassionate quality clinician for less money.

Dental curricula have remained essentially unaltered for decades; this in contrast to the practice of dentistry, which has undergone significant changes over time (Glick, 2006). Any given basic science faculty member in a traditional dental school teaches a course a semester with remaining time devoted to writing grants, research, or teaching at another professional school. A chronic problem is the translation of basic science knowledge into relevant clinical application. The recipients of this knowledge, the students, lack the background at this early stage of their education to assess the relevance of the information and the basic science instructors lack the practical experience to translate the information to clinical relevant application.

The knowledge gained in the basic sciences is also strongly influenced by the National Boards. The academic reality is that dental schools are ranked, in part, by student scores on the National Board exams, passing these exams is mandatory for licensure in any

given state, and the scores are often used in ranking applicants applying to post-doctoral programs. “Teaching to the test” for these reasons induces resistance to curriculum change that could jeopardize success on these national examinations.

The basic sciences require the memorization of facts in a rapidly changing professional environment with an emphasis on evidence-based practice. Saguaro dental school developed a model that recognizes the reality of National Board scores and the use of these scores, but also sought an innovative model that bridges the translation of basic science knowledge and clinical application. This fulfills the idea and mission of producing competent and quality general dentists, that is, practitioners capable of critical inquiry, interpretation of evidenced-basic procedures, and application of these procedures in clinical application as quality practitioners.

The rationale for the modular format is opportunity to create the translation of basic science into clinical application and a reduction in the cost of dental education while producing high quality and clinically competent dentists. The angst produced by the reality of board scores is tempered by the success of the students taking the boards. In the words of Dr. Harmon, the vice dean:

The focus on the basic science is to make sure we’re providing these students with everything they need in order to be successful on National Boards because that’s kind of what you’re teaching to and, I hate it, but it’s a necessary evil. Our National Board scores reflect that it’s successful.

Dr. Simms, an associate dean adds to the success of the students with this format:

We’ve had success on our Boards. Last year is was 93% pass rate-passed their Boards the first time around.

Students typically take Part I of the National Boards the second year of dental school. Data from 2005, which represents the second year of the inaugural class at Saguaro dental school, demonstrates a national failure rate of 15.4 % (ADA, 2007). The failure rate of Saguaro students was 7% during this same testing year.

Associate dean Elim emphasizes the effort to bridge the gap between the basic sciences and clinical application:

We have constructed the curriculum to be an integrated curriculum, to be a systems-based curriculum instead of a science discipline-based and we sequence it differently.

This effort is corroborated by Dr. Berkut, a clinical director:

Basic science faculty are brought in from all areas of the country and they bring with them some diversity. We're not trapped into one way of doing things. We get to see such a nice variety of teaching strategies, implementing, and getting the material across.

This emphasis on the need for innovative change in format in the words of Dean

Scholler:

You get people showing the same slides, giving the same lectures, resistant to change, not innovative, not fluid, not flexible, and in the basic science area, there was a lack of connection between basic science and actual clinical dentistry. They weren't building that bridge; that translational piece.

The other dimension driving the change to a modular format in basic sciences is cost. The change to a modular method reduces the need for a large physical facility and also eliminates a number of costs associated with full-time instructors. Associate dean Elim explains both the physical plant and professorial costs:

We have, in the visiting faculty format; we don't pay benefits, we pay well for their time that they're here. We have one office for 25 employees because that person changes every week, or every couple of weeks. The physical space is less, we're not supporting them on an ongoing basis for technology, for conferences, for travel, for faculty development. That was one of the major motivating factors for moving to the modular format and the design of the school. That certainly affects our costs.

Dr. Harmon, a vice dean, echoes a similar theme:

We don't have, then, the need to have a facility to support that faculty. We don't have to have the office space. We pay these people well but we don't have other obligations to them except what we pay them, and how we get them out here and take care of them, take good care of them, while they're here; we spoil them. The basic science modular thing seems to really work well and I think it has the most financial impact, as much as anything, we're doing here; [it] has the most positive financial impact on the dental school.

The perceptions from Dr. Berkut, a clinical director who also has a faculty appointment:

Its many thousands of dollars less to bring in these instructors from all over the country for a one week module or a two week, as opposed to paying a full salary with full benefits to 50 to 60 people who would need to be on the faculty. The physical plant, the school, doesn't have to be a large, you don't have to have 20 departments. But with this school here and a fairly small number of faculty members, in comparison to other schools, I think that would have to have a financial impact.

Aggregate data from 2003 lists the average number of full-time basic science faculty at US dental schools to be 15 and full-time clinical faculty averages 64 (ADA Survey, 2002/3, Vol 3). The variability of full-time basic science faculty is high, ranging from as little as 3 to as high as 101. Similarly, the range for full-time clinical faculty was 31 to 133. In contrast, Saguaro dental has 0 basic science and 8 full-time clinical faculty along with 8 full-time administrators, some of which have dual appointments. The estimate of

50-60 full time faculty requiring salaries, benefits, and a larger facility to accommodate offices appears to fall within the national average for US dental schools.

The modular format in the basic sciences is designed to address the reality of National Board scores but add the translation of those sciences to clinical dentistry through a systems-based approach as much as possible. The costs of dental education can be reduced as well by a reduction in the size of the physical facility as well as the elimination of the costs of full-time salaries and benefits. The school is new, however, and it is perhaps far too early to determine if these cost reductions are, in fact, cost savings and not cost shifting.

With the mission of the dental school always in the forefront, an expressed outcome of this format is a high quality, competent dentist with the capacity to produce the best that evidenced-based dentistry has to offer.

The pre-clinical sciences are taught in the same manner as the basic sciences, that is, in a modular format. These courses and labs are specific to dentistry and are taught by dentists and dental specialists from all areas of the country. The rationale for the format is identical to that of the basic sciences; however, some hybridization has been incorporated into the preclinical curriculum. Both administrators and faculty I interviewed expressed an initial “disconnect” between several preclinical courses and the beginning of the “hands-on” education in the clinic setting. Simply too much time elapsed between preclinical course content and the initial clinical procedures by students on human patients in several specific dental disciplines. An answer to this was a new module created within the school and taught by the core faculty within the school. A listing was

made of 32 dental specific clinical foundations which were re-introduced to the students prior to beginning their clinical activities. The intent is to bring the students back “up to speed”, reviewing core material that may have been relegated to distant memory over time. The other modification initiated within specific clinical disciplines is a three day mini-course just prior to beginning clinical activities. The students have a didactic review, simulation labs, practical and theoretical exams, and a review of the evidenced-based rationale for the procedures they will be providing. The short courses and clinical foundations module together constitute the hybrid modular format when combined with the preclinical sciences courses. The class of 2007 will be the first class to take Part II of the National Boards and clinical exams for state licensure so the preclinical science modular format has not yet been fully assessed. Ongoing assessment and changes as needed have been promulgated as evidenced by the hybrid modular approach in response to perceived disconnects resulting from the temporal distance between instruction and clinical practice in selected disciplines.

Another preclinical area substantially distinctive from traditional dental education is a curricular change that eliminates multiple lab courses taken by dental students that replicate the training of dental lab technicians. Over generations of practicing dentists, performing lab procedures that produced dental appliances used in patients was the norm. Now commercial labs produce virtually all the appliances using written direction of dentists as guidelines. Saguardo dental school perceives too much to learn in dental training to concurrently train dentists as dental technicians. Dentistry has changed with commercial labs producing virtually all dental appliances and effective communication

with the commercial labs is perceived as more important than becoming a dental technician. Dr. Harmon, who is also a prosthodontist, a type of dental specialist that works closer with lab technicians than any other dental specialty, provides this rationale:

I'm a prosthodontist who's tried to reduce the amount of lab work the students have to do. I just think there's too much in the curriculum anymore to even consider trying to make laboratory technicians out of them. I think they need to know a certain amount of things about laboratory work; they need to be able to begin the process of learning to do quality control. I'm really inclined to be supportive of this but it's difficult to do at older institutions, but I would hope that other schools would look at this. Our students have to rotate through there [the dental laboratory] just like they rotate through other areas, specialty areas such as oral surgery and pediatrics. They go through the lab so that they get some contact with them. It's right here in the building so it really makes it nice for access.

Dean Scholler expresses similar perceptions of this curriculum change:

There was an abundant amount of time spent on lab work that really didn't improve your skills or make you a better dentist and didn't link, translate to the reality of dental practice. There's the overwhelming majority of dentists out there [who] don't do their own lab work, so why do we have to spend so much time doing it. There are other ways to learn it, by having students spend time in a lab, working with lab technicians, learning the communication skills, knowing what needs to be done to provide a really good product for your patient.

The curriculum change reduces a significant amount of time dedicated to laboratory procedures and, in conjunction with the modular format, creates the opportunity for students to enter the clinical arena and develop interpersonal and clinical skills with patients earlier in their dental education. This concept is expressed by Dr. Simms, an associate dean:

The advantages of that [the modular format] are our students get all their basic sciences done in the first year so they can, not leave the academics behind them, but get that under their belt so they can get into the clinic and start interacting with patients, start doing more procedures sooner than they would in a typical dental school. So we try to get students in there sooner; that's another difference.

The modular format, in addition to perceptions of cost reduction, creating translational coursework that brings relevancy of basic sciences to clinical practice, addressing the need to pass the National Boards, and prompting critical inquiry and the foundations of evidence-based practice, also accelerates the academic process to create additional time for clinical practice. With an eye on the mission and goals, associate dean Elim verbalizes a succinct summary of the entire modular concept at Saguardo dental school:

[The format] focuses on making them better people, better dentists, concentrating on the patients needs; because we've lifted some of those out of date measures away.

#### Senior Rotations

In addition to the modular method, another distinctive difference in the education of Saguardo dental students is the manner of clinical training in the final year of school. During the senior year, the students alternate clinical practice in the dental school clinic with clinical practice in community clinics every other month the entire year. Other dental schools may have some opportunities available for this type of clinical externship; however, Saguardo dental school has incorporated features that are unique in dental education. Associate dean Simms provides an insight to how this experience differs:

Our fourth year rotations are with private entities, such as community health centers. Our fourth year students, they just don't go out to extern sites just for fun and fluff, which is what most places [do]. When they are out there, we have people designated and trained as adjunct faculty so they are getting evaluated while out there.

Drs. Harrison and Harmon express the differences in greater detail:

Our external rotations in the fourth year; I think it's a big difference in what other schools are doing. More and more schools are having students go out to external sites. The thing we are doing differently right now is calibrating and training the

faculty out there to actually grade and cause our students to have experiences that we can evaluate from a grade point of view, from an experience point of view; we grade them out there just like there here in this school.

We are the first and only [dental school] to actually have what are considered adjunct faculty at those sites because they are calibrated here to how we like to have things taught and assessed, using a common assessment form. They are, indeed, being evaluated by our adjunct faculty-they're just off-site.

Dr. Johnstone, a clinical director and Dean Scholler provide perspectives on the rationale for this arrangement of alternating clinical assignments:

I think the whole idea that our fourth year students are going out into the community; in a sense, they are learning to give back now. Here it is a requirement. Here the students are going to go out into the community. Whether they become public health dentists or not, I don't think that's the main goal. I think what it's going to do is instill in students that they give back and I think a lot of us in dentistry, those of us who have been in dentistry many years, don't give back, or haven't had the opportunity to give back. So that's something that I think is different here.

You know, one of the things in traditional dental education, you have students in the third year and the fourth year in the same clinic with the same instructors seeing the same patients. There's no new. There's no innovation and the fact that we can get students out in the real world, exposed to adjunct faculty that have been calibrated and understand what's being taught, how it's being taught, how it's being measured, but seeing different types of patients in a real world setting in the fourth year is tremendously beneficial. And we stuck to all that.

The primary differentiating characteristic of these rotations is the calibration of dentists in the community clinics. The dentists in the community clinics pay their own expenses to travel to Saguaro dental school for their training and calibration. Saguaro dental school pays the travel expenses for the students to get to the clinics, which are in multiple states and several countries. The community clinics are responsible for housing the students and well as keeping them well fed.

Community clinics often serve the underserved with the externships fitting the mission and goals of the dental school. The students are exposed to a broad spectrum of society with differing dental diseases and differing expectations of dental treatment. This also fits the mission and goals of the school.

#### Organization/Administration

The administrators of Saguaro dental school are not great in number and all are saddled with multiple tasks and responsibilities. The dean reports directly to the provost and vice provost, both on the same campus, and he also has direct communication with the president of the parent university. The vice dean of Saguaro describes his position as the “chief of operations”, striving to keep all component aspects of the school working well together. The next of several associate deans is the associate dean for curriculum management and integration. This individual is responsible for a dental curriculum that is in place, delivered, and is assessed. There is an associate dean for academic assessment who is in charge of meeting all accreditation standards, evaluates the academic progress of the students, provides assessments on a program-wide level, and also serves as a liaison with student services in conjunction with the parent university. The associate dean for clinical activities also serves as the clinical director and oversees the clinic operations and functions within the dental clinic building; this includes schedules and staffing, supply orders, purchasing, and budgets. Another associate dean has responsibilities in the area of community partnerships. Assistant deans include one for American Indian Affairs and another serving as the assistant dean for pre-clinical education. This latter position

coordinates the first two years of dental education in areas such as recruitment of the visiting faculty, modular course assessment, and working with students individually regarding specific issues or problems that may arise during the beginning of their dental education.

Six individuals serve in a deanship capacity and two other individuals are pre-clinical or clinical directors. Collectively, these are the administrators of the dental school. Another eight individuals are full time faculty or service personnel, such as the business manager. These sixteen individuals are the core of full-timers that all serve on committees responsible for the ongoing operation of the dental school. The small number of full-time personnel requires many to sit on multiple committees.

Structurally, several committees divide responsibilities, although overlap of both personnel and responsibilities is typical. The curriculum committee is large and diverse with responsibilities for identifying all modules, learning objectives, goals, assessment methods, faculty members, and assuring the whole process is functioning as mandated. There is a faculty recruitment and appointment committee. This committee is responsible for filling vacancies, recruiting, advertising, interviewing, hiring, and appointing faculty. This committee overlaps with others in situations such as another committee wanting to hire a faculty member and this committee needed for the faculty appointment. An academic progress committee sets standards for academic progress and assessment of student progress in examinations, modules, and clinical experience for all four years of enrollment. The clinical activities committee has a focus on the administrative issues of the clinic and the final committee is the Deans council. The vice dean, all associate deans,

and the assistant deans sit on this council. This council covers a broad spectrum of activities from administrative issues, staff problems, student problems, visioning what the future may bring, to the optimal number of classroom seats – a plethora of issues with this forum serving to address both the expected and unexpected issues within the school.

A director of clinical education implements the mandates of the curriculum committee as they apply to the dental school clinic. This application, in turn, is through the Comprehensive Care Unit (CCU) directors who then work with adjuncts that are clinical instructors. The director of clinical education also serves as the chair of the subcommittee of clinical education which is under the curriculum committee. This position serves as a conduit between the curriculum committee and the faculty, specifically the CCU directors and directors of each specialty. Specialty directors are equivalent to department chairs and Saguaro dental school has co-directors in many departments and is striving toward co-directors in every department.

The structure of Saguaro dental school shares organizational mapping consistent with most dental schools. This dental school has several characteristics, however, that create distinctive differences from other dental schools.

Distinctive characteristics are best described as extraordinary accessibility and extraordinary flexibility throughout the organizational structure. The school is new with the rate of change as needed quite rapid and not without an occasional sense of urgency. An administrator described this to me with the analogy of the plate spinner, the guy working hard to keep the plates spinning on the sticks, but occasionally a plate falls. He admits that the school does drop a plate but is quick to reflect on the problem, develop

solutions, and implement corrective actions quickly. Both access among all strata of school personnel and built-in flexibility promote this rapid response.

Accessibility throughout the system is fostered by an organization wide open-door policy. Administrators I interviewed corroborated the plate spinner analogy, i.e., the policy is a work in progress with efforts directed toward less necessity and urgency and more toward a system in place for open lines of communication. In the words of associate dean Elim:

We engage both faculty and administration on a committee level. The dean has a very open door policy; if you have an issue, feel free to come and talk. The lines of communication, the mechanisms to allow communication are there sometimes, and not others. It's an area we continue to work on but it's not a closed system. I guess the attitude toward desiring to have open communication may be different than other schools.

Dr. Harrison, an associate dean, provides a description of the structural differences between Saguaro dental school and other schools and how this impacts accessibility:

When you have a regimented, traditional environment, almost a military environment, the whole chain of command thing brought to bear, everybody feels like they can't talk to anybody but their immediate superior to try to resolve whatever problem they've got. We try to go out of our way to establish an environment that is very open, a collegial environment where faculty can talk to anybody; the dean's door is always open. Our dean gets over here every day, walking through the chatting with faculty members and trying to encourage them. The whole environment of administration and faculty members almost cuts the line of separation between faculty and administration; there really isn't a cut and dried line between administration and faculty. We're all looked upon as all working together to get the job done.

Associate dean Simms adds to this discussion, providing texture to this topic:

It's a very flat organization. [The dean] acts like he's one of the crowd. Every once in a while he'll have to do something or he'll ask that something be done because he's dean, but very rarely. Our opinions and thoughts are never degraded, always supported and when we have project, its take and run with it. It's a very

empowering environment. [I've] been in encouraging environments, and this is certainly one of the most.

Flexibility is the other characteristic distinctive to Saguaro dental school. An associate dean revealed in the ability to make changes without having to go through multiple committees and lots of layers to get to a desired goal. The dean, Dr. Scholler, sets the tempo for the flexibility in the administrative system as follows:

We still make mistakes but what I like about the organization and the people is that we are able to correct them very quickly. We identify something that is an issue that needs to be corrected, it gets resolved in a day or two; quickly. We don't wait for a committee two months from now then that committee files a report to go to another committee, that goes up to an assistant dean, to the associate dean, to the dean. We're able to have an open door policy; if the students have issues we resolve them right away. Students are included on committees, so it's agile. Yes, it's lean and mean, but it's an agile organization.

Having been a recipient of dental education as well as a faculty member, the degree of accessibility, by students and faculty alike, with the administration was stunning to me. My observation of the relationship of the dean with the students was equally as startling. He knew each student by name, their backgrounds, families, and interests. The relationship observed was cordial, warm, caring, and mutual. I had opportunity to ask the dean if his background strongly influenced this highly accessible and flexible manner of administration. My question focused on the fact that he had not been a dean of a dental school before. His answer served to confirm my perceptions that the administration and organization of Saguaro dental school is certainly distinctive. The words of Dr. Scholler:

I don't have an agenda. I don't have a history of a traditional dental school to bog me down, if you will. I was free to make as many mistakes as I wanted to make, be as stupid as I wanted to be. The good news was that I was a proven public health leader, I ran a state health department, I headed up a couple of large national organizations and we all shared a common vision. The thing about this place that is very, very, extraordinary is the fact that everybody here understands

the mission and is driven by it. And that's what gets it done. It's why we're here early and stay late. But, yes, if there was a traditional dean here, no, it wouldn't have worked.

The organizational structure of Saguaro dental school maps closely with traditional dental schools but the functioning of the administration, especially in accessibility and flexibility, serves to distinguish this school from others. An argument could be made that the administration, when faced with issues, rapidly assessed, reflected, proposed, and implemented solutions because they are not shackled by a history of dental school tradition.

#### The Use of Technology

Saguaro dental school is a new building with state-of-the-art electronic technology. The use of technology in dental education is more than just the use of computers and the internet, however. The school endeavors to be a leader in all forms of technology in dental education. Technology as a means of education, communication, and commerce is described in this section as are the benefits as perceived by the administrators. The end of this section on the use of technology reviews an interesting incongruity between these perceptions and a national consensus regarding cost savings via the use of technology.

The school has dental lasers and every student will be certified in laser use prior to graduation. The students utilize the latest in materials such as new ceramics and devices such as implants. The school has cone beam imaging which is a very recent technology advance in radiology that produces three dimensional images in multiple planes. Not readily available in the private sector, it's already in the dental school. The students use

electric handpieces in both simulation labs and in their clinics; more expensive than air-turbine driven handpieces but on the cutting edge of technology.

The entire school is paperless, that is, all patient charts are computer based, all radiographs are digital and computer based, and any instructor or any student can download any patient forms, examinations, radiographs, reports, or correspondence from any chairside computer in any of the school clinics.

Technology in dental education at Saguaro dental school serves to provide the students with the most up to date materials and devices to enhance their education. It also introduces the dental students to a rapidly accelerating trend in clinical practice; the move to digital records and data such as radiographs. It also serves as a method to provide continuity of education consistent with their methodology of education. This is reviewed by Dr. Harmon, the vice dean:

You know, we have our students out on all these offsite clinics now and we're trying to work up something to communicate with us. One of the dilemmas of having half the class gone is that if we want to offer a course to them, we have to offer it twice because only half of them are here. One of the ways we've talked about is to be able to have something that's deliverable to them; we could record it and send it out to them on an i-pod.

Within the classroom, the students track the lectures with powerpoint, take notes concurrently, easily pick up missed information, and hear similar information from a different university if desired. All Saguaro dental students carry their laptops at all times in the classroom. This is an ongoing trend in dental education but the universal use of the laptop at this time sets this school apart from other schools.

Dr. Johnstone, a co-director of a dental specialty, uses electronic technology in a more traditional manner:

I have an open communication with the students; e-mails are phenomenal. When I'm home every night, the first thing I do is to go to my e-mails from the school and carry on a dialogue with the students.

Technology is also seen as a revenue stream. This could be in the form of on-line continuing education, on-line graduate degrees, or the electronic transfer of clinical data for a fee. For example, all states require a designated number of continuing education hours for re-licensure. Some states require several specific topics to be covered in continuing education courses. Saguaro is evaluating becoming the sponsor of several of these mandatory courses. Another example: a graduate degree in public health with an emphasis in dentistry has been approved and a sister school has the expertise to assist in providing an on-line graduate degree. Yet another example; all Saguaro dental students graduate with a certificate in public health. This is a five course program they are required to complete. All these courses are accessed on-line. Finally, clinical data, such as digitized cone beam CT scans, can be taken and e-mailed back to local dentists who have referred patients to the dental school for this type of imaging with associated fees for this service less than private radiology laboratories.

The use of technology is also perceived as a method of cost saving. The fourth year students are in offsite facilities half the time. The internet provides a medium for correspondence, not only with the students, but also with the adjunct faculty. The faculty can forward progress reports, grades, and other evaluations with this perceived to be a cost effective and expedited manner of communication.

Dr. Scholler succinctly summarizes his perceptions of the use of technology at Saguaro dental school:

Using technology ultimately saves money and time. The opportunity of distance learning, clinical diagnosis, use in rural areas to help in diagnosis and treatment planning, the use of practice-based software, not education-based, so that the students get real-world experiences, to learn from informatics; all will be an opportunity for our students and, at the same time, for our patients as well. We're using lasers, we use high speed electric handpieces; that's innovation for a dental school. We are a leader [ in dental school technology] and will continue to be.

The use of technology as a tool for education, communication, and commerce is deeply embedded in the mission, goals, and operation of this new dental school.

Technology is perceived as both efficacious and cost effective in dental education. The problem of keeping abreast of ever-changing software upgrades was mentioned by Dr. Harmon during his interview; however, the initial costs of hardware and associated infrastructure, as well as subsequent maintenance of both hardware and software, was not mentioned by any administrators when discussing the benefits of technology in dental education. The capital costs as well as labor costs to maintain technology, and this shifting of the costs within education that could negate cost savings, was not addressed by the administrators when examining perceptions of the use of technology in dental education.

### Resources

Higher education sources of revenue include tuition and fees, financial aid, appropriations, grants and contracts, endowments, gifts, sales and services of educational activities, and auxiliary enterprises. Expenditures include institution, research, public

service, academic support student services, administrative, capital costs, operations and maintenance, and cost of auxiliary enterprises. Dental education has income and expenses consistent with higher education; however, the academic/clinical content of all dental education creates shifts in the weighting of income and expenses that produces differences from other forms of higher education. This section examines the perceptions of administrators and faculty of Saguaro dental school regarding income and expenses of dental education and how their actions, as based on these perceptions, have further shifted the weighting in a distinctive manner. The topic of partnerships as related to income and expenses is central to the analysis and, as such, has been dissected from this section and is analyzed in its own, distinct section.

Saguaro is part of a private, non-profit university with proprietary or internal financial records not available; however, those interviewed at the dental school provide a candid background of sources of income, the expenses of operating the dental school, and the efforts that are evolving to bring proximity to income and expenses.

Tuition is the biggest source of revenue with instruction the primary nidus of resources; this distinctive from some other dental education institutions that often seek basic and applied research dollars. When the dental school opened in 2003, the tuition was listed as \$32,000. In comparison, during this same time, aggregated data suggests the average tuition of US dental schools was \$27,952 (ADA, 2006). Aggregated data available from 2002/03 reported other private dental schools having tuition levels that varied from \$15,090 to \$54,203 with a mean average of \$33,825 (ADA Survey, 2002/03, Vol. 2). In 2005, Saguaro dental students were paying more than this - the tuition had

increased about 50% in two years. With tuition now approaching \$40,000 a year, Dr. Simms, an associate dean, suggested that discussion is ongoing within the dental school to explore all avenues to keep a cap on the tuition at this level for as long as feasible.

Dental school is expensive but a faculty member, Dr. Grist, with a child in dental school, brings some perspective:

Its gotten very expensive to go to dental school. I can give you this from two sides. I can see the student going through, the parents of the student going through, and also the other side, as an educator, educating these students. Its not that the schools are overcharging, [it's] very expensive going to dental school. They are being exposed to many more things than we did when we were in school, which is very good. But it's also costing more to expose them to it.

The faculty member is referring to the daily costs of teaching in the clinical environment. Dental clinics use large volumes of expendable items that add to the costs of dental education. Added to these are very expensive materials, products, and devices such as dental implants, lasers, digitized imaging, CAD-CAM design technologies, diagnostic technologies, high tech resins, composites, and impressions materials. Bone products, membranes, blood products and the specialized surgical instrumentation for using these products and newer techniques such as osseous distraction techniques are all incorporated into the clinic curriculum. This is the state-of-the-art in dental clinical education but the cost of having, using, and teaching the use of these materials and devices is staggering. Having the instrumentation, supplies, equipment, and technology is essential in order to provide the students with the best education possible, however.

Saguaro dental school has taken steps to reduce costs of clinical education. An arrangement with a supplier results in a discount if 85% of supplies are purchased

through this supplier. This contract largely includes expendable products that are used in very large volumes and discounting provides substantial savings. For example, local anesthetics, disposable needles, and cotton gauze represent these types of contractual items. These items are essential but generic, disposable, and mundane with the specific product manufacturer, distributor, and supplier of little to no consequence regarding the training of dental students. An implant company has donated dental implants so that each dental student will have at least one implant to place each year. This would have negative consequences if the students were a captive market, that is, if they were to graduate with knowledge limited to this specific implant system in a sector of dentistry where one system seldom meets all the needs encountered in the practice of dentistry. This has been addressed by the dental school by having two other dental implant manufacturers donate as well. Though I was not able to determine specific arrangements with the other implant companies, I place implants in my private practice and know the expenses associated with providing this service. The cost savings to the school would be substantial, certainly in the tens of thousands of dollars and perhaps in the hundreds of thousands of dollars.

Saguaro dental school has not yet graduated a class, so alumni giving is not yet a factor, however, the school does have an individual in a development office, a recruiter for donations. To date, approximately fifty founding members have pledged money to the school in amounts from \$500 a year to \$20,000 a year. An annual golf tournament has brought in \$50,000 per year. Other donations have come from the local philanthropic community, local businesses, service clubs, and individuals.

The school also has a grant writer. Grants have come from trusts and foundations with the largest to date being a \$400,000 grant for purchase of imaging technology. The dental school has a special needs clinic and grants have been forwarded for equipment, such as wheelchair lifts, for use in this specialized facility.

The monies from grants typically have specific guidelines such as purchase of specific equipment or for paying part of the salary of a special-needs patient clinic director. Other donations may be earmarked for specific programs. For instance, the golf tournament revenues are designated for a program for those in the community who cannot afford dental treatment at the school. The program picks up those fees with the hope that the recipients can re-pay the program when circumstances in their lives change. Another program provides a similar service for a woman's shelter for methamphetamine addicts

Research is considered an essential component of dental education by Saguro administrators. This school perceives a distinct position in the dental research arena, however, and does not perceive research dollars as a large contributor to school income. Research money in dentistry is largely through NIH, or an agency within this organization. Problems perceived in getting these research dollars include the need for the proper credentials and time allocation for research grants, the increased competition for ever-fewer dollars, and the need to establish graduate departments that may conflict, in part, with the mission of the school.

Dr. Broder, a faculty member at Saguro with NIH research money experience:

NIH money is hard to get. I don't think you can get that kind of money without graduate departments. Even more than graduate departments, you need basic scientists. Most research is not done by a DDS who does not have a PhD in something else, immunology or something, or all of the PhDs who normally work

for dental schools who teach the basic sciences then, maybe if they have any time, try to apply for some grants. NIH [grants] are a real feather in the cap and are hard to get.

Dr. Harrison, an associate dean with several decades at a traditional dental school provides additional perceptions to NIH grants as dental school income:

Research dollars are drying up. The only [dental] schools that are going to continue to do well, depending on research dollars, are some of the big schools that already have the big grants in place, have long term NIH funding. If you set up a school [and] that was your focus and mission, you're going after the research dollars, and a lot of schools try to do that, they try to tie research to dental education by making faculty have to raise part of their own salary by capturing research dollars. The schools that have that bent, and there are a few, aren't going to survive. You can't, in the world of trying to go after research dollars, you can't ask a faculty member, if they're going to teach, and help your undergraduate program, if you've got to carve out time for them to go after research dollars, you almost need to get them out of the clinic and you really can't have both; there's so few faculty to go around. If you have [dental] institutions that are going after research dollars to be part of their overall economic model, it's not a good way to go

The baseline description of academic capitalism can typically be compressed into a high tuition and high research model accompanied by associated high levels of partnerships. The words expressed by Saguaro administrators do not, in part, fit this definition. This is a dental school that is part of a parent university that is not a big research university. In addition, the extensive use of part-time faculty does not support research activities nor does the mission of the school, which promotes the training of competent general dentists with a guarded position toward establishment of graduate departments or programs. However, the school does perceive a need for external funding and, as reviewed in the next section, partnerships are largely sought after and encouraged. The strategies of Saguaro dental school lead to an interesting conclusion, that is, academic capitalism is not monolithic. Academic capitalism can be broken down into

subsets with this case best described as niche market academic capitalism. Many characteristics and networks of academic capitalism have application in this case but the eschewing of high dollar basic science or clinical research funding represents a marked departure from activities typically associated with higher education institutions of this type. This major departure does not nullify the influences of academic capitalism but instead it refines the defining of academic capitalism which, in turn, creates subsets within this concept.

Associate dean Elim provides perceptions regarding the research directions that Saguaro dental school may be inclined to follow:

Do we need research dollars, yes, [but] because we don't have a lot of people around here that have the time, or release time to do research, that's a problem, because we have people interested, we have some people skilled and experienced in research, and yet there is no time because everybody's doing multiple jobs. I think we'll need research dollars, but our university and our school, I don't believe that we'll ever be doing the wet lab type of research. I think we will be doing other types: outcomes assessment, educational research, clinical outcomes, policy research, work force; those kinds of research, so that's a little bit different.

Dr. Scholler, the dean, further probes and defines the focus on educational and policy research at Saguaro dental school:

Research is an essential component of any dental school. The research we're looking at doing is dental education research. Does this model work, what are the elements of the model that are really good or bad that we need to measure. Are our students going out and going to communities of the underserved, is our model helping our partners in the fourth year, community health centers, and Indian health services improve the health status of their patients through our comprehensive approach, not just take care of their dental needs; policy research. These kinds of things have not been explored before [and] I think are very important for the future delivery of health care

This emphasis on education and policy research further defines Saguaro dental school as incorporating niche market academic capitalism. The American Dental Education

Association has developed a Commission of Change and Innovation to explore curriculum change and innovation in dental education in conjunction with the Commission on Dental Education, Joint Commission on National Boards, American Association of Dental Examiners, and the ADA (ADEA, 2007). This is a commission-based effort with input from multiple dental service/administrative organizations. Published efforts focused on educational and policy research in dental education by individual dental schools are rare. The dental school in Connecticut has an ongoing effort focused on innovation with technology and technology transfer in dental education and another effort is the desire by Saguaro dental school to pursue education research as outlined by the dean. In addition, the ADEA Commission on Change and Innovation (CCI) has implemented a program in January 2007, the School Liaison Program, through which individuals at each dental school serve as conduits for the exchange of ideas between CCI and the faculty implementing curriculum for dental students. This is anticipated to be a method to share curriculum innovations within schools to all liaisons and the CCI (ADEA, 2007).

The prevailing perception is that a few schools have a cadre of dental specialists with PhDs, or basic science PhDs, who have been in the NIH pipeline for many years and these schools will face evermore competition for fewer NIH dollars over time. Graduate programs, typically specialty programs or interdisciplinary PhD programs in dental schools, are an essential component of this endeavor. Saguaro dental school does not perceive the establishment of multiple graduate programs with one or two pending programs the exception and falling within the mission of the school.

Dean Scholler, with his perception about graduate programs:

Orthodontics we want to do because we want to focus on maxillofacial orthodontics linked with our special care clinic. I think we're going to see a lot of kids with cleft lip, cleft palate; issues that are more than a doctoral level of student. I see only a limited number of graduate programs. One of the reasons is that I don't want the complex cases going to the residents. Our students are tremendously qualified.

Saguaro dental school believes that research is essential for dental schools but their focus will be on educational and policy research as based on the structure and mission of the dental school.

Clinic income is a significant revenue source for dental schools. Saguaro dental school will have two classes of students in the clinic in the 2007/2008 academic year, but has only one class creating clinic revenues now. Several administrative sources suggested that the clinic income produced by this one class, the initial clinical class of Saguaro dental school, will exceed \$1.5 million the first year. While this is a substantial sum of money, associate dean Harrison puts this source of revenue into perspective:

If you just rely on clinic income from what a student can generate, you're never going to make it. Most dental schools are going to be in the red on account that they just have revenue and clinic expenses; expenses are always going to outweigh the revenue because a student can't see 14 patients a day. You're never going to have a student population that [is] going to outdo the expenses. It's never going to happen. You can try as hard as you want, but it won't be there. It's a break-even, not for profit situation. Most dental schools are loss leaders just because the student can't produce the kind of work and make the kind of income [like] that of a private practice.

Even though clinic income produced by students is equal or exceeded by the expenses for operation of the clinic, both faculty and administrators pointed out other revenue streams that can be derived from the clinic that are not dependent upon student production. For example, digital imaging equipment and associated software has been

donated by a philanthropic organization to the school. This equipment is complex, capable of multiple uses, and is very recent digital technology in radiology. It is also far too expensive for most practitioners in private practice. These devices are just becoming available in isolated private imaging centers. Saguaro sees an opportunity to provide radiology services using this equipment and, because there is not a debt to service, this can be provided at a reduced cost to the benefit of the school, the referring dentist, and the patient. Another revenue stream is a specific patient set within the special needs clinic. A team approach for cleft palate/cleft lip patients is a needed service in most communities and the dental school will have the faculty, residents, and technology to provide this much needed service.

Revenue savings within the clinic extends to the number of treatment areas available for patient care. Because the fourth year students are gone half the time at offsite facilities, the number of chairs and associated monitors, handpieces, diagnostic aids, instrumentation, materials, devices, and faculty can be reduced. Instead of 150 chairs, this facility only has and needs 82 chairs. All the physical equipment require maintenance with this cost reduced substantially, the size of the facility need not be as big, which reduces utilities, and the number of faculty and support personnel are reduced also.

Outside the clinic, revenue streams such as distance education and continuing education have already been reviewed in the use of technology section. Another method of revenue savings is elimination of redundancy in support functions. Saguaro dental school does have a business manager, but the human resources department, controllers office, and purchasing department are not replicated within the dental school. The school

utilizes these functions from within the parent university. The parent university has an admissions staff that is not replicated in the dental school with similar functions provided in student services and financial aid. In the words of Dr. Scholler, the dean:

We've centralized a lot. Many dental schools duplicate that. They have their own. We don't do that. We have people roll up their sleeves. It is a very lean organization; I think we're getting close to where we want to be for our ideals.

The modular method previously described does bring diversity into the classroom but the administration of Saguaro dental school does not downplay the cost savings brought by this method. Associate dean Harrison suggests:

You have to hire all the basic science faculty, you have to hire all the pre-clinical faculty, and to have to hire all the clinical faculty. They all have pretty good salaries, they have benefits. If you look at any dental education system, your going to see the biggest part of their budget is compensation. You can cut down; that's the model here. Dental education by traditional methods is inherently inefficient. We have to get more efficient which means cutting back and saving on things that are fat in the system and we have to be more creative at finding other ways to bring in money that are not tied to student production.

Similar beliefs are expressed by vice dean Harmon:

I think all schools have to be creative about how to minimize their expenses. I think you go to look at your bottom line and you got to figure out: it's going to cost me this much to operate, what can I do to reduce my operational costs.

Saguaro dental school, as a private non-profit, will not receive appropriations and does not yet have alumni. Some grants have been forthcoming, donations and gifts have been encouraging to date, and income streams from both in the clinic and outside the clinic are anticipated. Clinical revenues from student production are important, but are not anticipated to exceed the costs of providing those services, Research is perceived to be an important function of dental education but is not seen as a large source of funding for this dental school. In keeping with the mission and goals of the school, funds are allocated for

health services for several segments of the underserved population. Tuition is seen as the major source of revenue. An orchestrated effort to cap tuition costs with efforts to minimize expenditures is an ongoing strategy by the administration. Expenditures are being minimized by consolidation of services and personnel with the parent university, use of the modular method, the building of a smaller facility with lesser utility costs and upkeep, fewer clinical bays and chairs with resulting lower costs of maintenance, receiving discounts from bulk suppliers, and donations of materials and devices. While the Saguaro administrators speak of a “lean and mean machine” approach to minimizing expenditures, they are well aware that a critical mass of well qualified administrators, faculty, and support personnel are essential to provide the best dental education has to offer to their students.

The use of dental school-private sector partnerships has not been addressed in this section on resources. Saguaro dental administrators and faculty perceptions of these partnerships regarding resources is central to this analysis and is examined in this next section.

#### Partnerships in Dental Education

Dental education initiates with an academic program of basic, behavioral, and pre-clinical sciences with the final two years having an emphasis on clinical or “hands-on” education with characteristics ideally suited for partnerships between companies or corporations within the private sector and dental schools. These partnerships are clear connections to industry, whether through companies, coporations, distributors, or suppliers. The number of industrial representatives partnering with dental education

institutions is consistent with the plethora of materials, products, and devices used in clinical teaching, some mundane expendables and others technique sensitive and having exacting requirements both in use and subsequent maintenance. The great number of materials, products, and devices separate dental education from other higher education programs.

Private sector-dental school partnerships are defined differently among Saguaro dental school administrators and faculty but there is a convergence of concerns regarding a partnership, as a relationship, between the dental school and the private sector.

Partnerships in dental education are found to be defined on varying criterion within Saguaro dental school. For example, the school has a private dental laboratory within the dental school building that operates as a private business but also teaches dental students about the fundamentals of dental laboratory science. This is a contractual arrangement and, both from an intuitive standpoint and by contract, this arrangement is a private-sector and dental school partnership. Without exception, all faculty and administrators perceived this relationship as another department with faculty, not a partnership. The individual who owns and administers the dental laboratory is formally trained as an educator, has a history of training dental laboratory technicians, is a caring and compassionate individual, and fits the mission and goals of the dental school. In the words of Dr. Harmon, the vice dean and Dr. Simms, an associate dean:

[the person] who owns that lab and her commitment; just who she is, just the type of person she is, the enthusiasm for teaching and for the dental students, she loves them; she's absolutely just a wonderful, wonderful [person].

The lab is the best thing we've done; partly it's because of the people involved. Ms. ----- particularly; such an incredible technician, human being, and teacher

that the students have benefited so dramatically from being able to rotate through the lab under her guidance.

The name and reputation of the individual fits with a perception of faculty more than the definition of a partnership in this specific instance .

A dichotomy in defining partnerships among dental school members is often nested in the concept of a written contract. If, according to some, the private sector is providing instruction or advice, this is not a partnership. To others, a written contract is a partnership. Several administrators or faculty express concerns such as “I’m hesitant about contracted types of arrangements”. At all times, and with all individuals interviewed, I felt a tacit understanding of partnerships within the dental school but boutique definitions presented with enough frequency to merit attention.

The concerns about partnerships fell into two camps. The first concern is the impact on autonomy, i.e., how partnerships could alter what is taught and/or how taught. The second concern has some distinction from the first and is the boundaries that could arise when teaching dental students due to contractual relationships. For example, an exclusive contract with an implant company could limit the teaching of implants to that specific system. The expressed concern was the creation of boundaries that could limit the sources of knowledge available, that is, knowledge about and from other implant systems. Dr. Roberts, a faculty member, addresses these concerns:

Education needs to stand apart and not be beholden to anyone; certainly not financially or in those obligatory kinds of ways. I like the idea of partnerships if they can be designed so that there is a fair amount of autonomy for the educational institution. Maybe things can be made available to the students at the end. But I’m real hesitant to have a real contracted, obligatory relationship that can really direct the direction of the educational process. I would be very much

opposed to that type of thing where there would really be an influence by an outside influence; corporate influence in the direction of education.

Dr. Harrison, an associate dean, adds to this perception without mincing words:

No, I don't think it's a good thing. I think anytime you let the corporate world into education you're going to have, and rightly so if they're going to sink some money into it, they want to have a voice, and they want to have some power because they are putting money into it; they want to get some bang for their buck.

The concern about autonomy is expressed by Dr. Broder, the chair of a dental specialty:

I think it's a slippery slope to get into this corporate partnering with an academic institution. I think you have to be careful academically to retain your integrity and not be beholden to certain corporate entities [so] that pretty soon you structure your teaching, your thought processes based on contributions, or based on economics. Soon you become dependent on those economics and then the corporation could influence, or have the potential to influence, your academic integrity. I think that's a problem.

The "slippery slope" metaphor was used frequently by faculty members along with the consensus that partnerships have a potential to influence the teaching of dental students.

No faculty member had felt this pressure or influence at Saguaro dental school, however.

The consensus regarding the influence of partnerships on the teaching of dental students was not unanimous with two individuals, one a faculty member and the other an administrator, perceiving little detriment to the education of dental students. One faculty member perceived partnerships as very favorable with a belief that inherent bias created by the partnership is pesky but largely irrelevant in dental education: The words of Dr.

Lincoln:

If a corporation wants to partner with a dental school, I don't see any objection. If they're going to provide material and help the education, really what it boils down

to is to just be sure they're [the dental students] getting an unbiased education. A materials company or equipment company can come in and partner as long as they're not pushing their product toward the dental student during the process of education. This needs to be unbiased. If that can be placed, then great.

A similar theme was express by assistant dean Lamb:

I don't see a problem with it [partnerships]. To me, it's amazing and wonderful to do things like that. To get the leaders in the corporate field to partner with us; I don't see a problem there.

The other concern is the potential to place boundaries on methods or practices to solve dental problems associated with patient care. Using a previous example, dental students are taught about dental implants. If the dental school has an exclusive contract with one brand of implant, the students will only know that specific brand. Some differing brands serve specific needs better than others so dental students need to know of these other brands and indications or contra-indications for their use. Partnerships have the potential for exclusivity to the detriment of dental education.

Faculty member Robbins addresses this issue:

I think that it's really easy to get involved and tied into somebody else's direction, somebody else's bottom line. I think it would be unfortunate in education to discount any information from any direction.

Associate dean Elim expresses similar perceptions regarding boundaries as unintended consequences of partnering between dental schools and the private sector:

The consequences, I think, are the student may fell compelled, required, or more predisposed to use a product, a procedure, a type, a lab because of their dental school experience. I think you could perceive that as a potential negative. We know there are many acceptable approaches. Bringing in an outside vendor could skew that or make it so it's not as altruistic and ideal an educational institution.

Dr. Johnstone, a departmental director, provides a concrete example:

I insisted from a surgery standpoint that we not sign any exclusivity contracts. If they're [the dental students] only being taught one philosophy; that fits in with that particular companies philosophy, then you may be narrowing down the scope of what you do. It goes back to being beholden to that company. Patients can be treated in different ways, because I look at everybody a little differently and that's what I worry about; being tied into one thing, be it the school or the individual. If it's too narrow, you get one specific way of doing something. That's the only way it's taught [and] we're taking away the ability for the student to think about what other options are out there. If I need to do this technique because this is what I got available to me, there's no room for learning. I'd much rather have students well rounded, even if they never use the technique again.

With a full spectrum of perceptions regarding partnerships in dental education at Saguaro dental school, from positive to negative to nonchalant, and these perceptions having some basis on individual defining of these partnerships, my direction of analysis focused on methods employed by Saguaro dental school to reconcile these differences and concurrently create a mutually beneficial partnership arrangement. The vast variety of materials, products, and devices needed to educate dentists creates a very expensive form of education. Partnerships are perceived as a method of reducing some of these costs. The next section reviews methods that have been developed by Saguaro dental school to define their process of partnering with the private sector.

#### The Partnership Protocol

Saguaro dental school has an individual assigned to be the point person for all inquiries regarding materials, products, and devices. A manufacturer, company, corporation, or supplier is asked to submit a written proposal about their materials, products, or devices, how incorporation of these, or concurrent instruction for use of these, will benefit dental education, either the school or the students. About 25% of the

inquiries may have merit and are presented to the deans council. This council reviews the proposals and may find some of these proposals of interest and requests more information, which often includes samples and an oral presentation to several members of the deans council. Due to the nature of dental materials and devices, these proposals often include a need to present educational content to the students. If the product or device requires this, another proposal is needed that includes what is going to be taught. The curriculum committee, with membership consisting of several full-time faculty and administration, then look at the learning objectives, whether the objectives fit the mission and goals of the school, and what faculty they intend on providing. If these requirements are met, the vendor is advised that they can teach but not direct the course of instruction. All course content must be pre-approved by the curriculum committee and all content must go through the curriculum committee first. During presentation of the course of instruction, one or more members of the curriculum committee are in the class with the students to assure compliance with the approval to provide course material.

Willie Sutton, when asked why he robbed banks replied, “cause that’s where the money is”. Associate dean Elim provided an analogy in dentistry: ‘ if I was a pediatric dentist, I would really want to practice in an elementary school cause that’s where all the kids are”. This is also the reason that manufacturers and suppliers of dental materials, products, and devices want to partner with dental schools. They want visibility and the consensus among Saguaro dental school administrators is that this is all the dental school can do for manufacturers and suppliers; provide visibility in the hope that the students

will use them in the future in their place of practice. For the school, these are supplied at a discount, occasionally gratis, and this does reduce the costs of dental education.

Saguaro dental school, in addition to seeking to reduce costs, looks at the mission and goals of the school. The partnerships at this school are seen as positive when framed in the mission and goals, they are product driven with little money exchange, and create consensus among differing perceptions of the merits of partnering between dental school and private businesses.

Dr. Scholler, the dean, provides a foundation for the protocol and methods of partnerships between Saguaro dental school and private business:

Sometimes dental schools have a tough time, taking this ‘holier than thou’ attitude that if you got to make a profit maybe I shouldn’t be talking to you. I don’t think that’s the issue. I think the issue is maintaining academic independence and freedom, not so much whether a sponsor is going to make money on what they’re doing and helping you promote them to some extent.

Additional words of the dean:

I enjoyed nice relationships with the private sector. Government can’t do everything alone; the private sector can’t do everything alone. One of the things that has to do with this is a collaborative environment and to do that you need to do in these win-win situations where everybody [wins], without compromising quality of care.

The dean further related a situation that emphasized how these relationships can be win-win with the education of the student in clear focus and forefronted in negotiations:

I found them [ a dental product company] to be very open, particularly if they see the school offers a benefit to them. For example, one vendor that we just entered into a very large, nice financial arrangement; wanted an exclusivity. That we would only use that particular product. We said, “no, we can’t do that”. We’ll use yours and we’ll use others but you’ll be a major player but you won’t have the exclusive right. And they said, “Ok, we understand”. That was it. All we had to do is raise the issue and they understand. Obviously, we want to acknowledge those folks that are partners with us but certainly not to exclude other opportunities and

other modalities that might be beneficial to a patient and educationally relevant to a student.

The clinical activities of dental education require a vast array of materials, products, and devices that creates a partnership environment that separates dental education from many other forms of higher education. These partnerships provide visibility for vendors representing the private sector, the dental school can reduce the expenses of dental education, and the students are exposed to a larger selection of products and treatment selections if the partnerships are structured with latitude to incorporate products from multiple sources. Both administrators and faculty members have varying perceptions that help define these partnerships which, in part, create perceptions regarding the place of partnerships, positive or negative, in the higher education arena. These same individuals have a convergence of concerns regarding partnerships; both a concern for autonomy in teaching and the potential for the placement of boundaries in clinical teaching as a result of exclusivity.

The protocol developed by Saguaro dental school assures that the school serves as the director of any course content presented by the private sector and exclusive contracts are not considered. The bulk of expendable supplies are from a single source and could be considered a nearly exclusive contract; however, these products are not teaching materials or products. Saguaro dental school perceives these protocols as having been developed in a manner consistent with the mission and goals of the school to provide the finest education available for the students, provide assurances that teaching autonomy

remains intact, and provide a framework for consensus among those having diverse perceptions of partnering between dental education and the private sector.

This section has reviewed partnerships between dental school and the private sector based on the unique equipment, materials, products, and devices needs of dental education and the perceptions of both administrators and faculty of the school regarding these partnerships. Partnerships can also extend to educational content and/or revenue streams in other areas such as distance education, continuing education, licensing, patents, joint-ventures, and copyrights. These specific topics, as appropriate, are examined in Chapter 5 to better provide continuity of analysis in this dissertation.

#### Culture of Collegiality

Dental education institutions historically have a reputation of being threatening places to students. I excerpted two letters to the editor in Chapter 2 which illustrated the subsequent hesitancy to contribute to dental schools, with either dollars or time, by dental school graduates. During interviews with both administrators and faculty from Saguaro dental school, all of whom attended US dental school institutions, this threatening environment was evident in their experience at traditional dental schools as evidenced by the similarity of the descriptions of the culture within the schools they attended. The following is a montage of these verbal descriptions from four administrators and three faculty members:

When we were in dental school, they badgered you and belittled you, and everything else.

Faculty members [were] in a position to be authoritarian, almost ruling over these poor little plebes, the dental students, that they are whipping into shape, and the whole thing of crushing wax patterns. I had that happen to me many times in dental school, just being brow-beaten by faculty members, being stopped in the hallway and sent home because the sleeve of your jacket had dirt on it or something, I mean, just crazy, stupid things. I had so many people, my classmates, said when they got out of school, "I'll never go back to that school again cause I didn't enjoy my time there".

You're a vet generation, a victim of dental education and so is everyone else here who is a male and over 50. Heck, you could bump it down to anybody over 40 as well.

You were dirt. I don't know about you, but if I had received any of my faculty from \*\*\*\* State, I wouldn't even acknowledge their presence. I have no desire to even see them.

[For] most of us, dental education has not been the most pleasant experience, kind of like army training stereotype.

There was an instructor who was renowned as being an asshole. He was the one in charge of restorative; actually, he, at one time, was chairman to two departments, both restorative and crown and bridge. So, he worked me over, but I graduated anyway.

It was hazing.

The horror stories; hollered and screamed at, instruments thrown on the floor, crowns thrown out the window and all that kind of stuff.

This culture of hazing and belittling dental students is pervasive, multigenerational, and persistent. After dental school, and before I began a residency in periodontics, I had a three year obligation with the US Army. Our dental unit had dozens of dentists in multiple clinics representing virtually every dental school in the US. The stories were similar and ongoing from every dental graduate of every school. I've worked in clinics with dental graduates from 1965 to 2005 and the stories are again similar, ongoing, and multigenerational. I've heard countless comments from dentists about never giving so

much as a dime to their dental school, never even considering making any time commitment to their dental school, and many have made the boast that they will never even set foot in their dental school again. As a specialist who has communicated with referring general dentists for over 30 years, the stories of hazing and belittlement are frequent and pervasive. These ubiquitous negative comments, and the emotions behind them, may be underestimated in dental education and may correlate with the miserly endowments and gift-giving in dental education by practicing dentists.

My strategy in examining the culture of Saguaro dental school was to ask about the relationships between students and faculty/administrators and the strategies employed in the development of these relationships. As this was repeated with every interview, the words “collegiality” and “emerging colleagues” began to surface with regularity. Dr. Harrison, an associate dean, described the strategy as a distinctive characteristic of Saguaro dental school and referred to this strategy as the Culture of Collegiality. In opposition to the culture, and subsequent negativity, in traditional dental schools, this culture establishes the dental students as emerging colleagues. This culture extends to relationships beyond students as well.

This cultural shift is perceived to fit the mission and goals of the dental school, promote collaboration among all participants in Saguaro dental education, create better quality practitioners, and graduates may be more apt to support the school with time or dollars, or both.

A culture of collegiality does have the potential to create teacher-student boundary issues; however, such possibilities are acknowledged and addressed. Dr. Harmon, the vice dean, summarizes this issue:

Most people of my age and maybe even older see dental education as a threatening place to students and that's the one thing that Dr.----- and I are just dead-on the money that we will not allow that to happen in this school. These young men and women are our young colleagues and we want them treated that way. You got to be strict and you got to be strong about your evaluations of them but it can't be a demeaning, belittling process and I think we tend to really stay focused on making sure that these students know that.

Faculty members Robbins, Grist, and Berkut elaborate on this cultural shift:

We don't berate the students at the chair, we pull them aside and make corrections as we need to and don't hesitate to make corrections we need to.

There's a good, positive line of communication that goes on here. There is not as much separation between faculty and students at this school. The students here are viewed very much as colleagues as opposed to underlings like you see at some of the other dental schools so I think this is a very positive aspect.

We view our students as colleagues. Now you have to walk a fine line with that because you have to command respect, because there is some authority figure, but you don't have to be nasty and hardhanded about it. You can get done what you need to get done in a different way rather than humiliating and degrading a students and that's what a lot of our faculty has been through.

Associate deans Elim and Harrison add to the cultural shift at Saguaro dental school:

We're one-on-one, very personal. We know their spouses names, their kids names, where they come from and their interests because they are our developing colleagues. We need to know about their developing professional life. So, I think that's how we approach students; not in a subservient role, not equal but getting them that way.

We want to have a very close collegial relationship with the students and not have a traditional brow-beating kind of authoritarian situation most dental schools [have].

The culture of collegiality is thought to produce a higher quality dental practitioner as suggested by the words of associate dean Elim:

It comes back to treating students well. I think it's our deans intent that treating them well certainly helps them become better professionals actually; and the way they treat their future staff and their future patients in their practice.

The culture of collegiality is also thought to produce graduates who would be giving back to the school after graduation. The words of associate dean Harrison:

We want the dental students, when they graduate from here, to not only love their time here but they want to come back and give back to the school. That's only going to help us in the future; if we have alumni that are happy. They will be alumni who will contribute and perhaps alumni who come back to teach. I believe that we're going to have a very high percentage of alumni giving because the faculty here are so caring and nurturing of the students here and the students know we're here for them. We treat them with respect and they know the only reason we're in business is because they're here. To me, the key is providing students with a caring, nurturing, positive dental school experience. Then they're going to be more apt to give.

The culture of collegiality extends beyond faculty-student relationships to include faculty-faculty, faculty-administration, and administration-administration relationships.

The dean of Saguaro dental school summarizes how this culture infiltrates the entire dental school system:

We've created a culture here that is mutually supportive, collegial in nature, a very close relationship with students, in a mentoring way, and there's no competition. We find that the environment that we've created here promotes collegiality and collaboration and people like working in that environment. They like coming here. They call this the happy dental school.

I inquired about how this culture further extends into the lives of both faculty and administrators. The dean reviewed the use of co-directors (this would be the equivalent of

co-department chairs in most higher education settings) and committees in the dental school:

Instead of having one king (a departmental chair) you have a couple working together, covering for each other, collaborating; it promotes collegiality. When we do committees, we like to do even numbers so we don't vote. We don't want winners and losers, we want consensus. A lot of our work is by consensus; we like to get input from faculty and students alike.

The dean continued to include the president of the university, the provost, vice-provost, and himself as immersed in this culture with a blend of genuine friendship and collegiality necessary to replicate the culture created at Saguaro dental school.

It's a tremendous relationship we have here. We're all friends, not just colleagues, we're all friends. That, I think, might be difficult to replicate. But for another school to replicate, not without the culture that allows it; hoe the ground before you put the seeds in, you know, that has to be there.

The culture of collegiality created at Saguaro dental school has not gone unnoticed by applicants to dental schools. Associate dean Harrison describes the influence of this culture on applicants nationwide:

This last year we had 3400 applicants for this school, that's one out of every four applicants in the country applied to this school. Why do they do that? Well, it's not because of the environment and it's not because we have world renowned faculty members. It's because they have talked with other students and they hear that we are doing things differently. We have established this culture of collegiality and they want to come and be part of that. It's becoming known across the country that this is what we are about.

By comparison, data available for 2002/3 reveals dental schools typically receiving 805 applicants and accepting 81 students, or 10% of those who applied (ADA Survey, 2002/3, Vol 2).

The culture of collegiality as created by Saguario dental school is creating national interest by applicants to dental school. The stark contrast of this culture with the culture of traditional dental schools may mobilize scrutiny of this underestimated factor in dental education.

#### Summary of Distinct and Distinguishing Characteristics

This review of dental education has included a review of characteristics of Saguario dental school that sets this school apart; that make this school distinctive in dental education.

Saguario dental school has adopted the holistic approach of the parent university with the mission and goals framing the words and actions that drive the philosophy and operation of the school. The mission and goals are referenced during evaluation, reflection, and action, and re-evaluation as Saguario dental school, as this “work in progress” continues to evolve.

Consistent with the mission and goals, a distinction of this school is an emphasis on producing dentists having cultural competencies, knowledge of non-profit and public health models of health care, an emphasis on serving in leadership positions within their community, serving as a resource for public health issues, and participating in a multidisciplinary healthcare system.

The selection process for admitted students is distinctive. All admitted students have met the entrance requirements of all dental students, but these students must have a history of community service to be considered for admission. They bring this sense of

service with them and it is manifested both within the dental school and outside the school as well during their course of dental education.

Another distinction is the teaching of the basic sciences and pre-clinical sciences in a modular format. This is a model that fits the mission and goals of the dental school to respond to the needs of the community that would be both successful and cost effective. This concept is perceived to reduce the costs of dental education with this unique format also promoting the translational knowledge from basic sciences to clinical application that is often lost in traditional schools. The students enter simulation labs a year earlier than traditional dental schools. This format also allows earlier entry into the clinical arena with the opportunity for clinical instruction expanded and greater potential for producing a high quality clinical dentist.

Saguaro dental school does not attempt to replicate the training of dental laboratory technicians within the dental school curriculum. The emphasis is on creating dentists who understand the processes of dental laboratory science, have the ability to implement quality control of laboratory products, and can effectively communicate with laboratory technicians. These characteristics are distinctive by creating time in the curriculum for the ever-increasing complexity of materials and methods used in today's dentistry and the creation of a curriculum in laboratory science that more accurately mimics the practice of dentistry outside the dental school environment.

Saguaro dental students begin their clinical training in comprehensive care units. This is also distinctive and fits the mission and goals of the school. The students evaluate their patients in a holistic manner, not in a compartmentalized unit where the focus is on an

isolated problem or procedure. This comprehensive approach includes bringing specialists to the student and patient as needed. The senior students also go to the patients in need, as opposed to having those in need come to them, by providing dental services in offsite clinics. This distinctive approach to dental education is further enhanced by having the offsite supervising dentists undergo calibration so that the performance parameters and expectations are known by those in offsite locations when serving as clinical instructors for the dental students.

The organizational structure of the dental school is distinctive in its extraordinary accessibility and flexibility. The school is new and not bogged down with a traditional chain of command. It can respond to issues rapidly and effectively and is not shackled by a history of traditional dental school bureaucracy.

The parent university is technology-savvy and promotes this in all sister schools. The dental school is a fully digitized school and perceives itself as a leader in technology in dental education and expects to continue to be a leader in this arena.

While schools in the health professions focus on basic science or entrepreneurial/science based research, Saguaro dental school feels that research is an essential component of any dental school, but the direction chosen by this school is research directed toward education and policy research; this a distinctive change from other dental schools.

The great number of materials, products, and devices needed to instruct dental students separates dental education from many other forms of higher education. Saguaro dental school is further distinctive by the creation of partnerships based on an extension

of friendship; a relationship based on friendships between the dental school and the private sector. A protocol has been established to assure that partnerships do not impinge on classroom autonomy nor create boundaries in clinical education that could discount the opportunity for information from a variety of sources.

The dental school also fosters a self-described culture of collegiality. The students are treated as emerging colleagues with collegiality and collaboration evident throughout all strata of the entire school. This serves as a significant distinction in dental education.

Saguaro has set itself apart from traditional dental education while maintaining all criteria needed for accreditation. This has created national interest in this dental school, especially among students considering dentistry as a career. Saguaro garners 25% of all the applicants applying to all US dental schools. This is yet another distinction of this dental school.

CHAPTER FIVE  
FINDINGS: THE ISSUES

Introduction

The faculty, administrators, and members of the blue ribbon panel that developed the mission and goals, policies, and protocols for Saguaro dental school all, without exception, came from an academic background framed in traditional dental education. In spite of this history they have developed a dental school with multiple characteristics quite distinctive from their traditional schools of origin. In Chapter 4, their words and actions present the rationale for the philosophies and policies that guide the daily operation of the school. In this chapter, their words and actions serve as a platform for analysis in the context of the research questions of this dissertation.

The first research question asks to what extent do these dental school administrators and faculty perceive the salient characteristics of the new economy and how are the processes of dental education influenced by these perceptions. Knowledge of the exact terminology of these characteristics (globalization, knowledge as raw materials, non-Fordist manufacturing, and educated/tech savvy workers) is not necessarily expected, however, through their words, or embedded in the structure of their responses, the extent of their perceptions of these characteristics and how these perceptions affect dental education serves as the foundation for analysis to address this research question. In addition, operational definitions of each of the salient characteristics are utilized in analysis of the research question.

Similarly, the following research question asks to what extent do these dental school administrators and faculty perceive major networks within the theory of academic capitalism and how are the processes of dental education are influenced by these perceptions. Again, knowledge of the terminology to identify these networks ( new circuits of knowledge, interstitial organization emergence, intermediating networks, extended managerial capacity) is not expected but analysis of interview responses identifies the extent of their perceptions of these networks and how the processes of dental education may be influenced by these perceptions. As with the first research question, operational definitions of the networks are of assistance in analysis.

The final research question asks to what extent do these administrators and faculty perceive there are crises in dental education, which also serves to shed light on the larger state of dental education.

The salient characteristics of the new economy are intertwined with each other as well as with the networks within the theory of academic capitalism. Slaughter & Rhoades (2004) defined, and enlarged upon, these intertwined entities individually and this analysis follows this same format. The expectation is that this approach leads to clearer understanding while not discounting or underestimating the complex relationships among all characteristics and networks. Although the theory of academic capitalism dominates in this study, institutional theory is also utilized in this analysis; this study suited to analysis utilizing the conceptualizations of Rhoades (1992), Meyer & Rowan (1978) and Dimaggio & Powell (1983).

The initial research question is addressed through the salient characteristics of the new economy.

### Salient Characteristics of the New Economy

#### *Globalization*

Organized dentistry, through the American Dental Association, initiated an examination of globalization and dentistry in 2006. Multiple installments in the ADA News in April, May, and June 2006, reviewed possible impacts on the profession of dentistry. The migration of manufacturing and service jobs from nation to nation was cited as the central feature of globalization (ADA News, June 5, 2006). The new president of the ADA presents a slightly different view of globalization with focus on migration of people and more emphasis on partnering with other professional groups, foundations, and activities such as international accreditation and the movement of foreign trained dentists to the US (ADA News, October 2, 2006). Although the concept of globalization has been forefronted by organized dentistry, an operational definition is needed to address globalization as a salient characteristic of the new economy and effects on dental education. The authors of the theory of academic capitalism provide an operational definition that serves as a basis for analysis, that is, globalization has a reliance on information technologies as well as a convergence around markets for a knowledge intensive new economy ( Slaughter & Rhoades, 2004).

Saguaro dental school is part of a parent university that established a sister school that provides graduate degrees via on-line education, beginning in the mid-1990s. The school emphasizes the use of information technology and innovation in higher education.

Similarly, Saguaro dental school, having a physical plant only two years old, has state of the art technology literally built into the walls of the school. The dental school, although new, considers itself a leader in technology in dental education and intends on remaining a leader.

Although the word “globalization” was never used by those interviewed at Saguaro dental school, the words and actions of the faculty and administrators fit the operational definition as delineated by the authors of the theory of academic capitalism and influence the processes of education within their school. The words of three administrators provide perceptions of globalization and these effects on dental education: From Dr. Harmon, the vice dean:

We have a very strong IT component but we don't have a strong AV component We'll see what we got here in the future. But there are a lot of other ways to get; to have a product.

The lack of a strong AV department has been resolved by partnering with a foreign university, a foreign technology company, and Saguaro dental school to provide on-line distance education for both knowledge distribution and as a revenue stream. Dean Scholler succinctly summarizes his perceptions of this global partnering in dental education:

I'm a partnership type guy. I'm not afraid of partnerships and working and sharing knowledge or money. I think that's very important. I'm really a firm believer that we can't do everything ourselves. The all of us is a lot smarter than any one of us.

Associate dean Harrison provides a concrete example of perceptions of globalization and effects on dental education. Partnering between Saguaro dental school and a foreign

company that has the information technology capacity to provide electronic continuing education courses is described as well as the underlying perceived benefits:

We partnered with a company able to offer us essentially an electronic CE [continuing education]. We can provide the content for them, they can post it, and do the billing and collecting the money and we can profit from it. If one course is needed out there by the dental community, consider that there is conservatively, maybe 20,000-30,000 out there in the country, maybe five people in every office. That's 100,000-150,000 people out there that need some sort of dental training and you offer something on-line that they can actually go get it, and pay for it with a credit card, and say you keep it at a minimal cost. In most CE courses you travel, you're going to spend \$150-200 a day. So say you offer it [for] \$50 with 100,000 people and even if you split that three ways between the person offering the CE on-line, their part of it, you get a cut, and content producer gets a cut, everybody's going to make about a million dollars. Not too bad. There are things out there that one can do that can offset your loss in the clinic and that's what people ought to look at.

In the context of the operational definition of globalization, Saguaro dental school has a strong reliance on information technologies, has a self-perception as a leader in technology yet recognizes areas where others, foreign or domestic, have greater strengths, and will partner with those entities to converge to the market for dissemination of knowledge as well as creating profits for the school. Revenue enhancement by offering continuing education courses has long been seen as an area where dental schools can take advantage of the shift to lifelong learning, mandatory continuing education by state licensing boards, creation of client relationships with practitioners, and enlargement of continuing education opportunities (Douglass & Fein, 1995). This line of reasoning is offset, however, with heavy industry support needed to subsidize the cost of providing courses; often necessary to stay in business (Schaffer, 2000). This, in turn, leads to concerns about uneasy alliances as the providers of continuing education struggle to separate education from marketing (Belman, 2001, Blumenthal, 1996, Wazana, 2001,

Bodenheimer, 2000). Saguaro dental school is sensitive to the need for revenue streams and, with the mission and goals in front of them, is comfortable with providing visibility for partners in industry while sustaining the separation between education and marketing.

### *Knowledge as Raw Material*

Florida (1999) has referenced knowledge as raw material. Traditionally, natural resources and mechanical innovations have been the raw materials driving economic growth. In the new economy, both ideas and intellectual capital have replaced these as the raw materials that drive economic growth. Slaughter & Rhoades (2004) expand upon this theme. Universities are adopting strategies of the private sector by treating knowledge as a raw material. Whereas patents, copyrights, and trademarks of products and services have been a traditional enterprise of the private sector, these same enterprises are now a sector within some universities and colleges. Within higher education, this can also manifest itself as equity positions and distance education services. The trend in higher education is that these repositories of advanced knowledge are becoming profit centers by selling this knowledge (Slaughter & Rhoades, 2004). Advanced knowledge, then, becomes dominate raw material in the new economy, replacing the pork bellies and machine goods of the industrial economy.

Saguaro dental school does perceive knowledge as a commodity that can be sold with this influencing the processes of dental education within their school. The sale of knowledge, however, is required to meet specific criteria and begins with principles

delineated by the president of the university with these principles permeating all sister schools.

*Principled Dissemination of Knowledge*

The perceptions of knowledge as a raw material by the administrators of Saguaro dental school are framed, in part, by attributes of the president of the parent university. In the words of associate dean Elim:

I think the president of the university really enhances the mind, body, spirit. He promotes us to be healthy and be well in our minds so that we can do the best that we can for the students and give that to the students so that they can do the best that they can for the community and their patients.

I acknowledged this description but needing more depth, I then asked another administrator about the president. The question focused on the finances of the school and potential incongruities with the mission and goal of the school. An answer was provided by Dean Scholler:

He's very principled. He has a wealth of experience in academia and the finance side but recognizes how important all of these elements are in terms of health. He wants to really make a difference, really change things. I think the president is not afraid to take a risk and do these things to keep with these principles.

Saguaro dental school has partnered with a major implant manufacturer to develop continuing education courses. The implant manufacturer gains visibility and the dental school will potentially make a profit by selling knowledge. The school directs the course, the content of the course, and outcome assessment of the course. The perceptions of the administrators of this activity begin with the adopted principles of the president, that is, there is nothing inherently wrong with making money in education as long as all parties win, that is, the manufacturer received value in terms of visibility, the school provides the

course and may find this profitable, and the recipients of the course receive quality information that is going to improve the health of patients.

Neither the parent university nor any of the sister schools, including the dental school, have a history of seeking patents, copyrights, trademarks, or joint-ventures with members of the private sector. Dean Scholler provides a view of the school position:

We will not build laboratories to check the cariogenicity of saliva [in] rats versus another; this is not going to happen. We may do a little dental materials research from a clinical perspective and things like that. I think we are looking at things that have not been explored before that I think are important to the future delivery of health care.

Saguaro dental school perceives participation in multi-center clinical trials but the focus is on educational health care policy research. This is where the school would like to make a difference. Monetary gain from this emphasis on policy research was mentioned by administrators during interviews; however, the extent of monetary gain was not quantified.

Virtually every interview included a response with the words, “it’s important to keep the integrity of the school first”. The administrators proved no less principled than the president of the parent university. The effects of this characteristic of the new economy on dental education appear to have focus on the need for a revenue stream, to establish a relationship with local professionals, increased opportunities for knowledge, and provide visibility for material, products, or devices that can improve the health of patients. Saguaro dental school perceives a need for dental education institutions to be the guardians of principled dissemination of knowledge that is for sale.

### *Non-Fordist Manufacturing*

The third salient characteristic of the new economy influencing higher education is non-Fordist manufacturing. Slaughter & Leslie (1997) define Fordism as mass production that is highly standardized; this consistent with the industrial revolution.

The post-industrial economy has brought change in the work force that impacts educational institutions in a similar manner as the private sector. Slaughter & Rhoades (2004) refer to non-Fordist manufacturing as the reconfiguring of the labor force in the new economy. Thirty years ago “just in time delivery” of parts was embraced by US manufacturers as a cost-cutting and efficiency enhancing business practice. Today, “just in time delivery” is as likely to refer to people (Stafford & Heaster, 2006). “Just in time” workers, also called part-time, on-call, contract, temporary, independent, free agent, free-lance, day labor, contingent, or nonstandard have the common characteristic of being part of a flexible work force. Just as the corporate world has embraced a flexible work force, higher education institutions have embraced a flexible work force as a necessary method to integrate with the new economy. The dominant trait of the flexible work force in higher education is the increasing use of part-time faculty.

Saguaro dental school thoroughly embraces this salient characteristic of the new economy, that is, this is not only perceived but heavily influences dental education at their school as evidenced by full time administration and faculty limited to sixteen individuals supplemented by over 100 adjunct faculty. Tenure or tenure-track positions are not offered or available. The rationale for this structure within the dental school is

embedded in the mission and goals of the school and focus on cost, productivity, availability of faculty, and the culture of collegiality; all these areas of focus intertwined but dissected for clearer understanding and analysis.

### *Cost*

Cost savings is clearly a major consideration in utilization of adjunct faculty. The modular method is a visiting faculty member format that impacts the design of the school with a smaller physical size creating reduced maintenance and utility costs. The use of the visiting faculty as well as part-time pre-clinical and clinical instructors eliminates benefit costs as well as associated costs such as faculty development, travel, and conferences. In two interviews with administrators, the terminology of “circuit riders” was used to describe those teaching basic sciences as well as pre-clinical sciences. The dental school perceives instruction provided with these circuit riders who teach at multiple schools with an aggregate income exceeding income expectations of teaching at a single school in the traditional method of dental education. Several administrators expressed this circuit rider innovation as intrinsic to Saguaro dental school and anticipate that this may extend to other dental schools as well. There are three dental schools in the state of Texas and associate dean Harrison uses this as an example:

What if the three dental schools in Texas decided, hey, we’re spending a lot of money between Dallas, Houston, and San Antonio by hiring all these faculty that are teaching the same thing, biochemistry as an example. We have three biochemists at \$150,000 a year and the three of us are wasting \$200,000. Why not hire one guy and have him teach biochemistry to all three schools. We save the money and share it among the three schools. Dental education by traditional methods is very inherently inefficient. We have to get more efficient in providing

education which means cutting back and saving on things that are fat in the system.

The circuit rider theme is repeated by associate dean Elim with an additional perception of how this could impact higher education outside of dental education:

If dental schools organized in a modular format, we don't really need a lot of them [basic science faculty] because you could come here for two weeks, and teach complete dentures, then go to [another dental school] and teach for two, and you could go here for two, there for two and, from a basic science faculty perspective, in both situations that leads to the question, "are they dying in the number of people they need to graduate from their programs". In theory, you wouldn't need as many positions in universities, not just dental schools.

The cost savings is summarized by vice dean Harmon:

If we can share faculty more in schools, if we can have faculty, especially basic science faculty; if you can share them, then it would make more sense that we could somehow begin the process of reducing the costs [of dental education].

### *Enhanced Productivity*

A sense of enhanced productivity was expressed by several administrators via the extensive use of adjunct faculty. These comments often referred to a greater sense of flexibility as well as working together and sharing responsibilities. In the words of vice dean Harmon:

I do think that the idea that we keep a very, very low number compared to other schools, of core faculty, will keep you lean and mean, that's one way and, of course, the other is just good practice management; practice management of an office [and] I've got an office over there [the dental clinic] with 82 chairs in it.

Dean Scholler provides perceptions of production gains in congruence with the ideals of the dental school:

People roll up their sleeves. It is a very lean organization. I think we're getting close to where we want to be for our ideals. We still have a couple of positions to

fill, but it does work. You got to like to work. This is not the environment where you're going to find faculty and staff sitting and reading a newspaper in the lounge. It's not that. People like to work, they love it.

### *Faculty Availability*

Faculty availability also drives the extensive use of adjunct faculty. The income discrepancy between academic salaries and those of the private sector is significant, especially the differential in the income of dental specialists. The dental school needs dental specialists to serve as directors of the specialty areas of dentistry. Announcements for faculty positions in specialties by dental schools often are met with no inquiries or responses to offers for academic employment. Saguaro addresses this problem by the use of adjunct faculty. The dental school retains a core of dental professionals who concurrently practice in the private sector. Vice dean Harmon explains:

One of the things we're doing here in the specialty areas in our clinic; we have our directors, across the board, without exception, all of them, the specialty directors are all private practitioners; they practice and they teach. In order to be a director you have to be here two days, then you have to hire somebody who's here the other two days, a co-director. The fifth day is covered by an adjunct. This is the model we're trying to spread out there. So we have that sort of faculty; strong clinicians, people who are out there practicing, treating patients, and I like that model. I like that idea. First of all, because of the shortage. How do you get an oral surgeon to come on to a faculty full time, I mean, good gravy, much less an endodontist. If you do it this way, where you split it and give some dual responsibilities to people, it really helps with the faculty shortage.

### *Culture of Collegiality*

The culture of collegiality also plays a significant role in the rationale for the small core/extensive adjunct model at Saguaro dental school. All faculty and administrators have trained at traditional dental schools and some may bring the traditional system of

dental education with them. The model used by Saguaro dental school provides the flexibility to retain those with a mindset compatible with the mission and goals of the school and dismiss those who insist on berating and belittling students while teaching them. The lack of tenure is also perceived as an avenue to sustain a flexible and agile model. Innovative education is part of the mission and goals of the school and tenure is perceived as a barrier to rapid dismissal of faculty who have an incompatible mindset with the mission and goals of the school. In addition, tenure is perceived as potentially incongruent with innovative education. The words of the dean succinctly summarizes this perception which eliminates tenure availability at the dental school:

They [blue ribbon panel] had real concerns about tenure; that you get people that stay on a university payroll for many years, [are] resistant to change, not innovative not fluid, not flexible.

Several administrators and faculty address the need for a compatible mindset among those teaching the dental students: From faculty member, Dr. Grist:

They've [the dental school] has gotten much more selective in the people they're accepting into the university now to teach than they did at first because they realized that there was a problem with some of the first people in there and they're weeding them out and getting quality people in there, that should be there, and there are some people that shouldn't be teaching; maybe good practitioners but they just can't relate to the students to teach. If there's someone there they don't like who came in, the following year they're finding someone new to replace them and teach the subject.

Associate dean Elim adds to this:

We have a very flexible hiring strategy, we have no tenure, so people who don't work out; they can be out of here a lot easier than they would otherwise. So we try to stay focused, its part of our mindset and upper administration has not hired anybody that thinks otherwise. We would like that attitude to pervade our school so the people we've hired to work in clinic, those who work with students, have that mindset as well.

Faculty member Robbins continues the topic:

It's just hard to get the right people and sometimes hard to keep the right people. We don't have tenure here so that there's a tension here of being on your toes and not being complacent and not many of us here are, and I kind of like that personally, having worked with people who probably shouldn't have been here and, if tenured, would have been here forever. We've all had that experience. I kind of like that aspect of things here.

Associate dean Simms continues with these thoughts:

I want to spend my time making this a better place to graduate really good dental students. Being able to cut people off, that is priceless, like the commercial. It's like having 90 day contracts, or a year. [If] it's not working out, it's not discrimination suits and all that, it's not any of that. Having and taking in evaluations from students and their supervisors, and its not working, yes, that's the biggest thing. I think it helps people focus more on what they want to do than what they don't want to do.

These comments by Saguaro faculty and administrators appear at least terse and, at most, incongruent with a culture of collegiality; however, these words from members of Saguaro are consistent with their foundation of treating their students as emerging colleagues. The vice dean, speaking for himself and the dean, as quoted in Chapter 4, are “just dead-on the money that we will not allow that (demeaning and belittling students) in this school”. Although not quantified, faculty members had been hired with experience in other dental schools that brought the demeaning and belittling attitude with them and were subsequently let go. Among the faculty and administrators interviewed, this foundation of treating students with dignity and as emerging colleagues was quite important and not to be underestimated.

### *Unbundling of Professorial Work*

Slaughter & Rhoades (2004) delineate specific characteristics of non-Fordist manufacturing that can be incorporated into higher education. One characteristic is the

flexible work force, already reviewed, which is the increase use of part-time faculty. Another is the “unbundling” of professorial work. This can be manifested by professors dividing responsibilities in the development and presentation of coursework, by a small cadre of faculty managers over a larger number of part-time adjuncts presenting coursework or by delegating traditional professorial responsibilities such as mentoring or counseling to others such as academic advisors. Saguaro dental school embraces the unbundling of professorial work and this does influence the educational processes within their school. In the words of associate dean Elim:

We’re a top-down curriculum, which means we want to dictate what we teach, not necessarily how we teach it.

At one time, Saguaro dental school, as a “lean and mean machine” was too lean. In the words of vice dean Harmon:

They [the dental school] were so lean and mean you couldn’t get anything done, there just wasn’t enough people here. But I think we’ve seen what needs to be done. They’ve always supported and been very flexible about whatever additional faculty we might need

The dental school has brought in the expertise as needed but adheres to the original ideals of a very small cadre of full-time administrators and faculty with the bulk of teaching by adjuncts. The adjuncts must fit the culture of collegiality but are not told how to teach. A very small cadre of full-timers directing a much larger number of part-timers is incorporated into the original mission of the school with the unbundling of professorial work never mentioned but, by both mission statement and daily operations, is not of concern to the school.

*Educated Workers and Technology Savvy Consumers*

The fourth salient characteristic of the new economy is the need for educated workers and consumers as described by Slaughter & Rhoades (2004). The authors describe components of this characteristic as increased opportunities for consumption by students, the use of the university as test beds for commercial products, and the use of students for product improvements as well as savvy consumers of these products.

The last component has direct impact on dental education. Although dental students purchase basic instrumentation each year of dental school, virtually everything else used in the teaching of clinical dentistry is retrieved from a school dispensary. The number of different materials, products, and devices is high with an ongoing inventory of each item mandatory. Dental manufacturers have traditionally provided products at a discounted rate to gain visibility and student familiarity. The rationale is explained by faculty member Dr. Grist, who now has a child in dental school:

This has been going on since I was in dental school. They sold the product at dental schools at reduced prices, or putting in the supplies or equipment at reduced prices, hoping students would get familiar with their product, or equipment, and use it. So, it's been going on forever. When I was in dental school, the same thing was going on, certain products were bought, certain brands, and they were hoping you would use them; and they let you know that too. The companies that came in, they would say, "this is the product we have, this is the way to use it. We'll help you in any way, and we hope you use our product when you graduate".

Dental education requires the use of equipment, instrumentation, materials, products, and devices and the students will be consumers of everything utilized in clinical training.

The clinical setting is ideally suited for students as consumers as they become familiar with the brands of equipment and products, their specific handling characteristics, and begin to develop preferences for these products.

Saguaro dental school takes advantage of the cost savings realized from discounted pricing, however, two issues play a role in the extent of purchasing from a specific manufacturer. The first is an accreditation issue. There is a specific accreditation guideline (CODA Standard 1-1) that prohibits any one source of income from having a large sphere of influence on an area of dental training. Manufacturers cannot afford to give products away and typically sell them at a discount. More recently, however, some manufacturers, such as implant companies, have been giving away their products. For example, a \$100,000 gift of implants annually to the school could become a dollar equivalent that creates an uneasy sphere of influence in the teaching of implant dentistry. Saguaro dental school stays well within the boundaries of accreditation by having several implant companies donate implants. This eliminates any single company from having too large an influence. This also precludes exclusivity, which is the second issue that plays a role in the extent of purchasing from a single manufacturer. Saguaro dental perceives manufacturers wanting to gain visibility and familiarity of their products in a new dental school. The words of vice dean Harmon:

Corporate is pushing more than the school, at least at this school. We're new and everybody; a lot of people want to get on board with something.

The school response is an acknowledgement of discounted products from manufacturers and providing visibility but with the additional acknowledgement to the students that

equivalent products are available either within the school or in the marketplace. Several administrators and faculty echo this perception: From faculty member Dr. Grist:

I see products coming in and, as an educator, I have told the students and let them know that there are other products out there besides the ones we are using in school and they're going to have to see which ones work best in their hands and then make a determination of what they want to use. We all know there is more than one way to solve a problem; there's more than one type of material or equipment out there to deal with.

Dr. Johnstone, a department director provides these perspectives:

It brings a potential to keeping them [the dental students] very narrowly focused that this may be the only approach, or the best approach. In fact, we know there are many acceptable approaches so we are trying to teach that bringing in outside vendors.

We have people who have had experiences with different types of implant systems who see the value of exposing our students to different kinds. I think the students have to learn a lot of different techniques that will fit where they are going long term. And then, by not being tied into any one particular company, it expands their horizons.

The teaching of clinical dentistry has a multi-generational history of students as consumers. Dental schools exchange visibility and familiarity of products for cost savings via discounts. The perception of students as consumers is entrenched in Saguaro dental school, as with traditional dental schools, with this school taking administrative steps to deny too large an influence by any one manufacturer and the faculty advancing multiple approaches to clinical problem-solving, including product availability outside the school dispensary.

The second research question is addressed through the major networks within the theory of academic capitalism.

### Networks within the Theory of Academic Capitalism

#### *Circuits of Knowledge*

“Teaching is no longer the province of faculty members who work with students in classrooms, connected to wider realms of knowledge through their departments and disciplinary associations” (Slaughter & Rhoades, 2004, pp. 24-25). This serves as a preamble to the formation of new circuits of knowledge in higher education. New circuits of knowledge are pervasive throughout Saguaro dental school and significantly influence the educational processes within the dental school. Both the parent university and the dental school desire to take advantage of technology and perceive electronic teaching as innovative teaching. Advances in computer technology are seen as no less important in dental education than advances in dental technology. The words of faculty member Wright describe the differences information technology is making in dental education:

Communication, the ability to communicate now with cyberspace and have access to research that we would have had to have a hard copy of a book or periodical that goes back 5, 10, 50 years ago; classic articles. You had to go to the library and get them. Now everything is accessible through the internet. Every student at this school has their own computer, they have all the lectures, all the classroom materials, and didactics is all on discs right on their computers so they have immediate access. They can be tracking the power point lectures on their computers as the teacher is giving the lecture, so they can take their notes on the computer.

The dean perceives a saving of both time and money when faculty can develop pod-casts that students can download to their laptop computers with this advantageous to both the

student and the patient. With the fourth year students at off-site clinics every other month, efforts are ongoing to provide on-line education to them by downloading electronically or have lessons sent to them on an I-pod. An administrator acknowledges that the technology is changing faster than the school can make plans in implementing such a program for the fourth year students.

Dr. Berkut, a clinical director with a faculty appointment reviews one of his courses and perceived benefits:

Another project I need to get on, is that they [the administration] would like me to take one of our smaller courses, a one day course that we give to the first year students, and record that and have my slide presentation in the background but it would be my voice going through a script. I would have written the course so that it could be taught on-line. It would be web-based. Internally, have some of our courses [taught on-line] which would eliminate having to bring in some of the instructors, letting the students have the freedom to study whenever they want to.

This concept of having the visiting professors provide modular course content on-line expands the concept of electronic transfer of knowledge. The perception of assistant dean

Lamb:

We've talked about perhaps putting their [the visiting faculty] modules on-line, or a form of web-conferencing; we do want to have something technologically advanced like that.

A graduation requirement for Saguaro dental students is completion of a certificate in public health program. The program is currently provided on-line by a university in the eastern United States. This is described by associate dean Simms:

Our students have to complete a public health; a certificate in public health core concepts, to graduate. They have to [take] five courses over the four years they're in dental school, but typically complete the courses in their last three years. One [course] a semester through the last three years, exposing them to that area.

Saguaro dental school perceives the electronic means of teaching as a method that saves time and costs, provides access to knowledge at times convenient to the student, and promotes internal on-going integration of knowledge even if students are not on campus and are providing clinical services at an offsite facility.

Saguaro dental school perceives information technology as not only assisting internally to teach their dental students, but also as a tool to create external revenue streams. Two prominent revenue streams perceived by the school are potentials in both continuing education and graduate education. The trustees of the parent university have approved a Masters of Public Health with a dental emphasis. Dental Public Health is a recognized specialty in dentistry with this program designed as an in-house graduate degree provided entirely on-line. A director for this program has recently been hired. The other revenue stream is continuing education. Saguaro dental school has partnered with a private sector company to create an on-line course of instruction on the use of the company product in specific surgical services.

An assistant dean participates in a transition course given to the dental students just prior to beginning their clinical training. A private company wanted to participate in the teaching of a specific clinical procedure. This individual, assistant dean Lamb, describes perceptions of this private sector firm participating in education:

Dxxxxxx contacted me. They want to do some of my lectures for me, particularly the use of the ultrasonic. They'll bring the ultrasonics, one for each four students while we sit in the classroom and work with those. I don't have a problem with this; I'm grateful that they contacted me, I really am.

The school hires visiting faculty to provide coursework and I inquired about perceptions of Saguaro dental faculty regarding these visiting faculty and their teaching of Saguaro students. The prevalent perception, provided by assistant dean Lamb, is as follows:

They're [Saguaro faculty] thrilled that they're not the ones having to teach the modules. We do have people flying out here, but there is no animosity what-so-ever.

Whether teaching through electronic transmission methods, the use of representatives of industry, or medical school instructors teaching dental students, new circuits of knowledge are pervasive within Saguaro dental school and certainly influence the processes of education within the school.

#### *Interstitial Organization Emergence*

The generation of external revenues by universities has created a need to manage activities associated with these revenues. Slaughter & Rhoades (2004) have defined this as the emergence of interstitial organizations, that is, organizations emanating from the interstices of the university. Saguaro dental school does not perceive basic or applied research as a foundational activity of the school. This self-perception and, having been open only three years, precludes the formation of organizations within the school such as a technology licensing office.

The school is actively involved in fund raising and for-profit educational activities, however. Two individuals within the school have responsibilities for enhancing revenues. One is a grant writer whose efforts have resulted in several grants, the largest being approximately \$400,000 for the purchase and installation of specialized digitized

radiological equipment. The other individual is charged with seeking donations. These efforts are directed toward philanthropic organizations, individuals, and businesses. Local donations have been forthcoming, for example, an annual golf tournament has raised \$50,000 per year for the previous four years. The school has a designated development office which is this individual and the dean of the school.

The importance of the dean as a fundraiser led to changes in the structure of the dental school and creation of the position of vice dean. In the words of vice dean Harmon:

The decision was made about a year ago to restructure so that [the restructuring] could allow our dean to spend more time doing some external things as it relates to fund-raising; and just the things that have to take place outside the school.

The dean provides his perceptions of his role in fundraising:

I'm the face out there. I do a lot of outside stuff, meeting with communities, speaking and so on, getting people to know about this school. I used to joke that I have the largest collection of Rotary clocks. I'm lucky in that I'm considered a reasonably fine and entertaining speaker at lunch, so I get invited to the Rotary and Kiwanis, and out of that we get some interest and funding. So, yes, fundraising is an important part of what a dean does and I do that. I go to some fundraising events [and] we have a variety of events. We're doing a big gala for our graduation and I'm very excited about it. It's going to be a big fundraising ball. Yes, it's an important part of what I do. I don't think of it as a category, but it is.

The dental school has partnered with a dental manufacturer to create on-line continuing education coursework that does focus on a niche market; a set of procedures only performed by 6% of all dentists. Vice dean Harmon provides a synopsis of the perception of the school regarding education for niche markets:

I think that, yes, I think we [Saguaro dental school] really want to get involved and be a conduit for continuing education and things like that for anybody who wants to participate.

The school is interested in revenue-producing relationships and recognizes fundraising as an activity that creates interest in the school as well as additional funding.

The school is three years old and in the words of the dean:

We're still in the creative stage. We're not in the maintenance mode yet. That takes work and energy and I think, at some point, once we get to maintenance, we'll still be creating and growing programs.

With maturation of the school and on-going fundraising efforts, as well as the desire to create secure relationships leading to production of courseware, components defining interstitial organizations are just beginning to emerge within Saguaro dental school

### *Intermediating Networks*

The new economy brings opportunities that can beget problems seeking solutions. The creation of networks that intermediate between the university and industry provide working platforms for problem solving and the seeking of solutions. Slaughter & Rhoades (2004) provide examples of networks of industry and university leaders collaborating through common organizations to take advantage of opportunities in the new economy that often tend to redraw the traditional boundaries between industry and the university.

Dental education institutions can have individual networks within the school that possess characteristics similar to intermediating networks. For example, the University of Connecticut School of Dental Medicine has a Center for Research and Education in Technology Evaluation that is university staffed but guidance and advice is provided by an Industry Advisory Council made up of representatives of ten dental manufacturers

(Rossomando, 2004, June). This is a collaboration of academics and industry with a focus on one program in one school. In examination of collaborative efforts less parochial and more focused nationally on US dental education, a singular organization with characteristics of an intermediating network is the American Dental Education Association. Evaluation of awards, scholarships, and fellowships available in 2007 through the ADEA reveals 75% are ADEA sponsored and funded in collaboration with industries such as Oral-B Laboratories, GlaxoSmith Kline pharmaceuticals, Pfizer pharmaceuticals, Sunstar Americas, Vitasource Technologies, and Zimmer Dental Implants. The ADEA has a Leadership Institute with 2/3 of the funding by sponsors from industry, including GC America, Oral-B Laboratories, Procter & Gamble, Sullivan Schein Dental Supply, Oral Health America, and Pfizer Consumer Healthcare. Similarly, the ADEA Center for Educational Policy and Research is supported by funding sponsors, 2/3 of which are corporate sponsors; largely the same sponsors as the Leadership Institute (American Dental Education Association, 2006). In November, 2005 the ADEA announced an educational partnership with Zimmer Dental, a private dental implant company, as a collaborative \$500,000 effort to support dental education programs and an Implant Education Teaching Award. The ADEA is the leading organization for dental education with all 56 US dental schools as members. The corporate membership of the ADEA is 60 members with 2006 corporate contributions to the ADEA a record \$1.5 million dollars (Valachovic, 2006).

Federal grants, though in decline in dental research, are awarded to some dental schools. In other cases, industry has provided funding directly to dental schools. For

example, UCLA School of Dentistry recently received funding for an endowed chair in surgical implant dentistry (Dentistry Today, 2006, November). The University of Illinois-Chicago dental school has recently received a similar gift from an implant manufacturer (ADA News, 2006, June 19). The American Dental Association Foundation receives 19% of its contributions from industry with 25% of these dollars awarded to dental schools for research or education, however, review of recent research topics is not indicative of industry directives in the awarding of grants (Dentistry Today, 2006, July). The ADEA, while adhering to its mission of leading the dental education community in addressing issues facing dental education, research, and the delivery of oral health care, has developed a set of strategies for 2006-2007 that includes the financing of dental and allied dental education (American Dental Education Association, 2006). In this endeavor, the ADEA is the organization in dental education that has the characteristics of an intermediating network; working in collaboration with industry in problem solving and seeking solutions. The impact on dental education is an increased presence of ADEA in dental research, advocacy, communication, and finance.

The perception at Saguaro dental school is that the ADEA has heightened interest in the innovative models developed since opening in 2003. In the words of clinical director Berkut:

The ADEA is interested in how [Saguaro dental school] works. They're looking at us, kind of watching us to see if this modular approach is a good way to go.

The next ADEA convention is being held March 2007 in New Orleans and all members, including myself, have been asked to send proposals for presentation topics. Several

administrators and faculty of Saguaro dental school are presenting at this meeting. Dr.

Burkut speaks to this as well:

I know that ADEA is excited about our giving 5 presentations next year in New Orleans. One of them is a faculty development workshop on our model because a lot of the members of the ADEA have mentioned [to the dean]; “tell us what you’re doing there. Show us what you’re doing”. We can do that and by then we’ll have a little bit more of a track record and some actual corroboration of what we are doing.

Associate dean Simms adds to the ADEA desire to learn more about Saguaro dental:

We have really good relations with dental education as a whole. One of the big places for that is the ADEA which I’ve been active in and we are planning proposals at their March annual meeting. People are wanting to know what we are doing here, how we’re doing it, why we’re doing it, and how it’s going.

Saguaro dental school has individual administrators serving on committees of the ADEA, participates as speakers at national meetings, and this organization has expressed interest in this specific school; however, this organization is not perceived as influencing educational processes at the school.

### *Extended Managerial Capacity*

The first three networks within the theory of academic capitalism, new circuits of knowledge, interstitial organizational emergence, and intermediating networks, can lead to a fourth network, extended managerial capacity. This refers to the need for an increased number of people to service the first three networks.

Saguaro dental school utilizes personnel from the parent university to avoid replication of services, currently has a development office consisting of two people, one of which is the dean and, in the words of associate dean Harrison:

Everyone always talks here about, ‘you don’t have just one job, you’ve got lots of jobs’.

This is a dental school with sixteen full-time administrators and faculty supplemented by slightly more than 100 adjunct faculty to administrate and teach 54 dental students per class. By default, each full-time member serves on multiple committees with most administrators having teaching appointments as well. It is truly a lean, mean, machine.

The administrators of Saguario dental school use this “lean, mean, machine” metaphor with enough frequency to merit discussion. I never saw or experienced any examples of meanness during multiple visits to the dental school with the subject of leanness referring to the small number of full-timers at the school. It’s a metaphor that seems to easily roll over the lips of many of us subjected to years of “lean, mean, grilling machines” seen on infomercials for many years. My perception is that lean, mean machine is a descriptor used by Saguario only as a clichéd metaphor that describes an avenue taken to reduce the costs of dental education but otherwise not to be taken literally. Any sense or display of meanness would certainly be contrary to the culture established by the school, a culture embedded and taken very seriously by the school administration. The lean, mean metaphor does suggest that extended managerial capacity is without influence in the education processes of this school.

The third research question asks to what extent administrators and faculty perceive crises in dental education.

## The Crises in Dental Education

### *Faculty Shortage*

Although not unanimous, the consensus of Saguaro dental administrators and faculty is that the national dental school faculty shortage is very much a crisis; however, this shortage does not impact their school. Associate dean Harrison expressed a perception that the shortage of dental faculty is highly inflated:

You hear these reports [of] more than 2000 faculty not filled. We see numbers in ADEA publications, or whatever, [and] I think they are inflated. Why are there so many unfilled faculty positions? Because there's way too much fat in traditional education.

The majority feel otherwise regarding faculty shortages. Vice dean Harmon provides this answer when asked if he perceived a national shortage of dental faculty:

It's not a perception, it's a reality. I think there's a couple of things going on because all of us who have been around dental education in the last 15 years, which I have, know that it's a critical shortage. Most schools have vacancies on their faculty, maybe because their faculty numbers are too high for what they really need, but the reality of it is that dentistry in the last 20 years has become a profession in which it's relatively easy to make a reasonably good income practicing.

The discrepancy in faculty salaries and income from private practice is seen as the most predominant reason for a faculty shortage. Several administrators and faculty pointed to these salary differences: The perception from vice dean Harmon:

Faculty salaries are an issue that, I think, probably more than anything else, it's pure and plain financial. It's what can I do to support a family and provide for myself. I've worked hard, I'm up to my belt buckle in debt and how or why would I even consider being a faculty [member] going into education.

Dr. Johnstone, faculty member and specialty director:

Financially, it's a big issue because dentists see what other dentists can earn, what their earning potential is, and dental schools are going to have to provide opportunities for their full time faculty.

Faculty member, Dr. Lincoln has similar perceptions:

I think this is a national problem. The financing and what you can make in private practice versus coming to dental education, I think finances drive it to some degree.

From Dr. Broder, faculty member and specialty director:

From a national perspective, I think the key; I think that financing will always be an issue because you can make more money in private practice.

Faculty member Dr. Wright was succinct:

You know, it always comes back to economics

Dr. Grist was also succinct in his perceptions:

They [dental schools] don't pay you enough money to make it worthwhile going in and teaching.

The salary differences can be quantified from 2005 data with the median salaries of dental school instructors \$60,143, assistant professors \$103,262, associate professors \$117,954, and professors \$146,828 (Wells, 2006). For dentists in private practice, the median salaries in 2005 were \$152,880 for the new dental school graduate, \$180,650 for a solo practitioner with several years' experience, and \$287,190 for dental specialists (Valachovic, 2006).

The "graying" of present dental school faculty adds to the perception of faculty shortages being a crisis in dental education. Presently, 55% of dental faculty are 50 years

old or more and 24% are over 60 years old (DiMatteo, 2005). Saguaro faculty member Robbins provides a summary of the aging of dental faculty:

There is a whole generation of dental educators that will be retiring. There's a lot of us in the same age bracket and so the concern for making sure that there's coverage, and good coverage coming up, and I know there has to be; but there's a big pool out there of dental educators that have been around for a long time, so that's the good news and the bad news

Vice dean Harmon provides a perception of the need to create interest in becoming a dental educator:

We better begin to wake up to this and start doing some things that would promote the idea that younger people want to be interested in it [becoming dental faculty]. The bigger issue is getting younger people to get involved.

In addition to financial discrepancies and the departure of a large block of soon-to-be-retired dental faculty, the culture of the dental school is also mentioned as a contributor to faculty shortage. Associate dean Elim verbalizes this theme:

I think it comes back to the way they were treated and, if they are interested, in knowing what environment they're coming into.

Associate dean Harrison provides a very direct response in the same theme:

All the traditional dental school models out there teach in this old traditional fashion and it makes students hate the institution to the point where they don't want to come back to it; they don't want to be that.

And Dean Scholler summarizes the cultural differences at Saguaro dental:

We've created a culture that is supportive and collegial. The environment promotes collegiality and collaboration. I think we've got a lot of things going for us relative to recruiting [faculty].

With a reservoir of retired and semi-retired dentists and an educational model premised on the use of a large number of part-time faculty, Saguaro dental school does

not have a self-perception of faculty shortages but acknowledges that this is a national concern and has significant implications in many other dental schools.

*Cost of Dental Education & Lack of Funding*

With the median cost to a dental school for training one dental student for one year hovering in the \$80,000 range, the cost of dental education has been designated as one of the crises in dental education. Several faculty members reflect upon the high cost of dental education: From faculty member Wright:

I know running a dental school is a very, very expensive proposition. It's more expensive than medical school or any other school, just because of all the hardware, all the electrical, all the plumbing, all the equipment, all the personnel. A dental clinic, a private practice clinic, is expensive and a dental school is a very expensive thing.

Dr. Grist, a faculty member has this thought:

The dental education system today is going along with modern technology. Books are obsolete, everything is done on a computer; everything is updated constantly.

Clinical director Berkut provides a succinct perception:

Any kind of dental program is so expensive to operate.

Dr. Johnstone reflects on the changes in the cost of dental education:

I know its expensive today. I know that when I went to a private dental school and it cost \$3200 a year, I thought that was expensive, and that was in the mid-1970s. So, here we are 30 years later and \$30,000-\$40,000 a year tuition. I see that as inconceivable.

Faculty member Wright reflects upon the dental school he attended and actions taken by the parent university as a result of the high cost of dental education:

The whole university did a complete financial analysis and one of the things that came out of that is they absolutely closed the dental school down. They closed it

and ended having a dental school because of the economy of it. It was just very expensive to run it.

The cost of educating dental students is high and the perceptions of the effects of this cost on dental education institutions is provided by Vice dean Harmon and Dean

Scholler:

First of all, the traditional dental school model is just not going to work long term. If it's not broken, it's close to it.

If they [traditional dental schools] don't change, they'll close. That number [\$78,000-\$80,000] is not sustainable. Not at that number. I think that's the reality.

I think there's some [traditional dental schools] really close to the edge. If they don't come up with a winning lottery ticket, or some innovation that's going to spark someone's interest in bailing them out, they're going down.

Lack of funding for dental education is one of the crises of dental education; however, this was never mentioned in the context of the cost of dental education. Saguaro dental school is part of a private, non-profit system and funding is tuition driven.

Supplementation of tuition with clinic income, school-derived revenue streams, and revenue streams derived by partnering with industry is essential but the clear emphasis is on reduction of costs as opposed to creating revenues to meet or exceed those costs.

Dr. Harmon provides perceptions regarding how the total cost of dental education can be reduced:

I think all the schools have to be creative about how to minimize their expenses. I think you got to look at the bottom line and you got to figure out; you know, it's going to cost me this much to operate, what can I do to reduce my operational costs. It's just like private practice.

Clinical education director Berkut is assigned to the task of operating the dental school clinic similarly to a large private practice:

A goal is to be lean and mean. I think they're very careful when they look at their budget and [the director of operations] and others will come and say, "what are your needs". They try to identify the needs and they don't cut corners but I think they do watch things carefully. That's one of his jobs as clinical director of operations is that he watches basic overhead very carefully.

Cost reductions beyond a control on clinic operations include the concept of a smaller facility with less upkeep, maintenance, and utilities. The biggest part of the budget is faculty compensation and this is addressed by the modular system as well as compensation that does not match that of the private sector. The concepts and perceptions begin with a comment from associate dean Harrison:

We try to do things close to the vest as we can, just enough; the number of chairs for the students that are here, so, cutting back to the number of students puts us right at that break even point.

Dr. Berkut adds an additional perspective:

We want to be a lean, mean machine so that we don't have skyrocketing costs. [The] idea was to have a small clinic, [so] you don't have all those costs.

Associate dean Simms with the following:

We don't in dental education pay people exorbitant salaries, even double-degreed certified specialists. I mean, it's not where you come to make money.

From vice dean Harmon:

The most positive financial impact on the dental school is to have circuit riders and have them go from school to school.

And associate dean Elim adds:

That was one of the major motivating factors for moving to the modular format and the design of the school. That certainly affects our costs.

Whether a dental school where funding is tuition-driven or where state and federal funding is declining as a percentage of total dental school revenues, additional revenues

are needed. Even with efforts to reduce the cost of dental education, a lack of funding persists and additional resources are necessary for the production of quality dentists. Clinically derived revenues are important but do not meet or exceed the cost of clinical education. Additional funding is needed by all schools as reviewed by Saguaro faculty member Robbins and assistant dean Lamb:

There is limited funding and everyone is wanting the same money that's out there, or as much of it as they can get.

I can see it coming from the educational perspective to stay competitive and needing to be at the forefront of whatever's available and needing funds for that.

Even with concerted efforts to reduce the cost of dental education, a gap between tuition and/or government derived funding and the necessary revenues needed to sustain the processes of dental education requires additional funding. Saguaro dental school perceives filling this gap, in part, by specialized services to patients and dentists such as the maxillofacial orthodontic clinic, availability of three dimensional digitized radiography services, graduate degrees, or some forms of continuing education programs. This is not enough, however. Partnerships with industry are seen as required to fill the remainder of the gap in revenues. Faculty member Wright provides a synopsis of the school/industry relationship:

Who is going to jump into the breach, so to speak. The school is looking for them and they're looking for opportunities, so it's a commercial advantage for the corporation and an economic advantage for the academic institution. You can't run a practice losing money every year and say you're going to make it up with volume, you know, we're losing 20% on each student, but we'll add more students, so we'll make it up on volume.

Saguaro dental school forms partnerships when expertise is needed to produce a quality, profitable product, such as a continuing education course. The school further

benefits from discounted or gratis products provided to them which reduces clinic education costs, and perceives these gap-filling relationships as capable of being structured so that all parties benefit and the mission and goals of the school remain intact.

### *Student Indebtedness*

The large debt incurred by dental students is acknowledged by the administrators and faculty of Saguaro dental school. Vice dean Harmon sums this up quite succinctly:

I don't know; I don't know how they do it. It boggles my mind. It doesn't look promising to me.

Dr. Quincy, a faculty member, chimes in with similar perceptions:

I just am always amazed that the ones could even support, you know, to be able to afford it and I am always wondering what kinds of money, kinds of loans, they have by the time they get through dental school.

Faculty member Grist has a child in dental school. This affords him an opportunity to talk with his child and other students about student indebtedness. This faculty member provides some insights regarding the school debts of his child and classmates:

Cost factor for the students is a problem. Most of the students, probably 95% of the students, are on loans coming through here and they are coming out with loans. They will finish, when they get done, with about a quarter of a million dollars, I'd say, would be the average, some more some less, but I'd say that is the average; they're coming out of school a quarter million in debt. As we know, this is going to be a big debt service to carry besides what they are going to have to do to go out and practice.

During conversation with the dean of the school, he mentioned that in 2005 about 20%-22% of the billets for Indian Health Service dentists were not filled. New dental graduates can work in these jobs and have a portion of their school debts forgiven. Given the mission of Saguaro dental school to serve the underserved, most administrators and

faculty do not discount the extraordinary indebtedness of the students, but invariably refer to these types of debt forgiveness programs as a solution, in part, to student indebtedness. Debt forgiveness for serving as faculty is mentioned as well. Some of these perceptions from administrators and faculty follow and begins with comments from

Associate dean Harrison:

If we did a debt repayment as an incentive to become a faculty member; what if we say, "once you graduate, we'll pay you a nice base salary plus we'll forgive; we'll pay all your loans until they are completely paid off, let's say its three years and you give us three years as a dental educator". It would help fill the slots that are needed plus it would help alleviate the loan repayment for the students.

Clinical director Berkut expresses a similar theme:

You wonder if we can go back to some saying, "if you'll go work on the Hopi reservation for a year or two years, we'll help fund your education". They are going to be going out and serving this underserved group and that's a good thing so the government or the state maybe should kick in some as well.

Assistant dean Lamb adds:

Many enlist in their first semester and that covers their tuition and then they have 3 or 4 years in the military. I strongly support that, they're so young, why not do it.

Dr. Harrison has a final thought:

Yes, it's a problem. Yes it is because with the higher tuition costs, keep going up because its so much more expensive to operate a dental school, you're having kids come out with bigger and bigger debts and they have to find a way to solve that. You know and I know that if you go out into private practice and set up a practice on your own you're looking at \$200,000-\$250,000 to set up a one man office. So, you've got \$100,000 or more in debt from dental school and another \$250,000 so \$300,000-\$400,000 in debt. That's tough to face and pay back. A way: come back to dental education for 3 years. Then when you get out of debt and if you still think you want to go into private practice, you're debt free and go on with life. I think there's creative ways to look at it, that's only one idea; I'm sure there are others.

Saguaro dental school has developed a policy that, in concept, is intriguing and summarized by the dean. It's called the "home town" program with an objective of having all students on scholarships:

Its called our home town program where community health centers identify a young man or woman in their community that has a history of community service in high school and college and they say they would like you to be our dentist for our community health center. They send the student to us and they pay for the tuition. During the fourth year, we send the student back for the bulk of their clinical rotation and they begin practice development, relationships, and so on. There is no debt. So, we're trying to take what the Health Resources and Services Administration does for loan repayment, which is sort of a back end way to get money back for loans and convert it to a front end. So, you know who this person is, that person knows exactly what they're getting in to and not the tail end where a kid graduates with \$200,000 in the hole; what am I going to do and says, " ah, I can go to the community health center in Nogales, I'm going there for 4 years and I'll pay my loans off". And then [he's] there 3 weeks, realizes there's no Nordstrum, gets very disappointed and says, "I'm outta here". Everybody's upset. So, I think there are better models and the one we are working with here is really viable.

Associate dean Elim reviews the problem of debt and how this can affect the efforts to encourage students to serve the underserved:

Yep, financing, that's a problem. It can be pretty substantial. And where they're able to practice and putting those altruistic values in to reality is a challenge

Most administrators and faculty speak of loan repayment programs that generally serve the underserved, which is consistent with the mission of the school. This addresses, in part, the extraordinary student debt. The other part is expressed by a Saguaro vice dean Harmon:

Again, I think all schools have to be creative about how to minimize their expenses.

This final comment succinctly summarizes the implications of student debt on Saguaro dental school, that is, reduction in the cost of dental education is perceived as the single most important component when addressing student debt.

*Aging Infrastructure:*

An aging infrastructure in dental education is cited as one of the crises in dental education. “Aging physical and clinical facilities” is the common descriptor in the dental literature (Dentistry Today, 2006, October, ADA News 2006, October 2).

The administrators at Saguaro dental provide their perceptions of the aging infrastructure in dental education institutions. Saguaro dental is very new with the latest in education technology so perceptions as contrasts are typical. Several perceptions from associate dean Simms:

Our technology, they [the dental students] really like it because the generation is very “teckie” oriented.

Our technology definitely sets us out from other schools, but that’s a trend that other universities and colleges are going to, so we’re not that unusual, but within dental education we’re more unusual that way.

Because we new, we’ve got state of the art equipment and have the flexibility to grow and change.

The dean, Dr. Scholler, provides perceptions, not on contrasts, but on observations of other schools:

I believe that there are going to be more and more schools out there that are going to need help, particularly the traditional inner city large dental school clinic. They’re going to need help renovating; their equipment is getting old, they’re not up with the state of technology, laser or digital or paperless, and those upgrades cost money and manufacturers just can’t give it away.

While descriptors are generic and refer to the need for infusion of dollars into the infrastructure of many schools and include references to the need for the technology of the new millennium to create smart classroom, modern clinics, and simulation laboratories, the number of schools requiring such improvements is not quantified in the literature. What is quantified in the literature is estimated costs to bring schools with an older infrastructure up to the standards of a new facility. The estimate used by some university presidents to bring their dental school infrastructure up to date is \$30 to \$50 million per school (Dugoni, 2004).

## CHAPTER SIX

### CONCLUSIONS

#### Introduction

Dental education a generation ago was heavily subsidized by capitation programs that produced an abundance of private practitioners, researchers, dental educators, and administrators. The termination of the capitation programs, steady decline in state support of dental education, precipitous decline of federal support, and tapering of dental research dollars has been coincident with the pending retirement of a large block of dental faculty trained during that generation, the facilities built a generation ago now an aging infrastructure, new products and technologies dramatically increasing the cost of dental education, and dental students heavily in debt as family resources and grants have been replaced by loans. The number of dental graduates has been declining as the population increases and the demand for services is expanding. The median income of a new dental graduate in private practice is 2.5 times the income of a new dental faculty member as a result of this demand. Dental schools now face a critical shortage of faculty which, along with the cost of dental education, lack of funding, aging infrastructure, and student indebtedness, has been defined by organized dentistry as crises in dental education.

Shortly after the beginning of the new millennium a panel convened at the request of a private, non-profit university to establish a new dental school in the southwestern sector of the US. All members of this panel had been trained in traditional US dental schools, yet a dental school was developed that met accreditation standards but was decidedly distinctive from traditional dental education.

Chapter 4 contributed to understanding of the case, this new dental school, less by description and more by development of questions, contexts, and history of the case itself. From this, the development of understanding of the case can take a realistic, confessional, or impressionist path (Van Maanen, 1988). The realistic path, a direct, matter-of-fact portrait, is the path I have chosen to develop understanding of something not sufficiently understood: the formation and operation of a very distinct dental education institution.

Chapter 5 examined the issues, including the crises in dental education, that guide and define data sources and data-gathering activities as well as a foundation from which the entire study is organized. As both an intrinsic and instrumental study, the potential to make too much of the study, that is, to serve too many audiences can be problematic (Stake, 1995). However, at no time did I feel the case, issues, or number of issues, made demands that lessened the value of the study.

The remainder of this chapter begins with conclusions regarding the case, the legitimacy of the dental school, and the contributions of the salient characteristics of the new economy as well as the networks within the theory of academic capitalism to this study. These areas of interest are followed by conclusions regarding the issues.

### Conviction and Culture

The words and actions of administrators and faculty of Saguaro dental school convey a strong sense of conviction regarding the cultural and educational models used in the teaching of dental students. This sense of conviction should not be underestimated. It is

both heartfelt and pervasive among the members of the dental school. Faculty member Robbins provides insights into this sense of conviction:

I'm sitting in faculty meetings and listening to the voices around me, again, we're all so focused. Ultimately, we're very different people and that's the beauty of it. But we're all focused on the one goal that it's really amazing to work through things and listen to a variety of voices on any particular subject and come up with creative responses to things. I think there's a lot of mutual respect among faculty, we kid a lot, you can do a lot of that, any of us knows that and institutions admit it. There really is a lot of mutual respect here and a willingness to figure it out-what makes the most sense. So far, I think this is working really well.

Faculty members Grist, Wright, and Roberts corroborate this same theme:

I think we work pretty well together. We are all absolutely devoted to the big goal and making this thing work and to the students who are here. They're fabulous people, so we all just have to pull our individual weight collectively and figure out how best to come together and get everything done so that all the bases are covered.

I wouldn't go anywhere else. I like the challenge of it being new and everything isn't cast in stone. The school is very viable to change, they're accepting change. Someone comes up with a good idea at the faculty meetings; they listen. I have seen things change tremendously. They're saying, "maybe we should re-think what we are doing here and change things around a little bit" because they're eager to change and they are making the changes. They are not sparing the cost, and there are making changes. [If] they got something brand new and it's not working, they're going in and replacing it. They want to be the top dental school in the country. There is no question in my mind that's the motive; to make this the best possible dental school that can be made.

I think we are a very different place. I think we have a lot to prove to the world and I think we're committed, not to proving ourselves, that's a piece of it, but just to make it. I think we all believe so passionately and wanting to make this thing work. We believe in the approach, we believe in it's worth; that there is a change that needs to take place in dental education, an evolution and that we're kind of pioneering that. I think it's absolutely the right direction to go towards. It's an exciting place to be a part of-I'm thrilled to be here. I really am.

Other faculty and administrators express a similar desire to be a part of this new dental school:

A comment from Dr. Harmon:

Seriously, strike me dead. I'm not going anywhere. I love it here. It's a package issue to me.

Associate dean Elim adds to this theme:

It's the best place I've ever worked. Because we are innovative, I love working here. We have growing pain problems, but I think these are not unique to any developing organization. But I love working here.

Dr. Berkut, the director of clinical education chimes in also:

I'm happy here. It's just like the basic premise of education. You try a strategy; you do it, you reflect on it, and see what you need to change and improve or not do or whatever, and make those changes to try to keep improving. I think everybody's heart is in the right place. It's all the details and getting it all to mesh and work that is the challenge.

Dr. Lincoln, a faculty member and assistant director:

I can say that if I plan on having a full time permanent academic career, I would be very happy here. Very happy.

Dr. Roberts, a faculty member, expresses in a similar manner:

Here's the thing. I've developed some great relationships, I really enjoy the people I'm working with, I like the students, I like the staff. I really like the atmosphere, I'm involved. This is my fourth year being involved here so I feel like I'm a part of it.

The dean of Saguaro dental school was a member of the blue ribbon committee that established the mission and goals of the school. He is mentioned by administrators and faculty with some frequency when reflecting upon the educational and cultural models with the school. Administrator Sandstone with the following synopsis:

I love it here. Working with the dean is great, working with my colleagues is great, everybody here is fabulous. Seeing what the students are doing and what they're going to do; it makes it worth it. It makes it worth getting up. There's never a day that I get up and say, "oh, I don't want to go to work today". Sometimes I'm here until 9:30 or 10 and I look outside and it's dark and I'm like,

“ok, I better go home now”. I don’t have a problem putting in those hours. I don’t have a problem doing whatever it takes.

Dr. Simms, an associate dean adds:

We all know he [the dean] is such as cheerleader but every time we have our monthly faculty meeting and every time we’re at a function where he is speaking, we all get passionate all over again. It’s not that we lose sight of what we’re doing here and what we believe in, but he’s so good at articulating the passion that we all share. It’s always good for me to get pumped up again. Ya, absolutely. That’s why I came here and that’s why I’m willing to work hard to make this thing work as much as I know how to.

The heartfelt convictions in the educational and cultural models of education at Saguaro dental school are deeply embedded within the belief systems of administrators and faculty. I found this to be universal when conversing with members of this dental school. The culture of collegiality is no less embedded. Certainly, both the culture of conviction and cultural of collegiality could prove to be sequelae of a new and exciting educational institution having initial successes with the jury still out regarding tensions that could evolve within these cultures over time. Cultural components expand beyond this, however. This is examined in the next section, convergence and legitimacy.

### Convergence & Legitimacy

In 2000, the Surgeon General of the United States issued a seminal report on Oral Health in America (NIH, 2000). This was followed three years later by the Surgeon General’s 2003 National Call to Action (NIH, 2003). These reports articulate the gap between scientific advancement and the incorporation of these advances into both education and clinical practice. In addition, the 2000 report documented the association

of oral and systemic diseases and the compromises in health and well-being that can occur over the human lifetime. This report labeled oral diseases as a “silent epidemic”.

While specific links between oral and systemic disease have been documented for decades, such as oral inflammatory diseases and diabetes, organized dentistry, especially my specialty of periodontics, has initiated multiple studies regarding links between oral and systemic diseases, targeting organ systems or specific conditions. The issuance of position papers within the professional community continues cautiously as correlational studies are beginning to emerge albeit with many confounding factors. Examples include specific links between periodontal diseases and pre-term low birth weight babies, carotid artery disease, heart disease, and some forms of pneumonia.

Descriptions of the links between oral and systemic diseases are also beginning to emerge in nonprofessional publications as well. Some pose as a disservice to dentistry and the public with cause and effect conclusions presented at a time when such results cannot be documented. However; publications that have a history of good scientific review and scrutiny are addressing this linking of oral and systemic disease and are presenting this information to the public with accuracy. For example, Scientific American magazine has a 2006 edition with the entire issue dedicated to oral and whole body health (Guynup, 2006). The ongoing study of oral-systemic links has spawned new terminology in dentistry; this area of inquiry now called the study of periodontal medicine.

From a seminal report authored by the Surgeon General, through dental research efforts, and filtering to the public media, the convergence of medicine and dentistry is ongoing. In my own practice, medical referrals from dermatologists, ear/nose/throat

specialists, and internal medicine specialists have steadily increased. The words of the dean of Saguaro dental school, Dr. Scholler, convey this sense of convergence:

Mind, body, spirit; that makes more sense than anything. For us to go in and just write a prescription and that's going to take care of stuff: No. There's stuff called exercise, there's stuff called nutrition, there's stuff about feeling good about yourself, self-esteem and all these things that really come into play and if we just think about teeth we're missing the boat. That's one of the beauties here, there's a real belief, and this is something I bring, that everybody, they believe at the highest level, there's a person attached to that tooth. And it's more than a tooth and, yes, we'll take care of teeth but it doesn't do a lot of good if we missed the diagnosis of diabetes, if we missed depression, missed the bruise on a woman's cheek as a victim of domestic violence. That's why we want to bring the dentist into this health care collaborative of making a difference in these peoples lives. This is the mind, body, spirit; this holism, health care for the total person. And we all believe it and it's not any kind of cultish thing or an osteopathic medicine thing; it's sensible and rational for health care.

The words of the dean are corroborated by faculty and administrators of the dental school:

I am particularly excited about how the whole systemic and oral thing works together and I think that's absolutely the direction that dentistry is going to be taking.

We need people who know more than dentistry to be out there; to work with other disciplines, to work with medicine, to work with communities, to maintain and increase the quality of the health of our public.

Mind, body, spirit is the phrase everybody uses, but there's certainly truth to that, looking at the whole individual, really looking at the whole person. Certainly there is restorative interest because there has to be to pass boards and everything else but we spend a lot of time looking at the whole patient, emphasizing how all the pieces have to fit together and how we have to individualize every patient.

There is so much coming to light in medicine and in the whole systemic influences, back and forth with dental, that we have to go in that direction of looking at the entire individual and not segregate the mouth out, not just see what we can fix in there. I absolutely think that dentistry will be forced to become more holistic and it would be wonderful to be on the pioneering side of that.

These words express an embedded culture of convergence that accompanies the culture of collegiality within Saguaro dental school.

In 1910, Abraham Flexner submitted a report to the Carnegie Foundation for the Advancement of Teaching that resulted in the closing of many medical schools and improvement in the quality of others as a template emerged to guide legitimate medical education (Flexner, 1910). Sixteen years later, William Gies submitted a report to the same Foundation with a focus on dental education and the results mirrored that of medical education (Gies, 1926). The Gies report addressed pre-dental education requirements. At the time, pre-medical requirements included two years of college which included sciences such as biology and chemistry. Pre-dental requirements were one year of college. The Gies report recommended two years of pre-dental college, that is, requirements comparable to medical education. The Gies report continued with recommendations of comparable dental education to medical education in quality and support of science education, dental educators being comparable in teaching and research, comparables in curriculum, and the same regarding clinical training and hospital based training in specialties (Gies, 1926). As recommendations were accepted many proprietary dental schools closed and others opened under the umbrella of a parent university as dental education sought legitimacy as health care education institutions training specific health care providers: dental professionals. Scholars of institutional theory could correctly perceive the recommendations of the Gies report as mimetic isomorphism as described by DiMaggio & Powell (1983).

Institutional theory holds that changes in formal organizational structures are explained as responses to changes in the institutional environment (Rhoades, 1992). Furthermore, formal organizational structures are in some measure myths, that is, they are adaptations to external expectations that may or may not have an effect on the work performed in the organization. This relies on organizational culture, as opposed to formal coordination, as a force that integrates the activities of the organization (Rhoades, 1992). Cultural theorists can perceive organizational culture as a variable that can be produced and manipulated but they can also have a focus on the relationship between the organization and the environment. DiMaggio & Powell (1983) focus on the relationships between the organization and the environment, specifically organizations within organizational fields. Mimetic isomorphism is the tendency of organizations to model themselves after similar organizations. The Gies report was foundational in dental education adapting comparables to medical education for legitimacy in health care education.

DiMaggio & Powell (1983) also address the normative environment of a field of organizations. The beliefs, values, and understandings of a field of organizations represent that normative environment. Normative isomorphism is the tendency of professionals to exhibit similarity to their professional counterparts in other organizations. The words of several Saguaro dental administrators and faculty provide insights in initiation of the applicability of normative isomorphism in the quest for legitimacy.

Associate dean Elim provides these words:

This [Saguaro dental school methods of education] is kind of pushing the envelope in some ways.

Dr. Berkut, clinical education director continues as follows:

It [Saguaro dental school] is somewhat; I want to say cutting edge just in the short time the school has been around. Traditional educators may look at that [our educational methods] and go, “I don’t know”. It seems to be a really functional idea. ADEA, is interested in how that works, they’re looking at us.

Dr. Lincoln provides these words:

We have to reassess how we are training dentists with all the new technology out there. I think that right now, this school is under a microscope, being studied by other schools.

The environment is changing with a slow but steady convergence of medicine and dentistry. Saguaro dental has embraced this convergence, both in the mission and goals of the school and in clinical teaching of dental students. The teaching of dental students is within CODA guidelines for accreditation but the methods of the school are distinctive. In casual conversation at dental conventions and meetings the topic of this dental school occasionally arises and dentists question if it’s a “virtual” dental school, an “on-line” dental school or a real dental school. The administration of Saguaro dental school is well aware of these descriptors of the dental school.

During informal discussions with several administrators, the success of the students on Part I of the National Boards is expected to be repeated on Part II of the National Boards and again with Regional Clinical Boards for state licensure. Because a class has not yet graduated, results are yet unknown. The success on these latter exams is seen as a barometer for the legitimacy of the distinctive methods of dental education utilized by Saguaro dental school. The legitimacy of Saguaro dental school lies in a normative

environment larger than dental education, however. By both word and actions, Saguaro dental school embraces a culture of convergence in which the isolated cottage practice is becoming a vestige of a previous era and collaborative health care efforts among differing health care disciplines is ascendant. The school is part of a parent university that teaches a number of differing health care professions. Collaboration among sister schools is ongoing and furthering the emergence of the culture of convergence. The dental school perceives this positioning as a sister school as an opportunity to embrace and expand collaborative efforts among differing health and helping professions. Saguaro dental school has a self perception as a leader in this convergence of health care. Legitimacy emanates not just from the dental profession, but the medical, health, and helping professions as well. Normative isomorphism brings legitimacy from this constellation of beliefs and values.

#### Niche Market Academic Capitalism

Legitimacy stands astride viability. Saguaro dental school has an expressed goal of creating caring and competent dentists at a lower cost than traditional dental education. Corraling costs of dental education is perceived as pivotal in sustaining a vibrant, financially solvent, and viable dental educational institution. Their words and actions do not match all components of the prevailing model of academic capitalism; however. Without having used the lexicon of the model, Saguaro dental administrators perceive, and act upon, a niche market model of academic capitalism. This is a tuition driven school that actively seeks partnerships that meet specific criteria. Unlike traditional

schools training health care professionals, this school does not seek basic science or clinical research dollars nor partnerships that could lead to these resources. Their perception is a shrinking pool of research dollars in an era of increasing costs to provide this research. The infrastructure and personnel costs of establishing a research center within the school is not congruent with their perception of lowering costs of dental education. Saguaro dental school administrators perceive dental education policy research as fulfilling an obligation of all dental schools to participate in research with the nature of this research having profound effects on health care in the US. Research examining educational policies, including many of the non-traditional methods utilized by Saguaro dental school, are perceived to enhance dental education as costs, efficacy, and sustainability are explored through these efforts.

#### Contributions of the Salient Characteristics and Networks

The salient characteristics of the new economy and the networks within the theory of academic capitalism serve well as powerful tools to examine both the case and the issues. Slaughter & Rhoades (2004), when delineating the salient characteristics of the new economy and the networks within the theory of academic capitalism, also provide the mechanisms for applicability. Each characteristic and network is not only described but given an operational definition. It is this operational definition that serves as the mechanism for examination and evaluation of both the case and issues, that is, the operational definition is the power behind applicability.

*Salient Characteristic of the New Economy: the Contributions*

Organized dentistry addressed globalization in sequential issues of the official news publication of the American Dental Association. Globalization was defined as the movement of goods or the movement of people or from the framework of Thomas Friedman, the New York Times foreign affairs columnist, who views globalization through ten factors he calls “flatteners”. This series proved informative and perhaps that was the intent of the series. However, the operational definition of globalization as defined by the authors of the theory of academic capitalism provides dental education something to sink their teeth into (pun intended) in examining the effects of globalization in the higher education arena. The operational definition, 1. reliance on information technologies and 2. convergence around markets for a knowledge intensive new economy, define what to examine in evaluation of the actions of the higher education institution to determine if globalization has an effect on the university with additional data and interpretation needed to quantify that effect. The partnering of Saguaro dental school with several offshore industries to produce continuing education courses is a classic example of an effect of globalization. Quantifying the effect requires substantially more information.

Higher education institutions are the repositories of advanced knowledge. Slaughter & Rhoades (2004) use corporate positioning in the new economy to operationally define similar higher education positioning. The operational definition of knowledge as raw material is the treatment of advanced knowledge as a product or service that can be claimed through legal devices, owned, and marketed. Traditional enterprises including

patent, copyrights, trademarks, and equity positions may not apply specifically to Saguaro dental school but distance learning services, another traditional enterprise, does fit the operational definition. The dental school has established protocols to position itself as a guardian of principled dissemination of advanced knowledge that is offered for sale. This operational definition does serve as a tool to determine if this salient characteristic of the new economy effects this higher education institution. The extent of that effect is then determined by quantitative data and further interpretation of all available data.

The authors of the theory of academic capitalism have elucidated three separate components that define non-Fordist manufacturing as the third salient characteristic of the new economy. These include reconfiguring the labor force, unbundling of work, and, in the academic arena, an expansion of middle management. The first two of these components have an operational definition in higher education that includes an increase in the number of part-time or contingent faculty and unbundling of professorial work, that is, the dividing of responsibilities in the development and presentation of coursework. The operational definition of the third component is an increase in middle management, that is, the opposite of the managerial trend in industry. It simply takes more people to manage a large number of contingent workers and the consequences of unbundling in the academic arena. The operational definition provides three possible components indicative of a non-Fordist manufacturing effect on higher education with any one producing that effect. Saguaro dental school embraces the first two of these operational definitions. A large contingent faculty is perceived as essential to address the costs, productivity, faculty availability, and culture in the daily operation of the school. In addition, their perception

includes the unbundling of professorial work to provide cost savings, diversity in teaching, innovation, and expanded use of technology consistent with the mission and goals of the school. The extent of the effect of non-Fordist manufacturing requires additional data and interpretation but the operational definition provides the mechanism to determine if an effect is applicable to this higher education institution.

The final salient characteristic of the new economy as defined by Slaughter & Rhoades (2004) is educated workers and technology savvy consumers. The components of this characteristic include increased opportunities for consumption by students, the use of the university as test beds for commercial products, and the use of students for product improvements as well as savvy consumers of these products. An operational definition includes increased consumption by students due to increased familiarity and preference as a result of student use, testing, or improvement of a product or service. Dental student use of products, materials, and devices is intrinsic to the process of clinical education. Students learn product characteristics and develop preferences that continue well after graduating from dental school. The dental industry gains visibility, the school realizes discounts and cost savings by providing that visibility and the students continue their acquisition of advanced knowledge while concurrently becoming technology savvy consumers. This is an effect that has always been a part of dental education. Saguaro dental school stays well within the accreditation boundaries by having multiple sources of products, materials, and devices which also precludes exclusivity of any single product.

*Networks within the Theory of Academic Capitalism: the Contributions*

New circuits of knowledge represent the first of four networks within the theory of academic capitalism. Members of the university have traditionally had responsibility for teaching, peer review, disciplinary boards, performance, shared accrediting functions, and the value of produced research. When this is replaced or augmented with standardization of teaching via technology, partnerships with industry or government, outside performance, peer review, and value judgments, and outside positioning for rankings, new circuits of knowledge have developed outside the educational profession. Operationally defined, efforts to standardize teaching via technology, an invitation or accepted request by a governmental or industry agent to augment the teaching of students, or acknowledgment and completion of forms, surveys, or inquiries by outside agencies for the purposes of rankings or performance all qualify as, or aid in developing, new circuits of knowledge. Any of these operationally defined activities produces an effect on the higher education institution. Saguaro dental school participates in and promotes electronic teaching. In addition, industry representatives do participate in the teaching of dental students after filtering of course content by the dental school curriculum committee. Also, dental school students receive a large portion of their didactic teaching from faculty outside the dental school; medical school professors. This establishes an effect with additional data necessary to determine the extent of that effect in the process of dental education.

As the need to generate external funding is embraced by universities the need to manage these funding activities can lead to the emergence of interstitial organizations.

Slaughter & Rhoades (2004) provide examples of these organizations that arise from the interstices of universities such as technology licensing offices, economic development offices, and trademark offices. These emerging offices also serve as needed links with industry or government. An operational definition includes the emergence of specific offices to manage external funding and, in addition, for-profit educational activities focusing on niche markets as well as compartmentalized fund raising efforts, that is, departmental or sister school fund raising as opposed to university-wide foundation efforts. Any component of this operational definition creates an effect with additional data needed to determine the extent of that effect. Saguaro dental school is new, lean and without dedicated external funding offices, however, the school does have a focus on for-profit educational activities within niche markets and is actively pursuing its own sister school fund raising activities.

The third network within the theory of academic capitalism is the proliferation of intermediating networks. The new economy brings opportunities requiring problem solving common to differing sectors. Intermediating networks bring these sectors together in this endeavor. An operational definition is the presence of networks that bring industry and academic leaders together in collaborative efforts to take advantage of opportunities in the new economy. Within dental education, the ADEA has the characteristics of an intermediating network with members of Saguaro dental school active participants in this organization.

The final network, extended managerial capacity, stems from the first three networks. The number of additional personnel needed is dependent upon the degree to which a

higher education institution engages the market. The operational definition is the presence of increased personnel for the purpose of increased capacity to participate in the market. Increased personnel has an effect, however, Saguaro dental school presently does not have extended managerial capacity as operations continue as a lean, mean machine.

The theory of academic capitalism was published in 2004. The salient characteristics of the new economy and networks within the theory may be known and understood by contemporary students of higher education but the lexicon of both the characteristics and networks would not be expected to be known by dental school administrators and faculty due to the very recent introduction of this theory. A characteristic such as “non-Fordist manufacturing” could be expected to have little or no meaning to a dental school administrator; however, an operational definition such as the increased use of part-time or contingent faculty would have obvious and immediate meaning. The operational definitions are the tools that permit evaluation to determine if salient characteristics or networks affect the processes of dental education and, if so, examinations to better determine the extent of that effect on dental education. Through the operational definitions, the contributions of the salient characteristics and networks are as effective tools that drive further inquiry and data acquisition to address the research questions of this dissertation.

### Conclusions and Summaries: The Issues

#### *Perceptions of the Salient Characteristics-the extent of influence*

The implications of the extent to which the salient characteristics of the new economy are perceived by administrators and faculty of Saguaro dental school and the influences on the processes of dental education loom large in the mission goals, policies, and daily operations of the dental school. The perceptions are through the operational definitions and all salient characteristics have a profound effect on every aspect of the school. The dental school, like the parent university, has a strong reliance on information technologies and has a self-perception as a leader in the use of technology in dental education. The school seeks partners with content or technological expertise in the production of educational products. These partnerships can be with academic, governmental, or industry entities, foreign or domestic, as long as a quality product resulting in enhanced health care emanates from the effort. This operationally defined globalization is seen as essential to produce quality education and as a needed revenue stream. If properly structured, the mission and goals of the school are not perceived as being compromised.

The use of knowledge as a raw material is linked to patent, copyright or trademark offices as well as equity positions or distance learning services. Saguaro dental school is in the building stage of development and does not have specific enterprise offices but is involved in distance learning activities and desires to pursue more of these enterprises if specific criteria can be met. The president of the parent university has a set of principles that permeates through all sister schools. The focus is on improved patient health care

and his belief, adopted by the dental school, is there is nothing inherently wrong with making money in educational enterprises, such as distance learning, as long as the school directs the course and the recipients of the coursework receive quality information that will improve the health of patients. If partnering with industry in this type of endeavor, the school retains direction and content of coursework and hopes to make a profit, the recipient expectations should be a quality product, and industry gains visibility that may be converted to profits. The perception of virtually all Saguaro dental school administrators is that the mission and goals of the school are not compromised if these criteria are met in pursuing educational enterprises.

Non-Fordist manufacturing has had dramatic effects on Saguaro dental education. The physical size of the building, number of faculty offices, number of chairs and units in each clinic, and the number of clinics are predicated on a very small cadre of full-time administrators and faculty and a large number of adjunct faculty. The smaller building size and reduction in the number of products and devices within the school creates cost savings in utilities and maintenance. The costs savings extends to the faculty as well. Full-time salaries, benefits, training, conferences, and travel are minimal and limited to a small core of full-time administrators and faculty. The small core is perceived as agile and capable of rapid decision making consistent with a developing school. Faculty availability is also addressed by the use of a large contingent of part-time faculty. Dental professionals, generalists and specialists alike, are plentiful when asked to teach a day or two a week. This plentiful supply provides the ability to retain faculty who fit the culture of the school and dismiss those who don't. The unbundling of professorial work,

especially in the basic and pre-clinical sciences, is not perceived as problematic. The visiting professor model is perceived as a model that reduces the cost of dental education, adds to diversity in teaching, promotes innovation, and expands the use of technology; all characteristics consistent with the mission and goals of the dental school. Both the unbundling of professorial work and the extensive use of part-time faculty, two major components of non-Fordist manufacturing, have been embraced by the school from the initial concept of this new dental school to the daily operation of the school. The concept of non-Fordist manufacturing is perceived as not only foundational to the development of their model of dental education but also essential for innovation in dental education.

Educated workers and technology savvy consumers is the final salient characteristic of the new economy as described by Slaughter & Rhoades (2004). The sheer number of materials, products, and devices used by dental students is staggering but consistent with clinical teaching of the full spectrum of clinical skills required of all dental students. Students gain familiarity and preferences quickly within clinics and, without exception, are going to be consumers of these products following graduation from dental school. Manufacturers and suppliers have been discounting products in exchange for visibility and exposure for generations of dental students and the dental schools reap the benefits as a cost savings within dental education. Saguaro dental school participates in this multi-generational practice with protocols in place to expose students to a broad variety of materials, products, and devices to remain within accreditation policies and prevent appearances of product exclusivity. While the school does not profess a desire to pursue basic research, participation in clinical trials and the testing of materials and products has

been left on the table as a possible external revenue stream for the school. Offers to be beta-testers for products have not been forthcoming to date.

### *Summary*

Saguaro dental school administrators have held the mission and goals of the school in front of them from inception of the school to present operation of the school. These missions and goals embrace every salient characteristic of the new economy. The extent of the effects of the salient characteristics of the new economy has been both deep and broad. Whether the physical facility, administrative structure, missions and goals, teaching methodologies, relationships with government and industry, or cultures of collegiality and conviction, the effects of the salient characteristics of the new economy have permeated every aspect of this school.

### *Perceptions of the Networks-the extent of influence*

Some networks within the theory of academic capitalism have dramatic influence on the processes of dental education within Saguaro dental school while others have minimal influence, that is, the influence of the networks can be found along a broad spectrum. The network having the most dramatic influence is new circuits of knowledge. Operationally defined activities within Saguaro dental school include the use of electronic methods of teaching, use of members from industry for the teaching of dental students, use of academic personnel from other higher education institutions for the teaching of dental students, and mandatory on-line courses as a graduation requirement. The parent

university embraces technology in education and the dental school has embraced this as well. Information technology is perceived as a foundation of innovative teaching that is perceived as saving both time and money. In addition, access to knowledge at a time convenient to the student and on-going integration of knowledge, regardless of student location on campus or at an off-site clinic, is perceived as advantageous to both the student and patients. With senior students developing clinical skills at off-site facilities every other month, electronic teaching is the conduit for knowledge integration during a significant portion of the academic year.

Representatives from industry do have contact with students and provide specific coursework for students. For example, this may include coursework related to business management regarding the operation of a private practice or the use and required maintenance of specific technical equipment or devices. Saguaro dental school controls the sponsorship and content of this coursework by using the curriculum committee as a filter to assess all proposed course content, require modifications of content if not consistent with the mission and goals of the school, and monitoring of coursework for quality assurance.

Part-time faculty provides all basic science coursework. These are faculty members from medical schools across the US. The pre-clinical sciences are taught by dental faculty similarly brought to the school from other institutions. These individuals typically teach one or two week modules with compensation including living accommodations, meals, and a weekly salary greater than received at their home institution. This coursework is occasionally supplemented by individual topics of instruction by Saguaro dental faculty.

The process of packaging the Saguaro dental faculty presentations as electronic teaching is in the initial stages and the packaging of the visiting professors modular teaching as electronic teaching, eliminating the need for travel, living accommodations, and meals, has been discussed but not implemented.

All Saguaro dental students, in addition to a dental degree at graduation, receive a certificate in public health. Attaining this certificate is mandatory with a series of five on-line courses the only educational route available for completion of this coursework. Currently, these courses are provided as a partnership agreement with another university but discussion and preliminary efforts are ongoing to create equivalent on-line courses that are produced within Saguaro dental school.

Saguaro dental school perceives the electronic transmission of knowledge as not only time-saving and cost-effective method of teaching but also necessary for daily operation of the school, especially in accommodation of their off-site students. Saguaro dental school recognizes the rapid changes in technology and the need to remain agile to capture and utilize technology upgrades to not only remain a leader in technology in education but also to sustain congruence with the mission and goals of the school. New circuits of knowledge, as operationally defined, guide the distinctive methods of teaching dental students that have generated changes in both the physical and academic structure of the school that separate this school from traditional dental education. This is the most influential of the networks within the theory of academic capitalism on dental education as provided by Saguaro dental school.

Saguaro dental school is not exempt from the need to generate external funding. Currently, the emergence of interstitial organizations is of marginal influence on the process of dental education at this school. The school does not perceive basic or applied research as a foundational activity of the school. Technology licensing offices or trademark offices often associated with these activities are not anticipated as emerging at this school. The school has a self-perception of a “lean, mean machine” with this clichéd description used routinely and fondly by the administrators of the school. With this descriptor in mind, the school does have a development office which consists of two individuals, the dean and another person in charge of seeking donations from businesses, individuals, and philanthropic organizations. The dean is the “face” of the school and recognizes the role of the dean as a fund raiser. Fundraising and creation of courseware for niche markets in the pursuit of external funding are already intrinsic to this school that is in an early, creative stage of development. A small development office has emerged in recognition that external funding is essential with this representing the only emerging interstitial organization at this school currently. The influence of this network proves difficult to quantify due to this early emergence, however, the extent of the effects are palpable, that is, the need for external funding is on-going and essential.

The proliferation of intermediating networks is the third network within the theory of academic capitalism. Like the previous network, the extent of the influence of this network on Saguaro dental education is difficult to quantify due to the early developmental stage of the school. The operational definition utilized in this study is the presence of networks that bring industry and academic leaders together in collaborative

efforts to take advantage of opportunities in the new economy. While organizations within the dental profession are collaborating with industry with greater frequency the ability to ascertain a linkage with a specific emphasis on taking advantage of opportunities in the new economy is more difficult to identify. An exception may be the recent actions of the ADEA. In January 2006 the ADEA eliminated member annual dues for anyone who had affiliation with a dental or allied dental education institution. The resulting funding shortfall was then compensated by industry contributions. While the mission of the ADEA to address issues in dental education, research and the delivery of oral health care has not changed, industry memberships now outnumber US dental school membership by 60 to 56 and a substantial majority of funding of awards, scholarships, fellowships as well as institutes, centers, and partnerships are industry-derived. This change in the financial and collaborative relationship between industry and the ADEA contains elements consistent with those that define intermediating networks. Several members of Saguardo dental school are active in the ADEA and the ADEA has served notice that the activities of Saguardo dental school are of interest to this organization. Both Saguardo dental school and the changing relationship between ADEA and industry are new and emerging. Quantifying the extent of influence of an intermediating network on the processes of dental education may not be possible currently due to the relatively new and dynamic relationships recently instituted. The influence remains indeterminate at this time.

The fourth network within the theory of academic capitalism is an extended managerial capacity, that is, an increased number of people needed to service the first

three networks. In the current, creative stage of development, Saguaro dental school does not have, nor expect to have, a cadre of managers within the school. The school utilizes personnel within the parent university to avoid replication of services to the greatest extent possible and all full-time administration and faculty wear multiple hats to address problem solving in the daily operations of the school. The concept of extended managerial capacity does not influence the processes of dental education currently. The short history of the school does suggest, however, that the school is not reluctant to hire if a need can be defined. For example, the dental school was too lean in its “lean, mean machine” descriptor of 2005. The school improved operations by the additional hiring of another full-time administrator that year. The administration became aware of the critical mass needed to function more effectively and responded rapidly and with agility to solve a perceived problem. The dental school, then, is not averse to hiring additional personnel as a need is defined

#### *Summary*

The influences of the networks within the theory of academic capitalism on the processes of education at Saguaro dental school are quite divergent. New circuits of knowledge have a pervasive influence and, at the other end of the spectrum, increased managerial capacity has no influence to date. The influences of other networks are indeterminate although with evidence of emerging influence as the school continues to develop.

## Perceptions of the Crises in Dental Education

### *Faculty Shortage*

Saguaro dental administrators and faculty perceive the faculty shortage in dental education as very real and very much a crisis in dental education. With a large bolus of “capitation age” dental educators on the threshold of retirement, a new generation of dental educators is simply not on the horizon. Their perception of income disparity between academic salaries and private practice as the primary reason for a faculty shortage is consistent with positions taken by dental organizations and other dental schools. Similarly, student debt and an unpleasant dental school experience are perceived as barriers to seeking a full-time academic career. At the same time, recruiting part-time faculty is not perceived to be a problem. Part-timers may teach for fun, to get out of the office a day a week or, in the case of a colleague of mine who volunteered to teach a day a week at a dental school in Boston, the parking pass that came with the appointment was considered to have greater value than a part-time salary by both him and his family.

Saguaro dental administrators perceive an inability to compete with full-time private practice salaries. Their answer to the crisis is employment of private practitioners on a part-time basis. Dental specialists, nearly impossible to recruit for full-time faculty positions, are willing to work part-time and retain the ability to work in their private practice. The use of co-chairs of a department allows the use of part-timers which, in turn, solves the faculty shortage problem. Their answer, then, circumvents what is perceived as an otherwise insurmountable problem.

Dental organizations such as the ADEA, as well as other individual dental schools, have initiated dialogue to re-define the meaning of full-time employment. An idea being explored includes defining a three day work week as full-time employment and qualifying for full benefits. This concept remains in an exploratory stage at this time.

As solicitations for dental school faculty appointments go unanswered and shortages continue to increase, Saguaro dental school, in recognition of the crisis of faculty shortages, has opted to work with perceived adversities and dodge this specific crisis. These actions have been based on recognition that faculty shortages are truly a crisis in dental education. In answer to what extent are faculty shortages are perceived to be a crisis, the entire school from inception to daily operations is distinctive in the use of a very small cadre of full-timers and an exceptionally large contingent of part-timers as their effort to address this specific crisis. The perceived benefit of this faculty recruitment model is summarized by associate dean Simms:

We don't have a lot of the problems the other dental schools have with recruiting faculty, not that we don't have any problems because there's certainly a big shortage, but we have less of a problem because we're not like everyone else.

### *Cost of Dental Education*

In early 1998 the president of a parent university in the midwest sector of the US announced a recommendation to close their dental school. A spokesperson for the school suggested that, "money required to raise the level of dental education would be better spent elsewhere" (JADA, 1998, p. 156). In April of the same year a definitive decision was made to close the school, citing finances as a factor behind the closure (JADA, 1998, p. 418). The magnitude of the cost of dental education has not been underestimated by

the administration of Saguaro dental school. With the median cost to a dental school to educate one dental student for one year hovering in the \$80,000 range, the perception of Saguaro administrators is that this number is not sustainable and that dental schools with costs at or above this level face dire consequences which could include the closing of dental schools, that is, for these schools the cost of dental education is truly a crisis.

Perceptions also suggest the subsequent opening of new schools with models of dental education that better address the spiraling costs of training dentists. To what extent do they perceive the cost of dental education a crisis is illustrated within the design of the facilities and the models developed and utilized in the training of dental students.

Whether the physical structure or academic structure, the design of the school has a clear focus on cutting the cost of dental education.

### *Lack of Funding*

Lack of funding is the third crisis in dental education as defined by the American Dental Association and Foundation. Even with efforts to reduce the costs of dental education, a gap persists between tuition and/or government-derived funding and the revenues needed to teach dental students. Saguaro dental perceives a decline in research dollars available to fill the gap and philanthropy among dentists in support of dental education remains historically abysmal. Both organized dentistry and individual schools do not want dental education available only to those who can afford the tuition and significant tuition hikes are creating dialogue suggesting that some undergraduate students may already feel that dental education is not affordable. Saguaro dental

perceives lack of funding as a crisis in dental schools where efforts have not been made to reduce costs of dental education and in schools choosing not to be creative and innovative in the pursuit of resources. Saguaro has implemented policies and programs that do not ignore research dollars and philanthropy but shift emphasis to specialized clinical services and the use of technology, with or without partnerships with industry, to fill the gap between the costs of dental education and tuition dollars.

*Cost of dental education & lack of funding: combined summary*

The Saguaro dental perception is that for those dental schools at or above the defined median cost, only creative and innovative efforts can reduce these costs. Similarly, regardless of the primary source of funding, tuition or government derived subsidies, additional revenues are needed to adequately train competent clinicians. Creative and innovative efforts are equally as important to fill the gap in these resources. Saguaro dental perceives their distinctive methods of dental education as creative and innovative in addressing both cost and funding. In the words of Dean Scholler:

People are looking at us and we're hoping to help answer folks that, yes, we can produce a quality graduate for less money.

*Student Indebtedness*

Student indebtedness is perceived as a crisis in dental education by all Saguaro administrators and faculty. The staggering debt upon graduation has not gone unnoticed. Saguaro perceives the most direct response for reducing student debt is reducing the cost of dental education and has taken steps to do so. Even with these efforts and a number of

repayment or forgiveness programs, the shift from grants and family resources to loans has resulted in indebtedness that restrict post-graduation opportunities in the clinical arena, post-graduate and specialty training, or the additional training needed to pursue an academic or research career.

### *Aging Infrastructure*

Aging infrastructures are the final crisis in dental education. The perception within Saguaro dental school is that this is a crisis with qualification. They perceive the older inner city dental schools as having the most difficulty in obtaining the technology, clinical upgrades, simulation labs and smart classrooms that meet the standards of new dental facilities. These are the same schools that will have the greatest difficulty finding the \$30-\$50 million estimated to fund these upgrades.

### *Summary*

Saguaro dental perceives faculty shortages, costs of dental education, lack of funding, student indebtedness, and aging infrastructures as crises in dental education as defined by the ADA; however, three of the crises are perceived with some qualifications. The cost of dental education is a crisis within those schools that meet or exceed the median cost of training dental students. This is not perceived as a sustainable number. The lack of funding can be a crisis but schools making an effort to cut the cost of education in combination with creative and innovative methods of revenue enhancement can avoid or

minimize this crisis. Finally, aging infrastructures are a crisis but this may be limited to a segment of dental schools, especially those older schools located in inner city locations.

### Limitations and Contributions of this Study

The major limitation of this study is that perceptions of the addressed issues are from one private, non-profit dental school. The case study of the dental school does not allow generalizations to other dental schools. Similarly, the perceptions from within one dental school does not allow generalizations regarding perceptions of the extent of influence of salient characteristics of the new economy or the extent of the influence of networks within the theory of academic capitalism on processes of dental education at other dental schools. Nor can the perceptions of whether crises in dental education exist be generalized to perceptions within other dental schools.

Another limitation is that the stories, both the case and the issues, remain unfinished. The school is developing, a class has not graduated yet, and proficiencies and success on regional clinical examinations are yet to be known. The school is quick to take action when a need is defined with resulting changes expected to have cascading effects that can change the case as well as perceptions of the issues.

The theory of academic capitalism consists with networks and associated characteristics of the new economy having applicability to this research; however, the model of academic capitalism as introduced in 1997 does not apply to the case study of this research which serves as a limitation of this study. The chase for research revenues as emphasized in academic capitalism simply does not apply to this case.

The use of operational definitions and perceptions of these definitions can also serve as a limitation of this study. Perceptions could be enigmatic, especially when responses to operationally defined constructs are utilized as a means to collect meaningful data.

Finally, this is a new school with non-traditional approaches to US dental education. Sustainability of these approaches over time is not known with this also serving as a limitation of this study.

The flip side to these limitations are the contributions of this study. The contributions of the salient characteristics of the new economy and networks within the theory of academic capitalism have been previously reviewed. The use of the theoretical frameworks provides a mechanism of explanation for the use of pieces and parts of the perceptions and actions of Saguaro dental school emerging in other dental schools.

#### *Catastrophic Loss and New Funding*

Organized dentistry has defined the crises in dental education. The administrators and faculty of Saguaro dental school are products of traditional dental education with historical ties to organized dentistry. The story of the case is one of development and operation of a new non-traditional dental school. The story of the issues is the perceptions and influences that served as a foundation for this non-traditional approach to dental education and perceptions of the crises in dental education.. This study provided alternative approaches to dental education along with the perceptions that precipitated these approaches. There is reason to believe that the issues, and subsequent influences on dental education, have application in other dental schools of the US. During my

conversations with Saguaro administrators, many made reference to an interest by other dental schools regarding the innovative approaches of their school. For example, Hurricane Katrina literally flooded and washed the LSU dental school away. With massive efforts and donations, temporary quarters were established farther inland. As LSU began the process of rebuilding from scratch, Saguaro dental school was besieged by phone calls from LSU, wanting to know about their system prior to initiating the planning for permanent rebuilding of the school. Likewise, a new dental school has been funded on the eastern seaboard and correspondence has been ongoing between this new school and Saguaro dental in a similar manner to the LSU rebuilding.

### *Tabula Rasa*

The perceptions of the Saguaro administrators and faculty suggest that dental schools cannot ever compete with the salaries of the private practice. They perceive the cost of dental education as not a sustainable number at a certain threshold, Lack of funding is perceived as requiring assistance from the private sector and, without all these efforts, student indebtedness cannot be adequately addressed. Individuals with a history as traditional dental educators initiated Saguaro dental school as a tabula rasa, a clean slate, with these perceptions brought from, and in spite of, the traditional setting of dental education. While the case cannot be generalized, the perceptions of the issues are from administrators and faculty from a broad swath of traditional US dental education and it could be argued that these perceptions have generalizability.

### Future Studies

Another contribution of the study is the defining of future studies by the participants themselves. This school may pursue research in clinical trials if requested but does not have interest in “bench” or ‘wet’ lab research. The focus is clearly on educational and policy research. An assistant dean with a graduate degree in education with an emphasis in computer-based education described the need for studies on the long-term effects of the modular method of instruction. The long-term retention of material is an area of interest as is similar effects of on-line educational programming this individual has produced. Similarly, the school strongly desires participation in research evaluating their educational models and methods of measuring these models. They want to know if the goals of serving the underserved are being met, if the needs of the off-site clinics are being met, and whether the comprehensive approach is working. These are studies perceived as not having been done previously and also perceived as very important to the future delivery of health care.

### Commentary

“Those colleges and universities unable or unwilling to integrate with the new economy have difficulty accessing new programs and opportunities” (Slaughter & Rhoades, 2004, p. 22). The study contributes to the understanding of perceptions that can serve educational opportunities. The crises in dental education are perceived as a reality and, although an individual crisis may qualitatively or quantitatively affect a singular school to a greater or lesser extent, no dental school is exempt from ongoing changes as

higher education integrates with the new economy. Saguaro dental school remains in the formative stage with other dental schools observing and asking questions as dental education institutions tread into the new economy. The challenges will be difficult and the changes will not be easy in traditional dental education but this study provides evidence of both the consequences and opportunities inherent with dental education integration into the new economy.

## APPENDIX A: FACULTY ADMINISTRATOR INTERVIEW QUESTIONS

What is your title, job description, and length of time at this job?

What is your educational background?

How did you get here at this dental school?

How long have you been a dental educator/administrator?

How does this dental school compare to other dental schools where you have worked?

-in the manner in which dental education is done, i.e., strategies for providing education?

-strategies involving student/faculty interactions

-strategies involving faculty and administration

-other strategies perceived to make this dental school distinctive

Do you perceive the strategies here as being a trend in dental education?

Our dental journals write of problems in dental education. Do you see problems in dental education?

(VIGNETTES)

#1 Some dental schools have entered into a partnership agreement with a private orthodontic company. The company builds, supplies, and trains orthodontic residents for the school. In return, the orthodontic graduates are required to use orthodontic company equipment and supplies for a designated number of years. The dental school gains an orthodontic program.

#2 A dental school in the eastern region of the US is supplementing the teaching of full-time and part-time faculty with corporate PhDs for some of the course content to the dental students. PhDs from several corporations are used to avoid accusations of exclusivity.

The following series of questions have a focus on this “partnering-up” of dental schools with companies or corporations in the private sector.

Does this dental school have contracts with the private sector involving the teaching of dental students? If so, in what manner?

What do you see as the possible consequences of this partnering-up?

Is partnering-up a trend in dental education? Might it be in the future? And why?

Or why not?

Would partnering-up necessarily effect the goals and purposes of dental education?

Could you elaborate on your answer?

The role of faculty – might partnering-up effect this? Please elaborate

With the cost of educating one dental student one year averaging \$80,000 to the dental school, and tuition high, but much less than this, how might dental schools make up the difference?

How about ideas regarding the cost of dental education?

Do you perceive dental schools seeking out the private sector or the private sector more seeking out the dental schools? Why?

What might you say to encourage a young dentist to become a dental school faculty member?

## APPENDIX B: MISSION AND GOALS OF XXXXXXXX SCHOOL OF DENTISTRY & ORAL HEALTH

The mission of the xxxxxxxx School of Dentistry & Oral Health is to educate caring, technologically adept dentists who become community and educational leaders serving those in need and:

- to be the leader in the lifelong education of community responsive general dentists
- to prepare graduates with a strong foundation of critical inquiry, evidenced-based practice, research, cultural competency, an orientation to prevention, interdisciplinary healthcare experiences
- to promote the delivery of optimal patient care and for the transfer of newly acquired knowledge skills, and technology, to the profession and to the community.

The goals of xxxxxxxx School of Dentistry & Oral Health are:

- graduates will be skilled in the delivery of optimal patient care using a treatment model that emphasizes prevention and evidence-based treatment
- graduates will be culturally-competent, community-responsive general dentists who are able and willing to serve as a resource in their community for dental public health issues
- graduates will have a strong foundation in critical inquiry, research principles, and evidenced-based practice
- graduates will be participants in an interdisciplinary healthcare system and have the skills and knowledge to become leaders in this system
- graduates will have knowledge of business models relating to private dental practice as well as non-profit and public entities
- the dental school will be a leader in continuing dental education, lifelong learning and dental public health

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