Assessing Effectiveness and Economic Efficiency in California Community College Transfer Advising

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Approval

Assessing Effectiveness and Economic Efficiency in California Community College Transfer Advising

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Abstract

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This applied dissertation was designed to assess the effect of student participation in community college-based transfer advising programs on the resultant levels of effectiveness and economic efficiency in California's public higher education system. The outcomes of a representative transfer advising program at a California Community College campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between subjects who participated in the transfer advising program and subjects who did not. The results indicated a statistically significant 14.47% difference in transfer effectiveness (i.e., transfer rate) between transfer advising program participants and non-participants, χ^2 (1, N = 115) = 4.9793, p = .0257. No significant difference was found in the overall levels of transfer course efficiency (t = 1.1966, p = .2343) or transfer cost efficiency (t = 1.1933, p = .2355) between the two groups. However, additional analysis revealed that program participants completed, on average, 3.51 more units of coursework fulfilling university requirements prior to transfer than program non-participants did (t = -

2.6547, p = .0101). This resulted in an average taxpayer cost savings of $658.11 per program participant (t = 2.4253, p = .0182) due to the completion of this coursework at the lower-cost CCC system. These results indicate that student participation in community college-based transfer advising programs has a positive effect on the resultant levels of effectiveness and economic efficiency in California's public higher education system. This study provides an example of how the expenditure of public funds in higher education can be tied to measurable, effective, and cost efficient outcomes. Systemic efficiencies such as those generated by transfer advising programs are necessary if California's higher education system is to increase graduation rates without a concurrent increase in cost. The expansion of such effective and cost efficient programs to greater numbers of students seems indicated by these results.

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The published works of other researchers in this field were vital to the formulation and design of this study. In particular, I thank Nancy Shulock and Colleen Moore at California State University, Sacramento; Patrick Perry, Willard Hom, and their colleagues at the California Community Colleges Chancellor's Office; and Patrick Murphy of the Public Policy Institute of California for their inspiring work.

This dissertation would not have been possible without the support of the faculty, administration, and staff of the San Diego Community College District. I am particularly indebted to Dr. Terrance Burgess, Gerald Ramsey, Peter White, Marilyn Harvey, and Lisa Clarke for their time and assistance. Most importantly, I thank the students of San Diego City College who served as the anonymous subjects for this study. The dedication, perseverance, and commitment they demonstrate on their educational journeys both impress and humble me.

This work is dedicated to the memory of my father Tim Short, in thanks for the encouragement, support, and good advice he always provided me in all of my endeavors.

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CHAPTER 1: INTRODUCTION

Transfer is the process of students moving from one institution of higher education to another with the intention of applying previously completed coursework to degree requirements at their new institution. Transfer is an area of significant interest to state policymakers both because of the large number of transfer students in California's public higher education systems and the public benefits that transfer provides.

More than 97,000 students transferred from the California Community College (CCC) System to universities in 2006-07; a figure representing a 24% increase over the past decade, compared with a 7% growth in overall CCC students during the same time period (Perry, 2007). Despite this recent increase, researchers have calculated that only 20% to 40% of students who demonstrate the intent to transfer from a CCC to a university actually do successfully transfer (Bradburn, Hurst, & Peng, 2001; California Community Colleges Chancellor's Office [CCCCO], 2002; Shulock, 2008; Perry, 2008; Peter & Cataldi, 2005; Sengupta & Jepsen, 2006; Wassmer, Moore & Shulock, 2003). In other words, despite the almost 100,000 students who successfully transferred in 2006-07, there was an even larger group who intended to transfer but did not. A related area of concern is that many students move from community college to university having completed more units than the maximum that will apply toward the baccalaureate degree, having not completed all appropriate preparatory courses, or both (Florida State Legislature, 2002; Palmer, Ludwig & Stapleton, 1994; University of California, 2005). These statistics are significant because every unit

of coursework a student completes that does not contribute to a desired educational outcome represents unnecessary cost to the taxpayer (between $152 and $754 per unit in 2004, extrapolating from figures calculated by Murphy, 2004).

This dissertation was designed to assess the effect of student participation in community college-based transfer advising programs on the resultant levels of effectiveness and economic efficiency in California's public higher education system. Examining transfer from an economic perspective is important because it allows public administrators and policymakers to choose between various transfer program and policy alternatives based on criteria of measurable, effective, and cost efficient outcomes – criteria that taxpayers increasingly insist be tied to the funding of public programs (Behn, 2003; Burke & Modarresi, 1999; Burke, 2002; Davies, 2006; Dunn, 2004; National Commission on Accountability in Higher Education [NCAHE], 2005; Shulock & Moore, 2005; Thompson & Riggs, 2000).

Statement of the Problem and Purpose

The problem of low transfer rates (that is, the number of students who successfully transfer out of the number who demonstrate the intent to do so) has been well documented. Despite significant increases in the number of transfer students over the past decade (Perry, 2007, 2008), researchers have calculated that only 20% to 40% of students demonstrating the intent to transfer from a CCC to a university actually do successfully transfer (Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et

al., 2003) – a significantly lower rate than that observed in the overall U.S. community college population (Bailey, Jenkins, & Leinbach, 2007; Hoachlander, Sikora, & Horn, 2003). In other words, despite the almost 100,000 students who successfully transferred in 2006-07 (Perry, 2007), there was an even larger group who intended to transfer but did not. Moreover, researchers have found that transfer rates in California have declined significantly since the 1970's, despite an overall increase in enrollment at all three higher education systems and in the California population as a whole (Turk, 1996; Wassmer et al., 2003).

The related problem of unnecessary coursework completed as part of the transfer process has also been explored and cited as an area of growing concern (Florida State Legislature, 2002; Hill, 2006; Palmer et al., 1994; Shulock, Moore, & Gill, 2005; University of California, 2005). For example, researchers found that CCC transfer students spent an average of three to five years at the California State University (CSU) system prior to graduation, which is 1 to 3 years longer than the expected 2 years of study at the upper division level (Kegley & Kennedy, 2002; Ssemakula, 2003). In addition, researchers at the University of California (UC) (2005) studied data suggesting that CCC students transfer with an average of 20 more units than the maximum accepted by UC – a level representing over a semester of unnecessary coursework.

Low transfer rates and unnecessary transfer coursework are significant problems in California's higher education system both because they negatively affect a large number of students and because they mitigate the social and financial benefits realized by a successful transfer process (Dee, 2003; Kegley &

Kennedy, 2002). Over 66,500 students transferred from the CCC system to the UC and CSU systems in 2004-05 (Community College League of California, 2006b), representing about one-third to one-half of all junior class students at these institutions. For this substantial number of students, transfer provides the opportunity to earn a bachelor's degree, thus improving quality of life while also increasing potential earning power and the resultant contribution to the state's tax base (Kegley & Kennedy, 2002; Marcotte, 2006; Moore, Shulock, Ceja & Lang, 2007; Shulock & Moore, 2005; Shulock, et al., 2005; San Diego Community College District [SDCCD], 2004). By providing an alternate pathway to universities, transfer also relieves pressure for immediate access to these institutions by high school graduates. Perhaps most importantly, transfer is theoretically an excellent financial investment for individual students and for the state: CCC campuses offer many of the same courses that CSU and UC campuses do, yet CCC courses cost students and taxpayers significantly less. For example, in 2004 CCC courses cost students $26 per unit, which were the lowest fees in the nation for any institution of higher education. By comparison, in 2004 students at the CSU system paid approximately $85 per unit and students at the UC system paid approximately $154 per unit (Murphy, 2004). CCC courses cost significantly less for taxpayers as well: In 2001-02, the state funded the UC system at $22,634 per full-time student, the CSU system at $10,191 per full-time student, and the CCC system $4,560 per full-time student (Murphy, 2004). By comparing the differences in these funding levels over a 60-unit transfer curriculum, it can be seen that a student who completed 2 years of

university coursework at a CCC in 2002 instead of a CSU saved the state over $11,000 while a UC-bound transfer student saved the state over $36,000. However, if students do not successfully transfer or transfer with large numbers of unnecessary units, these benefits are greatly diminished or eliminated altogether.

Other researchers, practitioners, and state policymakers have suggested that the problems of low transfer rates and unnecessary transfer coursework are caused primarily by factors impacting students' educational planning process at the community college. These factors include students' lack of knowledge about the benefits of a baccalaureate-level education, excessive exploration of different subject areas, incorrect counseling and advising, confusing or inconsistent course requirements among universities, and personal and economic barriers inhibiting successful transfer (Academic Senate for California Community Colleges [ASCCC], 2003; Bers, Filkins & McLaughlin, 2001; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cejda & Kaylor, 2001; Hill, 2006; Intersegmental Committee of Academic Senates [ICAS], 2005; Shulock & Moore, 2003, 2004; Turk, 1996; Wechsler, 1989). Various solutions have been proposed by other researchers and practitioners, including increasing the numbers of community college counselors, standardizing and simplifying transfer coursework requirements among public universities, and providing transfer advising programs that aid students at navigating the transfer process (ASCCC, 2003; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006;

California Educational Round Table Intersegmental Coordinating Committee, 2004; Cohen, 2005; Handel, 2006; Hill; Hungar & Lieberman, 2001; ICAS; Shulock & Moore; Turk; University of California, 2005; Wellman, 2002).

All of the proposed solutions to the problems of low transfer rates and unnecessary transfer coursework require investments of time and resources. Even if these proposed solutions were effective at improving transfer outcomes, from a public policy standpoint they would only be desirable if the benefits they provided actually exceeded the additional cost they represent to the taxpayer. Programs that facilitate student degree completion "…should focus on increasing the return on the investment of public resources….It is to the benefit of students, and ultimately the state, if student success can be maximized for any level of resource investment" (Shulock et al., 2005, p. vi). Economic analyses of these proposals are therefore essential to determine the extent to which they produce effective and cost efficient outcomes.

The purpose of this quantitative study was to assess the effectiveness and economic efficiency of community college-based transfer advising programs. The primary research question was: *What effect, if any, does student participation in community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system?*

Background and Significance of the Problem

Researchers in the field of higher education policy warn that emerging challenges to the system of higher education in California have the potential to

significantly degrade the state's economic wellbeing: Changes in the California economy will increasingly require a workforce with a college education. In fact, several researchers estimated that the number of Californians earning a college degree must increase by as much as 50% in order to remain competitive through 2025 (Baldassare & Hanak, 2005; Johnson & Reed, 2007; Little Hoover Commission, 2000; Shulock et al., 2005; Shulock et al., 2008). However, California has ranked among the lowest of all states on many measures of student success in higher education, including degree completion rates (National Center for Public Policy and Higher Education, 2006; Sengupta & Jepsen, 2006; Moore et al., 2007; Shulock et al., 2008). This situation is forecasted to worsen as the state's demographics shift towards populations with historically lower levels of educational participation and attainment (Baldassare & Hanak; Shulock et al., 2005; Shulock et al., 2008). Absent significant changes in California's higher education policy and practices, the state is likely to "…be left with an under-educated population and an under-prepared workforce" (Shulock, et al., 2005, p. iv).

The function of transfer from the CCC system must be an integral part of any solution to this problem; because of the large volume of transfer students the system generates (Association of California Community College Administrators [ACCCA], 2006; Perry, 2007, 2008; Shulock et al., 2005). Over 66,500 CCC students transferred to the UC and CSU systems in 2004-05 (Community College League of California, 2006b), representing about one-third to one-half of all junior class students at these institutions. Over 30,000 additional students

transferred to private institutions in the same year (Perry, 2007). About one-third of all UC and two-thirds of all CSU graduates began their higher education at a CCC (Community College League of California, 2007). In fact, between 2002 and 2005 almost 70% of all graduates of California's three higher education systems were CCC graduates or CCC transfer students (Shulock et al., 2005).

Research into possible scenarios under which California policymakers might address the growing need for college graduates indicates that any solution to this problem must include policy and program changes as well as funding increases. For example, Shulock et al. (2005) found that an approximate 26% increase in higher education funding would be required to simply accommodate the increase in college enrollment leading to the graduation rates needed by California's economy through 2025. This figure would increase to 62% if the CCC system were funded at the level of the national average (Shulock et al., 2005), or higher if the CCC system were funded at the actual cost required to deliver high-quality instruction in all CCC mission areas (CCCCO, 2003). Given the size of the state's overall budget and the share allocated to higher education, Shulock et al. (2005) asserted that an increase in funding of this magnitude is very unlikely to occur. However, the researchers argued that policies and programs that improve the effectiveness and efficiency of California's higher education system have the potential to increase graduation rates without a concurrent increase in cost. These "…*systemic* efficiencies would require improving the efficient flow of students from high school through college such that the average number of units

taken by a student, throughout his or her college years, would decline…" (Shulock et al., 2005, p. vi).

Transfer has perhaps the greatest potential to provide these kinds of systemic efficiencies, particularly in terms of the total cost to state taxpayers per university degree earned. CCC campuses offer many of the same courses that CSU and UC campuses do, yet CCC courses cost students and taxpayers significantly less. In 2001-02, for example, the state funded the UC system at $22,634 per full-time student, the CSU system at $10,191 per full-time student, and the CCC system $4,560 per full-time student (Murphy, 2004). By comparing the differences in these funding levels over a 60-unit transfer curriculum, it can be seen that a student who completed 2 years of university coursework at a CCC instead of a CSU in 2002 saved the state over $11,000 while a UC-bound transfer student saved the state over $36,000.

The California legislature and interested stakeholder groups have been concerned about low transfer rates among CCC students since at least the early 1980s. The problem was first recognized as a significant overall decline in transfers from CCCs to CSU and UC campuses during the 1970s and early 1980s. To illustrate, by combining data from the CSU system, the California Postsecondary Education Commission, and the National Center for Educational Statistics, Turk (1996) found that between 1972-73 and 1984-85, transfers from CCCs to CSU campuses declined by 15.5% and to UC campuses by 26.6%.

> Yet, during approximately the same timespan [*sic*], the state's population continued to grow, and total enrollments at the two university systems

> continued to increase, as did the population age-range most likely to attend college (18-29 years). In fact, the Community Colleges themselves experienced the largest percentage growth among the three postsecondary systems in that time period. So, while the general population, the population age category most likely to become community college enrollees, and even the actual community college enrollments were increasing, the number and proportion of community college transfers to the UC and CSU systems experienced a serious decline. Potential students were in the Community Colleges, but they were not transferring. (Turk, pp. 3-4)

Transfer rates continued to be a concern of the CCC system and other stakeholders in California higher education in the following decades. For example, in 2000 the CCC Chancellor's Office reported the results of a preliminary study of transfer rates among California's community colleges, which included a list of institutions exhibiting low transfer rates. Subsequently, this list was reported in the news media, generating concern, discussion, and criticism among transfer stakeholders and the general public (Weiss, 2000). Administrators at districts, colleges, and the CCC system have tracked their year-to-year transfer numbers and rates with the goal of improving their program offerings and transfer services or as a way to promote the college's success as a transfer institution to potential students. In addition, both researchers and practitioners in the field of California higher education policy have regularly published reports describing the problem of low transfer rates, the potential

causes, and possible solutions (ASCCC, 2003; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; California Educational Round Table Intersegmental Coordinating Committee, 2004; Hill, 2006; ICAS, 2005; Shulock & Moore, 2003, 2004, 2007; Turk, 1996; University of California, 2005).

The related issue regarding the efficient use of transfer coursework emerged in the early 2000s as an area of concern to researchers, practitioners, and policymakers (Hill, 2006; Shulock et al., 2005; see also University of California, 2005). In large part, this was prompted by the large upswing in the number of students seeking enrollment to California's university systems; an estimated increase of 28% between 2000 and 2010 (Shulock & Moore, 2003). This increased demand was attributed to the new generation of baby boomer children who began reaching college age during this time period (Piland, 2004). One result of this demographic shift was a large number of students seeking to transfer from community colleges (Perry, 2007, 2008), with a corresponding decline in the receiving capacity of many university programs (Shulock & Moore, 2003, 2004; see also Perry, 2007, 2008). As more and more students demanded access to universities, more and more of these institutions became *impacted* with more qualified applicants than the institution had the capacity to enroll (California State University, 2004). In response, universities, policymakers, and researchers began to more closely examine the transfer pipeline process, and capacity of receiving institutions (Shulock & Moore, 2003). One aspect of this examination was a focus on the course-taking behavior of transfer students and the

realization that many students completed excessive units or unnecessary coursework prior to transfer. These behaviors increased the time and units needed to complete the bachelor's degree after transfer, and therefore both increased the cost to taxpayers and exacerbated the overcrowding already present in California public universities (Hill, 2006; Palmer et al., 1994; Shulock et al., 2005; University of California, 2005).

The problem of unnecessary coursework taken prior to transfer is believed to be caused primarily by matters related to curriculum and course advising: students often change educational or career goals; they complete requirements for multiple destinations in case they are not admitted to their preferred campus; they incorrectly assume the requirements for an associate degree are identical to the requirements to transfer; they have excessive remedial or prerequisite work to complete before entering their transfer courses; or they receive incorrect, incomplete, or no transfer course advising. Paralleling these causes, some of the proposed solutions have included improved community college counseling and advising services and increased standardization and simplification of transfer coursework requirements among public universities (California Educational Round Table Intersegmental Coordinating Committee, 2004; California State University, 2006; Hill, 2006; University of California, 2005).

This dissertation research study contributes to the body of knowledge described above by testing the theory that improved community college advising programs can both significantly improve transfer rates and decrease the aggregate amount of unnecessary coursework taken prior to transfer. If true,

these outcomes would have significant economic implications for individual community college students, colleges and universities, and public administrators and policymakers:

In 2004, CCC courses cost the student $26 per unit, which were the lowest fees in the nation for any institution of higher education. By comparison, in 2004 students at the CSU system paid approximately $85 per unit and students at the UC system paid approximately $154 per unit (Murphy, 2004). On a national level, "…in 2000–01, [CCC fees] represented less than one-half the cost of community college tuition in New Mexico ($866 per year)—the state that ranks 49th in the country—and less than one-quarter of the national average ($1,359 per year)" (Murphy, 2004, p. 66). Students can therefore save thousands of dollars by completing the first 2 years of their baccalaureate degree work at a community college. However, this cost savings will only be realized if students both successfully transfer and complete required university coursework before doing so. Effective and efficient transfer advising programs are therefore valuable in assisting students to attain their transfer-related educational goals in the most economical way possible.

For faculty and staff at colleges and universities, successful transfer programs are an important means of fulfilling institutional missions and goals. For example, transfer is a primary mission of the CCC system (ASCCC, 1996; Commission for the Review of the Master Plan for Higher Education, 1986; Liaison Committee of the State Board of Education and The Regents of the University of California, 1960), and one in which CCCs have been evaluated

regularly (CCCCO, 2002, 2003; Perry, 2007, 2008; Shulock & Moore, 2002, 2004, 2007). For university personnel, a successful transfer process ensures the continuing inflow of a significant source of new students (Perry, 2007, 2008; Shulock & Moore, 2003), and may allow the concentration of institutional resources on upper-division and graduate level studies, instead of lower-division courses that students can complete at community college.

For public administrators and policymakers, this topic is significant from both social and economic standpoints. Effective transfer programs provide access to a bachelor degree for those who are educationally, economically, or socially disadvantaged and others who would not otherwise be able to attend college. The benefits of higher college graduation rates include improvements in health and quality of life (Kegley & Kennedy, 2002), increased participation in voting and other civic duties (Dee, 2003), and significant individual and statewide economic benefits that accrue from a better-educated workforce (Marcotte, 2006; Moore et al., 2007; Shulock & Moore, 2005; Shulock et al., 2005; SDCCD, 2004). Transfer also has the potential to be an excellent financial investment for the state. As described above, in 2002 each successful transfer student who efficiently completed all lower division university requirements at the CCC system theoretically saved state taxpayers between $11,000 and $36,000. The potential exists, therefore, to save thousands of taxpayer dollars by establishing transfer advising programs that promote the completion of a significant portion of the baccalaureate degree at the lower-funded CCC system. Public investment in such programs, however, only makes sense if the programs are both effective at

facilitating the completion of the baccalaureate degree and economically efficient for taxpayers. This last point is particularly important, as public administrators and policymakers are under increasing pressure to tie the expenditure of public funds to measurable, effective, and cost efficient outcomes (Behn, 2003; Burke & Modarresi, 1999; Burke, 2002; Davies, 2006; Dunn, 2004; NCAHE, 2005; Shulock & Moore, 2005; Thompson & Riggs, 2000).

Research Questions

The primary research question addressed in this quantitative study is: *What effect, if any, does student participation in community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system?* To answer this question, the outcomes of a transfer advising program administered at a CCC campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between students who participated in the transfer advising program and students who did not. The population target frame consisted of potential transfer students who attended a CCC campus. The data was drawn from existing student records, including transfer program administration records and student transcripts. In order to address the primary research question, the following three subordinate research questions were answered:

Research Question 1: What is the difference, if any, in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not?

Research Question 2: What is the difference, if any, in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not?

Research Question 3: What is the difference, if any, in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not?

Brief Review of Related Literature

Three general themes have appeared in the literature related to the topic of transfer in postsecondary education. These are: higher education transfer policy and programs; the transfer process and programs; and transfer effectiveness and efficiency.

Researchers studying transfer policy have focused on the role transfer plays in the context of higher education, its importance to the broader field of public education policy, and the trends and challenges in higher education policy. Several authors have documented the history and missions of community colleges, the evolution of the transfer function on a national level, and the similarities and differences among contemporary state-level transfer policies. Literature in this area includes Brossman and Roberts' (1973) work on the history and evolution of community colleges; Bailey and Morest's (2004) evaluation of the multiple missions of community colleges, Wellman's (2002) descriptions of

the differences among state-level transfer policies; Hungar and Lieberman's (2001) case studies of transfer policies and their effects in several different states; and Gutierrez's (2004) survey of contemporary state articulation policies. The history, role, and purpose of transfer in California as well as important stakeholders in California's higher education policy have been described by the ASCCC (1996), Turk (1996), the California Postsecondary Education Commission (2002), and Hill (2006).

Several researchers have also studied the challenges facing California's systems of higher education. Much of the literature in this area focused on the growing need for college graduates in California's changing economy and the increasing challenges to producing those graduates (Baldassare & Hanak, 2005; National Center for Public Policy and Higher Education, 2006; Sengupta & Jepsen, 2006; Moore et al., 2007; Shulock et al., 2008). Researchers have also studied specific challenges facing the CCC system, particularly in light of its critical role in educating large numbers of California college students (Little Hoover Commission, 2000; Shulock et al., 2008). These issues included low overall levels of funding, state policies that create barriers to student success, an increase in the number and mobility of transfer students, and a reduction in the capacity of universities to accommodate the influx of transfer students. Murphy (2004) researched the comparatively large and growing differences between CCC funding levels and those of other systems, including community colleges in other states; the California K-12 system; and the UC and CSU systems. Shulock and Moore (2007a; 2007b), Shulock et al. (2008), Hilmer and Leyden (1998), and

others studied various state education policies that may create systemic barriers to student success, including those related to funding policies, optimal enrollment levels, restrictions on college expenditures, and student fees and financial aid. Perry (2007) and others measured the large increase in college enrollment, projected to peak around 2010. At the same time, several researchers found an increasing number of transfer students with complex academic histories that complicate the transfer process (Horn & Lew, 2007b; Lauren, 2004; Peter & Cataldi, 2005; Townsend, 2001). Additional restrictions in transfer have been caused by the increasing requirements and decreasing capacities of many university programs, as documented by Shulock and Moore (2003) and Sullivan, Dyer & Franklin (2004). Researchers in this field have proposed several policy and program solutions to increase the number of California college graduates in light of the challenges posed by funding, policy, and capacity issues. These have included proposals related to funding levels and policies (Shulock & Moore, 2007b; Shulock et al., 2005; Shulock et al., 2008) and proposals related to academic and student support programs (Bailey et al., 2007; Moore et al., 2007; Shulock et al., 2008).

The growing emphasis by the general public and lawmakers on accountability measures in public higher education has been studied by several researchers (Burke, 2002; Burke & Modarresi, 1999; Hudgins & Mahaffey, 1998; Little Hoover Commission, 2000; NCAHE, 2005; Rubenstein, Schwartz, & Stiefel, 2003; Rubin, 2003; Stillman, 1996). By 2005, accountability systems for public education were being implemented in nearly every state (Shulock & Moore,

2005). Behn (2003) summarized research in this area by describing the specific purposes for public performance measurement. Bowen (1980), Bothe (2001), Burke, and Thompson and Riggs (2000) are among a variety of researchers who have studied the relationships between institutional characteristics such as funding levels, bureaucracy, or institutional expenditures, and the dependent variable of performance outcomes. For example, Bowen (1980) found a modest relationship between the independent variable of overall institutional cost per unit and the dependent variable of *value added* in student performance. As another example, Burke (2002) surveyed the prevalence of outcome accountability and performance-based funding and budgeting in public higher education. Among other things, Burke (2002) found that transfer rates were the second most common performance indicators used by states. Researchers have also described the public demand for increased effectiveness and efficiency in the use of public resources and have proposed a number of policy and program changes designed to increase institutional and systemic efficiencies (Behn, 2003; Burke, 2002; Burke & Modarresi; Council for Aid to Education, 1997; Davies, 2006; Dunn, 2004; Gill & Leigh, 2004; Shulock & Moore, 2005; Shulock et al., 2005).

A second major theme that researchers have studied is the transfer process and programs designed to facilitate it. For example, the California Intersegmental Articulation Council (CIAC, 2006) described the categories, process, and benefits of course articulation as a means to facilitate the transfer process. In addition, several researchers have studied the public benefits that accrue from an effective transfer process, including increased participation in

civic life (Dee, 2003) and local and statewide economic benefits (Moore et al., 2007; Shulock & Moore, 2005; Shulock et al., 2005; SDCCD, 2004).

Researchers have also studied and described a wide variety of transfer-related programs and services available to community college students, including course articulation reference tools, transfer centers, counseling services, online transfer advising tools, and special programs for underrepresented populations (ASCCC, 2003; California Education Round Table Intersegmental Coordinating Committee, 2004; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; CIAC, 2006; ICAS, 2005). The history, mission, and functions of transfer centers on CCC campuses has been described by several researchers (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; Farland & Anderson, 1989; Turk, 1996), as has the components of transfer advising programs, such as the Transfer Studies Degree Agreement (TSDA) program that is the subject of this proposed dissertation (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; CIAC, 2006; ICAS, 2005).

Finally, a third theme studied by researchers pertained to the effectiveness and efficiency of the transfer process. Transfer effectiveness has been studied by many researchers, both in terms of the annual volume of transfers (Perry, 2007; Shulock & Moore, 2003, 2004; see also Farland & Anderson, 1989) and, more broadly, by use of a transfer rate comparing the number of students who successfully transfer in a given cohort with the number

of potential transfer students from the same group (Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et al., 2003). Several researchers have also studied the most accurate way to define and measure transfer rates (Berman, Curry, Nelson, & Weiler, 1990; Bradburn et al., 2001; Cohen, 1999, 2005; Horn & Lew, 2007a; Prather, 2002). Researchers studying the factors that influence transfer effectiveness have generally examined the relationships between various independent variables and the dependent variable of transfer rate as a measure of the effectiveness of the transfer process. For example, Bahr, Hom, & Perry (2003, 2005) used a multiple regression technique to study the relationships between independent variables present at 108 California community colleges and the dependent variable of transfer rate. The researchers identified several independent variables that had statistically significant effects on transfer rates, including the academic preparedness of incoming students; proximity of the college to the nearest CSU campus; age of incoming students; local per-capita income; and local unemployment rate. Other researchers have analyzed transfer effectiveness using the concept of student flow patterns, which is the movement of students between and among two-year and four-year institutions (Lauren, 2004; Townsend, 2002). The designs of these studies have included the effects of capacity restraints at the receiving institution on student flow from community college to university (Shulock & Moore, 2003); the average number of units completed prior to transfer (Palmer et al., 1994); and the average time to degree after transfer (University of California, 2005).

Research on transfer efficiency is less prominent in the literature than research on transfer effectiveness, although the topic has been cited by several researchers as an area of growing concern (Hill, 2006; Shulock et al., 2005; see also University of California, 2005). Most research regarding efficiencies in higher education has focused on those cost efficiencies realized by colleges and universities as independent entities, rather than the broader systemic efficiencies realized by an intersegmental process such as transfer (Shulock et al., 2005). For example, Robst (2000), Bowen (1980), Kinsella (2003), Mensah and Werner (2003), and others studied the relationship between institutional efficiencies in individual higher education institutions and a variety of independent variables thought to influence efficiency. Some research related to systemic efficiencies, and particularly related to the efficiency of the transfer process, has also been conducted (Florida State Legislature, 2002; Hoachlander et al., 2003; Palmer et al., 1994; University of California, 2005). One example of research in this area was conducted by the University of California (2005). The researchers found that many transfer students believed they did not take all the appropriate courses prior to transfer, took many unnecessary courses, or otherwise did not complete their transfer coursework in the most efficient manner possible. These results suggest low levels of transfer course efficiency among students who otherwise demonstrated high levels of transfer effectiveness (that is, students who did, in fact, successfully transfer).

Researchers who conducted the studies cited above measured transfer efficiencies in terms of student course-taking behavior. That is, the authors of

these studies examined the number of units or the amount of time students took to transfer or complete the bachelor's degree. While excessive units or time to degree unquestionably represent additional costs to taxpayers, such measures do not explicitly include an actual estimation of that cost in terms of a monetary value. Some researchers have included the construct of costs in studies related to the transfer process (Shulock, 2008; Shulock & Moore, 2004, 2007; Shulock et al., 2005; Turk, 1996). However, they did not examine specific transfer programs from the standpoint of relative economic costs and benefits; an analysis that would be most useful to public administrators and policymakers who must choose between various program and policy alternatives based on criteria related to measurable, effective, and cost efficient outcomes. This suggests the need for additional research that examines transfer programs from an economic perspective.

Definition of Terms

Transfer: The process of students moving from one institution of higher education to another with the intention of applying previously completed coursework to degree requirements at their new institution. In California's public higher education system, transfer refers to students moving from the CCC system to CSU or UC systems (Liaison Committee of the State Board of Education and The Regents of the University of California, 1960).

Transfer rate: A ratio representing the number of students who successfully transfer out of the number who demonstrate the intent to do. A commonly-used measure of transfer effectiveness, a transfer rate is calculated

by dividing the total number of students who successfully transfer in a given cohort with the number of potential transfer students from the same group, aggregated over a specific time period. There are many ways to define what a potential transfer student is, including full-time or part-time status, stated educational goal, or course-taking behavior (Bradburn et al., 2001).

Transfer advising program: A coherent set of services offered to potential transfer students that are intended to assist them in successfully moving from community college to university. These services most often include some form of advice or direction provided by college staff regarding the "…selection of courses required for university admission, general education options, and major preparation" (California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006, p. 10).

California's public higher education system: The three publicly-funded systems of higher education in California: the University of California (UC), California State University (CSU), and California Community College (CCC) systems. These three organizations are referred to herein as comprising a *system* because they have shared responsibility for and complementary roles in the transfer process (Liaison Committee of the State Board of Education and The Regents of the University of California, 1960; see also Council for Higher Education Accreditation, 2000; Douglass & Greenspan, 2005; Hill, 2006).

Highlights and Limitations of Methodology

The purpose of the quantitative study was to address the question: *What effect, if any, does student participation in community college-based transfer*

advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system? To answer this question, the outcomes of a transfer advising program administered at a CCC campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between students who participated in the transfer advising program and students who did not. The population target frame consisted of potential transfer students who attended a CCC campus. The data was drawn from existing student records, including transfer program administration records and student transcripts.

The nonequivalent control group research design was selected for several reasons: It provided a means for statistically analyzing relationships between the variables in order to determine significant differences and correlations that may suggest causality. Unlike one-group designs, it could be used to demonstrate the effects of an independent variable (Cozby, 2004). Furthermore, it could be readily used with transfer data, which do not have pre-test components. In addition, this approach met the criteria listed by Trochim and Donnelly (2007) for good research design: It was theory-grounded, in that it was designed to test the theory that transfer advising affects transfer outcomes; it was situational, in that it measured data as they occur in the natural setting (as opposed to a laboratory); it was feasible, as the data to be used was obtainable in the research setting, and; it was flexible, in that it measured several related variables.

There were also several disadvantages to the proposed research design. First, due to the nature of the phenomena being studied – a voluntary transfer advising program administered in a natural college setting – the study lacked a true experimental control group. This opened the possibility of a confounding variable due to nonrandom selection differences between the control group and the experimental group (Cozby, 2004). Second, the absence of a true experimental control group meant the study could not demonstrate actual causality (Trochim and Donnelly, 2007). Third, the use of archival research techniques in analyzing a data set consisting of historical student records limited the study to an examination of only those kinds of data that have already been collected; the researcher was unable to gather additional new data on the subject group.

The proposed research methodology was assessed as having high reliability and relatively high internal validity. The data to be used in the study was derived from official college, university, and state records. They were therefore likely to have a very low measurement error and a corresponding high level of reliability. For example, measurement errors in the coding of student grade information (such as typos) were likely to be noticed and corrected by the students themselves, who had high interest in ensuring that their transcripts accurately reflect the grades they earned in their classes. The design of this study was also intended to maximize the construct and internal validity of the variables measured. For example, the construct of transfer effectiveness referred to how well a program actually assists students in gaining admission to a

university. University admission rates are undoubtedly the most accurate means to measure that construct (although alternative measurements of this construct have been used by other researchers, including measures of *transfer prepared* and *transfer ready* students, CCCCO, 2003a). This study was also designed to maximize internal validity; "…the ability to draw conclusions about causal relationships from…data" (Cozby, 2004, p. 87): The researcher examined two groups of students drawn from the same population – one group that participated in a transfer advising program and one group that that did not. This program was expressly intended to increase transfer effectiveness and transfer course efficiency (therefore demonstrating a logical connection between independent and dependent variables), and it occurred temporally before the intended effects.

The proposed study was also assessed at having only moderate external validity. The variables being measured (such as participation in transfer advising programs, university admission rates, etc.) do exist in other settings, such as other community colleges. However, the general population of students and the specific procedures of each advising program may be different. For example, the general population of students at the college that provided the setting for the study was somewhat older, more ethnically diverse, and of a lower economic status than the student bodies at many other community colleges (CCCCO, 2002; Wassmer et al. 2003). These characteristics may constitute confounding variables that could have affected the results of the study and its ability to be generalized to other colleges and programs.

Summary and Conclusions

The problem of low transfer rates and the related problem of unnecessary coursework taken prior to transfer have been issues of growing concern to policymakers, in large part because they create significant additional costs to the taxpayers funding California's higher education system. Researchers studying these phenomena and practitioners working in this field have cited transfer advising programs as a potential solution to these problems. Researchers studying the effectiveness of such programs have usually approached the topic from the *macro-view* of aggregate transfer rates at the state, district, or college level. Such designs, while helpful at describing the extent and conditions of the problem statewide, are often of limited value to the policymaker or practitioner, who must make decisions about specific programmatic alternatives which may affect only a subset of students in a particular college or district.

More importantly, relatively few researchers studying transfer have taken economic factors into effect. Specifically, transfer has been cited in the literature as promoting efficiency in higher education because it costs less for students to complete the first 2 years of university work at a community college. However, efficiency in public programs is correctly defined as "…the relationship between effectiveness and effort, with the latter often measured in terms of monetary costs" (Dunn, 2004, p. 224). While it may cost significantly less to complete 2 years of study at community college prior to starting at university, this will only equate to an economically efficient policy alternative if the education received at

community college actually prepares a student to commence upper-division university coursework.

This study contributes to the existing body of transfer-related research by examining the effects of a transfer advising program on variables related to effectiveness and economic efficiency. The study is expected to be of particular value to policymakers and practitioners in the field, because the results can help to inform future decisions regarding the allocation of public funds to other transfer advising programs. In addition, the study is expected to contribute to and build on the existing body of transfer research by incorporating the concept of economic cost in the measurement of transfer constructs and by utilizing a research methodology that maximizes reliability and validity.

CHAPTER 2: REVIEW OF LITERATURE

Three general themes have appeared in the literature related to the topic of transfer in postsecondary education. These are: higher education transfer policy and programs; the transfer process and programs; and transfer effectiveness and efficiency. Researchers studying transfer policy have focused on the role transfer plays in the context of higher education, its importance to the broader field of public education policy, and the trends and challenges in higher education policy. Researchers studying the transfer process and programs designed to facilitate it have conducted research related to the transfer process; the historical development of transfer; the public benefits that accrue from an effective transfer process; and a variety of transfer-related programs and services available to community college students. Researchers studying transfer effectiveness have used the constructs of transfer volume to examine the flow of students through the transfer process and the construct of transfer rate to assess the percentage of students who successfully transfer. Studies of transfer efficiency are less prominent in the literature than studies of transfer effectiveness, although the topic has been cited by several researchers as an area of growing concern. Researchers that have studied this area report that relatively low levels of transfer course efficiency exist among students who otherwise demonstrated high levels of transfer effectiveness (that is, students who did in fact successfully transfer).

California Higher Education Transfer Policy and Stakeholders

Modern higher education policy in California was founded in large part on California's Master Plan for Higher Education, which was first codified in public law by the Donahoe Act of 1960 (Douglass & Greenspan, 2005). The plan promised that public higher education would be available for any Californian who wanted to pursue it.

> According to the Master Plan, UC institutions enroll the top 12 percent of high school graduating classes, CSUs the top 33 percent and the CCCs all high school graduates and non-graduates past a certain age. This system became the envy of the higher education establishment across the country. (Piland, 2004, p. 22)

The plan also outlined the relationships and missions of the UC, CSU, and CCC systems and formally recognized the role of CCCs in transfer preparation (ICAS, 2005; Liaison Committee of the State Board of Education and The Regents of the University of California, 1960; Trounson, 2006).

California's community colleges comprise the largest system of higher education in the world, educating over 1.6 million students (Piland, 2004). In fact, 1 out of every 10 college students in the United States is a CCC student (C. Carroll, personal communication, January 12, 2005). Nationwide, 45% of all first-time college students attend a community college (Spence, 2002). Community colleges fulfill a wide array of educational missions, including transfer preparation, vocational training, two-year academic education, workforce training, continuing education, and remedial education (Bailey & Morest, 2004; Brossman

& Roberts, 1973; Gill & Leigh, 2004; Jacobs, 2001; Harada, 1994; Schuyler, 1999; Wechsler, 1989). Community college funding and governance systems evolved over the last century as a hybrid of the K-12 and university systems. In California, this process resulted in a set of 72 semi-autonomous quasi-governmental CCC districts overseeing 109 independent colleges.

California public policy and funding efforts have primarily focused on those students who transfer from CCCs to the UC or CSU systems (although many CCC students also transfer to private or out-of-state institutions, CIAC, 2006; Handel, 2006). Transfer between California's three higher education systems is more complicated that it may appear. In 2006 there were 109 CCC campuses, 10 UC campuses, and 23 CSU campuses (Community College League of California, 2006b), resulting in 3,597 potential pairs of CCC sending and UC or CSU receiving institutions. Each of these institutions had its own individual curriculum, composed of a unique set of majors, general education courses, and graduation requirements. In fact, when one takes into account the fact that a student's transfer coursework is dependent on both the university and the individual major the student intends to pursue, there were literally tens of thousands of transfer curricula, each unique to a particular combination of CCC, university, and major. In addition, each system (and sometimes each university) had its own set of admissions criteria and procedures, further complicating the transfer process (CIAC, 2006).

Counselors and other faculty at community colleges have traditionally been responsible for the bulk of transfer counseling, advising, and preparation.

However, the community colleges as a whole have been significantly under-funded, by almost any measure (Breneman & Nelson, 1980; CCCCO, 2003b; Murphy, 2004). In 2002, they were funded in the bottom 10% of all U.S. community college systems. Within California, community colleges received less than one-fourth the funding per full-time student than the UC system, less than one-half the funding per full-time student than the CSU system, and about two-thirds the funding per full-time student than the K-12 system (Murphy, 2004). One of the results of low CCC system funding was that counseling and advising services, such as those related to transfer preparation, often were not sufficient to serve all students. For example, because of funding constraints the relative numbers of CCC counselors diminished over the years so that in 2005 there was an average of one counselor to every 1,900 students – a far cry from the recommended 350:1 ratio (ICAS, 2005). Despite these formidable challenges, over 66,500 students transferred from CCC campuses to the UC and CSU systems in 2004-2005 (Community College League of California, 2006b), representing about one-third to one-half of all junior class students at these institutions. This made the CCC system and particularly the transfer component of its mission a very significant participant in the California higher education system as a whole.

Because California's transfer policy included the involvement of all three systems of higher education in the state, it attracted a wide variety of interested public groups. Key stakeholders that have routinely provided input to state transfer policy include student groups, system offices, individual campuses and

districts, intersegmental coordinating bodies, faculty associations, and special interest groups (California Postsecondary Education Commission, 2002; Shulock & Moore, 2005; Turk, 1995).

Typically, it has been community college students (as opposed to university students) who are most interested and involved in transfer policy, a fact that makes sense when one considers that university students have either already transferred or were never transfer students at all. CCC students have often been involved in public discussion of transfer issues, particularly in cases regarding restricted access to educational programs. CCC student government groups also have had formal representation at the CCC system office's Board of Governors through a consultation process on policy issues (CCCCO, 2004).

The UC, CSU, and CCC systems have each maintained a system office devoted to state-level planning, budgeting, policy implementation, accountability monitoring, and other centralized functions. The system offices have functioned as the primary link between the colleges and the legislative and executive branches of state government, and have often had direct input (or have even served as the initiators of) state transfer policy. Each system office, however, has had a somewhat different level of authority and autonomy. For example, by California's state constitution, the UC system was exempt from most state education legislation. Legislators, therefore, have often mandated policies or programs for the CSU and CCC systems, but only recommended them to the UC system. As another example, the CCC system was structured as a set of 72 different community college districts, each its own autonomous special-purpose

government with an independent board elected by local vote (CCCCO, 2004). Compared to the other systems, therefore, staff at the CCC system office have had somewhat limited authority over the individual districts and campuses.

In addition to providing input through their system offices, administrators at individual college and university campuses and districts have often independently opposed, supported, or otherwise influenced transfer policy. One way that administrators have accomplished this is through implementation of policy decisions. For example, an administrator at a university campus that has been mandated to accept all qualified students in its local service area might do so, but require that the students complete remedial instruction at a community college prior to actually taking classes at the university (San Diego State University, 2005). Alternatively, an administrator at an individual UC campus may simply refuse to participate in a transfer program made mandatory for the other two systems. Another way that administrators at individual campuses or districts have affected transfer policy making is by communicating directly with the state legislature or executive branch. For example, in 2005 board members and administrators at several low-funded community college districts formed an independent coalition in order to directly lobby the governor and key legislators to provide more equitable funding among CCC districts (Carroll, 2005). Chief executive officers of colleges or districts have also routinely invited state legislators or other influential policymakers to visit their campuses, meet with them on matters of education policy, or communicate with their legislative staffs.

Several organizations devoted to intersegmental coordination and cooperation have been established in California. These include ICAS, the California Education Round Table Intersegmental Coordinating Committee (ICC); and the California Postsecondary Education Commission (CIAC, 2006). Members of these coordinating bodies have produced formal recommendations and other input on transfer policy to decision makers. For example, between 2003 and 2005, members of both ICAS and ICC produced comprehensive reviews of transfer policy that included descriptions of problem issues and policy recommendations (California Education Round Table Intersegmental Coordinating Committee, 2004; ICAS, 2005).

The members of official faculty associations have also often participated in discussions related to transfer policy. Such associations are generally of two types: First, each education system has its own academic senate composed of faculty representatives from each college or university campus. These faculty senates have created committees devoted to particular issue areas, including transfer, and occasionally the senates have issued resolutions, studies, or other forms of input into the transfer public policy process. The second type of faculty associations consist of professional associations or other groups formed to promote and coordinate a specific transfer-related function, such as CIAC.

Finally, California has some special interest groups that were formed for the express purpose of influencing transfer policy or have been interested in it as one of their ongoing areas of concern. For example, the Campaign for College Opportunity was formed as a grass-roots organization of private citizens,

educators, and businesspeople for the express purpose of supporting access to transfer programs and other missions of the CCC system (Piland, 2004). Another example is the Community College League – a nonprofit organization whose members have conducted education, policy analysis, and advocacy for California Community College programs and services, including those that support transfer (Community College League of California, 2006a).

Members of the stakeholder groups described above have often framed discussion of California's higher education policy in reference to the values of *access* and *success* (Moore et al., 2007; Shulock & Moore, 2005; Shulock et al., 2008). In fact, the California Master Plan for Higher Education and subsequent legislation defined these values as the most important to California's transfer policy (Douglass & Greenspan, 2005; Trounson, 2006). Access is perhaps the most fundamental value enumerated in the Master Plan, in that the plan promised all Californians the opportunity to pursue higher education. In Dunn's (2004) schema of value criteria, access is an expression of *equity* – a value associated with the fair or equitable distribution of public goods or services. CCCs support the value of access by providing open enrollment to any adult Californian (Piland, 2004). Transfer supports the value of access by providing the opportunity of an alternate pathway to a baccalaureate degree for every Californian who wants to pursue it, regardless of prior academic achievement or ability.

The value of success in California higher education policy refers to a variety of student outcomes related to the missions of the higher education

systems. Examples include completion rates for associate degrees and certificates, persistence in completing coursework, and transfer rates (Ashburn, 2007; Shulock & Moore, 2007b; Moore et al., 2007).

> The research literature points to several factors that affect student success in community colleges, including factors related to 1) the students themselves and what characteristics they bring with them to college, 2) the course-taking and enrollment patterns students follow while attending college, and 3) the policies and practices of colleges. (Moore et al., 2007, p. vi)

For example, in a national study on the propensity for low-income youth to enter and succeed in college, Bedsworth, Colby, & Doctor (2006) found that academic preparation, particularly high school graduation, had the greatest impact on college enrollment and success. This result demonstrates how student pre-college characteristics can affect college success. As another example, Ashburn (2007) found that students' enrollment in remedial math and English had an effect on overall success rates, demonstrating how course-taking behavior in this area is associated with success.

Historically, the most fundamental higher education policy decisions pertaining to the CCC system have been intended to promote access (Little Hoover Commission, 2000; Shulock & Moore, 2004; 2007b). However, those policies have sometimes been at cross-purposes with the value of success (Associated Press, 2007; Shulock, 2008; Shulock & Moore, 2007b; Shulock et al., 2008). For example, according to Shulock et al. (2008),

> … [CCC] funding policies create pressures to enroll students until the official count occurs in the third week but give no financial incentive to improve outcomes such as persistence, course completion, acquisition of basic skills proficiency, degree completion, or student learning. This encourages colleges to maximize funding by taking actions not in the best interest of student success, such as allowing late registration and minimizing use of course prerequisites. (p. 13)

While the value of access has been considered of vital importance to most California higher education stakeholders (Clark, Walton, & Snowhite, 2003; Piland, 2004; Shulock & Moore, 2007a), there has also been increasing recognition of the need for policies and programs that promote student success, particularly in light of the need for more college graduates in an environment of lower funding and diminished capacity in colleges and universities (Baldassare & Hanak, 2005; Council for Aid to Education, 1997; Johnson & Reed, 2007; Hebel, 2007 Moore et al., 2007; Shulock, 2008; Shulock et al., 2008).

Current Challenges in Higher Education and Transfer

Researchers in the field of higher education policy warn that emerging challenges to the system of higher education in California have the potential to significantly degrade the state's economic wellbeing: Between 2005 and 2025, California's higher education system must generate approximately three college graduates for every two that graduated in the previous decade in order to remain economically competitive. However, the state's younger workers have been less well educated than older workers, and this gap is expected to widen due to

California's shifting population demographics (Baldassare & Hanak, 2005; Shulock et al., 2008). Moreover, California ranks among the lowest of all states on many measures of student success in higher education, including college preparation levels, college enrollment rates, persistence, and degree completion (National Center for Public Policy and Higher Education, 2006; Sengupta & Jepsen, 2006; Moore et al., 2007; Shulock, 2008; Shulock et al., 2005). For example, in 2008 California ranked 47th in the nation for the number of baccalaureate degrees completed per 100 undergraduates and 48th in the nation in full-time college enrollment (Shulock, 2008). Researchers have forecasted that this situation will worsen as the state's demographics shift towards populations with historically lower levels of educational participation and attainment (Baldassare & Hanak, 2005; Shulock et al., 2005). Absent significant changes in California's higher education policy and practices, the state is likely to "…be left with an under-educated population and an under-prepared workforce" (Shulock et al., 2005, p. iv).

The CCC system must be an integral part of any effort to increase the number of college graduates, because historically the majority of California undergraduates enroll at CCC campuses (Little Hoover Commission, 2000; Shulock et al., 2008), including approximately one-third of all students who eventually graduate from the UC system and two-thirds of all students who eventually graduate from the CSU system (Community College League of California, 2007). Despite these facts, a number of significant challenges to the CCC system's mission of transfer and vocational preparation have emerged.

These issues include low overall levels of funding, state policies that create barriers to student success, an increase in the number and mobility of transfer students, and a reduction in the capacity of universities to accommodate the influx of transfer students.

Funding for CCCs originally developed out of the funding system for the K-12 system. The District Law of 1921 provided for the establishment of independent community college districts which would receive a grant from the state plus the same operational funding as high schools. In 1931, independent community college districts were authorized to levy property taxes in their districts in order to support their operations. These were very similar in structure and powers to K-12 districts. Total funding for community colleges still mirrored that of high schools and was provided by the combination of a fixed level of state support and local tax revenues that varied from district to district (Kim, 1994). In 1973, the average revenue per unit was specified for all CCCs, with the amount of state and local taxes varying as needed to provide for this amount. In 1975, a 5 percent cap was set on growth funding from the state, although districts retained the authority to raise local property taxes for additional revenue (CCCCO, 1999).

In 1978, Proposition 13 was approved in California, which limited the local property tax rate and essentially froze in place the amount of local tax funding that could be raised by community college districts.

Prior to the passage of Proposition 13, community colleges received about 55 percent of their revenues from local property taxes with the tax rate

> under local control, within limits. Since 1978, community colleges have been ‘state-funded’ with a portion of that support from the local property tax. The local share of support has been between 20 and 32 percent on a statewide basis. The local share is no longer set or controlled by local district boards of trustees. (CCCCO, 1999, p. 3)

As a result, since 1978 each community college district has received a different level of overall funding, a difference that can total several thousands of dollars per student, despite the fact that each district must educate all students who apply. In addition, since 1981 each district has been assigned a *growth cap*. This cap represents the amount of enrollment growth the state will fund for that year. Districts that experience enrollment increases beyond their cap are not funded for the additional students (CCCCO, 1999). Many CCCs have experienced growth beyond their cap, requiring administrators at those institutions to enroll students without funding, cut course offerings, or both. For example, from 2001 to 2003 faculty at CCCs taught the equivalent of 74,000 totally unfunded full-time students and “… ‘fill rates’ (the percentage of seats taken in a class) were running between 90 and 95 percent, making California community colleges the most efficient higher education institutions in the country from a classroom utilization perspective” (Piland, 2004, p. 23).

California’s financial support for all of its higher education systems has declined significantly since the passage of Proposition 13. “In 1971, 16.8 percent of the total state budget was allocated to the three segments of higher education, but by 2003, that allocation had declined to 11 percent” (Piland, 2004, p. 23). In

an effort to preserve funding for the K-12 and CCC systems, voters passed California's Proposition 98 in 1988. This measure amended the state constitution to guarantee that a certain percentage of total state revenue would be allocated to K-12 and community college education. Proposition 98 also specified that this funding would be split between the two segments each year, with approximately 89% of the funding going to the K-12 system and 11% to the CCC system. However, from 1992 to 1999 the California legislature suspended the Proposition 98 guarantee for community colleges (but not for the K-12 system) in almost every year, resulting in significantly lower funding levels than is required by the state constitution (CCCCO, 1999). In fact, between 1990 and 2000, the repeated suspensions of the Proposition 98 guarantee to CCCs under-funded the system by a cumulative total of $2.7 billion (Spence, 2002).

The decline of overall funding for higher education in California (Piland, 2004), coupled with the decline of funding for the CCC system (Murphy, 2004; Spence, 2002) has resulted in California's community colleges being funded among the lowest in the nation (Breneman & Nelson, 1980; CCCCO, 2003b; Murphy, 2004). In 1999-00, only the Arkansas, Tennessee, Nevada, and Virginia community college systems were funded at a lower rate than California's. In fact, the national average funding level for community colleges in that year was 23% higher than California's funding level (Murphy, 2004).

California Community Colleges are also funded at a much lower level than any other segment of California public education. In 2001-02, the UC system was funded at $22,634 per full-time student, the CSU system at $10,191 per full-time

student, and the CCC system at $4,560 per full-time student. CCCs were even, somewhat surprisingly, funded significantly less than the K-12 system, which received $6,291 per full-time student in 2001-02 (Murphy, 2004). “When state funds and student fee revenue are considered together, CSU has about 2.5 times the per-student funding as the CCC and UC has about 5 times the funding” (Moore et al., 2007, p. vi).

While the absolute level of funding among California’s public education systems is striking, the disparities may be explainable in terms of the differing missions and expectations among the systems. For example, the UC is expected to produce research in a wide number of highly technical and advanced fields of study, and this may rightly justify the five-fold increase in its funding over the CCC system, which has no such mandate. However, this explanation does not account for the disparity in the *rate of increase* in system funding. The missions of each segment of higher education have not changed significantly in recent decades, yet the funding provided to the UC, CSU, and K-12 systems has grown significantly, while funding for the CCC system has basically kept pace with enrollment levels. Between 1972 and 2002, revenue (in real terms) increased approximately 23% for the UC system and 24% for the CSU system, but only 4% for the CCC system. Similarly, from the time Proposition 98 was implemented to 2002, funding for the K-12 system grew 20% more than funding for the CCC system (Murphy, 2004), despite the fact that the state constitution requires a consistent split of funding (albeit with significantly less per student going to the CCC system) every year.

Funding levels have varied significantly even among the CCC districts themselves (Carroll, 2005; Murphy, 2004). Due to the revenue freeze required by Proposition 13, different levels of funding provided by local taxes (for some particularly wealthy districts), and the state's CCC funding model, the difference in per-full-time student funding levels among districts varied from a low of about $4,300 per student to a high of almost twice that amount in 2002. In the same year, the lowest funded district received about 11.6% less than the average district funding level, while the highest funded district received 70.1% above the average (Murphy, 2004).

The CCC funding situation contributed to a gradual erosion of the system's ability to meet the value of access enumerated in the California Master Plan for Higher Education:

> The Community College League of California (CCLC) estimates that more than 175,000 students were denied access to the state's 108 community colleges during the 2003-2004 academic year. About 90,000 of these denied enrollments were caused directly by budget reductions that forced community colleges to cancel thousands of class sections. The remaining 85,000 represent the expected increases in enrollment based on growth in high school graduates and the adult population. These individuals, based on past trends, would otherwise have attended community colleges but were similarly shut out. (Piland, 2004, p. 22)

Low funding levels and the resultant decrease in access have reduced the CCC system's ability to provide the college graduates needed by California's

changing economy. At the same time, some state policies have also created barriers or disincentives to student success in completing degree or transfer programs. Shulock and Moore (2007a) studied this phenomenon by tracking the educational outcomes of CCC students over a six year time period. The dependent variable measured was ***student success***, defined as the proportion of students who completed a CCC certificate/degree or who transferred to a four-year institution within six years after first enrolling at a CCC, out of the total number of degree seekers. Students were classified as degree-seekers if they:

> 1. were age 17-19 at the time of initial enrollment; ***and/or***
> 2. indicated a goal of degree or certificate completion or transfer upon enrollment or after meeting with a counselor; ***and/or***
> 3. demonstrated intent to complete through their behavior by completing at least 12 units and attempting a transfer- or degree-level English or math course. (Shulock and Moore, 2007a, p. 5)

Using this definition, the researchers found a 24% rate of student success. By viewing these results in the context of California education policy, the authors concluded that state education policies that place an emphasis on removing barriers to access (the independent variable) have an unintended effect of creating barriers to student success: Historically, state policymakers have "…focused policy attention on *removing barriers to enrolling* in college. With emerging concerns about inadequate education levels of the state's workforce, the time has come to turn attention to *removing barriers to completion*" (Shulock & Moore, 2007a, p. 4). Researchers have found that policies related to CCC

funding sources, enrollment, restrictions on expenditures, and student fees and financial aid are likely to be among those responsible for creating barriers to student success (Hilmer & Leyden, 1998; Shulock, 2008; Shulock & Moore, 2007a, 2007b; Shulock et al., 2008).

The CCC system has historically been funded at a base level derived from the Proposition 98 formula. This base funding has been allocated to individual CCC districts solely on the basis of total student enrollment during the early part of the semester. This funding was not contingent on any measure of student success in completing coursework or progressing towards an educational outcome. Districts also received growth funding, which provided an economic incentive to increase enrollment each year by a specified (legislated) amount, but again did not provide any incentive for improving student success. “This encourages colleges to maximize funding by taking actions not in the best interest of student success, such as allowing late registration and minimizing use of course prerequisites” (Shulock et al., 2008, p. 13). Research into the causes of student success has demonstrated that many of these practices were correlated with lower levels of degree and transfer completion rates. For example, Shulock et al. (2008) found that students were more likely to complete their educational programs if they avoided course dropping, enrolled in an orientation course, and registered for courses on time; practices that have rarely been required and may have even been discouraged by the enrollment practices of many CCCs.

From an organizational efficiency perspective, policies that support student enrollment at the expense of student success may have also reduced the

economic efficiency of CCCs because they encouraged colleges to grow larger than their optimal organizational size. In a quantitative study of college and university enrollment levels, Hilmer and Leyden (1998) compared the marginal benefit to society of enrolling an additional student in college with the marginal cost to society of doing so (marginal cost measured by the additional revenue provided to the college to educate an additional student). The results indicated that both community colleges and universities enroll more students than is socially optimal. In addition, the authors found that state policies encouraging student transfer tend to make the receiving universities more economically efficient and the community colleges less economically efficient in terms of net social benefit; a result that was not reflected in or compensated for by funding levels at either type of institution.

Restrictions on the ways in which administrators at CCCs may expend funds may have also generated barriers to student success: In a qualitative review of CCC expenditure restriction policies, Shulock and Moore (2007a) found that a variety of hiring regulations limited the community college administrators from funding programs and services essential to student success. For example, the researchers found that California's *50% law* required that each CCC spend at least 50% of its total budget on direct classroom instruction.

> This means that colleges face strict limits on what they can spend on staff who provide support services that are essential to so many of today's CCC students, such as academic advisors, financial aid advisors, information technology consultants, health care staff, and orientation

> leaders. Also on the “wrong” side of the 50% is the time that faculty spends working with students outside of the classroom, such as on advising, working with student organizations, or updating curricula… (Shulock & Moore, 2007a, p. 11)

In addition, CCCs have received a variety of different categorical funding streams that were intended to be used for specific purposes determined by state policymakers; examples include funds to support the disabled student services and matriculation programs. However, like other funding sources, categorical funding was typically provided to colleges on the basis of particular actions faculty and staff at the colleges must perform or services they must provide, rather than outcomes they must achieve (Shulock & Moore, 2007b; Shulock et al., 2008). Moreover, “[t]he stated goals of the categorical programs are not always promoted by the funding mechanisms…. By segmenting a college budget into various protected pieces, categorical funding prevents colleges from developing college-wide priorities for the allocation of resources” (Shulock & Moore, 2007b, p. vii). In addition, such funding policies have run counter to the growing consensus in the field of public administration that organizations should be held responsible for how well they achieve their mission using the public funds allocated to them, rather than narrow prescriptions for how those funds are spent (Gill & Leigh, 2004; Shulock & Moore, 2005, 2007b; Shulock et al., 2008; Sonstelie & Richardson, 2001).

From 1990 to 2008, CCC fees were consistently the lowest in the nation (Murphy, 2004; Shulock, 2008; Shulock & Moore, 2007b). Moreover, CCC staff

members were prohibited from collecting additional student fees except in particular cases for additional services (such as health fees) (Shulock & Moore, 2007a, 2007b). In addition, "…fees collected from students do not add to a college's resource base…. The lack of a link between fees collected and resources available removes any incentive for colleges to support fee increases" (Shulock & Moore, 2007a, p. 12). Low student fees have also had the effect of encouraging students to register for college without concurrently applying for state or federal financial aid – an effect that has been measured in low rates of CCC use of financial aid (Shulock, 2008). This may have actually promoted student failure after enrolling, since without additional financial aid students may need to work full time to pay for food, housing, child care, books, and other necessary expenses while attending college (Shulock & Moore, 2007a). Moreover, low fees may have had the effect of depriving the state of additional federal revenue in the form of federal financial aid. This is because higher CCC fees are likely to encourage more students to apply for federal financial aid (Shulock, 2008; Shulock & Moore, 2007b). Students that receive such aid would apply part of it towards the cost of attending college, which would direct the funds to the state. The net result would be an increase in federal funding being provided to support the CCC system.

In addition to low levels of overall funding and state financial policies that serve as disincentives to student success, a third challenge that has faced the CCC system is an increase in the number and mobility of potential transfer students. From 2000 to 2008, California's institutions of higher education have

experienced a large increase in the number of students seeking enrollment. This increased demand is attributed to the generation of baby boomer children who reached college age during this time period (Piland, 2004). Between 2000 and 2010, the age group of 15 to 25 year olds in California was expected to grow by over 1 million people. Corresponding to this growth, the number of students transferring from CCCs to universities increased by 24% over the same time period (Perry, 2007).

At the same time, an increasing number of transfer students had non-traditional academic histories, including enrollment at several different community colleges (sometimes concurrently), gaps in education, and previous *reverse transfer* university coursework (Horn & Lew, 2007b; Lauren, 2004; Peter & Cataldi, 2005; SDCCD, 2005; Townsend, 2001). “There are now ‘reverse transfers’ (4-year to 2-year), ‘lateral transfers’ (2-2 or 4-4), and ‘swirling students’ (co-enrolled in two or more schools simultaneously), among other permutations” (Lauren, 2004, p. i). In addition, most transfer students have experienced other issues that complicate their educational progress, including full-time employment, financial responsibilities, and dependent children (Gutierrez, 2004).

In their research on enrollment patterns, Peter and Cataldi (2005) found that out of the national-level cohort of students who began their postsecondary education in 1995-1996, 40% had enrolled at more than one institution. In addition, 47% of students that began their education at a community college had attended more than one institution, and 11-13% of all cohort students had sometimes co-enrolled (that is, enrolled at more than one institution

simultaneously). Of students who began postsecondary education at a community college, 42% had transferred (but only 61% of those had transferred to a four-year institution) and 11% had co-enrolled. Of students who began their postsecondary education at four-year institution, 38% had attended more than one institution, 26% had transferred, and 18% had enrolled in public community colleges. Such a wide variety of enrollment patterns and institutional histories significantly complicates the transfer advising process.

In a similar study focusing on CCC transfer students, Horn and Lew (2007b) found that a majority of CCC students who transfer do *not* do so as traditional transfer students, defined as students who complete 2 years at community college and then transfer as juniors. The researchers also examined differences in goals, course taking patterns, transfer destinations, academic preparation, socioeconomic status, and demographic characteristics between the study groups of traditional and non-traditional transfer students.

In addition to the complexities arising from non-traditional student enrollment behavior, additional complications in student transfer are caused by the increasing requirements and decreasing capacities of many university programs. As more and more students demand access to universities, more and more of these institutions have become *impacted*, with more qualified applicants than the institution has the capacity to enroll. As a response, admissions officers at universities have increased the requirements necessary for students to transfer. In a descriptive research study of this phenomenon, Shulock and Moore (2003) found that between 1997-1998 and 2001-2002, the number of transfer

students denied admission to CSU campuses rose by 46%. In 2001-2002, approximately 15% of all CSU undergraduate programs were impacted, with the major concentrations of impacted programs occurring at SDSU, Cal Poly San Louis Obispo, and nursing programs throughout the CSU system. Another example comes from the University of Florida, which admitted 51% of native students but only 27% of transfer students into its impacted programs. This means that "…native students were 2.74 times more likely than transfer students to be admitted even though they did not meet minimum program standards" (Sullivan, Dyer & Franklin, 2004, p. 104).

Various policy and program solutions have been proposed to address the need to significantly increase the number of California college graduates despite the challenging higher education environment created by the funding, policy, and capacity issues described above. These proposals can be divided into two broad categories: those related to finance and those related to academics and student support. Finance-related proposals have included recommended changes to policy to provide higher levels of funding to CCCs; allow districts to retain fee revenue; adopt different per-unit fee structures; and revise financial aid programs (Shulock & Moore, 2007b; Shulock et al., 2005; Shulock et al., 2008). Academic and student support-related proposals have included a number of policy changes designed to assess and place students in courses commiserate with their level of academic preparation, including basic skills courses; encourage full-time enrollment; discourage late registration and frequent dropping of courses; and encourage clear educational goals and pathways (Bailey et al., 2007; Moore et

al., 2007; Shulock et al., 2008). Many of these proposals are related to the idea that administrators at educational institutions should be held responsible for their institutions' performance. This includes institutional accountability for student outcomes and for the effective and efficient use of public resources invested in higher education (Burke, 2002; Burke & Modarresi, 1999; California Community Colleges System Office, 2006, 2007; Shulock & Moore, 2005, 2007b; Sonstelie & Richardson, 2001).

Accountability, Effectiveness, and Efficiency in Higher Education

Public administrators, policymakers, and educators throughout the United States have been under increasing pressure to tie the expenditure of public funds to measurable, effective, and cost efficient outcomes (Burke, 2002; Burke & Modarresi, 1999; Hudgins & Mahaffey, 1998; Little Hoover Commission, 2000; NCAHE, 2005; Rubenstein et al., 2003; Rubin, 2003; Stillman, 1996). "Fueled in large part by national attention to K-12 accountability, higher education is being called upon to be much more accountable than in past decades. Nearly every state is now developing or implementing accountability systems for public higher education" (Shulock & Moore, 2005, p. 1). Metrics related to the effectiveness of the transfer process have been used in the higher education accountability reporting systems for 25 different states, making transfer the second-most commonly used accountability construct (Burke, 2002). Moreover, administrators at higher education systems and other public agencies have been asked to use the results of these performance assessments to improve their institutions' effectiveness and efficiency in performing their missions (Burke, 2002; Burke &

Modarresi, 1999; CCCCO, 2003a; Council for Aid to Education, 1997; Davies, 2006; Dougherty & Reid, 2007; Gill & Leigh, 2004; Hagedorn, 2004; NCAHE; Thompson & Riggs, 2000). Improving the effectiveness and efficiency of California's higher education system has had broad appeal to many stakeholders in higher education policy (Gill & Leigh, 2004; Little Hoover Commission, 2000; Shulock & Moore, 2005). Transfer has the potential to provide significant efficiencies in the higher education process, particularly in terms of cost efficiencies to taxpayers and students. These efficiencies can be realized through improvements in the effectiveness and efficiency of the transfer process itself.

Public agencies have increasingly been asked to measure their outputs and outcomes in order to improve performance (Behn, 2003; Burke & Modarresi, 1999; Burke, 2002; CCCCO, 2003; California Community Colleges System Office, 2007; Davies, 2006; Dougherty & Reid, 2007; Gill & Leigh, 2004; Hagedorn, 2004; Hudgins & Mahaffey, 1998; Rubenstein, et al., 2003; Rubin, 2003; Shulock & Moore, 2005; Stillman, 1996; Thompson & Riggs, 2000). However, public organizations are not the same as private businesses, where financial performance can be measured to at least some degree of accuracy against accepted standards. Many authors have proposed or described different means and purposes of public performance measurement. Behn (2003) describes eight such specific purposes:

1. To *evaluate* how well the agency is performing. This is a common purpose for performance measures, even though it is not often explicitly stated. Sometimes an organization is evaluated with no specific end or purpose in mind.

To be a useful, or even a valid, evaluation, however, the evaluator needs to know the specific outcomes the organization is responsible for generating, in order to evaluate its effectiveness at doing so. In practice, organizational outcomes are rarely specifically defined for public agencies. Organizational outcomes may even be in conflict with one another, as is sometimes the case with the multiple missions and values of the CCC system (Gill & Leigh, 2004; Shulock & Moore, 2007a). Therefore, public administrators are often opposed to evaluation of their agency, as they may be evaluated on objectives that were not well defined and that they were not actively pursuing (Behn, 2003). Also, public agencies, including CCCs and other educational institutions, are often evaluated in comparison to each other on metrics related to outputs such as graduation or transfer rates (Bahr, Hom, & Perry, 2003; Bowen, 1980; CCCCO, 2002; Dougherty & Reid, 2007; Shulock & Moore, 2004).

2. To *control* what subordinates are doing. In modern management, this usually takes the form of measuring and therefore controlling the inputs that are provided to subordinates, such as line item budgeting as a measurement of spending behavior (Behn, 2003). In the CCC system, measures of categorical program performance are often related to this purpose (Shulock & Moore, 2007b; Shulock et al., 2008). Other researchers have also studied the relationship between the control of institutional inputs (such as overall funding levels or cost per unit of instruction) and various organizational characteristics (Bahr et al., 2003; Bowen, 1980; Brinkman, 2000; CCCCO, 2002; Murphy, 2004; Reindl, 2000; Shulock & Moore, 2004; Strauss, 2001). For example, Bowen (1980) found

that the dependent variable of cost per unit differed widely for a variety of organization-related independent variables such as institutional size, type, and affluence.

3. To appropriately *budget* where the organization expends its resources. Performance measurement may help inform choices about budgeting, but often does not provide a simple solution to budgeting choices. For example, if an organizational unit is underperforming, it is not immediately clear whether that means its budget should be reduced, increased, or reallocated to different activities (Behn, 2003).

4. To *motivate* personnel to improve performance. Historically this has been found to be an extremely useful and effective use of performance measurement. The manager sets performance goals for staff members and provides feedback on the individuals' efforts to reach those goals, resulting in better individual performance. The process also helps to inform staff members on their progress and effectiveness toward reaching organizational objectives, which improves organizational learning (Behn, 2003).

5. To *promote* the organization and its accomplishments to the public and other external stakeholders. Positive results from performance measurement can help to justify the organization's existence and funding needs, and gain other support from political leaders and the public. This can generate public support for both the individual organization and for government as a whole (Behn, 2003). For example, researchers at the SDCCD (2004) conducted an economic impact study to measure the benefits generated by the district. The report of the study,

which detailed regional economic benefits, student income benefits, social benefits, and the return to taxpayers for support to the college, was widely distributed to the public in the SDCCD service area.

6. To *celebrate* organizational accomplishments. Setting significant goals and celebrating their achievement can help to motivate staff, call attention to individual and team successes, and may help in organizational learning, recruitment, retention, and other means of organizational success (Behn, 2003).

7. To *learn* about institutional processes. True institutional learning involves understanding why a particular organizational process works or does not work. Performance measurement is the beginning of that process of understanding. However, in order to progress from this to useful learning, the manager must extract some meaningful information from the performance measurement data. By contrast, many organizations, including those in California's segments of higher education, have an abundance of data without interpretation of that data into meaningful information (Behn, 2003; Shulock et al., 2005).

8. To *improve* organizational performance. The seven other purposes listed above ultimately all relate to this overall purpose. Performance measurement is not an end in itself, but is a means to improve performance. Ideally, performance measurement should be part of a continuous feedback loop to make changes that are predicted to improve performance, and then measure the effects of the changes. However, there has been little evidence that most

public organizations do, in fact, use performance measurement data to actually improve performance (Behn, 2003).

Research related to accountability systems in higher education have generally focused on the relationships between a variety of institutional characteristics and dependent variables related to student performance (Burke, 2002; Bowen, 1980). For example, Bowen (1980) studied the relationship between institutional costs and student outcomes by measuring student performance before and after attending college and then comparing the change in student performance to the level of institutional expenditures associated with each group (the independent variable). Results indicated found a modest relationship between the independent variable of overall institutional cost per unit and the dependent variable of *value added* in student performance.

As another example, Bohte (2001) studied the relationship between bureaucracy in educational institutions and student academic performance. The construct of institutional bureaucracy was measured using variables related to the percentages of district and campus administrators as a fraction of total employees. The construct of student academic performance was measured using the variables of standardized test scores. Using the statistical technique of multiple regression, the researcher found that between 35% and 55% (depending on grade level) of the variability in the dependent variable of student performance on standardized exams was explained by the combination of independent variables included in the multiple regression models (Bothe, 2001).

A third example comes from Thompson and Riggs (2000), who studied the relationship between institutional expenditure patterns and the facilitation of institutional mission in Tennessee's public community colleges. Data related to these constructs consisted of public records regarding success in meeting performance standards set by the state and institutional expenditures in various categories. The authors used the population correlation coefficient statistic (ρ) to compare the colleges' scores on performance measures with their institutional expenditures in various functional areas. In this case, the researchers demonstrated that colleges scoring above the mean on performance standards spent more revenue on functions related directly to instruction and academic support, while institutions scoring below the mean spent more revenue on other institutional functions, such as institutional support and student services (Thompson & Riggs, 2000).

Some measures of public accountability for performance outcomes have already been put in place in California (Dougherty & Reid, 2007; Drummond, 2006). For example, as mandated by Assembly Bill 1417, researchers at the California Community Colleges System Office (2007) provided a variety of performance indicators for the system and its constituent colleges. Key outcomes described in this report included an increase in wages for students earning a vocational degree or certificate, a high enrollment rate among Californians (6.6% of the population), and approximately 94,000 transfers from the system to universities, accounting for 43.5% of UC and CSU graduates.

In addition to accounting in general for their performance in institutional outcomes, public administrators have increasingly been asked to improve their organizations' effectiveness and efficiency in achieving those outcomes (Behn, 2003; Burke & Modarresi, 1999; Burke, 2002; CCCCO, 2003; California Community Colleges System Office, 2007; Council for Aid to Education, 1997; Davies, 2006; Dunn, 2004; Gill & Leigh, 2004; Shulock & Moore, 2005; Thompson & Riggs, 2000). As the NCAHE (2005, p. 29) asserts, "[t]he most important financial resource is not 'new money,' but existing investments; these can and must be used more effectively to contain costs, improve quality, and attain educational objectives." Qualitative research conducted by Shulock and Moore (2005) indicated that in California, public officials, business leaders, and the general public all share related concerns about the cost of education to the student and taxpayer, particularly in terms of the need for cost efficiency in the provision of higher education. Public policymakers "…want ever-increasing numbers of students to obtain college-level skills to maintain state competitiveness in today's information economy, but without corresponding increases in expenditures of tax dollars. They are convinced that colleges and universities can operate more efficiently…" (Shulock & Moore, 2005, p. 4). Similarly, business leaders believe that higher education's "…inflexible bureaucracies, outmoded teaching methods, and insufficient use of new technologies reduce productivity" (Shulock & Moore, 2005, p. 7).

In response to this demand, researchers have proposed policies and programs that are designed to improve the overall effectiveness and efficiency of California's higher education system. In this endeavor,

> …we must distinguish between two very different kinds of efficiencies – institutional efficiencies and systemic efficiencies…. [Institutional efficiencies] are actions, typically taken by individual campuses or departments, that reduce per-unit costs…. [Systemic efficiencies] increase the efficient movement of students within and across segments, increasing the return on investment as measured by student success, not cost per student. These are very different kinds of actions than those that reduce unit costs at a single institution. We believe that California has the most to gain from focusing on systemic efficiencies… (Shulock et al., 2005, p. 25)

Institutional efficiencies include actions that directly affect campus budgets. Examples include increase use of facilities at non-peak times, larger class sizes, reduction of course delivery costs, reduction of low-enrollment courses, streamlined business operations, reductions in campus administrative and maintenance overhead, and economies of scale in the provision of campus- or district-wide services. These types of efficiencies have the potential to incrementally reduce the average cost of instruction. However, many colleges have already realized many of the gains that can be achieved through such measures (Council for Aid to Education, 1997; Shulock et al., 2005).

In contrast, systemic efficiencies, while recognized as potentially of significant public benefit, have not been explored or implemented to any great

degree (Shulock et al., 2005). Changes in this area therefore have the greatest potential to increase graduation rates without a concurrent increase in overall cost to the taxpayer.

> Actions that reduce the overall number of units that a typical student takes on the road to completing a degree or certificate can reduce…costs to the state. If, for example, a student takes 15 fewer units en route to earning a baccalaureate degree, that student will cost the state… less… over the course of his or her academic career. Widespread reductions in units taken upon completion could have significant cost-savings implications. (p. 25)

Systemic efficiencies can be achieved through a variety of means, including designing policies and programs to increase the number of college credits students can complete in high school; improving assessment practices; encouraging efficient course-taking behavior; improving academic advising; increasing the availability of required courses; and standardizing intersegmental transfer and articulation practices (Shulock, et al., 2005). However, while systemic efficiencies have the potential to improve the return on California's investment in higher education through the additional numbers of college graduates without additional cost,

> …improving graduation rates would not save money for the higher education system. In fact, increased completion rates would increase higher education costs as more students stay enrolled, rather than drop out…. It is critical, therefore, that discussions about efficiency be focused

> on the state's overall return on its education investment… (Shulock et al., 2005, p. 26)

Improvements in the effectiveness and efficiency of the transfer process have perhaps the greatest potential to provide the kinds of systemic efficiencies described above. This is true for two reasons: First, transfer is itself theoretically an excellent source of systemic efficiency, particularly in terms of the total cost to state taxpayers per university degree earned. Second, research indicates that current levels of transfer effectiveness and efficiency in California is low, suggesting large room for improvement and correspondingly large potential gains in systemic efficiencies.

Transfer is a source of systemic efficiency in California's higher education system for a variety of reasons. Effective transfer programs provide access to a bachelor degree for those who are educationally, economically, or socially disadvantaged and others who would not otherwise be able to attend college. The benefits of higher college graduation rates have included improvements in health and quality of life (Kegley & Kennedy, 2002), increased participation in voting and other civic duties (Dee, 2003), and significant statewide economic benefits that accrue from a better-educated workforce (Moore et al., 2007; Shulock & Moore, 2005; Shulock et al., 2005; SDCCD, 2004). Transfer also theoretically results in a much lower cost-per-degree than the UC or CSU systems can provide on their own. CCC campuses offer many of the same courses that CSU and UC campuses do, yet CCC courses cost students and taxpayers significantly less. In 2001-02, for example, the state funded the UC

system at $22,634 per full-time student, the CSU system at $10,191 per full-time student, and the CCC system $4,560 per full-time student (Murphy, 2004). By comparing the differences in these funding levels over a 60-unit transfer curriculum, it can be seen that a student who completed 2 years of university coursework at a CCC instead of a CSU during this time period saved the state over $11,000 while a UC-bound transfer student saved the state over $36,000. The process of transfer can therefore theoretically save thousands of taxpayer dollars by facilitating the completion of part of the baccalaureate degree at the lower-funded CCC system.

The state of transfer in California also provides an opportunity for the realization of significant gains in systemic efficiency, because research indicates the effectiveness and efficiency of the transfer process has been relatively low. Researchers have calculated that only 20% to 40% of students demonstrating the intent to transfer from a CCC to a university actually do successfully transfer (Bahr et al., 2003; Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et al., 2003) – a significantly lower rate than that observed in the overall U.S. community college population (Bailey et al., 2007; Hoachlander et al., 2003). A related area of concern is that many students moved from community college to university having completed more units than the maximum that will apply toward the baccalaureate degree, having not completed all appropriate preparatory courses, or both (Florida State Legislature, 2002; Palmer et al., 1994; University of California, 2005). These statistics are significant because every unit of coursework that does not

contribute to a desired educational outcome represents unnecessary cost to the taxpayer (between $152 and $754 per unit in 2004, extrapolating from figures calculated by Murphy, 2004). The apparent abundance of potential transfer students who do not successfully transfer and the apparently high levels of unnecessary transfer coursework among those who do represent areas where potentially large gains in transfer effectiveness and efficiency could be realized. Improvements in these areas would create corresponding gains in systemic efficiency for California's higher education system as a whole. A focus on the transfer process would therefore be a crucial part of efforts to improve higher education accountability, effectiveness, and efficiency.

Overview of the Transfer Process

Transfer is the process of students moving from one institution of higher education to another with the intention of applying previously completed coursework to degree requirements at their new institution. Transfer has important benefits for students pursuing a bachelor's degree: Community colleges offer transfer curricula that apply to a wide range of university degree programs. This allows students the flexibility to pick the university and major of their choice after benefiting from the experience of 1 or 2 years of college work. Also, because community colleges have open admission practices, they represent an alternate pathway for students to fulfill university admission requirements they may not have completed in high school. In addition, community colleges provide significant cost savings to students. In 2004, CCC courses cost the student $26 per unit, which were the lowest fees in the nation

for any institution of higher education. By comparison, in 2004 students at the CSU system paid approximately $85 per unit and students at the UC system paid approximately $154 per unit (Murphy, 2004). On a national level, "…in 2000–01, [CCC fees] represented less than one-half the cost of community college tuition in New Mexico ($866 per year)—the state that ranks 49th in the country—and less than one-quarter of the national average ($1,359 per year)" (Murphy, 2004, p. 66). Students can therefore save thousands of dollars by completing the first 2 years of their baccalaureate degree work at a community college.

Transfer was the original mission and purpose of U.S. community colleges. Typically, a local high school district would create a college as a way to allow local students finishing high school to start college level studies without having to move away to a distant university. Eventually these colleges evolved into comprehensive institutions with academic programs (for students transferring to a university) and vocational programs (for students entering the workforce) on the same campus (Brossman & Roberts, 1973). While historically these two missions have been perceived as quite distinct or even conflicting (Jacobs, 2001; Schuyler, 1999), contemporary trends in the workplace have underscored the necessity for integration of traditional liberal education and vocational training (Bailey & Morest, 2004; Harada, 1994) – a combination that the community colleges are relatively well-prepared to provide. As Brawer (1999) asserts:

> …changes in the marketplace are now rampant and the average person will hold a number of jobs during a lifetime. Therefore, one needs to be literate and have knowledge of the humanities as well as to be trained for

> a career. Indeed, interest in a broad educational base – available in the community colleges – rather than just a narrow preparation for a specific job is one of the major distinctions between community colleges and proprietary schools. (pp. 20-21)

In fact, in a survey of CCC curricula, Gill and Leigh (2004) found that vocational courses that may also be transferable for university credit are becoming increasingly common, and that many community colleges offer programs that blur the distinction between these two areas.

Early transfer efforts were typically voluntary agreements between two institutions that were designed to ensure that students who complete an associate degree at the sending institution would be prepared to enter upper division work at the receiving institution (Gutierrez, 2004). At the time, a transfer student was assumed to be someone who completed 2 years of university study at the same community college before moving on to complete his or her studies at one university. Now, however, "…the '2-plus-2' model is only one of many. There are now 'reverse transfers' (4-year to 2-year), 'lateral transfers' (2-2 or 4-4), and 'swirling students' (co-enrolled in two or more schools simultaneously), among other permutations" (Lauren, 2004, p. i). Because of the increasing complexity of the transfer process, states today have more comprehensive transfer policies – often created through specific state legislation. Most of these mandate transfer of a common general education core between public two-year and four-year state institutions, but several also address two-year to two-year or four-year to four-year transfer. Most states also have voluntary transfer

agreements that are made among and between both public and private institutions (Lauren, 2004; Gutierrez, 2004). These agreements are both facilitated by and dependent on the process of *articulation* between institutions. As defined by CIAC, (2006), articulation is

> …the process of developing a formal, written and published agreement that identifies courses (or sequences of courses) on a "sending" campus that are comparable to, or acceptable in lieu of, specific course requirements at a "receiving" campus. Successful completion of an articulated course assures the student and the faculty that the student has taken the appropriate course, received the necessary instruction and preparation, and that similar outcomes can be assured, enabling progression to the next level of instruction at the receiving institution. (p. 3)

An articulation agreement, then, is like an educational roadmap; it provides students with a guide to the appropriate courses to take in order to fulfill requirements at their intended transfer destination. “Articulation and transfer agreements facilitate the movement of students between different institutions by establishing guidelines for admission and/or transfer credit and typically are constructed on the basis of courses, academic majors, departmental curricula, or a general education core” (Gutierrez, 2004, p. 119).

California’s Master Plan for Higher Education, which was first codified in public law by the Donahoe Act of 1960 (Douglass & Greenspan, 2005), promised that public higher education would be available to any Californian who wanted to pursue it. The plan also outlined the relationships and missions of the UC, CSU,

and CCC systems, including a formal recognition of the role of CCCs in transfer preparation (ICAS, 2005; Liaison Committee of the State Board of Education and The Regents of the University of California, 1960; Trounson, 2006).

In 1986, the Commission for the Review of the Master Plan for Higher Education reaffirmed California's commitment to the transfer mission and recommended that the three segments of higher education in California "…cooperatively develop and maintain a general education transfer core curriculum which, with the courses required for specific majors, will ensure transfer to the University of California or the California State University systems upon successful completion…" (p.8). In 1988, this recommendation was enacted into law in Assembly Bill 1725 and prompted the development of the Intersegmental General Education Transfer Curriculum, or IGETC (California Community Colleges Board of Governors, 1991), and the CSU General Education – Breadth curriculum, or CSU GE-B (California State University Office of the Chancellor, 1991).

As a result of Assembly Bill 1725 and other efforts to encourage the development of transfer and articulation agreements, contemporary transfer curricula can be divided into three broad categories: Courses accepted for baccalaureate-level credit, transfer general education patterns, and lower division major preparation courses. Courses accepted for baccalaureate-level credit are simply those courses that are regarded as meeting the scope and rigor of a university-level course, and therefore will fulfill unit requirements (at a minimum as elective courses) and be factored into the calculation for transferable GPA. In

California, courses are designated as baccalaureate-level by different means, depending on the system such courses are being transferred to. Staff members at the UC system evaluate each course submitted by community colleges to determine if it is either comparable to a lower-division course offered at any UC campus or would be "…appropriate for a university degree in terms of its purpose, scope and depth" (CIAC, 2006, p. 29). Courses that are designated by UC staff members as being university transferable are published on a list for each community college called a *UC Transfer Course Agreement*.

Under California State University Executive Order 167, the CSU system's faculty delegated to faculty at California Community Colleges and other regionally accredited institutions the authority for determining which of their courses should be designated as CSU baccalaureate-level (CIAC, 2006). Local curriculum committees at the community colleges and their districts propose and then vote on which of their courses will be designated as CSU-transferable. Like the UC TCA, the results are published on a *CSU Baccalaureate Credit* list for each college.

Each private and independent college in California has its own system of determining whether a course is acceptable for general transfer credit or not:

> Independent colleges and universities act autonomously in setting transfer credit policies. Since each institution is free to establish their own standards, there are few requirements that apply to all institutions….In a majority of colleges and universities the responsibility for determining transfer credit is assigned to a Transfer Admissions Counselor and/or an

> official evaluator in the Registrar's Office. Each record is evaluated on an individual basis, according to guidelines usually established by the academic departments, or in consultation with the department faculty or division deans. (CIAC, 2006, p. 44-45)

Statewide transfer general education patterns are a common feature among transfer curricula throughout the U.S. In a contemporary survey, 50% of states reported having a mandatory general education transfer program (Lauren, 2004). In California, the IGETC and CSU GE-B patterns are both mandated in state law or policy and ensure that students who take a proscribed curriculum at the community college will receive full credit for completing lower division general education requirements at their receiving institution (CIAC, 2006).

The IGETC is accepted in fulfillment of all lower division general education at all CSU campuses and most UC campuses (with exceptions made for unique UC schools and programs). It consists of 37 to 39 semester units, divided among five subject areas: (a) English Communication (nine units) which consists of courses in reading and written composition, critical thinking and composition, and oral communication; (b) Mathematical Concepts and Quantitative Reasoning (three units); (c) Arts and Humanities (three units with at least one course in each area); (d) Social and Behavioral Sciences (nine units); and (e) Physical and Biological Sciences (seven to nine units), which consists of one physical science, one biological science, and at least one lab. In addition, the UC system requires documentation of competency in at least one foreign language in fulfillment of this pattern (California Community Colleges Board of Governors, 1991). Like the

procedure for approval of UC-transferable coursework, faculty members at community colleges propose courses for inclusion in IGETC, which must be approved by faculty or staff members at the UC and CSU systems (CIAC, 2006).

The CSU GE-B pattern is accepted in fulfillment of lower division general education requirements at CSU campuses only. It is comprised of (a) English Language (nine units) which consists of courses in oral and written communication and critical thinking and composition; (b) Physical Science, Life Science and Mathematics / Quantitative Reasoning (nine units) which consists of at least one physical science, one life science, one lab, and one mathematics or quantitative reasoning course; (c) Arts, Literature, Philosophy, and Foreign Language (nine units); (d) Social, Political, and Economic Institutions (nine units), and (e) Lifelong Understanding and Development (three units) (California State University Office of the Chancellor, 1991). Like the IGETC, college faculty members propose courses to be included in CSU GE-B, which are then approved by faculty or staff members at the CSU system (CIAC, 2006).

Each California private and independent institution has its own general education or liberal arts curriculum and graduation requirements. The faculties of many of these institutions participate in voluntary agreements with community college faculties to articulate college courses to their general education requirements. Some also voluntarily accept the IGETC or CSU GE-B patterns in complete or partial fulfillment of their native general education curricula (CIAC, 2006).

The third type of transfer curriculum consists of lower division major preparation courses. These are courses that are accepted for transfer credit at the receiving university and also fulfill specific university major preparation requirements. Because each university major is different (even among campuses of the same system), articulation for major preparation courses is typically developed individually between each sending institution and each receiving institution on a course-by-course basis. Faculty members of a community college will usually propose courses that they believe are comparable to corresponding university courses that fulfill requirements for one or more university majors. The university faculty members will then evaluate the proposed courses using the catalog descriptions, course outlines, and sometimes syllabi to determine if the community college's courses are acceptable substitutions for the university's courses (CIAC, 2006). Development of major preparation articulation agreements is a costly and time-consuming process, even when just limited to public institutions: Theoretically, the faculties of each of the 33 California public universities would establish course-to-course articulation for each of their university's most popular majors with the faculties at each of the 109 CCC campuses. Assuming that perhaps 70 courses per institution would be evaluated in this undertaking (a conservative estimate), faculty members at each public university campus would be responsible for evaluating 7,630 courses for a statewide total of over 250,000 individual evaluations. In addition, some portion of this level of effort must also be maintained year after year, as curricula at each university and college changes constantly.

In modern CCCs, transfer and articulation work is carried out primarily by three types of people. First, *articulation officers* are responsible for developing and maintaining formal articulation agreements between the community college and the universities that receive its transfer students. These faculty or staff members also work to ensure the college's academic curriculum is aligned with university requirements and serve as resources to address transfer curriculum-related questions. *Transfer center directors* are responsible for promoting the transfer function, directing the activities of the transfer center, and conducting outreach to underrepresented potential transfer students. They also serve as the subject matter expert for non-curricular transfer information such as university application procedures. *Community college counselors* provide one-on-one counseling and advising services to help students explore educational options, make decisions, and develop a transfer education plan containing the appropriate transfer curriculum to fulfill lower division requirements for the student's intended university and major (ASCCC, 2003; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; CIAC, 2006; ICAS, 2005).

A primary goal of transfer advising is to assist students in developing the most efficient educational plan to achieve their academic goals. For transfer students, this process typically involves three steps: identification of the student's intended transfer university and major; determination of CCC transfer coursework that will fulfill the student's university admission, general education, and preparation for major coursework; and development of a semester-by-semester

plan to complete that coursework along with any required prerequisite or elective courses. Ideally, students complete these steps early in their college careers by utilizing the services provided by counselors, the transfer center, and the articulation officer. Ensuring students follow the steps to develop a transfer education plan that fulfills as many lower division requirements as possible while simultaneously avoiding unnecessary coursework is recognized as one of the most important components of an efficient path to transfer (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; Freedman, 2002; Handel, 2006; Moore et al., 2007; Nannini, 2002; Shulock et al., 2005; Shulock et al., 2008).

Transfer Centers

Many of the functions involved in the transfer process are carried out on CCC campuses by faculty and staff members who work in *transfer centers*. The purpose of the centers is to serve as focal points for transfer at the CCC campuses in order increase the number of students – particularly underrepresented students – who transfer to universities. The transfer centers "…provide academic advising and counseling to students preparing for transfer, articulation information for specific universities and majors, information on admissions requirements, and transcript evaluations" (Farland & Anderson, 1989, p. 1).

Transfer centers were originally authorized and funded as a pilot project through the 1985 budget bill. The transfer center pilot program provided $3.37 million in funding over three years to establish transfer centers on 20 CCC

campuses. Each transfer center was to be "…a specific location on a California Community College campus that is readily accessible and identifiable to students, faculty, and staff as the focal point of transfer activities…" (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006, p. 10). The mission of the transfer centers was to "…provide academic advising and counseling to students preparing for transfer, articulation information for specific universities and majors, information on admissions requirements, and transcript evaluations" (Farland & Anderson, 1989, p. 1). Other specific functions of faculty and staff at the centers included training college counselors and other groups on transfer requirements (which often change from year to year), developing marketing strategies to promote transfer, and assisting students with transfer research, counseling, and course planning (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006). Transfer center personnel were also tasked to provide outreach and counseling services to students from minority ethnic groups, disabled students, and others from educationally disadvantaged backgrounds (Farland & Anderson, 1989). In fact, these groups were originally targeted to receive special focused transfer services (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006).

Each of the 20 pilot transfer centers was affiliated with a local partner UC and CSU campus included in the pilot program funding. For example, the pilot transfer center at Southwestern College (located in the southern San Diego area)

was affiliated with UC San Diego and San Diego State University (Turk, 1996). Staff members at these partner institutions collaborated with staff members at the community colleges to provide transfer information and promotional materials, advising, and articulation agreements. Transfer center staff members were also responsible for creating relationships with representatives of other receiving transfer institutions. These initially included partnerships with 13 private/independent universities (Farland & Anderson, 1989). The transfer centers, in short, were intended to be the hub for liaison with all potential receiving transfer institutions, particularly in regard to student admission policies and requirements (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006).

Other than the mandate to provide encouragement and information to potential transfer students, the legislation establishing transfer centers was silent on how the centers were to be established, organized, and run. Administrators at colleges receiving transfer center pilot program grant funds were essentially free to devise their own systems of organization, management, service delivery, and other specifics of implementation for the program. In addition, the transfer center pilot program seemed to have been subject to less state-level scrutiny and accountability measures than other publicly funded education programs (Turk, 1996). Turk speculates that there are two causes for the relative lack of state involvement. First, the wide range of stakeholders and proposals during the development phase of the program likely resulted in a general, customizable administrative programmatic intervention – one that was broadly defined, so that

it could be interpreted and implemented in a variety of ways by the concerned stakeholders. Second, the mission of the transfer centers was to provide services that the community colleges were already responsible for under the Master Plan for Higher Education. In other words, in the view of many stakeholders, the centers were something that should have already existed at the community colleges. Therefore the legislation creating them was perceived as more of a funding source for an already-established CCC function rather than as a new experimental program.

Because administrators at the colleges participating in the transfer center pilot were given broad leeway in the structure, organization, and functions of the centers, several different variations emerged. However, virtually all of the transfer centers were managed by a transfer center director – typically, a faculty member with a background in transfer counseling. The centers also usually included transfer counselors, administrative support staff, and often student workers. They frequently contained a library of university catalogs and other transfer-related reference books. In addition to face-to-face transfer counseling and advising, personnel at the centers sponsored special events on campus, generated newsletters, maintained databases of potential transfer students, and distributed promotional information from partner universities (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006).

In 1988, California Assembly Bill 1725 formally acknowledged the comprehensive mission of the CCC system to include transfer and provided

continued funding to the transfer center program. In "…the 1990-91 academic year, the California Legislature allocated $4.365 million in Program Improvement moneys to be specifically directed toward the development and/or ongoing operations of transfer centers statewide" (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006). This initial allocation of funds was earmarked for the establishment or operation of transfer centers at all CCCs. After the first year, however, continued funding for transfer centers was integrated into the general funding for each community college. Administrators at each college, then, were free to choose the funding level they would provide to the transfer center out of the general budget; subject to the understanding that transfers programs and services of some kind would be provided.

In 1991, the CCC Board of Governors provided additional direction by mandating that each CCC district follow a set of minimum transfer program standards. These included formal recognition of transfer as a primary mission of the college and an emphasis on services to underrepresented students. In addition, each CCC district was required to develop and adopt a plan for the mission, purpose, and activities of the transfer centers. These plans were required, at a minimum, to include services to students, facilities, staffing, advisory committees, and evaluation and reporting (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006). As a result, by 2002 each of the then-existing 108 CCC campuses had a transfer center, either co-located with other services (such

as the counseling department) or as a stand-alone facility. In addition, by 2002, personnel at about 75% of CCC campuses reported the status of their transfer center (in terms of infrastructure and resources) as *good* or above. All of these facilities were open during the traditional academic year, and most were open in the summer and during evening hours (CCCCO, 2002).

Staff members at contemporary transfer centers offer students a variety of programs, services, and resources to assist in each step of the transfer process. They serve as a clearinghouse for transfer information and promotion, including dissemination of articulation agreements and other sources of transfer-related curricular information (CIAC, 2006). They also administer virtually all campus-based transfer programs, including the transfer advising program that is the subject of this proposed study (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; ICAS, 2005).

Transfer Advising Programs

Transfer advising programs are coherent sets of services offered to potential transfer students that are intended to assist them in successfully moving from community college to university. These services include one or more of the following components: incentives or marketing efforts providing *encouragement* for students to transfer; *information* about the transfer process, including the "…selection of courses required for university admission, general education options, and major preparation" (California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006, p.

10); and services or strategies designed to reduce various *barriers to transfer*. The TSDA program that is the subject of this proposed study is one example of a transfer advising program.

One of the components thought to directly affect the problem of low transfer rates is student motivation to pursue the transfer option. Many stakeholder groups have identified encouragement issues as major components to the problem of transfer (ICAS, 2005). Examples of these include students being unaware of the benefits that come from a university education, intimidation regarding the level or rigor of university-level courses, or students having the false assumption that attending a community college makes them less attractive candidates for admission to a university.

At community college, counselors, instructional faculty, support staff, and other members of the campus community are thought to have a significant effect on students' perceptions about the desirability and benefits of transfer. Many community college counselors, for example, believe part of their duties is to help advice and direct students into an appropriate pathway to achieve their educational goals. In this sense, counselors act as marketers for transfer and transfer programs (Turk, 1996). Research on transfer at community colleges has confirmed that low transfer rates may be due in part to the failure of community college faculty and staff members to encourage students to pursue a baccalaureate degree, the absence of a transfer culture on campus, or the lack of transfer promotional information and events (Tatum, Hayward, & Monzon, 2006).

University admissions and outreach staff members also often serve as the conduit for promoting university attendance to potential transfer students (ICAS, 2005). Encouragement from the university can take the form of participation at college special events, establishment of collaborative transfer programs, and provision of promotional materials such as flyers, brochures, and websites (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006). Both transfer centers in general and transfer advising programs in particular have been designed to address the encouragement component of transfer advising. Examples include university outreach programs, campus tours, student services projects, and high school student outreach programs (ICAS, 2005; Turk, 1996). Encouragement components in the TSDA program included brochures, posters, and other marketing materials, in-class presentations, on-campus visits by SDSU representatives, and promotion of the program on college and campus websites (M. Harvey, personal communication, March 5, 2008).

Information about transfer requirements and procedures is perhaps the most vital component of most transfer advising programs. Most universities have differing admissions processes, especially for impacted majors, and other special academic requirements that students must be made aware of. Many community college counselors do not possess complete information about admission and course requirements at all potential transfer destinations, which necessitates standardization and staff development training regarding transfer advising programs (ICAS, 2005; Turk, 1996). Out of all information-related issues,

however, the primary focus of transfer advising programs is to assist students in the development of a transfer education plan encompassing all articulated lower division coursework requirements of the student's intended transfer university and major. This includes CCC courses articulated to university general education requirements, such as those that fulfill the CSU GE or IGETC patterns; courses articulated to major preparation requirements; and courses articulated to fulfill other university graduation requirements.

Counselors assisting students in developing transfer education plans typically consult a web-based repository of articulation information called the Articulation System Stimulating Interinstitutional Student Transfer, or ASSIST. ASSIST was first created in the mid-1980s as an informational support tool and companion project to the Transfer Center Pilot Program (Turk, 1996). ASSIST

> …displays reports of how course credits earned at one California college or university can be applied when transferred to another. ASSIST is the official repository of articulation for California's colleges and universities and therefore provides the most accurate and up-to-date information available about student transfer in California. (ASSIST Coordination Site, 2005a)

In the TSDA program, counselors and students were required to submit student education plans developed using articulation information available on ASSIST as part of the program requirements (M. Harvey, personal communication, March 5, 2008).

Some transfer advising programs have a programmatic component designed to reduce barriers to transfer. Such barriers are issues that prevent students – particularly those who are educationally disadvantaged in some way – from successfully transferring (Bers et al., 2001). Barriers to transfer are distinct from issues related to encouragement and information because a barrier issue will be present even when students have the motivation and correct information needed to transfer. These types of issues can be categorized into two types: those that are related to curriculum and those that are not.

Curriculum-related barriers arise from the fact that each public university and major has a different set of coursework that should be completed at community college prior to transfer, even for the same major and even for universities that serve the same geographic area. For example, a student transferring to San Diego State University as a Psychology major in 2005 would ideally have completed 19 units of major preparation transfer courses as well as a CSU-applicable general education pattern at the community college prior to transfer. The same student transferring to UC San Diego in the same major in the same year would have completed a different set of courses totaling 27 units and a different general education pattern. In fact, only 6 units of major-related transfer courses were common between the two institutions for the identical major in the same year (*ASSIST Report: Articulation*, 2005). Three types of barriers arise from such inconsistent transfer course requirements. First, course inconsistencies limit the options that students have in selecting a transfer university and major because a student's selection of courses to meet

requirements at one potential transfer university or major necessarily excludes other universities or majors that do not share the same set of course requirements. Second, course inconsistencies create the need for multiple articulation agreements from each CCC campus to each UC or CSU campus, resulting in thousands of different transfer curricula and the corresponding difficulty and confusion in course advising. Third, inconsistent requirements increase the difficulty in determining comparable courses between institutions, because students must determine if a particular course will fulfill requirements at each individual university campus rather than at the UC or CSU system as a whole (Hill, 2006).

As described earlier, one way that public administrators have attempted to remove curriculum-related barriers of this kind is to create uniform patterns of general education courses that will apply to all public universities (Lauren, 2004). California has two such programs: the IGETC and CSU-GE patterns (CIAC, 2006). The TSDA program mitigated curricular barriers to transfer by specifying each student's intended SDSU major and by requiring students to complete a full transfer general education pattern such as IGETC or CSU-GE (SDCC, 2005). This facilitated the development of an education plan using only courses specific to the lower division requirements of the student's SDSU major.

Barriers to transfer that are not related to curriculum include economic, cultural, and academic preparation issues. Transfer students are often first-generation college students from families with lower incomes and less access to financial aid information (Turk, 1996). Many must work full-time to support

themselves. Some have children or others dependent on them for care. Some – particularly in southern California – are undocumented residents. Some students come from cultures that do not value higher education, or only value it for male members of the family. Finally, many transfer students arrive at the community college with poor levels of academic preparation, sometimes necessitating years of remedial basic skills education before starting university level coursework (Moore, et al., 2006; Turk, 1996). The TSDA program did not directly address non-curricular barriers to transfer. However, it was open to all students and was marketed through other CCC programs that were intended to address non-curricular barriers to transfer (M. Harvey, personal communication, March 5, 2008). For example, the TSDA program was promoted to students participating in California's Extended Opportunity Programs and Services (EOPS) program, which was intended to promote "…the enrollment, retention and transfer of students handicapped by language, social, economic and educational disadvantages, and to facilitate the successful completion of their goals and objectives in college" (CCCCO, 2005).

From a public policy perspective, transfer advising programs are valuable to the extent that they improve both the effectiveness and efficiency of the transfer process. That is, to be valuable to the taxpayer in terms of improving systemic efficiency, transfer advising programs must both increase transfer rates and do so in a cost-effective manner. Transfer advising programs "…should focus on increasing the return on the investment of public resources….It is to the benefit of students, and ultimately the state, if student success can be maximized

for any level of resource investment" (Shulock et al., 2008, p. vi). Economic analyses of the effectiveness and efficiency of the transfer process is therefore central to any effort to evaluate the utility of transfer advising programs.

Measures of Transfer Effectiveness

The construct of transfer effectiveness refers to the degree to which a program or process assists students to successfully transfer from a community college to a university. Transfer effectiveness is typically measured using one of two different metrics: transfer volume and transfer rate (Bradburn et al., 2001; Perry, 2007).

Transfer volume is a measure of the number of transfer students who move from a community college to a university in a given year (Perry, 2007). Various researchers have used transfer volume as a metric for evaluating the year-to-year efficacy of transfer services or the receiving capacity of universities. In 1989, for example, Berman-Weiler Associates conducted an evaluation of the transfer center pilot program following its three year term. The researchers determined that colleges participating in the pilot demonstrated an approximate 30% increase in the volume of students transferring to the UC system (although the number of students who transferred to the UC system was small to begin with, so this figure does not necessarily indicate a large increase in the number of transfers), with a much smaller increase to the CSU system (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; Farland & Anderson, 1989).

As another example, in research related to the flow of students through the transfer process, Shulock and Moore (2003, 2004) compared the metric of transfer volume to overall levels of CCC enrollment in order to examine the receiving capacity of universities and its effect on transfer. Despite significant increases in CCC enrollment, the researchers found "…the number of students successfully transferring to the state's public four-year institutions [had] remained remarkably flat – fluctuating between 50,000 and 60,000 students per year" (Shulock & Moore, 2003, p. 1).

Researchers at the California Community Colleges System Office also measured transfer volume on an annual basis as a means to assess the status of the transfer pipeline. Measurements conducted from 2001 to 2007 indicated that transfer volume had risen steadily from 2003 to 2007 academic year (Perry, 2007).

Researchers have identified several factors thought to affect the metric of transfer volume. These include factors related to the transfer *pipeline*, *process*, and *capacity*. Pipeline factors include "…student aspirations, social capital reflecting family and other support networks and their familiarity with higher education options, outreach efforts to recruit transfer students, and economic variables affecting students' perceptions of alternatives to pursuing the baccalaureate via the transfer process" (Shulock & Moore, 2003, p. 1). Process factors are defined as policies, services, and programs intended to facilitate the transfer process. These include routine advising services provided by counselors as well as transfer advising programs, articulation, and other efforts to ensure the

smooth flow of students from community college to university. Capacity factors are related to the ability of the receiving university to accommodate the influx of transfer students. Such factors include the overall budget and growth of receiving universities; competition in the educational marketplace, particularly between public and private institutions; course availability, program impaction, and other items that expand or constrict the ability of universities to accept incoming transfer students (Shulock & Moore, 2003, 2004; Perry, 2007). Capacity factors are an important consideration in any effort to increase transfer volume, because universities must be able to receive the additional transfer students:

> If all barriers to CSU and UC transfer were solved tomorrow, and a rapid increase of transfer-eligible CCC students ensued with no increased capacity to receive them, we would likely only increase the quality of the transfers to CSU and UC, not the quantity. (Perry, 2007)

While measuring transfer volume is useful in evaluating the transfer pipeline and capacity of receiving institutions, for practitioners attempting to improve the effectiveness and efficiency of the transfer process, transfer metrics mean little unless expressed as a ratio. The most commonly used ratio for measuring transfer effectiveness is known as a *transfer rate* and is calculated by dividing the total number of students who successfully transfer in a given range of years by the number of potential transfer students in a related cohort. There are many ways to define what a potential transfer student is, including full-time or part-time status, stated educational goal, and completed coursework (Berman et al., 1990; Bradburn et al., 2001; Cohen, 1999, 2005; Horn & Lew, 2007a; Prather, 2002).

One of the simplest is to define all students at a community college as potential transfer students. The transfer rate can then be easily calculated by dividing the number of transfers by the number of enrolled students. However, calculating a transfer rate in this manner rests on an assumption that all enrolled students actually intend to transfer. This is certainly not the case in the CCC system, with its other missions of vocational preparation, basic skills training, economic development, and community service (Gill & Leigh, 2004). In fact, research on students' reported goals upon entering community college demonstrates that

> …roughly one-third hope to transfer (with or without a degree) and another 10 percent intend to earn a formal credential (AA or vocational certificate). Thus, together less than half of CCC students report intentions to complete a formal course of study. Other students enroll to obtain or enhance job skills, for personal enrichment, or for obtaining basic or pre-collegiate skills. (Horn & Lew, 2007a, p. 2)

Instead, researchers often use a denominator that estimates the number of students who show the intent to transfer through their course-taking behavior (Berman et al., 2001; Horn & Lew, 2007a; Prather, 2002).

In research on the use of transfer rates, Horn and Lew (2007a) identified six different denominators that could be used in this calculation. These included the completion of any transferable units; the completion of 12 degree-applicable or transferable units; the *halfway milestone* of 30 completed transferable units; the completion of 12 transferable units and the enrollment in a transferable math or English course; the completion of a transferable math course; and the

completion of 60 transferable units including transferable math and English courses. The researchers then calculated transfer rates for three cohort groups of students using each of these six different denominators to arrive at transfer rates varying from 15% (using as a denominator the completion of any transferable units) to 67% (using as a denominator the completion of 60 transferable units including transferable math and English courses).

Despite the wide range of possible definitions of transfer rate, most researchers examining this metric have found that CCC transfer students exhibit transfer rates in the range of 20 percent to 40 percent (Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et al., 2003). For example, using a definition of transfer rate that includes a denominator equal to all students in the study group who had completed 12 transferable units and enrolled in a transferable math or English course, researchers at the CCCCO found that "…approximately one-third of all CC students meet the 'transfer-intended' criteria, and of these, approximately 40% of these [*sic*] students eventually transfer within six years of entrance" (Perry, 2007). Moreover, while CCC transfer rates appear to have risen somewhat between 2000 and 2006 (Horn & Lew, 2007; Perry, 2007), they have still remained low compared to those in other states (Bailey et al., 2007; Shulock, 2008).

In research intended to identify possible causes of variation in transfer rates among CCC campuses, Bahr et al. (2003, 2005) developed a quasi-experimental quantitative research method to measure the relationship between

transfer rates and a variety of characteristics associated with students attending 108 CCC campuses. This study used a nonequivalent control group design similar to that proposed in this dissertation research study, in which participants were non-randomly subjected to the independent variable, and the effect on the dependent variable was then measured. In this case, the transfer rates (the dependent variable) for a six-year cohort of students at 108 different community colleges were measured using National Student Clearinghouse data (Bougham, 2001) and statistically analyzed in relation to a variety of characteristics such as community college attended, average county income, and distance from the community college attended to the nearest CSU campus (the independent variables.) This analysis allowed the researchers to then calculate an expected transfer rate for each campus and the difference between the expected and actual transfer rates. To identify colleges exhibiting particularly low levels of transfer, the researchers calculated the interquartile range statistic (IQR) for the distribution of the differences between expected and actual transfer rates for all CCCs. Determining a measurement's distance from the IQR is "…the primary means by which 'outliers' are identified, making it a commonly accepted method of determination" (CCCCO, 2002, p. 43). In this case, using the IQR statistic the researchers identified one college that was a persistent outlier in terms of low rates of transfer over the three years the study encompassed.

Wassmer et al. (2003) expanded on the research conducted by CCCCO researchers by utilizing a similar research design but with three different cohort group models and a different set of independent variables, including age,

socioeconomic status, and ethnicity. Although the study did not incorporate control and experimental groups, the researchers were still able to reach interesting and relevant conclusions via the correlative relationships uncovered in the study and techniques used to statistically control for the influence of other variables. For example, the researchers found

> …compelling evidence of a racial/ethnic disparity in rates of transfer from California's community colleges. Factors other than socioeconomic status or academic preparation apparently account for transfer patterns among students of color, since [the] statistical method of analysis allowed [the researchers] to control for these factors. (p. 3)

Like the examples described above, most research related to transfer effectiveness has been performed at a system-wide or statewide *macro level*. However, policies, programs, and services designed to increase transfer effectiveness – such as those provided by transfer centers or transfer advising programs – are typically implemented at the *micro level* of the CCC campus. Research at the campus or program level may therefore be necessary to determine the efficacy of transfer-related programs and services. One such study was conducted by Turk (2006) in her evaluation of the transfer center pilot program's success in improving transfer rates. Through interviews with representative stakeholders and other qualitative research techniques, the researcher found that many involved parties reported that the project was less successful than hoped for, particularly in terms of generating numerical increases in transfers. Additionally, none of the follow-up studies cited found that the

transfer center pilot program succeeded in improving the number of transfers among ethnic minorities or other disadvantaged groups (Farland & Anderson, 1989; Turk, 1996). In fact, Turk (1996, pp. 170-171) found that “[w]hen segmental leaders and others interviewed were asked their opinion of the effectiveness of Transfer Centers, frustration with the lack of progress in generating more underrepresented student transfer generally describes their response.” In the same study, Turk reported that perhaps 500 more students transferred from the pilot project campuses than would otherwise have done so. However, when this data is viewed in conjunction with relative enrollment gains at the community colleges in question to create a simple transfer rate, the results are less clear. According to Turk (1996), among the pilot program colleges

> …seven campuses showed a strong (proportional) improvement in transfer to both senior systems after seven years, gains of between 12% and 59%. [However, in] four of the cases, the transfer gain matched or exceeded a general enrollment gain, while the other three campuses had transfer rates which increased, but at a lower rate than their enrollment increase. Of great concern is that eight of the Pilot Program campuses experienced unsettling declines in transfer after seven years, by as much as 39%, while their overall enrollment increased in every case but one. (pp. 204-205)

It is reasonable to assume that the colleges that received funding through the transfer center pilot project would benefit from 2 decades or more of established, well-funded transfer centers on campus. In fact, one might predict

that these colleges would have correspondingly higher contemporary transfer rates than CCC campuses that did not receive the pilot program funds. However, a review of the research conducted by Wassmer et al. (2003) that compared expected transfer rates to actual transfer rates shows that, of the 20 pilot program colleges, 11 had transfer rates that were lower than expected for the 1995 or 1996 cohort of students (this includes all students transferring within six years of those dates). Moreover, 9 of the 20 colleges had lower than expected transfer rates for both of these cohort years. Since such a result is no different than would be expected on average, it appears as though the establishment of pilot transfer centers has had no noticeable effect on the college's contemporary transfer rates.

Transfer rates have been a concern of the community college system and other stakeholders in California higher education since the establishment of the transfer center pilot program. For example, transfer rates are frequently cited in both research reports and the news media (Weiss, 2000). Districts and colleges often track their year-to-year transfer numbers and rates in order to meet state performance accountability requirements, improve their transfer programs and services, or promote the college's success as a transfer institution to potential students (CCCCO, 2003, 2007; SDCCD, 2005). Further research regarding transfer effectiveness at the campus or program level would aid practitioners in developing programs and services that improve transfer rates. Such improvements, when coupled with similar improvements in transfer efficiency,

also have the potential to generate significant systemic efficiencies for California's higher education system as a whole (Shulock et al., 2005).

Measures of Transfer Efficiency

In the field of public policy evaluation, ***efficiency*** "… is the relationship between effectiveness and effort, with the latter often measured in terms of monetary costs" (Dunn, 2004, p. 224). Transfer is often viewed as promoting efficiency in higher education because it costs less for to students complete the first 2 years of university work at a community college. However, as Dunn (2004) points out, the value of efficiency is correctly measured as a ratio of effectiveness to cost. While it may cost significantly less to complete 2 years of study at community college prior to starting at university, this will only equate to an efficient policy alternative if the education received at community college actually prepares a student to commence upper division university coursework. This phenomenon can also be expressed in terms of the overall number of units a student completes at community college and university that apply to the baccalaureate degree: More-efficient transfer programs result in lower total units per degree earned, while less-efficient transfer programs result in higher total units per degree. Efficient transfer processes resulting in lower total units per degree have the potential to provide significant cost savings to taxpayers (Shulock et al., 2005).

Most research regarding efficiencies in higher education has focused on those cost efficiencies realized by colleges and universities as independent entities, rather than the broader systemic efficiencies realized by an

intersegmental process such as transfer (Shulock et al., 2005). For example, Robst (2000) examined the relationship between cost efficiency in higher education institutions and the sources and amount of public funds supplied to the institution. The researcher found that larger university systems tend to be more cost efficient than smaller ones, and that institutions receiving the highest and lowest amounts of state funding tend to be less cost efficient than those in the middle ranges. Bowen (1980) also studied the relationship between institutional characteristics and a variety of efficiency-related dependent variables, such as total costs, costs per student, and student educational outcomes. Bowen also developed the revenue theory of cost (that cost per student is determined by the revenue available for educational purposes) and derived several laws of higher education costs related to cost efficiencies in educational institutions. Glass, McKillop, and Hyndman (1995) and Kinsella (2003) conducted research related to the cost efficiencies and economies of scale and scope in the teaching and research functions of universities. Finally, Mensah and Werner (2003) studied the relationship between financial flexibility (defined as the ratio of unrestricted net assets to total assets, or the degree to which an institution is free to determine how to expend its revenue) and cost efficiency. The results indicated that higher financial flexibility was associated with greater cost inefficiency. The authors hypothesized this is a causal relationship, in that the degree of financial flexibility led to cost efficient or inefficient behaviors. Interestingly, this conclusion runs counter to those from other researchers who argue that organizations should be

granted more flexibility in the way they target the use of public funds (Shulock & Moore, 2005, 2007b; Shulock et al., 2008; Sonstelie & Richardson, 2001).

Other researchers studying efficiency in education have focused on the construct of bureaucratic costs, both as a measure of the size of institutional administration and of the amount of non-instructional procedures required as part of the college attendance process. Bothe (2001) examined the relationship between bureaucratic size in educational institutions and student academic outcomes using multiple regression models. His results indicated a negative correlation between increased levels of bureaucracy and student educational achievement. Davis (2002) examined the relationship between institutional procedures and student performance by using the metric of bureaucratic transaction costs. The researcher demonstrated a significant negative correlation between students' GPA (a measure of their performance) and their perceptions of the bureaucratic transaction costs associated with attending college.

Similar to research conducted on efficiencies in universities, studies of efficiencies in community colleges have generally focused on institutional efficiencies – such as reductions in course delivery costs, streamlining business operations, and economies of scale – rather than systemic efficiencies. For example, Beckman (1996) conducted research into strategies adopted by community colleges to increase cost efficiency. Based on the results of this study, the researcher presented best practices organized into the categories of business operations and facilities; curriculum and instruction; networks, technology, and distance education; planning and budgeting, and; student

services. As another example, in their research on the proliferation of mission areas assigned to community colleges in the U.S., Bailey and Morest (2004) presented a strategy for increasing organizational efficiency by integrating and coordinating the disparate missions of community colleges.

Some research related to systemic efficiencies, and specifically related to the efficiency of the transfer process, has also been conducted. For example, researchers associated with the Florida State Legislature (2002) found that 20% of upper division transfer students completed at least one semester of lower division courses after transfer to a university, of which 51% were required to meet university degree requirements. In a study of CCC transfer students, the University of California (2005) utilized a phenomenological focus group research design to examine why students transfer with excessive units of credit (that is, more than the maximum accepted by the university toward the baccalaureate degree). In this case, the researchers interviewed two groups of CCC transfer students – one group with excessive numbers of units at transfer and one group with the maximum accepted by the university or less. The objective of the research was to identify independent variables that had an effect on the dependent variable of unit accumulation prior to transfer. The researchers found that most students attributed their excess units to “1) the exploration of various fields of study, 2) a decision to change majors, 3) erroneous advice from a CCC adviser, and 4) preparation for multiple universities with varying admission or selection requirements” (University of California, 2005, p. 1). In the same study, the researchers reported that transfer students as a whole take longer than

native university students to complete a university degree: On average, students spent about 3.5 years at community college prior to transfer and then an additional 2.5 years at the UC system after transfer in order to complete the bachelor's degree. Similar results have been reported for students transferring to the CSU system (Kegley & Kennedy, 2002; Ssemakula, 2003).

Research such as the University of California studies described above suggests that transfer inefficiency is believed to be caused primarily by matters related to curriculum and course advising: students often change educational or career goals; they complete requirements for multiple destinations in case they are not admitted to their preferred campus; they incorrectly assume the requirements for an associate degree are identical to the requirements to transfer; they have excessive remedial or prerequisite work to complete before entering their transfer courses, or; they receive incorrect, incomplete, or no transfer course advising. Paralleling these causes, researchers have proposed solutions such as improved community college counseling and advising services and increased standardization and simplification of transfer coursework requirements among public universities (California Educational Round Table Intersegmental Coordinating Committee, 2004; California State University, 2006; Hill, 2006; University of California, 2005).

The studies cited above measured transfer efficiencies in terms of student course-taking behavior. That is, researchers examined the number of units or the amount of time students took to transfer or complete the bachelor's degree. While excessive units or time to degree unquestionably represent additional

costs to taxpayers, there is little research in the literature that specifically measures the associated economic costs and benefits of transfer programs. To illustrate: results of the qualitative University of California study (2005) indicated that many students felt they had completed excessive units due to uncertainty about their intended major or a decision to change majors. A transfer advising program specifically designed to assist students in early exploration and decision-making about their university major would be a logical way to address this problem. However, from an overall cost efficiency standpoint, such a programmatic solution only makes sense if the monetary cost to state taxpayers of providing such a program is less than the savings it produces by reducing the average number of units per degree among student participants.

While few studies of transfer economic efficiency have actually been performed using an economic cost-benefit construct such as the hypothetical example illustrated above, some research has been conducted that includes monetary cost data. Results from studies of this kind can be extrapolated to arrive at conclusions about the economic efficiency the phenomena being studied. For example, in her evaluation of the transfer center pilot program, Turk (1996) reported that perhaps 500 more students transferred from the pilot project campuses during the 3 years of program operation than would otherwise have done so. While on the face of it this result sounds encouraging, an analysis of this figure in terms of programmatic cost efficiency indicates that the transfer center pilot program appears to have been very inefficient in terms of cost per transfer. Dividing the total program cost of $3.37 million by the estimated 500

additional transfers generated demonstrates that it cost the state approximately $6,740 in 1986 dollars to generate each additional transfer resulting from the program. This figure was more than the cost to the public for a student to attend a CSU campus full time for a year (Murphy, 2004). Extrapolating the data in this manner demonstrates that the transfer center pilot program was an inefficient use of public resources, since each additional transfer generated by the program cost significantly more than it would have to simply provide additional space for these students as freshmen at a university.

Summary

Transfer has historically been one of the primary missions of community colleges nationwide (Brossman & Roberts, 1973; Bailey & Morest, 2004). In California, transfer is considered an indispensible component of the state's higher education system, both because of the large number of students who enjoy the advantages of the transfer process and because of the economic and social benefits that transfer provides to the public (Dee, 2003; Kegley & Kennedy, 2002; Moore et al., 2007; Shulock & Moore, 2005; Shulock et al., 2005).

In order for California to remain economically viable through 2025, the California higher education system must produce many more college graduates than it currently generates (Baldassare & Hanak, 2005; National Center for Public Policy and Higher Education, 2006; Sengupta & Jepsen, 2006; Moore et al., 2007; Shulock et al., 2008). Despite significant problems related to system funding, changing student characteristics, and capacity (Murphy, 2004; Horn & Lew, 2007b; Lauren, 2004; Shulock & Moore, 2003; Peter & Cataldi, 2005;

Townsend, 2001), the CCC system must be a central part of the solution to producing more college graduates. This is true both because of the large number of students the system enrolls and because of the cost efficiencies associated with the CCC transfer process (Little Hoover Commission, 2000; Perry, 2008; Shulock et al., 2008). Moreover, there is mounting public pressure to hold administrators at educational institutions accountable for the effectiveness and cost efficiency of the outcomes they produce, including metrics related to transfer (Burke, 2002; Burke & Modarresi, 1999; Hudgins & Mahaffey, 1998; Little Hoover Commission, 2000; NCAHE, 2005; Rubenstein et al., 2003; Rubin, 2003; Stillman, 1996).

The transfer process is an essential component to increasing the number of college graduates in a cost efficient manner, because it theoretically costs the taxpayer much less to educate a transfer student than a student who begins university as a freshman. However, this is only true if the courses a student completes at community college ultimately apply towards the requirements of the baccalaureate degree. Research in this field indicates that both the effectiveness and efficiency of California's transfer process is relatively low (Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; University of California, 2005; Wassmer et al., 2003).

Efforts to improve the transfer process have focused on the establishment of transfer centers and transfer advising programs on CCC campuses. Few studies have measured the effectiveness and systemic efficiencies resulting from such campus-based programs (Shulock, 2008; Shulock & Moore, 2004, 2007;

Shulock et al., 2005; Turk, 1996). However, such analyses, especially from the perspective of relative economic costs and benefits, would be most useful to public administrators and policymakers who must choose between various program and policy alternatives based on criteria related to measurable, effective, and cost efficient outcomes.

CHAPTER 3: METHODOLOGY

Overview

The primary research question addressed in this quantitative study was: *What effect, if any, does student participation in community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system?* To answer this question, the outcomes of a transfer advising program administered at a CCC campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between students who participated in the transfer advising program and students who did not. The population target frame consisted of potential transfer students who attended a CCC campus.

All data to be used in the study were obtained using archival research techniques from existing historical student records, such as transfer program administration records and student transcripts. No students were contacted or questioned as part of the study and no student records left the facilities and/or computer networks of the district. Instead, a separate electronic database was created as the instrument to facilitate analysis of the data for purposes of the study. In this instrument, all subjects were identified only by an anonymous subject number (subject number 1, 2, 3, etc.). The data in this instrument were analyzed through the use of statistical spreadsheet templates developed by

Aczel & Sounderpandian (2006). The analysis consisted of descriptive statistics, the chi-square test, and the 2-tailed *t*-test.

Restatement of the Problem and Purpose

The problem of low transfer rates (that is, the number of students who successfully transfer out of the number who demonstrate the intent to do so) has been well documented by researchers over the past decade. For example, several researchers have calculated that only 20% to 40% of students demonstrating the intent to transfer from a CCC to a university actually do successfully transfer (Bradburn et al., 2001; CCCCO, 2002; Sengupta & Jepsen, 2006; Wassmer et al., 2003). The related problem of unnecessary coursework completed as part of the transfer process has also been explored and cited as an area of growing concern (Florida State Legislature, 2002; Hill, 2006; Palmer et al., 1994; University of California, 2005).

Low transfer rates and unnecessary transfer coursework are significant problems in California's higher education system because they mitigate the social and financial benefits realized by a successful transfer process. Specifically, transfer facilitates access to a bachelor degree for those who would not otherwise be able to attend college; it relieves pressure for immediate access to universities by high school graduates; and it is theoretically an excellent financial investment for individual students and for the state. However, if students do not successfully transfer or transfer with large numbers of unnecessary units, these benefits are greatly diminished or eliminated altogether.

Other researchers, practitioners, and state policymakers have suggested that these problems are caused primarily by factors impacting students' educational planning process at the community college (ASCCC, 2003; Bers et al., 2001; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cejda & Kaylor, 2001; Hill, 2006; ICAS, 2005; Shulock & Moore, 2003, 2004; Turk, 1996; Wechsler, 1989). Various solutions have been proposed, including increasing the numbers of community college counselors, standardizing and simplifying transfer coursework requirements among public universities, and providing transfer advising programs that aid students at navigating the transfer process (ASCCC, 2003; California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cohen, 2005; Handel, 2006; Hill, 2006; Hungar & Lieberman, 2001; ICAS, 2005; Shulock & Moore, 2004; Turk, 1996).

From a public policy standpoint, these proposed solutions are only desirable if the benefits they provide exceed the additional costs they represent to the taxpayer. Economic analyses of these proposals are therefore essential to determine the extent to which they produce effective and cost efficient outcomes.

The purpose of this quantitative study was to assess the effectiveness and economic efficiency of community college-based transfer advising programs. The primary research question to be addressed was: *What effect, if any, does student participation in community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public*

higher education system? To answer this question, the outcomes of a transfer advising program administered at a CCC campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between students who participated in the transfer advising program and students who did not. The population target frame consisted of potential transfer students who attended a CCC campus.

Statement of Research Questions/Hypotheses

The following research question statements (Q), null hypotheses (H_0) and alternative hypotheses (H_A) were used in the study:

Q1: What is the difference, if any, in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not?

$H1_0$: There is no difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not.

$H1_A$: There is a significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not.

Q2: What is the difference, if any, in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not?

$H2_0$: There is no difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not.

$H2_A$: There is a significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not.

Q3: What is the difference, if any, in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not?

$H3_0$: There is no difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not.

$H3_A$: There is a significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not.

Description of Research Design

The research questions were studied using a nonequivalent control group research design. This is one of several specific designs belonging to the family of quantitative, correlational, quasi-experimental research designs. This design was advantageous for studying the research questions for several reasons. First, all of the variables to be studied were quantifiable, which suggested the use of a quantitative, vice qualitative, research design. Second, the relationships underlying the research questions were essentially correlational in nature. Third,

the events to be studied had already occurred. This fact prevented the direct manipulation of variables by the researcher and the random selection of subjects into control and experimental groups, which precluded the use of a true experimental design (McMillan & Schumacher, 2001; Rudestam & Newton, 2001). However, the events studied did occur in a temporal sequence and did involve the (nonrandom) selection of subjects into control and experimental groups. These facts indicated that an *ex post facto* quasi-experimental design intended "…to investigate whether one or more preexisting conditions have possibly caused subsequent differences in the groups of subjects" (McMillan & Schumacher, 2001, p. 310) was most appropriate (McMillan & Schumacher, 2001; Trochim & Donnelly, 2007). Finally, the study included data taken from two nonrandom subject groups – one group that was subject to the independent variable (a transfer advising program) and one group that was not. This structure suggested the use of a posttest-only nonequivalent control group research design (Trochim & Donnelly, 2007).

The constructs of interest in this study were measured through the use of the independent variable program participation (X) and three dependent variables: transfer effectiveness (Y_1), transfer course efficiency (Y_2), and transfer cost efficiency (Y_3). These variables were selected to explore the research questions because they measured characteristics of the subject group that occurred in a temporal sequence, therefore facilitating the use of the nonequivalent control group research design. That is, subjects first participated or did not participate in a transfer advising program (leading to a measurement of

X), then either received an offer of university admission or did not (leading to a measurement of Y_1), and then completed community college coursework prior to transfer (leading to measurements of Y_2 and Y_3). The conceptual and temporal relationship between these variables is illustrated below (Figure 1).

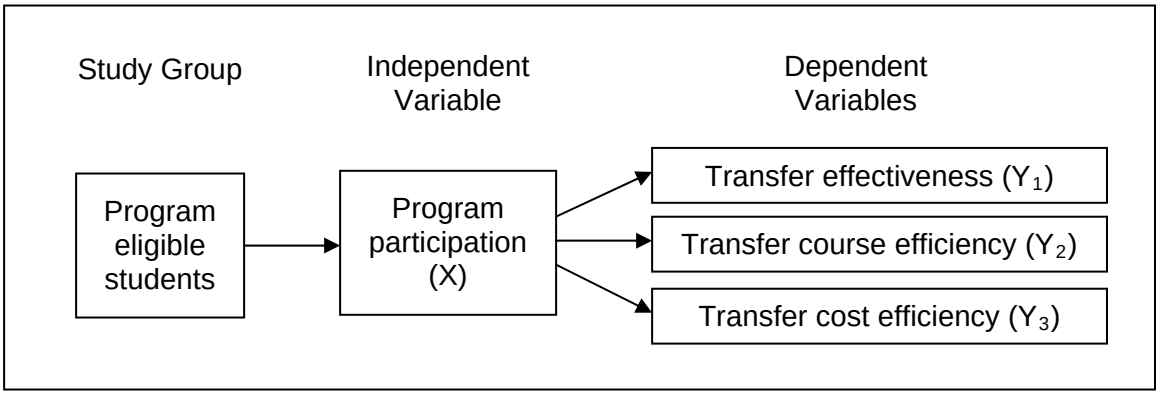

Figure 1. Construct relationship model

Once the variables of interest were measured, they were subjected to four statistical analyses. First, descriptive statistical values such as the mean, median and standard deviation were calculated for each of the dependent variables. These statistics were used to produce an overall representation of the data set and tools for visual analysis.

Second, the statistical significance of the difference in Y_1 values was calculated using the chi-square statistic (χ^2). This statistic is typically used to measure the extent to which observed frequencies of nominal-level data differ from expected frequencies if the null hypothesis is correct (Cozby, 2007). In this case, the chi-square statistic was used to test the difference between the observed and expected levels of transfer effectiveness (Y_1) for program participants and non-participants (X) as stated in research question Q1.

Third, the statistical significance of the difference in Y_2 values was calculated using a t ratio (*t*) statistic. This statistic is typically used to examine the difference between two population means using independent sampling when the population standard deviations are unknown (Aczel & Sounderpandian, 2006). In this case, the *t* statistic was used to examine the difference in the resultant levels of transfer course efficiency (Y_2) between program participants and non-participants (X) in accordance with research question Q2.

Fourth, the statistical significance of the difference in Y_3 values was calculated using a t ratio (*t*) statistic. The *t* statistic was used to examine the difference in the resultant levels of transfer cost efficiency (Y_3) between program participants and non-participants (X) in accordance with research question Q3.

This research design was subjected to statistical power analysis in order to analyze its appropriateness and feasibility in answering the research questions. Power analysis is the process of evaluating a prospective research design and its associated statistical tests to determine the probability that the design will actually detect the effect under examination when that effect is truly present (Schoenfeld, 2007; Trochim & Donnelly, 2007). Using online software designed by Lenth (2006), power analyses were conducted for each of the non-descriptive statistical tests intended for use in the study (descriptive statistics do not include tests for statistical significance, and therefore are not appropriate for use in power analysis). Specifically, power analyses were conducted for the chi-square test for Y_1 and the t-test for Y_2 and Y_3 (Table 1).

Table 1

Results of Power Analyses

Variable(s)	Statistical test	Power Analysis Results
Y_1	Chi-square	.9337
Y_2 and Y_3	T-test	.9853

For the power analysis of the chi-square test for Y_1, sample size was set at 120, since samples of 60 subjects each were used for the two independent variable subgroups. Effect size was set at .10, as it was estimated that a 10% change in Y_1 would be of practical use to public decision-makers in the field of transfer. To illustrate, according to researchers at the CCCCO (2002) a 10% increase in transfer effectiveness (i.e., transfer rate) at a CCC campus would be sufficient to move that campus from among the 10 lowest performing colleges in the state to the level of the average performing college in the state. Alpha level was set at .05, as per standard practice in social science research (Cozby, 2007). Using these parameters, the power analysis resulted in a power of .9337, which was judged to be more than adequate given the standard of .80 or greater that is generally used in social science research (Trochim & Donnelly, 2007).

For the power analysis of the t-tests for Y_2 and Y_3, sample size was set at 120. Effect size for both Y_2 and Y_3 was set at .20, as it was estimated that a 20% change in either ratio would be of practical use in the field. To illustrate, a 20% change in Y_2 for a student who has completed the maximum number of units at

community college acceptable toward the baccalaureate degree represents 14 units, or approximately one semester of full-time study. One semester is typically the shortest period of time a student can wait before attempting to transfer after an initial failure to do so. Therefore, one semester of full-time coursework, or approximately 14 units, serves as a reasonable estimation of the minimum relevant effect size for this variable. Standard deviation for both Y_2 and Y_3 was set at .57, which was evaluated as a conservative estimate of the maximum possible standard deviation for the potential data set. This estimate was calculated based on the assumption that, on average, students complete at least 30 units of pre-transfer coursework that can be applied to the bachelor's degree out of the theoretical maximum of 70 units. The value of 30 units was selected because it is the minimum number of general education coursework units required to transfer to the CSU system (California State University, 2004). This estimate of standard deviation was assumed to be valid for Y_3 as well as Y_2 because both values are ratios and are related measures of the same phenomenon. Alpha level was set at .05. Using these parameters, the power analysis resulted in a power of .9680, which was judged to be more than adequate given the standard of .80 or greater that is generally used in social science research (Trochim & Donnelly, 2007).

Operational Definition of Variables

The constructs of interest in the study were measured through the use of the independent variable *program participation* and three dependent variables: *transfer effectiveness*, *transfer course efficiency*, and *transfer cost efficiency*.

Program participation. This independent variable (X) was a nominal-scale variable describing the subject's participation or non-participation in the San Diego State University (SDSU) – San Diego City College (SDCC) Transfer Studies Degree Agreement (TSDA) program, as evidenced by the subject and counselor preparing, signing, and submitting a TSDA program agreement form. The variable X was defined as positive for students who participated in the TSDA program and negative for students who did not participate in the TSDA program. This variable was nominal because each subject could be categorized into one of two mutually exclusive categories (either the subject participated in the TSDA program or the subject did not). This operational definition was the same as that used in the research setting at SDCC (2005) and was similar to definitions used in other research on transfer-related programmatic interventions (Ashburn, 2007; Farland & Anderson, 1989; see also Berman et al., 1990; California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006; Handel, 2006).

Transfer cost efficiency. This dependent variable (Y_3) was a ratio-scale variable describing the relative economic cost or benefit of a transfer advising process or program for a particular subject. It was defined as: $Y_3 = (C_C\ U_M) / \{(C_C\ U_C) + [U_U\ (C_U - C_C)] + C_A\}$, where:

C_A = Cost of the additional transfer advising provided to the subject.

C_C = Cost to taxpayers per unit of coursework at community college (SDCC).

C_U = Cost to taxpayers per unit of coursework at university (SDSU).

U_C = the number of lower division transferable units that a subject completes prior to transfer.

U_M = the maximum number of transferable units that can be completed at community college and applied to the baccalaureate degree after transfer (70 in this case).

U_U = the number of units that a subject must complete at the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer.

Transfer cost efficiency was the ratio of the theoretically lowest possible cost associated with transfer coursework and advising to the actual observed cost. The numerator was calculated by multiplying the cost per unit of community college coursework by the maximum number of units that can be completed at the community college and applied to the baccalaureate degree after transfer. The denominator was calculated by adding together the cost of all units completed at community college, the additional cost associated with taking courses at university that could have been completed at a lower cost at community college, and the cost of any additional transfer advising (such as that provided in the TSDA program). A higher number represented closer alignment between the theoretically lowest possible cost and the actual observed cost, and therefore higher cost efficiency. A value of one indicated theoretically perfect cost efficiency – that is, all units taken at community college will fulfill baccalaureate degree requirements with no excess cost involved. This operational definition was based on the construct of efficiency in public program evaluation (Dunn,

2004) and was similar to that used in other research on cost efficiency in the administration of public education (Beckman, 1996; Burke, 2002; Gill & Leigh, 2004; Glass et al., 1995; Kinsella, 2003; Hagedorn, 2004; Shulock & Moore, 2005).

Transfer course efficiency. This dependent variable (Y_2) was a ratio-scale variable describing the degree to which a subject completed coursework at the community college that fulfills requirements for the baccalaureate degree. It is defined as: $Y_2 = U_M / (U_C + U_U)$. A higher number represented a higher proportion of units completed at community college that will fulfill requirements for the baccalaureate degree. A value of one indicated theoretically perfect course efficiency – that is, all units taken at community college will fulfill baccalaureate degree requirements, and no units must be completed at university that could have been completed at community college. This operational definition was based on the construct of efficiency in public program evaluation (Dunn, 2004) and was similar to that used in other research on the efficient application of transfer coursework (Florida State Legislature, 2002; University of California, 2005; Kegley & Kennedy, 2002).

Transfer effectiveness. This dependent variable (Y_1) was a nominal-scale variable describing the subject's success or failure in transferring, as evidenced by the subject having received an offer of admission to SDSU for the fall 2006 term. The variable Y_1 was defined as positive for students who received an offer of admission and negative for students who did not receive an offer of admission. This variable was nominal because each subject could be categorized into one of

two mutually exclusive categories (either the subject received an offer of admission or the subject did not). For each independent variable category, a higher number of admission offers represented a higher rate of transfer, and therefore a more effective process. This operational definition was similar to that used in other research related to the calculation of transfer volumes and rates (Bahr et al., 2003; Bradburn et al., 2001; CCCCO, 2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et al., 2003; see also Shulock & Moore, 2003, 2004).

Description of Materials and Instruments

Variables in this study were measured using the technique of *archival research*, which "…involves using previously compiled information to answer research questions. The researcher does not actually collect the original data. Instead, he or she analyzes existing data…" (Cozby, 2004, p. 118). In this case, the data to be analyzed consisted of statistical records maintained by the SDCCD and other existing publicly available records. Data obtained directly from these records were coded in a Microsoft Excel workbook, which was used as the primary instrument to analyze the variables of interest derived from this data (included as Appendix A). Four categories of records were analyzed in order to populate this instrument with data:

Record A was a database of students who participated in the fall 2006 TSDA program. This database included fields for student name, college identification number, intended date of transfer to SDSU, and other related information. The database was constructed by SDCC staff members who coded

information directly from the TSDA program agreement forms to the computer database. Record A was used to measure the variable program participation (X).

Record B was a list of all SDCC students who applied to SDSU for the fall 2006 term, with an indication of whether or not each student was offered admission and other student-specific information, such as the student's college of attendance, previous baccalaureate degree (if any), and intended SDSU major. This list was constructed by SDSU admissions personnel using data obtained from student admission applications. Record B was used to identify the study group, to measure the variable transfer effectiveness (Y_1), and to determine each subject's intended SDSU major as a component of determining U_U.

Record C was electronic database of student transcript information maintained by SDCCD. This database included official records of all college courses completed by each subject in the study, including courses completed at colleges outside the SDCCD and evaluated for transfer applicability. This database was constructed by SDCCD personnel using official enrollment and grade information provided by SDCCD instructors and transcript evaluators. Record C was used to determine U_C and U_U using a transcript analysis technique related to that employed by Hagedorn (2005). The values U_C and U_U in combination with values obtained via Record D were used to measure the variables transfer course efficiency (Y_2) and transfer cost efficiency (Y_3).

Record D was defined as a set existing publicly available documents such as university admission publications, state funding reports, articulation agreements, research reports, and SDCCD salary schedules that collectively

were used to determine or estimate the values U_C, U_U, U_M, C_U, C_C, and C_A. For example, U_M was determined by consulting *The California State University admission handbook, 2005-2006* (California State University, 2004). All cost data measured in Record D (C_U, C_C, and C_A) were taken from the 2005-06 academic year, in order to maintain consistency of dollar values, ensure valid ratio calculations, and correspond with the time period under investigation.

The instrument described above was assessed as having high reliability, high construct validity, relatively high internal validity, and moderate external validity. Reliability "…refers to the consistency or stability of a measure of behavior" (Cozby, 2004, p. 92) and can be thought of as consisting of a *true score* and a *measurement error*. The data used in the instrument came from official college, university, and state records. They were therefore likely to have a very low measurement error and a corresponding high level of reliability. For example, measurement errors in the coding of student grade information (such as typos) were likely to be noticed and corrected by the students themselves, who typically have high interest in ensuring that their transcripts accurately reflects the grades they earned in their classes.

Validity refers to "…the accurate representation of information. Research instruments can be described and evaluated in terms of three types of validity: construct validity, internal validity, and external validity" (Cozby, 2004, p. 86).

Construct validity refers to whether or not the variables being measured are truly representative of the construct in question. In this case, the variables and constructs appeared to be closely related – that is, the variables recorded in

the instrument had high face validity (Trochim, 2007). For example, the variable transfer effectiveness (Y_1) was intended to measure the construct of how well a program actually assisted students in gaining admission to a university. Y_1 was determined from Record B, which contained student-by-student admission data, compiled by university admissions personnel. University admission records of this sort are undoubtedly the most accurate means to measure the construct of university admission (although other means exist, including measures of *transfer prepared* and *transfer ready* students) (CCCCO, 2003).

Internal validity "…refers to the ability to draw conclusions about causal relationships from our data" (Cozby, 2004, p. 87). The design of this study was intended to maximize the internal validity of the variables measured. The study examined two groups of students drawn from the same population – one group that received a special type of advising service and one group that did not. The advising service was expressly intended to increase transfer effectiveness and transfer course efficiency (therefore demonstrating a logical connection between independent and dependent variables), and it occurred temporally before the intended effects. The record used to document the presence of the advising service also supported a high level of internal validity, because the data in it were coded directly from the advising program agreement forms signed by the students and counselors. These forms were the documents used to actually enroll students in the advising program, and therefore were a very accurate way to measure student participation or non-participation.

External validity is degree to which results can be generalized to other groups and settings (Cozby, 2004). In this case, the results of the study are evaluated as having a moderate degree of external validity. The variables being measured (such as participation in transfer advising programs, university admission rates, etc.) do exist in other settings, such as other community colleges. However, the general population of students and the specific procedures of each advising program may be different. For example, the type and frequency of student course advising provided through the TSDA program may not be the same as for other transfer advising programs at other institutions. Therefore, the instrument and procedures used to measure variables related to the TSDA program may not be appropriate or accurate for other programs in other settings.

Selection of Participants or Subjects

The overall population studied consisted of potential transfer students attending SDCC, a representative CCC campus. The overall population of CCC students encompassed a broad range of characteristics:

> In 2003, half of all students were aged 17 to 20, but almost two out of five students were over age 25…. Females outnumbered males, and this difference increased with age. About 40 percent of entering community college students were white, about 30 percent were Latino, and almost 15 percent were Asian/Pacific Islander (API). Most had high school diplomas, but substantial numbers of students without diplomas or with postsecondary degrees also attended….Younger students usually

> enrolled in transfer courses, while older students focused on vocational education and noncredit courses. (Sengupta & Jepsen, 2006, p. 1-2)

The student population at SDCC was reasonably representative of the overall CCC student population in terms of diversity. In 2003, slightly less than half of all SDCC students were aged 18 to 24 and slightly more than half were female. About 37% of entering students were white, about 27% were Latino, and about 12% were Asian/Pacific Islander (SDCCD, 2003).

The target population consisted of all potential SDCC transfer students. Potential transfer students have often been defined as students who demonstrate the intent to transfer through either official statements (such as listing transfer as an educational objective on an admission application) or behavior (such as enrolling in transfer preparation coursework, Bradburn et al., 2001). In this case, the pool of potential transfer students was identified through their behavior as evidenced by their applying for admission to SDSU for the fall 2006 term. SDSU was by far the most common transfer university among all SDCC students between 1995 and 2004 (SDCCD, 2005), and therefore likely to be the most representative of the population of all potential SDCC transfer students. The group of subjects studied within this target population was drawn, at random, from all *program eligible students*. This group was defined as all students who were enrolled at SDCC, eligible for the TSDA program, and subsequently applied for admission to SDSU for the fall 2006 term. In order to be eligible for the TSDA program, students must have completed at least 50% of their CSU-transferable

units in the SDSU service area and have obtained a 2.0 cumulative GPA or higher in all transferable coursework.

No students were contacted or questioned as part of the study. Instead, all subject data were derived from historical student records using archival research techniques. Individual student records were selected for inclusion in the subject group using stratified random sampling. This sampling technique was used to divide the population of interest into homogeneous subgroups and then select a random sample from each subgroup. Stratified random sampling ensured that the study represented not only the overall target population, but also minority subgroups within the population (Trochim & Donnelly, 2007). In this case, the group to be studied was drawn from all program eligible students. This group was divided into subgroups based on the value of the variable program participation (X). A random sample of 60 students was selected from each X subgroup for inclusion in the study database. This technique ensured that both X subgroups were equally represented in the study.

Access to student records for use in this study was provided by SDCC, subject to several procedural safeguards to ensure confidentiality: Student records were viewed only by people who have already been granted access to them as part of their normal employment with SDCCD. No student records left the facilities and/or computer networks of the district. Instead, a separate electronic database was created to facilitate analysis of the data for purposes of the study. In this separate database, all subjects were identified only by an anonymous subject number (subject number 1, 2, 3, etc.). No identifiers that

could tie specific student information to a particular individual (such as name, social security number, or student ID number) were used in the study database, removed from SDCCD facilities and/or computer networks, or viewed by individuals not already authorized to do so.

Procedures

The following procedures were followed to carry out the study:

1. The researcher obtained permission from SDCC and authorization from the Northcentral University Institutional Review Board to access historical student records in order to conduct the study, subject to safeguards to maintain confidentiality.

2. The researcher obtained access to Record A, which was a database of students who participated in the fall 2006 TSDA program.

3. The researcher obtained access to Record B, which was a list of all SDCC students who applied to SDSU for the fall 2006 term, with an indication of whether or not each student was offered admission.

4. The researcher obtained the following information pertaining to the 2005-06 academic year from Record D, which was a set of existing publicly available documents:

a. An estimate of average counselor and support staff time spent per TSDA contract, estimated at 1 hour of counselor time and 15 minutes of support staff time per TSDA contract (M. Harvey, personal communication, September 8, 2008).

b. An estimate of the average marginal hourly cost of counselor time and benefits, estimated to be $57.19 per hour (*AFT Guild, Local*, 2007a; J. Nickles, personal communication, May 15, 2008).

c. An estimate of the average marginal hourly cost of support staff time and benefits, estimated to be $20.29 per hour (*AFT Guild, Local*, 2007b; J. Nickles, personal communication, May 15, 2008).

d. The cost per unit to state taxpayers for a student attending a CCC campus, calculated to be $182.03 per unit (Community College League of California, 2007).

e. The cost per unit to state taxpayers for a student attending a CSU campus, calculated to be $387.47 per unit (Community College League of California, 2007).

f. The maximum number of transferable units that can be completed at community college and applied to a baccalaureate degree at a CSU campus after transfer (U_M), found to be 70 units (California State University, 2004).

g. The lists of SDCC articulated courses that fulfilled SDSU lower division general education requirements. Specifically, these were the IGETC (ASSIST Coordination Site, 2005b) and CSU GE-B patterns (ASSIST Coordination Site, 2005c).

h. The list of SDCC articulated courses that fulfilled SDSU lower division major preparation requirements for each SDSU major (ASSIST Coordination Site, 2005d).

6. The researcher created a new Microsoft Excel workbook with the following column headers: Subject; X; Y_1; Y_2; Y_3; C_A; C_C; C_U; U_C; U_M; U_U. This was the instrument used to consolidate data and analyze the variables of interest in the study. Figure 2 is a representation of this instrument. The completed instrument is included as Appendix A.

7. The researcher determined the study group of all program eligible students by identifying all students who both: (a) Applied to SDSU for the fall 2006 term, and; (b) were enrolled at SDCC and eligible for the TSDA program. To make this determination, the researcher analyzed Record B to determine if each student met the following eligibility criteria for the TSDA program: (a) Enrolled at SDCC during the 2004-2005 academic year; (b) No previous attendance at SDSU; (c) No previous baccalaureate degree awarded; (d) Intended major at SDSU something other than Dance; Nursing; Music; Television, Film, and New Media Production; Theatre Arts, Emphasis in Design and Technology for the Theatre; Theatre Arts, Emphasis in Design for Television and Film; Theatre Arts, Emphasis in Performance, or; Community Health Education (San Diego City College, 2005).

c. The researcher excluded all students who did not meet the eligibility criteria for the TSDA program. The remaining 371 students constituted the study group of all program eligible students.

8. The researcher divided the study group into two subgroups based on the value of X, as measured in Record A. The 106 students who were listed in

Record A were assigned a positive value of X. The 265 students who were not listed in Record A were assigned a negative value of X.

9. The researcher selected a random sample of 60 from each X subgroup using the technique of stratified random sampling and an online random sequence generator developed by Haahr (2008).

10. The researcher assigned an anonymous subject number (subject number 1, 2, 3, etc.) to each of the 120 subjects selected in step 4. The 60 randomly selected subjects with a negative value of X were assigned numbers 1-60. The 60 randomly selected subjects with a positive value of X were assigned numbers 61-120.

11. The researcher entered the value of X, as measured in Record A, into the instrument for each subject by anonymous subject number. The 60 subjects with a negative value of X (no program participation) were coded with a 0. The 60 subjects with a positive value of X (program participation) were coded with a 1.

12. The researcher entered the value of Y_1, as measured in Record B, into the instrument for each subject by anonymous subject number. Subjects with a positive value of Y_1 (received an offer of admission) were coded with a 1. Subjects with a negative value of Y_1 (did not receive an offer of admission) were coded with a 0.

13. The researcher entered a Microsoft Excel formula corresponding to the equation $Y_2 = U_M / (U_C + U_U)$ in the Y_2 column for each subject with a positive value of Y_1. Y_2 was only calculated for subjects with a positive value of Y_1 because the construct of transfer course efficiency is meaningless for

students who did not actually transfer (specifically, U_C and U_U could not be determined for subjects who had not yet completed their pre-transfer coursework).

14. The researcher entered a Microsoft Excel formula corresponding to the equation $Y_3 = (C_C\ U_M) / \{(C_C\ U_C) + [U_U\ (C_U - C_C)] + C_A\}$ in the Y_3 column for each subject with a positive value of Y_1. Y_3 was only calculated for subjects with a positive value of Y_1 because the construct of transfer cost efficiency is meaningless for students who did not actually transfer (specifically, U_C and U_U could not be determined for subjects who had not yet completed their pre-transfer coursework).

15. The researcher entered the value of C_A into the instrument for each subject with a positive value of Y_1. C_A was entered as 0 for subjects with a negative value of X, because subjects who did not participate in the TSDA program did not generate any additional cost to the taxpayer as a result of this program. For students with a positive value of X, C_A was calculated as $62.26 from the following values estimated in Record D: average counselor and staff member time per TSDA contract; cost of counselor time and benefits, and; cost of support staff time and benefits.

16. The researcher entered the value of C_C ($182.03) as determined in step 5 into the instrument for each subject with a positive value of Y_1.

17. The researcher entered the value of C_U ($387.47) as determined in step 5 into the instrument for each subject with a positive value of Y_1.

18. An SDCCD employee with access to student transcripts determined the value U_C, as measured in Record C, for each subject with a positive value of Y_1. The employee provided this value by anonymous subject number to the researcher, who coded it into the research instrument.

19. The researcher entered the value of U_M (70 units) as determined in step 5 into the instrument for each subject with a positive value of Y_1.

20. The researcher entered the value of U_U into the instrument for each subject with a positive value of Y_1 using the following procedures:

a. The researcher determined the subject's intended major at SDSU from Record B. Using this information, the researcher prepared a list of SDCC articulated courses that fulfill preparation requirements for the subject's intended major, as measured in Record D.

b. An SDCCD employee with access to student transcripts compared the list of SDCC articulated courses that fulfill SDSU lower division general education requirements (i.e., courses that appear on the IGETC or CSU GE-B lists), as measured in Record D, with all courses the subject completed prior to transfer, as measured in Record C, to determine the unit value of any articulated lower division general education courses that were not completed prior to transfer. The employee then provided this value by anonymous subject number to the researcher.

c. An SDCCD employee with access to student transcripts compared the list of SDCC articulated courses that fulfill major preparation requirements that was generated in step a with all courses the subject completed

prior to transfer, as measured in Record C, to determine the unit value of any articulated lower division major preparation courses that were not completed prior to transfer. The employee then provided this value by anonymous subject number to the researcher.

d. The researcher subtracted the value of U_C from the value of U_M. This result was compared to the total unit value of all SDCC articulated lower division general education and major preparation courses that were not completed prior to transfer, as determined in steps b and c above. The greater of these two values was entered in the instrument for U_U.

21. The researcher and SDCCD employee terminated access to Records A, B, and C. All additional analyses of data were performed using only anonymous subject numbers.

22. The researcher performed a set of statistical analyses (described in *Discussion of Data Processing* below) to test the hypotheses and answer the research questions.

Discussion of Data Processing

Data were collected and entered into the research instrument as described in *Procedures* above (see Appendix A for completed instrument). The data were then analyzed through the use of statistical spreadsheet templates developed by Aczel & Sounderpandian (2006) on the Microsoft Excel spreadsheet program. “A spreadsheet template is a specially designed workbook that carries out a particular computation on any data, requiring little or no effort beyond entering the data in designated places” (Aczel & Sounderpandian, 2006,

p. 3). The following procedures were used to analyze the data and answer the research questions:

1. Descriptive statistical values were calculated for each of the dependent variables using Aczel & Sounderpandian's (2006) *Basic Statistics from Raw Data* spreadsheet template. The inputs to this template were the data in the research instrument for each of the dependent variables. The template returned a variety of descriptive statistics about the series, including the mean, median, mode, and standard deviation.

2. Research question Q1 was answered by calculating the statistical significance of the difference in Y_1 values using a chi-square test. The analysis was conducted using Aczel & Sounderpandian's (2006) *Chi-Square Test for Independence* spreadsheet template. The inputs to this template were the frequency data for Y_1. The template returned the chi-square statistic (χ^2) and the *p*-value representing the rough probability that the frequencies were distributed as expected (the null hypothesis, Aczel and Sounderpandian, 2006).

3. Research question Q2 was answered by calculating the statistical significance of the difference in Y_2 values using a two-tailed *t*-test. The analysis was conducted using Aczel & Sounderpandian's (2006) *t-Test for Difference in Population Means* spreadsheet template. The inputs to this template were the values of Y_2 associated with the two X subgroups. The spreadsheet returned the *t* statistic and the *p*-value representing the rough probability that there was no statistical difference in the means of the two populations (the null hypothesis).

4. Research question Q3 was answered by calculating the statistical significance of the difference in Y_3 values using a two-tailed *t*-test. As in research question Q2, this analysis was conducted using Aczel & Sounderpandian's (2006) *t-Test for Difference in Population Means* spreadsheet template, using the values of Y_3 as the data analyzed.

Figure 2 is a graphical representation of the hypothesis testing methods used to answer each research question.

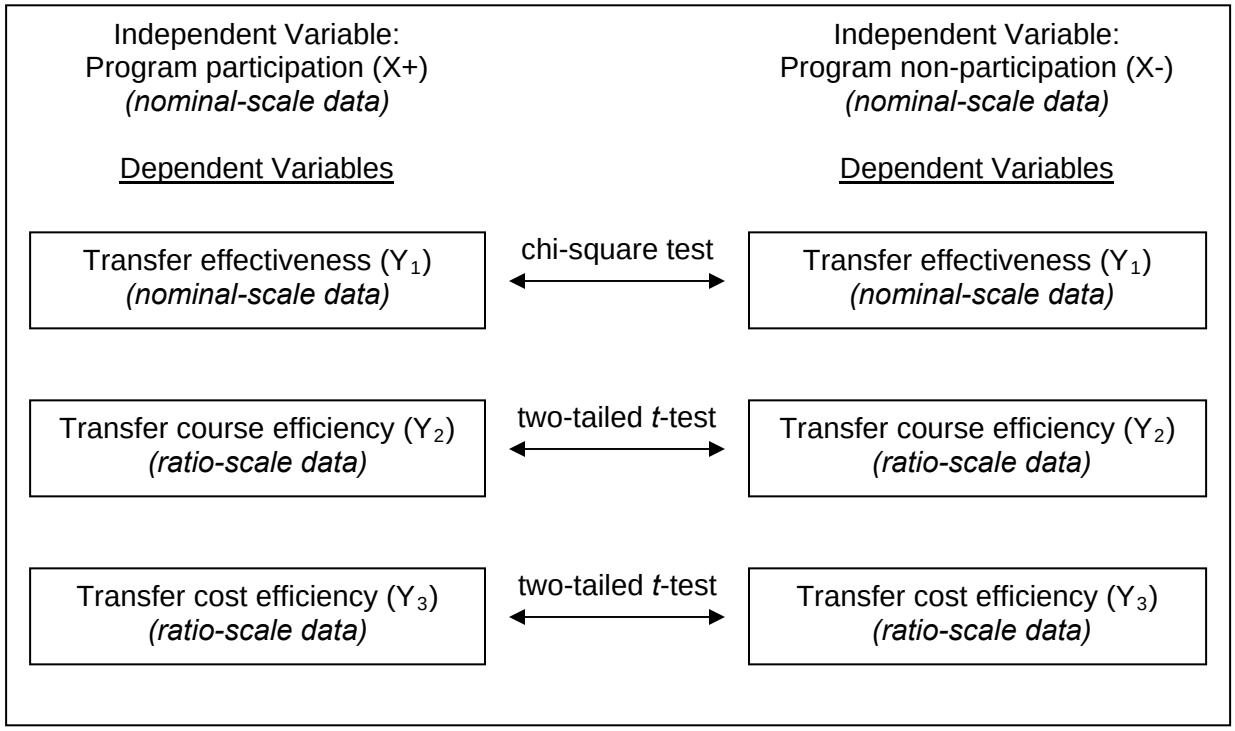

Figure 2. Hypotheses testing methods

Methodological Assumptions, Limitations, and Delimitations

Several methodological assumptions were made in the design of the study. First, the subject-specific data to be studied (Records A, B, and C) have already been collected by third parties outside of the control of the researcher, and therefore an assumption was made that this data were originally collected in

a reliable and valid manner. Second, a similar assumption was made that publicly available information pertaining to college financing, transfer requirements, and related information (Record D) was also accurate. Third, an assumption was made that subjects who enrolled in the TSDA program (those with a positive value of X) actually received the transfer advising benefits of the program. That is, it was assumed that those students who enrolled in the TSDA program actually participated in the transfer advising portion of the program. Finally, an assumption was made that subjects in the study group sought the attainment of the baccalaureate degree as their primary educational goal. In other words, it was assumed that students who applied for admission to SDSU completed their transferable coursework primarily for the purpose of transferring to a university, as opposed to earning a vocational-oriented degree, certificate, or other non-transfer educational outcome.

The study also had several significant limitations. First, the study lacked a true experimental control group, which precluded the ability to conclusively determine cause-and-effect relationships. Second, participants had already self-selected into the two independent variable study groups. This raised the possibility of a confounding variable due to nonrandom selection differences between the two groups that could account for observed differences in the outcomes (Cozby, 2004). Third, the study was somewhat limited in its external validity: Transfer advising programs similar to the one studied do exist in other settings, but the general population of students and the specific procedures of each advising program may be different. For example, the population of students

at SDCC may have been older, more ethnically diverse, or of a lower economic status than the student bodies at many other community colleges (CCCCO, 2002; Wassmer et al. 2003). These characteristics may limit the degree to which the results can be generalized to other colleges and programs. This is particularly true of colleges outside of California and of programs that are administered at an educational institution other than a community college (such as a high school or university).

Finally, the study had several important delimitations. First, it was structured to examine one specific (but representative) transfer program at one specific (but representative) community college. This delimitation facilitated an in-depth economic cost-benefit analysis of the program. However, it also reduced the study's external validity, as described above. Second, the study was delimited to one specific academic year, which avoided confounding variables related to program, policy, procedure, funding, and curricular changes that occur from year to year but, again, limited the results of the study from being generalized to other times and settings. Third, cost data in the study were delimited to those costs borne by taxpayers. In other words, direct and indirect costs to students that arose as a result of transfer economic inefficiencies (such as costs related to tuition, books, living expenses, and foregone income) were not considered in the analysis. This delimitation was established both because such costs would be infeasible to determine and because the study was intended to inform the decision making of educational policy makers and practitioners; not students.

Ethical Assurances

A number of safeguards were implemented to ensure compliance with the standards for conducting research with human subjects. These included methods to mitigate the potential for a loss of confidentiality and the impracticality of obtaining informed consent for the specific research study due to the use of archival research techniques. These methods met the ethical principles, guidelines, and procedures detailed in the Family Educational Rights and Privacy Act (FERPA, 2004) and the American Psychological Association (2001). In addition, no data were collected prior to approval of the study by the Northcentral University Institutional Review Board.

The dissertation research study involved the use of student academic records as the primary source of research data. Specifically, information obtained from a review of student academic records was entered into a database instrument that was used for statistical analysis purposes. Student records may contain confidential personal information, which must be protected under the ethical principle of beneficence (Cozby, 2004). Accordingly, FERPA (2004) contains strict guidance on the use of student academic records when such records can be tied to individual students through personally identifiable information. Personally identifiable information may include the student's or parent's names, address, or other personally identifiable information such as a social security number of student identification number. Researchers associated with the American Psychological Association (2001) have also provided ethical guidelines related to the use of confidential information in databases.

Several methods were used in the study to ensure the confidentiality of subjects' identities. First, data elements used in the study were segregated from all personally identifiable student information. This was accomplished by creating a separate electronic database instrument containing relevant student data elements. In this separate instrument, all subjects were identified only by an anonymous subject number (subject number 1, 2, 3, etc.). Second, student records were only viewed by an SDCCD employee who already had access to the records as part of the employee's normal scope of employment. This employee then provided the appropriate data to the researcher by anonymous subject number. Third, no actual student records left the facilities or computer networks of the district.

Under FERPA (2004) regulations, consent for the release of student academic records is not necessary for information that cannot be tied to personally identifiable student information. The student record information that was used in the proposed study meets this criterion, so student consent for its use was not necessary under FERPA. However, even if the information *were* tied to personally identifiable student information, it would still have been exempt from the requirement to obtain student consent because its disclosure would be to an organization conducting a study intended to improve instructional practices (FERPA, 2004, § 99.31).

Psychologists associated with the American Psychological Association (2001) have also provided principles and guidelines for the maintenance of subject confidentiality. The procedures used to maintain confidentiality of student

academic records met these guidelines by the use of "…coding or other techniques to avoid the inclusion of personal identifiers" (American Psychological Association, 2001, p. 389). American Psychological Association ethical guidelines also specified obtaining approval from host institutions before conducting research within the organization. In this case, written permission was obtained from the host institution (SDCC) prior to the use of its data in the proposed research study.

Under the ethical principle of autonomy, research subjects should give their consent to participate only after being fully informed about the procedures and risks (Trochim & Donnelly, 2007). In this study, the data to be used were collected through the technique of archival research, which is the process of collecting and analyzing data through the use of existing historical records (Cozby, 2004). The historical records in question were generated several years prior to the conduct of the study, and most or all of the subjects that the records pertain to had left the institution that collected the data. It was therefore deemed impractical or impossible to contact subjects in order to obtain their consent to participate. However, all potential subjects in the study had already given their consent to release their academic record information for other purposes that were closely related to the proposed research: First, all students of the host institution gave their permission for the institution itself to use their academic records internally when they applied for admission. Second, all potential subjects in the study gave their consent to the transfer institution (SDSU) to share their admission status results with the host institution. Third, all potential subjects who

participated in the TSDA program gave their consent to disclose their academic records for the purposes of administering the program. These three different sets of prior consent for the use and disclosure of student academic records were construed as effective consent to the proposed research, particularly since no personally identifiable student information was actually used in the study.

CHAPTER 4: FINDINGS

Overview

This chapter contains an overview of the research findings and their interpretation in the context of the research questions. The chapter is organized in three sections. The first section describes the findings from the research data, including descriptive and inferential statistics. The second section contains an interpretation of those findings in light of the research question statements and prior studies related to this topic. The third section is a summary of the key points in this chapter.

Findings

Out of the original 120 randomly selected subjects, 5 subjects were excluded because full transcripts were not available. A variety of descriptive and inferential statistical tests were then used to analyze the research data collected for the remaining 115 subjects (see Appendix A for raw research data).

Research data related to the variable Y_1 (transfer effectiveness) were analyzed using descriptive statistics and the chi-square test. Overall, 89.57% of subjects received an offer of admission from SDSU for the fall 2006 term (Y_1=1), while 10.43% did not (Y_1=0). For subjects with a positive value of X (program participants) this value was 96.61% and for subjects with a negative value of X (program non-participants) this value was 82.14%, resulting in a 14.47% difference between these two values (Table 2). The statistical significance of this observed difference was calculated using the chi-square test. With an alpha level

of .05, the difference was statistically significant, χ^2 (1, N = 115) = 4.9793, p = .0257.

Table 2

Descriptive statistics for Y_1 (transfer effectiveness)

	Program participants (X=1)	Program nonparticipants (X=0)	All subjects
$Y_1 = 1$	57 96.61%	46 82.14%	103 89.57%
$Y_1 = 0$	2 3.39%	10 17.86%	12 10.43%
N	59 100%	56 100%	115 100%

Research data related to the variable Y_2 (transfer course efficiency) were analyzed using descriptive statistics and the *t*- test. First, the difference in mean Y_2 values of .0324 was found by subtracting the mean value of Y_2 for program nonparticipants from the mean value of Y_2 for program participants. This result indicated that program participants demonstrated, on average, 3.2% higher transfer course efficiency than non-program participants. Other descriptive statistics related to this variable were calculated, including the mean, median, and standard deviation (Table 3).

Table 3

Descriptive Statistics for Y_2 (transfer course efficiency)

	Program participants (X=1)	Program nonparticipants (X=0)	All subjects
Mean	0.8563	0.8239	0.8419
Median	0.8805	0.8384	0.8750
Std. Deviation	0.1324	0.1416	0.1369
N	57	46	103

To graphically compare the research data between the independent variable subgroups, Y_2 values for all subjects were rounded to the nearest 10^{th} percentile to obtain an estimate of the frequency of this variable for each subject. These frequencies were then converted into percentages for each independent variable subgroup (Figure 5). The statistical significance of the .0324 difference in mean Y_2 values was then calculated using a two-tailed *t*-test. With an alpha level of .05, the difference was not statistically significant, $t = 1.1966$, $p = .2343$.

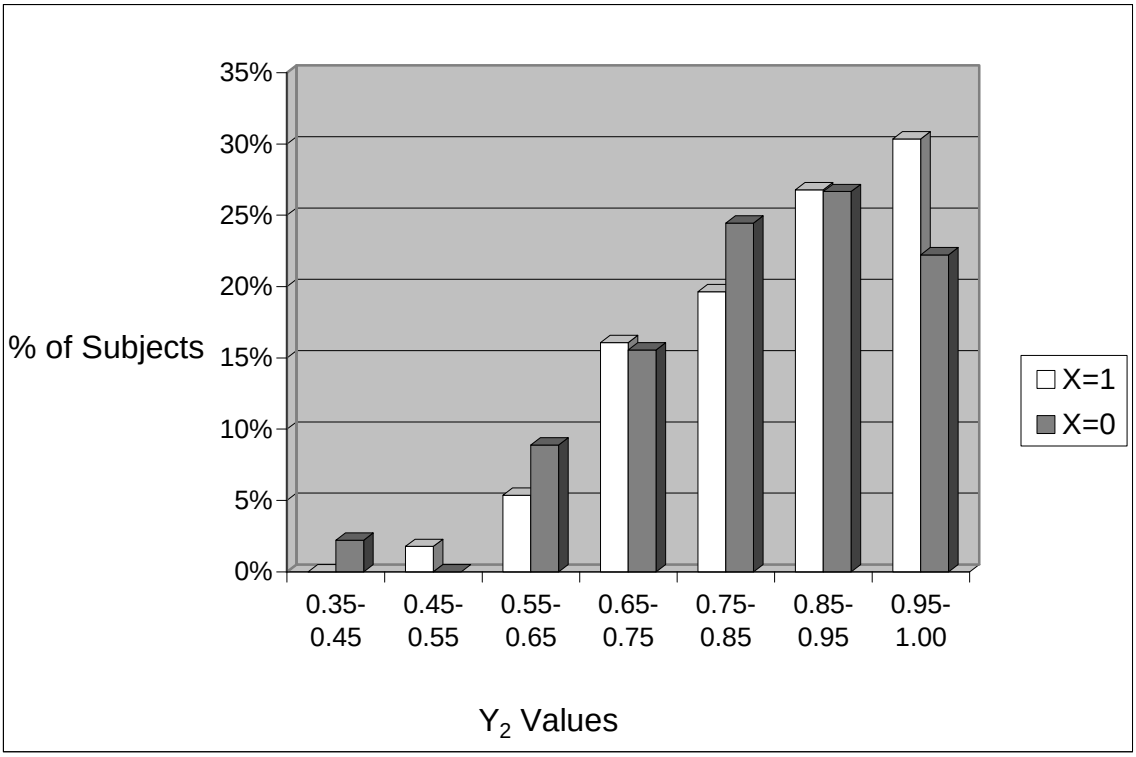

Figure 3. Distribution of Y_2 values

Additional statistical analyses were conducted on two of the component data elements of this variable: U_C (the number of lower division transferable units that a subject completes prior to transfer) and U_U (the number of units that a subject must complete at the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer). U_C data were analyzed using descriptive statistics and the *t*-test. A difference of -.72 in the mean values of U_C between the two subgroups was found by subtracting the mean value of U_C for program nonparticipants from the mean value of U_C for program participants. This result indicated that program participants completed, on average, .72 fewer lower division transferable units prior to transfer than program participants did. Other descriptive statistics related

to this variable were calculated, including the mean, median, and standard deviation (Table 4).

Table 4

Descriptive Statistics for U_C (the number of lower division transferable units that a subject completes prior to transfer)

	Program participants (X=1)	Program nonparticipants (X=0)	All subjects
Mean	81.30	82.02	81.62
Median	79.00	75.00	76.50
Std. Deviation	15.90	21.17	18.35
N	57	46	103

To graphically compare the research data between the independent variable subgroups, U_C values for all subjects were rounded to the nearest 10 digit value to obtain an estimate of the frequency of this variable for each subject. These frequencies were then converted into percentages for each independent variable subgroup (Figure 6). The statistical significance of the difference in the mean values of U_C for the two independent variable subgroups was then calculated using a two-tailed *t*-test. With an alpha level of .05, the difference of -.72 was not statistically significant, $t = -0.1981$, $p = .8434$.

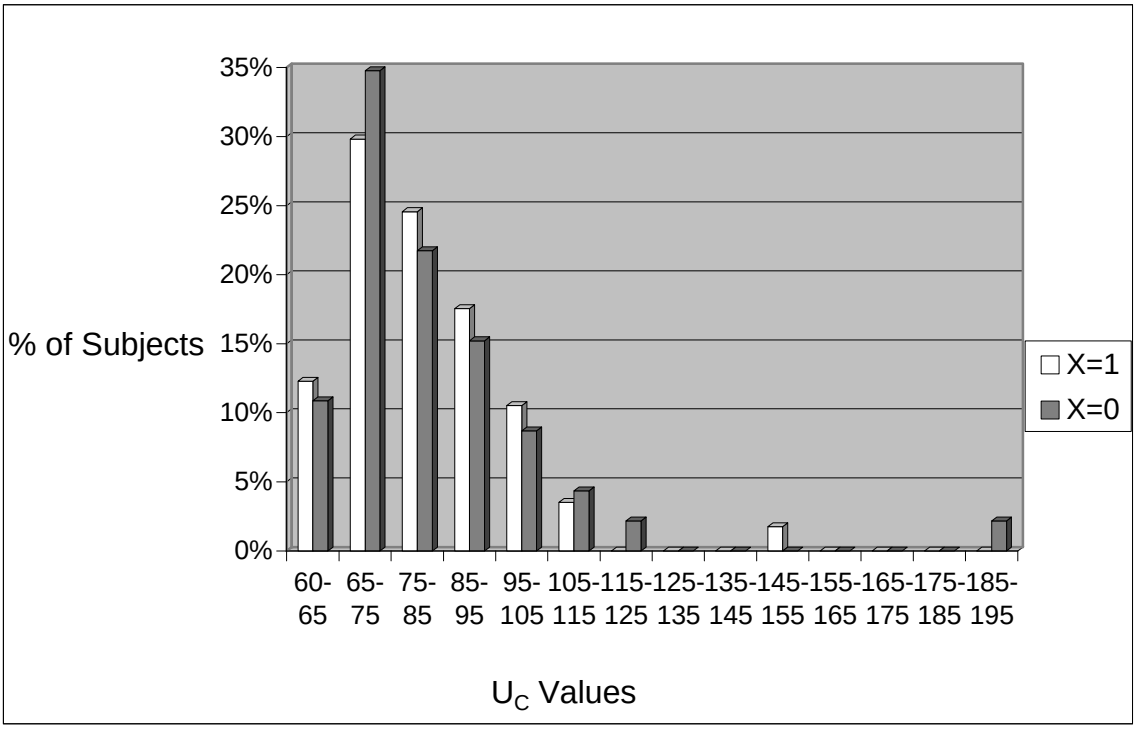

Figure 4. Distribution of U_C values

The values of U_U were also analyzed using descriptive statistics and the *t*-test. A difference of -3.51 in the mean values of U_U between the two subgroups was found by subtracting the mean value of U_U for program nonparticipants from the mean value of U_U for program participants. This result indicated that program participants had, on average, 3.51 fewer units of university-required coursework remaining to complete after transfer. Other descriptive statistics related to this variable were calculated, including the mean, median, and standard deviation (Table 5).

Table 5

Descriptive Statistics for U_U (the number of units that a subject must complete at

the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer)

	Program participants (X=1)	Program nonparticipants (X=0)	All subjects
Mean	2.75	6.26	4.32
Median	0	4.00	3.00
Std. Deviation	4.06	8.17	6.46
N	57	46	103

To graphically compare the research data between the independent variable subgroups, U_C values for all subjects were rounded to the nearest 3 units (representing the unit value for a typical lecture course) to obtain an estimate of the frequency of this variable for each subject. These frequencies were then converted into percentages for each independent variable subgroup (Figure 7). The statistical significance of the difference in the mean values of U_U for the two independent variable subgroups was then calculated using a two-tailed *t*-test. With an alpha level of .05, the difference of -3.51 was statistically significant, $t = -2.6547$, $p = .0101$.

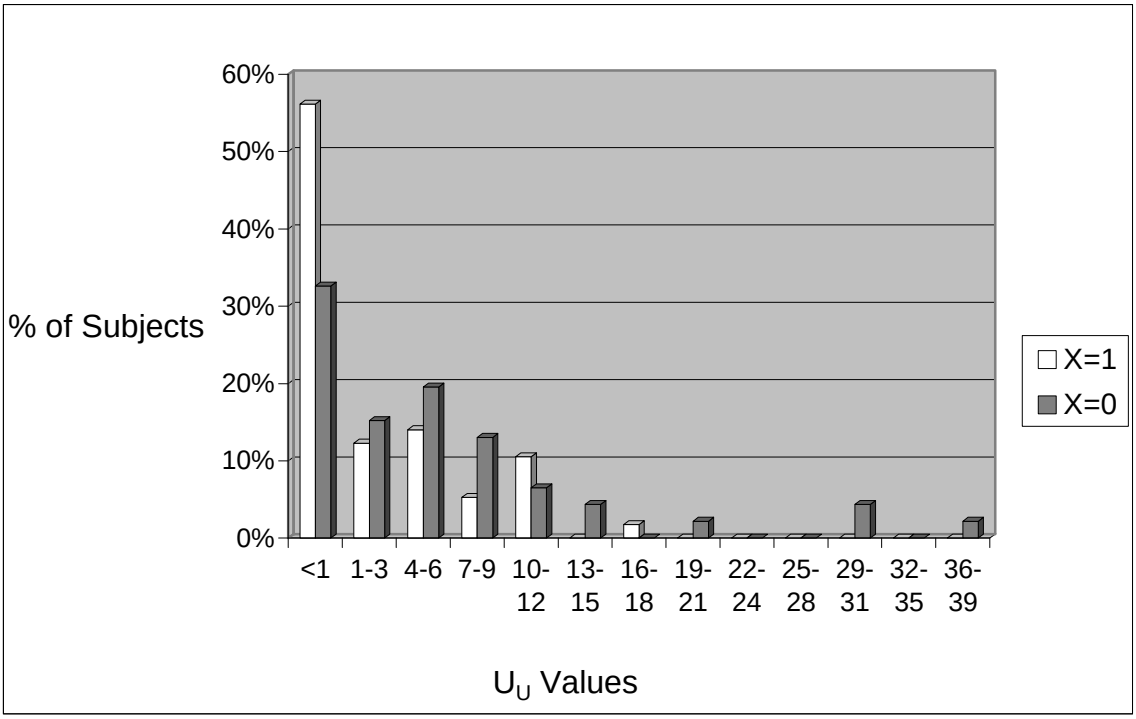

Figure 5. Distribution of U_U values

Similar to the analysis for Y_2, data related to the variable Y_3 (transfer cost efficiency) were analyzed using descriptive statistics and the *t*- test. First, the difference in mean Y_3 values of .0320 was found by subtracting the mean value of Y_3 for program nonparticipants from the mean value of Y_3 for program participants. This result indicated that program participants demonstrated, on average, 3.2% higher transfer cost efficiency than non-program participants. Other descriptive statistics related to this variable were calculated, including the mean, median, and standard deviation (Table 6).

Table 6

Descriptive Statistics for Y_3 (transfer cost efficiency)

	Program participants	Program nonparticipants	All subjects

	(X=1)	(X=0)	
Mean	0.8489	0.8169	0.8346
Median	0.8767	0.8327	0.8713
Std. Deviation	0.1300	0.1420	0.1357
N	57	46	103

To graphically compare the research data between the independent variable subgroups, Y_3 values for all subjects were rounded to the nearest 10^{th} percentile to obtain an estimate of the frequency of this variable for each subject. These frequencies were then converted into percentages for each independent variable subgroup (Figure 8). The statistical significance of the difference in mean values of Y_3 was then calculated using a two-tailed *t*-test. With an alpha level of .05, the difference of .0320 was not statistically significant, $t = 1.1933$, $p = .2355$.

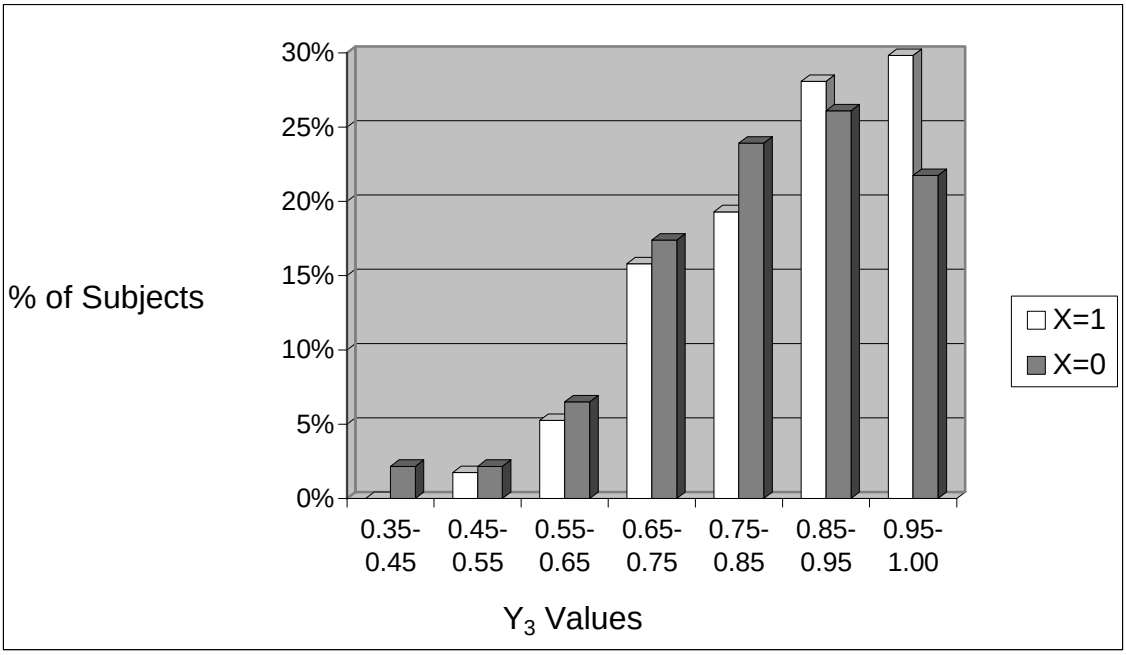

Figure 6. Distribution of Y_3 values

Finally, a statistical analysis was conducted of the cost components related to the data element U_U in order to further investigate the statistically significant difference previously found in the mean values of U_U between program participants and program non-participants. Specifically, the value of U_U for each subject was multiplied by the value C_U - C_C to obtain the additional cost to taxpayers of the required post-transfer coursework. These results were than analyzed using descriptive statistics and the *t*- test. A difference of $720.37 was found by subtracting the mean additional cost for program nonparticipants from the mean additional cost for program participants. This result indicated that, on average, program participants saved taxpayers $720.37 (less the cost of additional advising provided by the program) by completing more university-required coursework prior to transfer. Other descriptive statistics related to this

variable were calculated, including the mean, median, and standard deviation (Table 7).

Table 7

Descriptive Statistics for additional cost of post-transfer coursework

	Program participants (X=1)	Program nonparticipants (X=0)	All subjects
Mean	$565.86	$1,286.23	$887.58
Median	$0.00	$821.76	$616.32
Std. Deviation	839.26	1678.91	1326.57
N	57	46	103

To graphically compare the research data between the independent variable subgroups, the additional cost of post-transfer coursework for all subjects were rounded to the nearest $1000 to obtain an estimate of the frequency of cost ranges for each subject. These frequencies were then converted into percentages for each independent variable subgroup (Figure 9). The statistical significance of the difference in the mean additional cost of post-transfer coursework for the two independent variable subgroups was then calculated using a two-tailed *t*-test. With an alpha level of .05, the difference of $720.37 was statistically significant, $t = 2.6547$, $p = .0101$. A second two-tailed t-

test was then performed with values that included the additional cost of advising provided to program participants (C_A). With an alpha level of .05, the adjusted difference of $658.11 was also statistically significant, $t = 2.4253$, $p = .0182$.

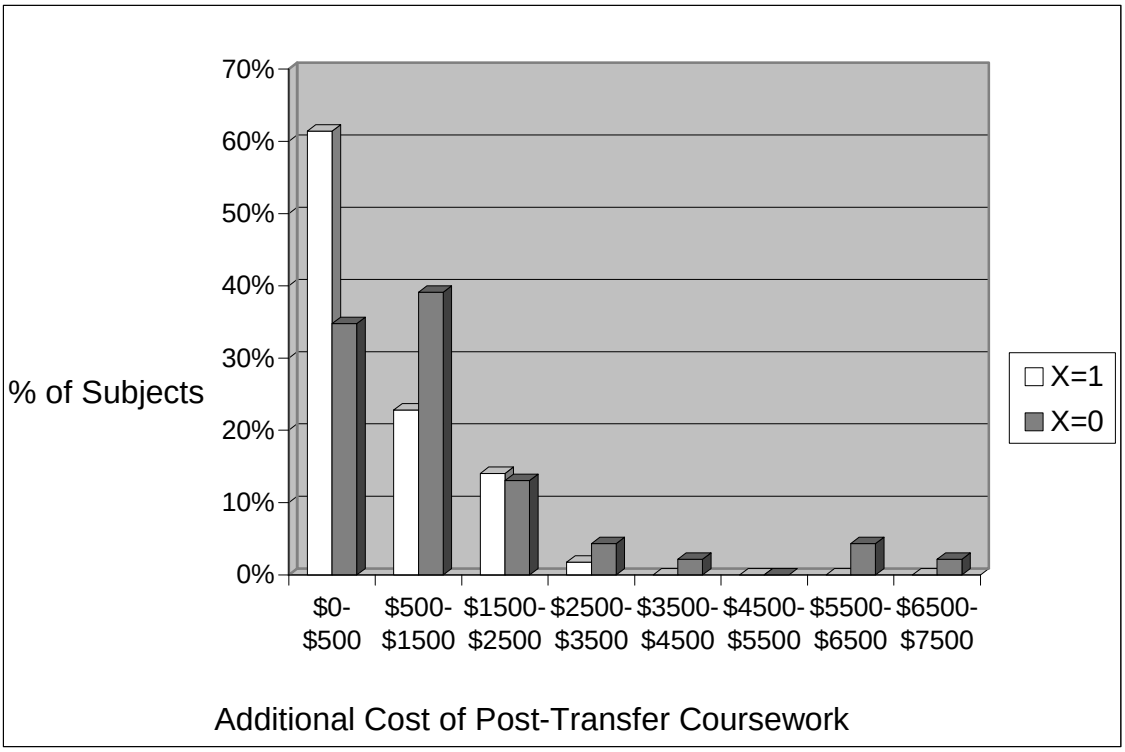

Figure 7. Distribution of additional cost of post-transfer coursework

Analysis and Evaluation of Findings

The purpose of this quantitative study was to assess the effectiveness and economic efficiency of community college-based transfer advising programs. Research question statements related to transfer effectiveness, transfer course efficiency, and transfer cost efficiency were generated and investigated using a quantitative nonequivalent control group research design. Significant results were found relative to each of these questions.

The first research question statement (Q1) was: *What is the difference, if any, in the resultant level of transfer effectiveness between subjects who*

participated in a transfer advising program and subjects who did not? Overall, transfer effectiveness for both of the independent variable subgroups was very high: almost 90% of all subjects received offers of admission from SDSU. At first glance this figure might be surprising given the CCC system's historical transfer rate of approximately 40% (CCCCO, 2002; Perry, 2007, 2008). However, several factors may explain the high level of transfer effectiveness measured in this study. First, the group of subjects who did not receive additional transfer advising through the TSDA program had a lower transfer effectiveness rate of 82%. This may be interpreted as the normal level of transfer effectiveness for this student population. Second, virtually all subjects in the study were likely to have completed the minimum requirements necessary for transfer eligibility to the CSU system, as there would be little point in applying for transfer admission without meeting at least minimum eligibility criteria. These requirements encompass the completion of at least 60 transferable units including transferable math, oral communication, and English composition and critical thinking courses (California State University, 2004). Using similar criteria as the denominator in calculating transfer effectiveness, Horn and Lew (2007a) found a transfer rate of 67%, which is closer to the observed rate of 82% for program non-participants found in this study than the previously cited 40% rate. Third, students transferring to the CSU system have traditionally demonstrated a relatively high transfer effectiveness rate. For example, in fall 2007 the CSU system as a whole admitted 75% of all transfer applicants and 89% of all transfer applicants who submitted a complete application file (Blackburn, 2008). Given these figures, the finding of an 82%

transfer rate for non-program participants and 90% for all subjects does not appear unusual.

The 14.47% difference in transfer effectiveness between subjects who participated in the TSDA program and subjects who did not was statistically significant, χ^2 (1, N = 115) = 4.9793, p = .0257. This finding indicated that the null hypothesis $H1_0$ should be rejected and the alternate hypothesis $H1_A$ should be accepted: There was a significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not. In addition, a 14.47% difference was evaluated as large enough to be of use to practitioners in the field. As described earlier, according to researchers at the CCCCO (2002) a 10% increase in transfer effectiveness (i.e., transfer rate) at a CCC campus would be sufficient to move that campus from among the 10 lowest performing colleges in the state to the level of the average performing college in the state.

The second research question statement (Q2) was: *What is the difference, if any, in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not?* On average, all subjects demonstrated about an 84% level of transfer course efficiency, meaning that approximately 16% of all transfer coursework was not actually necessary for the attainment of the baccalaureate degree. The 3.2% difference in this variable between program participants and non-participants was relatively small and found to be not statistically significant, t = 1.1966, p = .2343. This finding indicated that the null hypothesis $H1_0$ should be

accepted: There was no significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not. These results appeared consistent with prior studies indicating that general transfer advising was of limited value in reducing the number of units completed prior to transfer (Hill, 2006; Kegley & Kennedy, 2002; University of California, 2005).

However, when the values of Y_2 were viewed as a distribution (Figure 5), it appeared that a larger number of program participants demonstrated transfer course efficiency in the very high .95 to 1.0 range than program non-participants. To further investigate this phenomenon, additional statistical analyses were conducted on two of the component data elements of Y_2: U_C (the number of lower division transferable units that a subject completes prior to transfer) and U_U (the number of units that a subject must complete at the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer).

The additional statistical analysis of U_C demonstrated that, on average, subjects completed approximately 82 transferable units of coursework prior to transfer, which is 12 more units than the maximum that can be applied to the baccalaureate degree after transfer. This finding is consistent with prior studies of coursework taken before transfer (Kegley & Kennedy, 2002; Ssemakula, 2003; University of California, 2005). The very small difference in the mean values of U_C for the two independent variable subgroups (less than 1 unit) was found to be not statistically significant, $t = -0.1981$, $p = .8434$.

The additional statistical analysis of U_U demonstrated that, on average, subjects had 4.32 units of post-transfer coursework remaining to be completed at the university. This value is low compared to prior studies of this phenomenon (Florida State Legislature, 2002). When this result was viewed as a distribution (Figure 7), it was clear that most TSDA program participants had little or no post-transfer coursework remaining, while most non-program participants had three units or more remaining. In fact, the difference of -3.51 in the mean values of U_U between program participants and non-program participants was statistically significant, $t = -2.6547$, $p = .0101$, and possibly large enough to be of use to practitioners in the field. To illustrate, a standard lecture course is 3 units, and so a mean difference of 3 units or more represents an effect large enough to encompass the selection of at least one course. This finding suggested that the transfer advising provided through the TSDA program may have made a difference in the type of coursework selected prior to transfer, rather than in the amount of coursework. In other words, TSDA program participants appear to have completed an average of at least one more course meeting university requirements than program non-participants did, even though the overall number of units completed prior to transfer was essentially identical. While too small to have a statistically significant effect on the overall level of transfer course effectiveness, this finding was statistically significant when viewed in the limited context of post-transfer coursework (U_U).

The third research question statement (Q3) was: *What is the difference, if any, in the resultant level of transfer cost efficiency between subjects who*

participated in a transfer advising program and subjects who did not? The 3.2% difference in this variable between program participants and non-participants was relatively small and found to be not statistically significant, $t = 1.1933$, $p = .2355$. This finding indicated that the null hypothesis $H1_0$ should be accepted: There was no significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not. In reference to past research, this finding was actually more positive than Turk's (1996) evaluation of the transfer center pilot project: An analysis of Turk's research indicated that the transfer center pilot was cost inefficient, while in this study no significant difference in cost efficiency between TSDA program participants and non-participants was detected.

However, like in the related variable of Y_2, when the values of Y_3 were viewed as a distribution (Figure 8), it appeared that a larger number of program participants demonstrated transfer cost efficiency in the very high .95 to 1.0 range than program non-participants did. It seemed likely that this result was due to the statistically significant difference in the mean value of U_U between program participants and program non-participants that was previously detected in the findings related to Q2. To investigate this possibility, a statistical analysis was conducted of the cost components related to the data element U_U. The result of this analysis indicated that, on average, program participants saved taxpayers $720.37 (less the cost of additional advising provided by the program) by completing more university-required coursework prior to transfer. This difference was statistically significant, $t = 2.6547$, $p = .0101$. Moreover, when the additional

cost associated with the TSDA program was included, the adjusted difference of $658.11 was also statistically significant, $t = 2.4253$, $p = .0182$. This finding suggested that the difference in the type of coursework selected prior to transfer (previously detected in the statistical analysis pertaining to Q2) resulted in a statistically significant level of cost efficiency. In other words, by completing an average of at least one more course meeting university requirements at the lower-cost CCC system, program participants cost taxpayers, on average, $658.11 less per student than program non-participants did. While too small to have a statistically significant effect on the overall level of transfer cost effectiveness, this finding was statistically significant when viewed in the limited context of post-transfer coursework (U_U). The difference in mean cost may be large enough to have practical application, as a potential cost savings of $658.11 per student may be sufficient reason to fund expansions or additions to transfer advising programs.

Summary

Significant results were found relative to each of the three research questions investigated in this study. First, there was a significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not. Specifically, program participants had a 14.47% higher transfer rate than program non-participants. Second, while there was no significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not, there was a significant difference in the

number of university required post-transfer units between the two groups. Specifically, program participants completed, on average, at least one more course meeting university requirements prior to transfer than program non-participants did. Third, while there was no significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not, there was a significant difference in the cost associated with university required post-transfer units between the two groups. Specifically, program participants cost taxpayers, on average, $658.11 less per student than program non-participants did by completing more university required coursework at the lower-cost CCC system prior to transfer.

CHAPTER 5: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Transfer is the process of students moving from one institution of higher education to another with the intention of applying previously completed coursework to degree requirements at their new institution. Transfer is an area of significant interest to state policymakers both because of the large number of transfer students in California's public higher education systems and the significant public benefits that can accrue from the transfer process.

Researchers have estimated that the number of Californians earning a college degree must increase by as much as 50% in order for the state to remain competitive through 2025 (Baldassare & Hanak, 2005; Johnson & Reed, 2007; Little Hoover Commission, 2000; Shulock et al., 2005; Shulock et al., 2008). However, California has ranked among the lowest of all states on many measures of student success in higher education, including degree completion rates (National Center for Public Policy and Higher Education, 2006; Sengupta & Jepsen, 2006; Moore et al., 2007; Shulock et al., 2005). This situation is forecasted to worsen as the state's demographics shift towards populations with historically lower levels of educational participation and attainment (Baldassare & Hanak, 2005; Shulock et al., 2005; Shulock et al., 2008). Absent significant changes in California's higher education policy and practices, the state is likely to "…be left with an under-educated population and an under-prepared workforce" (Shulock, et al., 2005, p. iv).

The function of transfer must be an integral part of any solution to this problem, because of the large volume of transfer students the system generates and the systemic efficiencies that may result from the transfer process (Association of California Community College Administrators [ACCCA], 2006; Perry, 2007, 2008; Shulock et al., 2005; Shulock et al., 2008). These systemic efficiencies are possible because CCC campuses offer many of the same courses that CSU and UC campuses do, yet CCC courses cost students and taxpayers significantly less. In 2001-02, for example, the state funded the UC system at $22,634 per full-time student, the CSU system at $10,191 per full-time student, and the CCC system $4,560 per full-time student (Murphy, 2004). By comparing the differences in these funding levels over a 60-unit transfer curriculum, it can be seen that a student who completed 2 years of university coursework at a CCC instead of a CSU in 2004 saved the state over $11,000 while a UC-bound transfer student saved the state over $36,000.

The efficiencies associated with the transfer process can only be realized, however, if California's higher education system is both effective in promoting transfer from community college to university and efficient in the use of community college coursework to meet baccalaureate degree requirements. Unfortunately, research in this field has indicated that transfer effectiveness and efficiency in California is relatively low: Despite significant increases in the number of transfer students over the past decade (Perry, 2007, 2008), researchers have calculated that less than half of all students demonstrating the "intent" to transfer actually successfully do so (Bradburn et al., 2001; CCCCO,

2002; Shulock, 2008; Perry, 2007, 2008; Sengupta & Jepsen, 2006; Wassmer et al., 2003). Similarly, researchers have found that measures of transfer efficiency (i.e., the efficient application of CCC coursework to university requirements) is also relatively low: For example, CCC transfer students spent an average of three to five years at the California State University (CSU) system prior to graduation, which is 1 to 3 years longer than the expected 2 years of study at the upper division level (Kegley & Kennedy, 2002; Ssemakula, 2003).

Other researchers, practitioners, and state policymakers have suggested that these problems are caused primarily by factors impacting students' educational planning process at the community college (ASCCC, 2003; Bers et al., 2001; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cejda & Kaylor, 2001; Hill, 2006; ICAS, 2005; Shulock & Moore, 2003, 2004; Turk, 1996; Wechsler, 1989). Various solutions have been proposed, including increasing the numbers of community college counselors, standardizing and simplifying transfer coursework requirements among public universities, and providing transfer advising programs that aid students at navigating the transfer process (ASCCC, 2003; California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cohen, 2005; Handel, 2006; Hill, 2006; Hungar & Lieberman, 2001; ICAS, 2005; Shulock & Moore, 2004; Turk, 1996).

Out of these various solutions, transfer advising programs are perhaps the fastest growing method of improving transfer effectiveness and efficiency.

Transfer advising programs are coherent sets of services offered to potential transfer students that are intended to assist them in successfully moving from community college to university. Transfer advising programs are usually administered through CCC transfer centers, which were established by the California Legislature to "…provide academic advising and counseling to students preparing for transfer, articulation information for specific universities and majors, information on admissions requirements, and transcript evaluations" (Farland & Anderson, 1989, p. 1).

In theory, transfer advising programs have the potential to save thousands of taxpayer dollars by facilitating the completion of the first 2 years of the baccalaureate degree at the lower-funded CCC system. Public investment in such programs, however, only makes sense if the programs are both effective at facilitating the completion of the baccalaureate degree and economically efficient for taxpayers. This last point is particularly important, as public administrators and policymakers are under increasing pressure to tie the expenditure of public funds to measurable, effective, and cost efficient outcomes (Behn, 2003; Burke & Modarresi, 1999; Burke, 2002; Davies, 2006; Dunn, 2004; NCAHE, 2005; Shulock & Moore, 2005; Thompson & Riggs, 2000). Economic analyses of these programs are therefore essential to determine the extent to which they produce effective and cost efficient outcomes.

This quantitative study was designed to assess the effectiveness and economic efficiency of community college-based transfer advising programs. The primary research question was: *What effect, if any, does student participation in*

community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system? To answer this question, three research questions and hypothesis statements were developed and tested using a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between students who participated in the transfer advising program and students who did not. The population target frame consisted of potential transfer students who attended a CCC campus. The study was conducted using the technique of archival research, which is the process of collecting and analyzing data through the use of existing historical records (Cozby, 2004). The data were subjected to a series of statistical procedures designed to answer each of the research questions. These included descriptive statistical analyses, the chi-square test to assess the significance of the observed differences in transfer effectiveness, and the *t*-test to assess the significance of the observed differences in transfer course effectiveness and transfer cost effectiveness.

Significant results were found relative to each of the research questions. First, there was a statistically significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not, χ^2 (1, N = 115) = 4.9793, p = .0257. Specifically, program participants had a 14.47% higher transfer rate than program non-participants. According to research conducted at the CCCCO (2002), a 10% increase in transfer effectiveness (i.e., transfer rate) at a CCC

campus would be sufficient to move that campus from among the 10 lowest performing colleges in the state to the level of the average performing college in the state. Therefore, a 14.47% difference appears large enough to be of significant use to practitioners in the field seeking to substantially improve the transfer effectiveness at a CCC campus. This result supports the theory proposed by the ASCCC (2003), the California Educational Round Table Intersegmental Coordinating Committee (2004), and others that the effectiveness of the transfer process can be significantly improved through the provision of transfer advising programs.

Second, there was no significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not, $t = 1.1966$, $p = .2343$. This result appeared consistent with prior studies indicating that general transfer advising was of limited value in reducing the number of units completed prior to transfer (Hill, 2006; Kegley & Kennedy, 2002; University of California, 2005). However, there was a significant difference in the number of university required post-transfer units between the two groups, $t = -2.6547$, $p = .0101$. Specifically, program participants completed, on average, at least one more course meeting university requirements prior to transfer than program non-participants did. This finding suggests that the transfer advising provided through the TSDA program may have made a difference in the type of coursework selected prior to transfer, rather than in the amount of coursework. This result supports the theory that transfer advising programs can improve the effectiveness of the transfer process,

at least to a small degree and when only taking coursework (not cost) into account.

Third, there was no significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not, $t = 1.1933$, $p = .2355$. However, there was a significant difference in the cost associated with university required post-transfer units between the two groups, even when the additional cost of staff time associated with the TSDA program was included, $t = 2.4253$, $p = .0182$. Specifically, program participants cost taxpayers, on average, $658.11 less per student than program non-participants did by completing more university required coursework at the lower-cost CCC system prior to transfer. While too small to have a statistically significant effect on the overall level of transfer cost effectiveness, this finding was statistically significant when viewed in the limited context of post-transfer coursework (U_U). This finding supports the theory that transfer advising programs represent a cost efficient use of taxpayer resources: In this case, the additional investment of public funds generated a cost savings of $658.11 per student.

In terms of the primary research question, the results of this study indicated that student participation in community college-based transfer advising programs has a positive effect on the resultant level of effectiveness and economic efficiency in California's public higher education system. This conclusion supports the theory that enhancements of community-college based transfer services such as those provided by transfer advising programs can

improve the effectiveness and efficiency of the transfer process, at least to a limited extent. (ASCCC, 2003; California Community Colleges System Office, & California Community College Transfer Center Directors Association, 2006; California Educational Round Table Intersegmental Coordinating Committee, 2004; Cohen, 2005; Handel, 2006; Hill; Hungar & Lieberman, 2001; Intersegmental Committee of Academic Senates, 2005; Shulock & Moore, 2004; Turk, 1996; University of California, 2005; Wellman, 2002). In addition, the study provides an example of how the expenditure of public funds in higher education can be tied to measurable, effective, and cost efficient outcomes. In a broader context, improvements in systemic efficiencies such as those generated by the TSDA program are one means by which California's higher education system can increase graduation rates without a concurrent increase in cost (Shulock et al., 2005). The expansion of such effective and cost efficient programs to greater numbers of students seems indicated by these results.

Conclusions

The primary research question addressed in this quantitative study was: *What effect, if any, does student participation in community college-based transfer advising programs have on the resultant levels of effectiveness and economic efficiency in California's public higher education system?* To answer this question, the outcomes of a transfer advising program administered at a CCC campus were evaluated through the use of a nonequivalent control group research design measuring the differences in the resultant levels of transfer effectiveness, transfer course efficiency, and transfer cost efficiency between

students who participated in the transfer advising program and students who did not. The following research question statements (Q), null hypotheses (H_0) and alternative hypotheses (H_A) were used:

Q1: What is the difference, if any, in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not?

$H1_0$: There is no difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not.

$H1_A$: There is a significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not.

Q2: What is the difference, if any, in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not?

$H2_0$: There is no difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not.

$H2_A$: There is a significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not.

Q3: What is the difference, if any, in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not?

$H3_0$: There is no difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not.

$H3_A$: There is a significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not.

The following conclusions were generated relative to each question statement:

The first research question statement (Q1) was: *What is the difference, if any, in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not?* A 14.47% difference in transfer effectiveness was found between subjects who participated in the TSDA program and subjects who did not; a result that was statistically significant, χ^2 (1, N = 115) = 4.9793, p = .0257. This finding indicated that the null hypothesis $H1_0$ should be rejected and the alternate hypothesis $H1_A$ should be accepted: There was a significant difference in the resultant level of transfer effectiveness between subjects who participated in a transfer advising program and subjects who did not. Specifically, subjects who participated in a transfer advising program were 14.47% more likely to successfully transfer than subjects who did not participate in a transfer advising program.

This difference was evaluated as large enough to be of use to practitioners in the field. According to researchers at the CCCCO (2002) a 10% increase in transfer effectiveness (i.e., transfer rate) at a CCC campus would be sufficient to move that campus from among the 10 lowest performing colleges in the state to the level of the average performing college in the state. This result supports the theory proposed by the ASCCC (2003), the California Educational Round Table Intersegmental Coordinating Committee (2004), and others that the effectiveness of the transfer process can be significantly improved through the provision of transfer advising programs. At the level of the campus practitioner, this result is significant because it provides support for the establishment or expansion of transfer advising programs. It also provides a reason to encourage students to participate in those programs: Students who believe that participation in an advising program will increase their chances of successfully transferring are more likely to participate. Similarly, this result may be useful for practitioners attempting to increase transfer effectiveness among students who traditionally have low rates of transfer such as some minority ethnic groups, disabled students, and others from educationally disadvantaged backgrounds (Farland & Anderson, 1989; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006).

The second research question statement (Q2) was: *What is the difference, if any, in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not?* On average, all subjects demonstrated about an 84% level of transfer course

efficiency, meaning that approximately 16% of all transfer coursework completed was not actually necessary for the attainment of the baccalaureate degree. A 3.2% difference in this variable was found between program participants and non-participants. This difference was relatively small and not statistically significant, $t = 1.1966$, $p = .2343$. This finding indicated that the null hypothesis $H1_0$ should be accepted: There was no significant difference in the resultant level of transfer course efficiency between subjects who participated in a transfer advising program and subjects who did not. This result appeared consistent with prior studies indicating that general transfer advising was of limited value in reducing the number of units completed prior to transfer (Hill, 2006; Kegley & Kennedy, 2002; University of California, 2005).

To further investigate this finding, additional statistical analyses were conducted on two of the component data elements of Y_2: U_C (the number of lower division transferable units that a subject completes prior to transfer) and U_U (the number of units that a subject must complete at the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer). The additional statistical analysis of U_C demonstrated that, on average, subjects completed approximately 82 transferable units of coursework prior to transfer, which is 12 more units than the maximum that can be applied to the baccalaureate degree after transfer. This finding is consistent with prior studies of coursework taken before transfer (Kegley & Kennedy, 2002; Ssemakula, 2003; University of California, 2005). The very small difference in the mean values of U_C for the two independent variable

subgroups (less than 1 unit) was found to be not statistically significant, t = -0.1981, p = .8434.

The additional statistical analysis of U_U demonstrated that, on average, subjects had 4.32 units of post-transfer coursework remaining to be completed at the university. This value is low compared to prior studies of this phenomenon (Florida State Legislature, 2002). However, a difference of -3.51 in the mean values of U_U was found between program participants and non-program participants. This result was both statistically significant, t = -2.6547, p = .0101, and possibly large enough to be of use to practitioners in the field. To illustrate, a standard lecture course is 3 units, and so a mean difference of 3 units or more represents an effect large enough to encompass the selection of at least one course. This finding suggested that the transfer advising provided through the TSDA program may have made a difference in the type, rather than the amount, of coursework selected prior to transfer. In other words, TSDA program participants appear to have completed an average of at least one more course meeting university requirements than program non-participants did, even though the overall number of units completed prior to transfer was essentially identical. While too small to have a statistically significant effect on the overall level of transfer course effectiveness, this finding was statistically significant when viewed in the limited context of post-transfer coursework (U_U).

To the practitioner, this finding is significant for three reasons: First, it demonstrates that transfer advising programs can affect student course-taking behavior in ways that reduce the number of courses remaining to be completed

at university. This serves to qualify prior research indicating that transfer advising, in general, was ineffective in reducing the number of units completed prior to transfer (Hill, 2006; Kegley & Kennedy, 2002; University of California, 2005). Specifically, the finding illustrates that transfer advising performed in the context of a specific advising program – one where the student's intended university and major is known – can result in a more efficient selection of coursework. Second, this finding may encourage greater university involvement and support of transfer advising at the community college level. This is because the statistically significant effect on transfer course efficiency occurred after transfer rather than before. In other words, the savings in coursework that resulted from student participation in the transfer advising program was actually realized at the university; not the community college. This finding may therefore encourage greater support from university staff members for transfer advising programs, since it appears that it is the university that ultimately benefits from them. Third, this finding indicates that significant room for improvement exists in reducing the overall amount of coursework completed at the community college. Specifically, subjects completed an average of approximately 82 transferable units of coursework prior to transfer, which is 12 more units than the maximum that can be applied to the baccalaureate degree after transfer. Providing transfer advising to students early in their community college education – including guidance about university and major selection – may reduce the number of inapplicable units completed at community college while concurrently reducing the units of coursework remaining to be completed after transfer.

The third research question statement (Q3) was: *What is the difference, if any, in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not?* A 3.2% difference was found in this variable between program participants and non-participants. This difference was relatively small and found to be not statistically significant, $t = 1.1933$, $p = .2355$. This finding indicated that the null hypothesis $H1_0$ should be accepted: There was no significant difference in the resultant level of transfer cost efficiency between subjects who participated in a transfer advising program and subjects who did not. In reference to past research, this finding was actually more positive than Turk's (1996) evaluation of the transfer center pilot project: An analysis of Turk's research indicated that the transfer center pilot was cost inefficient, while in this study no significant difference in cost efficiency between TSDA program participants and non-participants was detected. For the policymaker and practitioner this finding is favorable, as program participants demonstrated a significantly higher level of transfer effectiveness with no significant increase in cost.

An additional statistical analysis conducted of the cost components related to the data element U_U (the number of units that a subject must complete at the university to fulfill requirements for the baccalaureate degree that could have been completed at the community college prior to transfer) indicated that there was a significant difference in the cost associated with university required post-transfer units between program participants and non-participants, even when the additional cost associated with the TSDA program was included, $t = 2.4253$, $p =$

.0182. Specifically, program participants cost taxpayers, on average, $658.11 less per subject than program non-participants did by completing more university required coursework at the lower-cost CCC system prior to transfer. While too small to have a statistically significant effect on the overall level of transfer cost effectiveness, this finding was statistically significant when viewed in the limited context of post-transfer coursework (U_U).

This finding is important to state policymakers and educational administrators because it demonstrates that the investment of public funds in counseling and advising services such as transfer advising programs can actually result in cost savings for the taxpayer. In this case, the modest marginal cost of approximately $62.26 per subject to pay for the additional services provided by the TSDA program resulted in an average savings of $658.11 per subject. This figure clearly represents a very large return on investment to taxpayers. This finding is a clear example of a systemic efficiency, in that it demonstrates that community college-based advising can reduce the average number of units taken after transfer, and therefore the overall costs to the state per baccalaureate degree (Shulock et al., 2005). In addition, it provides an example to state policymakers of how the expenditure of public funds in higher education can be tied to measurable, effective, and cost efficient outcomes. If broadly implemented, improvements in systemic efficiencies such as these may provide the means by which California's higher education system can increase graduation rates without a concurrent increase in cost.

Recommendations

Several recommendations are offered based on the results of this study. These recommendations are intended for use by three categories of stakeholders in the transfer process: Transfer practitioners such as community college transfer center directors, articulation officers, and counselors; educational policymakers such as state legislators and higher education system administrators; and future researchers in this field.

The following recommendations are offered for transfer practitioners:

1. *Expand the use of community college-based transfer advising programs*. The results of this study indicate that student participants in transfer advising programs demonstrate higher levels of transfer effectiveness and economic efficiency than non-participants. The expansion of these programs is therefore likely to benefit greater numbers of students. To this end, increased advertising and other promotion efforts are clearly needed: Less than half of all eligible SDSU applicants participated in the TSDA program during the time period covered by this study, even though program participants had significantly more beneficial outcomes, such as a higher chance of admission. Increased participation in transfer advising programs is especially warranted for students who have traditionally demonstrated low rates of transfer such as some minority ethnic groups, disabled students, and others from educationally disadvantaged backgrounds (Farland & Anderson, 1989; California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006).

2. *Provide transfer counseling services as early as possible in a student's community college education*. The results of this study indicate that the opportunity exists to reduce the average amount of unnecessary coursework completed prior to transfer by up to 16%. However, such a reduction is only likely to occur if effective transfer counseling services are provided to students early in their community college education, when there is still time to implement a plan for the efficient use of transfer coursework. These services should especially focus on assisting students to select a transfer university and major, as these two decisions are vital for the selection of appropriate coursework and the resultant economic efficiencies (California State University, 2006; Hill, 2006; Shulock et al., 2005; University of California, 2005).

3. *Encourage university representatives to participate in the development of transfer advising programs*. This is the case both because university involvement is important to the transfer process itself and because it is the university that primarily benefits from the efficiency associated with transfer advising programs.

The following recommendations are offered for educational policymakers:

4. *Financially support the expansion of community college-based transfer advising programs*. The results of this study indicate that such programs are associated with increased transfer effectiveness and reductions in overall taxpayer costs. However, this study also illustrates the lack of any financial stimulus or incentive to community colleges to create or expand such programs. In fact, CCC campuses actually have a financial disincentive to support programs

that improve the transfer process. This is because the primary source of funding to CCCs is dependent on the number of enrolled students (Murphy, 2004; Shulock, 2008; Shulock & Moore, 2007b; Shulock et al., 2008). Programs that increase transfer effectiveness and efficiency necessarily reduce enrollment: An increase in transfer effectiveness means a higher rate of students leaving the college to begin studies at the university, and an increase in transfer efficiency means fewer units completed at the CCC prior to transfer. These outcomes reduce the college's overall enrollment. The college must then either accept the consequent reduction in funding levels, or counteract the reduced enrollment through increased investment in student recruitment. Either way, the result is a net financial loss for the college. The paradox is that reduced costs at the broader state level that result from the transfer process are realized only when administrators at individual CCC campuses pursue programs that are contrary to their own campuses' financial interests. This unfortunate situation leads to a related recommendation:

5. *Implement funding strategies that do not financially penalize CCC campuses that improve transfer effectiveness and efficiency*. For example, the state could provide "incentive" funding to colleges that increase their overall average level of transfer efficiency. In this scenario, colleges that reduce the average number of units completed prior to transfer would be compensated for the subsequent loss of enrollment revenue by additional funding that could be used to invest in student recruitment. As another example, the state could directly implement transfer advising programs through categorical funding

earmarked to be used for this specific purpose only. Such an investment is likely to generate a significant return in terms of overall cost savings for taxpayers, although it would still result in a net reduction of funding for the college. Interestingly, this example is contrary to the recommendations of other researchers in this field who advise the reduction or elimination of categorical or other targeted funding of this sort (Gill & Leigh, 2004; Shulock & Moore, 2005, 2007b; Sonstelie & Richardson, 2001).

Finally, the following recommendations are offered for future researchers in this field:

6. *Determine which aspects of transfer advising programs are most strongly associated with improvements in transfer effectiveness and efficiency*. For example, it might be that the requirement for students to select a university major is most strongly associated with increased transfer course and cost efficiency. If so, then other programs and services directed at assisting students to select a university major would be valuable.

7. *Broadly investigate all outcomes associated with transfer advising programs*. The scope of this study was limited to students who applied for admission to SDSU for the fall 2006 term. It is possible that some students received advising through the TSDA program but were not included in this study because they did not apply for admission to SDSU during the appropriate term. Instead, they may have transferred to a different university, extended their time at the community college with the intention of transferring to SDSU in a future term, or dropped out of college altogether. A broader study, perhaps one using a

longitudinal cohort group methodology, would be valuable in identifying all of the outcomes associated with participation in a transfer advising program. Such a methodology would also provide additional estimates of the overall levels of transfer effectiveness and efficiency associated with such programs. For example, it is possible that some program participants actually dropped out of college altogether. Such a finding would indicate a lower level of transfer effectiveness than that found in this study.

8. *Compare the overall economic efficiency of transfer advising programs to the economic efficiencies of other potential uses of public funds*. This study utilized a methodology for calculating the cost efficiency of a public program that could be applied in a wide variety of other settings. Specifically, the cost efficiency metric was calculated as a ratio, and therefore can be compared to other ratios calculated in a similar method for other, perhaps dissimilar, public programs. (This process would be analogous to the use of ratios in financial analyses of dissimilar corporations.) For example, it would be valuable for public policymakers to compare the cost efficiency associated with transfer advising programs to other potential but dissimilar uses of public education funds, such as high school-based college preparation programs or investments in campus infrastructure. This is especially true given the increasing public demand that investment in education produce measurable, effective results in an economically effective manner (NCAHE, 2005; Shulock & Moore, 2005; Shulock et al., 2005).

9. *Compare the effectiveness and efficiency of transfer advising programs at a variety of different CCC campuses*. Replicating this research at a number of

CCC campuses throughout the state – particularly at campuses with different student population characteristics – would improve the somewhat limited external validity associated with this study. This would demonstrate the extent to which the results of this study may be generalized to other programs and settings.

10. *Investigate the outcomes of educationally disadvantaged students' participation in transfer advising programs.* One of the original purposes of transfer centers and enduring goals of transfer programs is to increase the rate of transfer among students from educationally disadvantaged backgrounds (California Community Colleges System Office & California Community College Transfer Center Directors Association, 2006; Farland & Anderson, 1989). Future research focusing specifically on the outcomes of educationally disadvantaged students' participation in transfer advising programs would be helpful to practitioners seeking to improve the transfer process among these important student populations.

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APPENDIX A

Completed Research Instrument

Subj #	X	Y_1	Y_2	Y_3	C_A	C_C	C_U	U_C	U_M	U_U
1	0	0	-	-	-	-	-	-	-	-
2	0	1	0.7292	0.7176	$0.00	$182.03	$387.47	84.0	70.0	12.0
3	0	1	0.915	0.9044	$0.00	$182.03	$387.47	69.5	70.0	7.0
4	0	1	0.6393	0.6393	$0.00	$182.03	$387.47	109.5	70.0	0.0
6	0	1	1	0.9873	$0.00	$182.03	$387.47	63.0	70.0	7.0
7	0	1	0.8037	0.7874	$0.00	$182.03	$387.47	73.1	70.0	14.0
8	0	0	-	-	-	-	-	-	-	-
9	0	1	0.979	0.9738	$0.00	$182.03	$387.47	68.5	70.0	3.0
10	0	1	0.6763	0.6738	$0.00	$182.03	$387.47	100.5	70.0	3.0
11	0	1	0.7216	0.7216	$0.00	$182.03	$387.47	97.0	70.0	0.0
12	0	1	0.8235	0.8005	$0.00	$182.03	$387.47	66.0	70.0	19.0
13	0	1	0.7865	0.7831	$0.00	$182.03	$387.47	86.0	70.0	3.0
14	0	0	-	-	-	-	-	-	-	-
15	0	1	0.5882	0.5838	$0.00	$182.03	$387.47	112.0	70.0	7.0
16	0	1	1	0.9927	$0.00	$182.03	$387.47	66.0	70.0	4.0
17	0	1	0.7035	0.6722	$0.00	$182.03	$387.47	63.5	70.0	36.0
18	0	1	0.875	0.875	$0.00	$182.03	$387.47	80.0	70.0	0.0
19	0	0	-	-	-	-	-	-	-	-
20	0	1	0.8861	0.865	$0.00	$182.03	$387.47	64.0	70.0	15.0
21	0	1	0.8805	0.872	$0.00	$182.03	$387.47	73.5	70.0	6.0
22	0	1	0.9459	0.9459	$0.00	$182.03	$387.47	74.0	70.0	0.0
23	0	1	1	0.9927	$0.00	$182.03	$387.47	66.0	70.0	4.0
24	0	0	-	-	-	-	-	-	-	-
25	0	1	0.8974	0.8843	$0.00	$182.03	$387.47	69.0	70.0	9.0
26	0	1	0.7609	0.7609	$0.00	$182.03	$387.47	92.0	70.0	0.0
27	0	0	-	-	-	-	-	-	-	-
28	0	1	0.7955	0.7829	$0.00	$182.03	$387.47	77.0	70.0	11.0
29	0	1	0.8434	0.8434	$0.00	$182.03	$387.47	83.0	70.0	0.0
30	0	1	0.7692	0.7692	$0.00	$182.03	$387.47	91.0	70.0	0.0
31	0	1	0.7071	0.6814	$0.00	$182.03	$387.47	70.0	70.0	29.0
32	0	0	-	-	-	-	-	-	-	-
33	0	1	1	1	$0.00	$182.03	$387.47	70.0	70.0	0.0
34	0	0	-	-	-	-	-	-	-	-
35	0	1	0.8333	0.822	$0.00	$182.03	$387.47	75.0	70.0	9.0
38	0	1	0.7955	0.792	$0.00	$182.03	$387.47	85.0	70.0	3.0
40	0	0	-	-	-	-	-	-	-	-
41	0	1	0.8974	0.893	$0.00	$182.03	$387.47	75.0	70.0	3.0
42	0	1	1	0.9991	$0.00	$182.03	$387.47	69.5	70.0	0.5
43	0	1	0.3636	0.3627	$0.00	$182.03	$387.47	188.5	70.0	4.0
44	0	1	0.733	0.73	$0.00	$182.03	$387.47	92.5	70.0	3.0
45	0	1	0.7778	0.7712	$0.00	$182.03	$387.47	84.0	70.0	6.0
46	0	1	0.5622	0.5459	$0.00	$182.03	$387.47	95.5	70.0	29.0
47	0	1	0.9589	0.9589	$0.00	$182.03	$387.47	73.0	70.0	0.0
48	0	1	0.7568	0.7526	$0.00	$182.03	$387.47	88.5	70.0	4.0
49	0	1	0.9333	0.9333	$0.00	$182.03	$387.47	75.0	70.0	0.0
50	0	1	0.9091	0.9091	$0.00	$182.03	$387.47	77.0	70.0	0.0
51	0	1	0.9272	0.9272	$0.00	$182.03	$387.47	75.5	70.0	0.0

Subj #	X	Y_1	Y_2	Y_3	C_A	C_C	C_U	U_C	U_M	U_U
52	0	1	0.6699	0.6649	$0.00	$182.03	$387.47	98.5	70.0	6.0
53	0	1	0.5932	0.5932	$0.00	$182.03	$387.47	118.0	70.0	0.0
54	0	1	0.9859	0.9684	$0.00	$182.03	$387.47	61.0	70.0	10.0
55	0	1	0.8974	0.8843	$0.00	$182.03	$387.47	69.0	70.0	9.0
56	0	1	1	0.99	$0.00	$182.03	$387.47	64.5	70.0	5.5
57	0	1	0.9524	0.9524	$0.00	$182.03	$387.47	73.5	70.0	0.0
58	0	1	0.7407	0.7397	$0.00	$182.03	$387.47	93.5	70.0	1.0
59	0	1	0.8861	0.8775	$0.00	$182.03	$387.47	73.0	70.0	6.0
60	0	0	-	-	-	-	-	-	-	-
61	1	1	0.9396	0.9353	$62.26	$182.03	$387.47	74.5	70.0	0.0
62	1	1	1	0.9773	$62.26	$182.03	$387.47	60.0	70.0	10.0
63	1	1	1	0.9951	$62.26	$182.03	$387.47	70.0	70.0	0.0
64	1	1	0.9138	0.9098	$62.26	$182.03	$387.47	76.6	70.0	0.0
65	1	1	0.7955	0.7878	$62.26	$182.03	$387.47	84.0	70.0	4.0
66	1	1	0.6061	0.5931	$62.26	$182.03	$387.47	98.5	70.0	17.0
67	1	1	0.9722	0.9625	$62.26	$182.03	$387.47	69.0	70.0	3.0
68	1	1	0.9396	0.9353	$62.26	$182.03	$387.47	74.5	70.0	0.0
69	1	1	0.9589	0.9544	$62.26	$182.03	$387.47	73.0	70.0	0.0
70	1	1	1	0.9861	$62.26	$182.03	$387.47	65.0	70.0	5.0
71	1	1	0.8235	0.8202	$62.26	$182.03	$387.47	85.0	70.0	0.0
72	1	1	0.7778	0.7748	$62.26	$182.03	$387.47	90.0	70.0	0.0
73	1	1	0.7179	0.7154	$62.26	$182.03	$387.47	97.5	70.0	0.0
74	1	1	0.7609	0.7581	$62.26	$182.03	$387.47	92.0	70.0	0.0
76	1	1	0.8861	0.8823	$62.26	$182.03	$387.47	79.0	70.0	0.0
77	1	1	0.9859	0.9812	$62.26	$182.03	$387.47	71.0	70.0	0.0
78	1	1	0.9459	0.9367	$62.26	$182.03	$387.47	71.0	70.0	3.0
79	1	1	0.915	0.911	$62.26	$182.03	$387.47	76.5	70.0	0.0
80	1	1	0.8805	0.8725	$62.26	$182.03	$387.47	76.5	70.0	3.0
81	1	1	0.8434	0.8399	$62.26	$182.03	$387.47	83.0	70.0	0.0
82	1	1	1	0.9826	$62.26	$182.03	$387.47	63.0	70.0	7.0
83	1	1	0.875	0.8713	$62.26	$182.03	$387.47	80.0	70.0	0.0
84	1	1	1	0.9773	$62.26	$182.03	$387.47	60.0	70.0	10.0
85	1	1	0.8589	0.8553	$62.26	$182.03	$387.47	81.5	70.0	0.0
86	1	1	0.7735	0.7706	$62.26	$182.03	$387.47	90.5	70.0	0.0
87	1	1	1	0.9773	$62.26	$182.03	$387.47	60.0	70.0	10.0
88	1	1	0.8333	0.83	$62.26	$182.03	$387.47	84.0	70.0	0.0
89	1	0	-	-	-	-	-	-	-	-
90	1	1	0.6393	0.6373	$62.26	$182.03	$387.47	109.5	70.0	0.0
91	1	1	0.9459	0.9416	$62.26	$182.03	$387.47	74.0	70.0	0.0
92	1	1	0.8537	0.8501	$62.26	$182.03	$387.47	82.0	70.0	0.0
93	1	1	0.6731	0.6611	$62.26	$182.03	$387.47	92.0	70.0	12.0
94	1	1	0.9859	0.9812	$62.26	$182.03	$387.47	71.0	70.0	0.0
95	1	1	0.791	0.7811	$62.26	$182.03	$387.47	82.5	70.0	6.0
96	1	1	0.7778	0.7737	$62.26	$182.03	$387.47	89.0	70.0	1.0
97	1	1	0.6667	0.6613	$62.26	$182.03	$387.47	101.0	70.0	4.0
98	1	1	0.4714	0.4703	$62.26	$182.03	$387.47	148.5	70.0	0.0
99	1	1	1	0.9933	$62.26	$182.03	$387.47	69.0	70.0	1.0
100	1	1	1	0.9915	$62.26	$182.03	$387.47	68.0	70.0	2.0

Subj #	X	Y_1	Y_2	Y_3	C_A	C_C	C_U	U_C	U_M	U_U
101	1	1	0.6699	0.6677	$62.26	$182.03	$387.47	104.5	70.0	0.0
102	1	1	0.7254	0.719	$62.26	$182.03	$387.47	92.5	70.0	4.0
103	1	1	1	0.9773	$62.26	$182.03	$387.47	60.0	70.0	10.0
104	1	1	0.6699	0.6677	$62.26	$182.03	$387.47	104.5	70.0	0.0
105	1	1	0.7292	0.7266	$62.26	$182.03	$387.47	96.0	70.0	0.0
106	1	1	0.7447	0.739	$62.26	$182.03	$387.47	91.0	70.0	3.0
107	1	1	0.9396	0.9258	$62.26	$182.03	$387.47	68.5	70.0	6.0
108	1	1	1	0.979	$62.26	$182.03	$387.47	61.0	70.0	9.0
109	1	1	0.9211	0.9169	$62.26	$182.03	$387.47	76.0	70.0	0.0
110	1	1	0.9459	0.9416	$62.26	$182.03	$387.47	74.0	70.0	0.0
111	1	1	0.6195	0.6148	$62.26	$182.03	$387.47	109.0	70.0	4.0
112	1	1	0.7955	0.7878	$62.26	$182.03	$387.47	84.0	70.0	4.0
113	1	1	1	0.9808	$62.26	$182.03	$387.47	62.0	70.0	8.0
114	1	1	0.7778	0.7748	$62.26	$182.03	$387.47	90.0	70.0	0.0
115	1	1	0.6731	0.6619	$62.26	$182.03	$387.47	93.0	70.0	11.0
116	1	1	0.9859	0.9812	$62.26	$182.03	$387.47	71.0	70.0	0.0
117	1	1	0.8805	0.8767	$62.26	$182.03	$387.47	79.5	70.0	0.0
118	1	1	0.9459	0.9416	$62.26	$182.03	$387.47	74.0	70.0	0.0
119	1	1	0.979	0.9744	$62.26	$182.03	$387.47	71.5	70.0	0.0
120	1	0	-	-	-	-	-	-	-	-