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Source and Destination:

Transfer Success at a Multi-campus University System

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Source and Destination:
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At one multi-campus research university system in the Midwest, transfer students comprise forty-two percent of all entering students. The percent of transfer students is highest for the two urban campuses, where transfer students are the majority of entering students.   For one urban campus, transfer students comprise up to seventy-eight percent of their entering students. Forty-three percent of the transfer students previously attended a two-year institution, while thirty-seven percent attended a four-year. Seven percent were transfers from within the system. The system itself is made up of two urban institutions, a Research I institution, and a smaller, residential institution with a strong emphasis in engineering. Transfer students play a significant role in the level of enrollment, and have become a vital group to target in enrollment management efforts. It has also been imperative to study the success of these students in order to refine admission requirements. The admission standards for entering first-time students to the system are much different than those for entering transfer students. The initial study took a close look at the effect of these differing standards. After the initial study, there was a lot of feedback given to the system from other institutions in the state. As a part of the postsecondary education community within the state, it is important to provide information about transfer students to the institutions that have previously served these students. This study is an extension of the previous study by the system (Author & Mullen, 2002). The original study was a comparison between native students and transfer students. The research questions for the study were: Are transfer students more likely to graduate than native students, when controlling for ability and credit hours? And what characteristics help explain a transfer student's likelihood of graduating? The extension research questions address the types of institutions from which students transfer and the institutions to which they transfer. The following questions provide valuable information to the source institutions, or the institutions from which the students transfer, and the destination institutions, or the institutions to which the students transfer. The research questions are: Are transfer students more likely to graduate if they enter from a two-year, four-year, or system institution, when controlling for ability and credit hours? What characteristics help explain a transfer student's likelihood of graduating based on whether they transfer from a two-year, four-year, or system institution? Are transfer students more likely to graduate if they transfer to an urban or residential campus, when controlling for ability and credit hours? What characteristics help explain a transfer student's likelihood of graduating, based on whether the student transferred to an urban or residential campus?

Background

The previous study at the same university system showed that native students do graduate at a higher rate than transfer students when controlling for student ability and credit hours. The students were given six-years from the semester they entered to graduate. The findings also supported the use of a minimum GPA and minimum number of credit hours as admission requirements. The transfer GPA and transfer credit hours were both positive indicators of a transfer student's likelihood to graduate (Author & Mullen, 2002). These findings have also been shown in other studies investigating the role of transfer GPA and transfer credit hours in the success of a student (Glass & Harrington, 2002; Koker & Hendel, 2003; Saupe & Long, 1996; and Townsend, McNerny, & Arnold, 1993).

Transfer students to a four-year institution transfer from different types of institutions. Cliff Adelman describes the amount of students who attend more than one four-year institution and the amount of students who attend a two-year and a four-year institution in his 2004 publication, *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000*. Adelman analyzed the National Center of Educational Statistic's data in the National Longitudinal Study of the High School Class of 1972, the High School and Beyond Longitudinal Study of the 1980 Sophomores, and the National Education Longitudinal Study of 1988. From this he found that of the students in the class of 1992 who started in a four-year institution and earned a Bachelor's degree, 20% earned the degree from an institution other than from the one where they began their postsecondary educational career. Of all the students who entered a community college and earned at least 10 credits from this type of institution, 36% transferred to a four-year institution (Adelman, 2004).

Arnold, (2001), and Saupe and Long, (1996), analyze the effect of the type of source institution on the success of a student. Both studies found that students from a two-year source institution do as well as those from a four-year source institution. One aspect of transfer unique to two-year transfers is whether or not they obtain an Associate's degree prior to transfer. Some institutions will waive their general education requirements if a two-year transfer has been awarded an Associate's of Arts or Associate's of Science degree. Two studies found that students who transfer from two-year institutions with an Associate's Degree have a higher graduation rate from four-year institutions than those two-year transfer students without an Associate's Degree (Saupe & Long, 1996; and Townsend & Barnes, 2001). Although some studies focus on universities in urban settings, few compare the success of students who transfer to urban/commuter institutions and residential institutions (Arnold, 2001; Bach, Banks, Kinnick, Ricks, Stoering, & Walleri, 2000).

In current research on the success of transfer students, persistence to graduation is used as a success variable (Arnold, 2001; Bach, Banks, Kinnick, Ricks, Stoering, & Walleri, 2000; Carlan & Byxbe, 2000; Author & Mullen, 2002; Koker & Hendel, 2003; Saupe & Long, 1996; Townsend & Arnold, 2003; and Townsend & Barnes, 2001). Student level characteristics are analyzed to determine whether or not they affect a student's persistence to graduation. Student level characteristics include transfer credit hours, transfer GPA, gender, ethnicity, age, and degree program (Carlan & Byxbe, 2000; Author & Mullen, 2002; Glass & Harrington, 2002; Koker & Hendel, 2003; Saupe & Long, 1996; Townsend & Barnes, 2001; and Townsend, McNerny, & Arnold, 1993). Studies separate transfer students into different cohorts based on their demographic characteristics. The groups are analyzed to determine if there is a difference in their graduation rates, and if this difference is found to be statistically significant by a chi-square test (Glass & Harrington, 2002; Kearney, Townsend, & Kearney, 1995; and Koker & Hendel, 2003). Logistic regression is also used by researchers to determine whether or not certain student level characteristics affect a student's obtainment of a Bachelor's degree (Author & Mullen, 2002; Koker & Hendel, 2003; and Saupe & Long, 1996).

Research Questions and Methodology

Four research questions drove this study. 1) Are transfer students more likely to graduate if they enter from a two-year, four-year, or system institution, when controlling for ability and credit hours? 2) What characteristics help explain a transfer student's likelihood of graduating based on whether they transfer from a two-year, four-year, or system institution? 3) Are transfer students more likely to graduate if they transfer to an urban or residential campus, when

controlling for ability and credit hours? 4) What characteristics help explain a transfer student's likelihood of graduating, based on whether the student transferred to an urban or residential campus? These questions were developed in response to feedback from several of the institutions from which the system received transfer students. This information allows all institutions involved in the education of the student to better understand their students and the characteristics with which they enter the institution. These questions are important to the system in understanding our own enrollment management and admissions standards.

To address the first and third research questions, transfer students who entered the university during the fall terms 1991 through 1997 were identified and tracked. For the first question, transfer students were separated into three groups dependent upon type of source institution. One group contained those students who transferred from a two-year institution. Another group contained those students who transferred from a four-year institution that is not in the system. And the third group contained the students who transferred from within the system. For the third question, transfer students were separated into two more groups. One included the students who transferred to an urban institution, and the other included those who transferred to a residential institution.   The number of credit hours and overall GPA were used to compare students in different groups who entered the system. In this study, transfer students were given six years to graduate from the semester they entered the system.

Logistic regression was used to determine which student characteristics (e.g., transfer GPA, transfer credit hours, source institution, major, etc.) helped to predict a transfer student's likelihood of success, defined as graduation in six years. The second and fourth research questions drove this analysis. Logistic regression analyzes effects of categorical and continuous independent variables on a dichotomous dependent variable. For our model, point estimates of each characteristic that are statistically significant ($p < 0.05$) explain the likelihood a person with that particular characteristic is to graduate compared to a person with the alternate characteristic. The explanatory independent variables we investigate in this model are gender, ethnicity (Asian-American, underrepresented minority, or other), type of source institution (four-year, two-year, or system), type of associate's degree if the student was from a two-year source institution (none, Associate's of Arts, Associate's of Science, and other), type of destination institution (urban, or residential), transfer GPA category, transfer hour category, and age. African-American, Hispanic, and Native American ethnicities are considered underrepresented minorities for this study. The transfer GPA category and transfer hour category are considered ranked ordinal variables, with each category in progression of GPA or hours ranking higher than the one before. The point estimate for these two variables represents the likelihood someone will graduate compared to someone in the next lowest transfer GPA category or transfer hours category. Age is the only continuous variable.

For each variable that is statistically significant, a point estimate is given. The point estimate represents the likelihood a student with that characteristic will graduate compared to those students who do not have that characteristic, holding the other variables constant. For example, for the dichotomous gender variable, assume the point estimate for being female is 1.25. Thus a female is .25 (1.25 – 1.0) times as likely to graduate as a male student. Alternatively, assume .80 to be the point estimate for being female. Then, we would say a female is .20 (1.0 - .80) less times as likely to graduate as a male student.   Transfer GPA and transfer hours are grouped into ordered categorical data. The GPA categories are 2.0 – 2.49, 2.5 – 2.9, 3.0 – 3.49, and 3.5 – 4.0. The transfer hour categories are 24 –35, 36 – 47, 48 – 59, and 60 and above. For ordinal variables, the point estimate represents the likelihood a student will

graduate compared to a student in the category below them. For example, assume the point estimate for transfer GPA is 1.20. A student whose GPA is between 2.5 and 2.9 is .20 times as likely to graduate as a student whose GPA is between 2.0 and 2.49. The point estimate for age, a continuous variable is similar. It represents the likelihood a student will graduate compared to the student who is a year younger.

The study population includes full-time, degree seeking transfer students who entered a system institution between fall 1991 and fall 1997. Transfer students are only included if they transferred from an institution within the state and if they had at least 24 credit hours and a 2.0 GPA prior to transferring. There are 17,226 transfer students included in the study. Of these, 363 are transfer students whose source institution was not categorized as a two-year, four-year, or system institution and are not included in the final analysis.

Characteristics of Transfer Students
Demographic Characteristics
Of the total transfer student population to the multi-campus system during the fall semesters of 1991 to 1997, 52 % were female and 48% were male. Over three-fourths of the transfer students were white, while only 8 % were African-American, 2% were Hispanic, and 3% were Asian-American.

The total number of transfers and the amount entering from each type of source institution and to each destination institution is shown in Table 1. For the 17, 226 in-state transfers to the system, 54% transferred from a two-year institution, 38% from a four-year, and 6% were intra-system transfers. For the urban and residential destination institutions, there was a difference in the population of students from different types of source institutions. The difference at the two urban institutions was largest where 61% of the students transferred from a two-year institution and 31% transferred from a four-year institution. However, at the two residential institutions, only 43% transferred from a two-year institution, whereas 48% transferred from a four-year institution.

**Table 1. Number of Transfer Students, 1991 - 1997 Cohorts
By Type of Source Institution and Destination Institution**

	Destination Institution		
Source Institution:	**All**	**Urban**	**Residential**
2-year	9,244	6,156	3,088
4-year	6,524	3,084	3,440
UM System	1,119	605	514
Total	17,226	10,083	7,143

Source: Transfer Data Files, Fall 1991 - Fall 1997

Graduation Rates – Different Source Institutions
The overall graduation rates for different cohorts of students are shown in Table 2 below. These graduation rates are not controlling for entering GPA or credit hours. Overall, the intra-system transfers graduate at a higher rate than other transfers. When comparing two-year

transfers to four-year transfers, students from four-year institutions graduate at a slightly higher rate than those from two-year institutions.

Table 2. Graduation Rate of Transfers, 1991 - 1997 Cohorts
By Type of Destination Institution

	Destination Institution		
Source Institution:	**All**	**Urban**	**Residential**
2-year	51%	49%	55%
4-year	52%	43%	60%
UM System	59%	54%	67%
Total	52%	48%	59%

Source: Transfer Data Files, Fall 1991 - Fall 1997

Table 3 shows a comparison between graduation rates for students who transferred in from a two-year institution and a four-year institution. The intra-system transfers were not included because several of the aggregated groups' did not have at least thirty students. Two trends are similar for both represented groups of students. First, students who transfer with more credit hours graduate at a higher rate. Secondly, students who transfer with a higher GPA graduate at a higher rate.   The increase in graduation rate is greater from the lowest GPA category to the highest GPA category compared to the lowest credit hour category to highest credit hour category. Four-year transfers graduate at a higher rate than two-year transfers for three of the sixteen categories. Two-year transfers with less than a 3.0 GPA show a considerable increase in graduation rate when they transfer in with more than 48 hours compared to when they transfer in with less than 48 hours. Four-year students with less than a 3.5 GPA tend to graduate at a higher rate if they transfer with 24 – 35 credit hours than if they transfer with 36 – 47 hours.

Table 3. 2-year and 4-year Transfer Student Comparison, 1991 - 1997 Cohorts
Graduation Rates by Credit Hours and GPA

	Student GPA:							
	Less than 2.50		2.50 - 2.99		3.00 - 3.49		3.50 or more	
Credit Hours:	**2-Year Tranfers**	**4-Year Transfers**	**2-Year Tranfers**	**4-Year Transfers**	**2-Year Tranfers**	**4-Year Transfers**	**2-Year Tranfers**	**4-Year Transfers**
24 - 35	29%	34%	39%	50%	52%	59%	54%	64%
36 - 47	29%	30%	35%	37%	53%	51%	65%	67%
48 - 59	38%	37%	51%	58%	58%	66%	69%	71%
Over 60	40%	43%	51%	54%	62%	61%	69%	74%

Source: Transfer Data Files, Fall 1991 - Fall 1997

Descriptive Characteristics of Graduates – Different Source Institutions

As mentioned in the methodology section, logistic regression was utilized to determine the characteristics that indicate whether or not a student graduated. For students who transferred from a four-year institution, the characteristics found to indicate they would graduate were transfer GPA (p. est. 1.484), transfer hours (p. est.1.165), and transferring to a residential institution (p. est. 1.683). Negative indicators were age (p. est. 0.955) and being an underrepresented minority (p. est. 0.761).

Table 4. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Four-year Transfers

	Point Estimate	95% Wald Confidence Limits		Effect	
Variables Found as Significant:*					
Transferred to a Residential	1.683	1.515	1.870	Positive	
Transfer GPA	1.484	1.409	1.563	Positive	
Transfer Hours	1.165	1.119	1.212	Positive	
Age	0.955	0.945	0.966		Negative
Minority	0.761	0.634	0.913		Negative
Other variables looked at:					
Gender					
Asian/Pacific Islander					
Other Ethnicity					

* p <.05

Source: Institutional data files.

Transfer GPA and transfer hours were also positive indicators of graduation for students who transferred from a two-year institution and for those who transferred from within the system. The transfer GPA point estimates were 1.529 and 1.221 for two-year and intra-system transfers, respectively. The transfer hour point estimates were 1.204 and 1.125 for the two groups of transfers, respectively. Table 5 below shows the remaining point estimates for transfer students from two-year institutions. Specific to the two-year transfers, whether or not a student had obtained an Associate's Degree prior to transferring to the system, and if they had, the type of Associate's Degree, were also included in the logistic regression. For transfers from a two-year institution, obtaining an Associate's of Arts degree was a positive effect (p. est. 1.270) compared to not having an Associate's degree. Obtaining an Associate's of Science degree was not significant, whereas obtaining any other type of Associate's had a negative impact on graduation (p. est. 0.707). The last two characteristics to indicate a student had a higher likelihood of graduating than others were being female (p. est. 1.158) and transferring to a residential institution (p. est. 1.103). Age (p. est. 0.964) and being an underrepresented minority (p. est. 0.711) were statistically significant (p < .05) as indicators a student did not graduate.

Table 5. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Two-year Transfers

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transfer GPA	1.529	1.463	1.597	Positive
Associate's of Arts Degree	1.270	1.140	1.415	Positive
Transfer Hours	1.204	1.158	1.252	Positive
Female	1.158	1.060	1.265	Positive
Transferred to a Residential	1.103	1.001	1.215	Positive
Age	0.965	0.958	0.972	Negative
Minority	0.711	0.618	0.817	Negative
Other Associate's Degree	0.707	0.580	0.861	Negative
Other variables looked at:				
Associate's of Science Degree				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

The logistic indicators for transfers within the system are shown in Table 6. Transferring to a residential institution was positive (p. est. 1.528) while age was a negative indicator of graduation (p. est. 0.929).

Table 6. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Intra-System Transfers

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transferred to Residential	1.528	1.176	1.985	Positive
Transfer GPA	1.221	1.071	1.391	Positive
Transfer Hours	1.125	1.013	1.249	Positive
Age	0.929	0.894	0.965	Negative
Other variables looked at:				
Gender				
Minority				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

Graduation Rates – Different Destination Institutions
    The third and fourth research questions addressed different types of destination institutions within the system. Again, the system is comprised of two urban, mainly commuter campuses, a Research I residential institution, and a residential institution with a strong emphasis

on engineering and the physical sciences. Transfer students to the two urban institutions were grouped together, and the transfer students to the two residential institutions were grouped together. For each environment, students from two-year and four-year source institutions were evaluated. The intra-system cohort of transfer students became too small to analyze after aggregating for transfer hours and transfer GPA.

Referring to Table 2, transfer students overall graduate at a higher rate from the residential institutions (67%) as compared to the urban institutions (54%). However, when looking at the types of destination institutions separately, there is a difference in how two-year transfers perform compared to four-year transfers. At the urban institution, transfers from two-year institution graduated at a higher rate (49%) compared to those students from four-year institutions (43%). The opposite was true at the residential institution, where four-year transfers graduated at a rate of 60% and two-year transfers graduated at a rate of 55%.

Table 7 below shows a comparison of transfers to urban and residential institutions aggregated by transfer GPA and transfer hours.   For thirteen of the fifteen categories, residential transfer students graduate at a higher rate than urban transfer students. Also, for both groups, there is a greater increase in graduation rate as the transfer GPA increases than when the number of transfer credit hours increases.

Table 7. Urban and Residential Transfer Student Comparison, 1991 - 1997 Cohorts
Graduation Rates by Credit Hours and GPA

	Student GPA:							
	Less than 2.50		2.50 - 2.99		3.00 - 3.49		3.50 or more	
Credit Hours:	Urban Tranfers	Residential Transfers	Urban Tranfers	Residential Transfers	Urban Tranfers	Residential Transfers	Urban Tranfers	Residential Transfers
24 - 35	32%	39%	43%	52%	50%	63%	56%	67%
36 - 47	31%	34%	38%	41%	54%	53%	66%	66%
48 - 59	41%	42%	52%	60%	60%	61%	68%	73%
Over 60	40%	53%	51%	62%	57%	69%	63%	81%

Source: Transfer Data Files, Fall 1991 - Fall 1997

Table 8 and 9 below show comparisons of two-year and four-year transfer students at the urban institutions (Table 8) and the residential institutions (Table 9), aggregated by transfer GPA and transfer credit hours. In both of these tables, regardless of source institution, there is an increase in graduation rate in both categories of transfer GPA and transfer credit hours, with the greatest gain being in transfer GPA category. The higher the transfer GPA, the more likely a student is to graduate. The more transfer hours a student accumulates, the more likely they are to graduate.

At the urban institutions, two-year transfer students graduate at a higher rate than the four-year transfers in nine of the sixteen categories. The two-year transfer students' graduation rate was higher than the four-year transfer students' in all four GPA categories where the credit hours earned was over sixty.

Table 8. 2-year and 4-year Transfer Student Comparison, 1991 - 1997 Cohorts
Graduation Rates by Credit Hours and GPA
Transfers to an Urban Campus

| | Student GPA: | | | | | | | |
| | Less than 2.50 | | 2.50 - 2.99 | | 3.00 - 3.49 | | 3.50 or more | |
Credit Hours:	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers
24 - 35	29%	29%	41%	40%	51%	49%	51%	59%
36 - 47	28%	27%	33%	40%	53%	48%	64%	70%
48 - 59	40%	36%	49%	52%	59%	62%	65%	69%
Over 60	38%	36%	49%	46%	58%	51%	64%	53%

Source: Transfer Data Files, Fall 1991 - Fall 1997

At the residential institution, four-year transfer students graduate at a higher rate than two-year transfer students in thirteen of the sixteen categories. This is similar to the overall graduation rate of two-year and four-year transfer students at the residential institutions.

Table 9. 2-year and 4-year Transfer Student Comparison, 1991 - 1997 Cohorts
Graduation Rates by Credit Hours and GPA
Transfers to a Residential Campus

| | Student GPA: | | | | | | | |
| | Less than 2.50 | | 2.50 - 2.99 | | 3.00 - 3.49 | | 3.50 or more | |
Credit Hours:	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers	2-Year Tranfers	4-Year Transfers
24 - 35	29%	40%	36%	57%	53%	65%	62%	67%
36 - 47	30%	34%	39%	34%	52%	55%	68%	65%
48 - 59	32%	40%	54%	63%	56%	68%	76%	71%
Over 60	46%	57%	56%	62%	68%	69%	77%	88%

Source: Transfer Data Files, Fall 1991 - Fall 1997

Descriptive Characteristics of Graduates – Different Source Institutions
The last part of the study evaluated the characteristics that best indicate a student will graduate, depending on whether the student transferred to an urban institution or a residential institution. Logistic regression was utilized to analyze these characteristics. Table 10 below shows the overall characteristics that were statistically significant at the urban institutions. Table 11 and 12 evaluate the characteristics for these students based on whether they transferred from a four-year or two-year institution, respectively. For all transfers to an urban institution, transfer GPA (p. est. 1.438) and transfer hours (p. est. 1.134) were positive indicators of graduation. Other positive indicators were being female (p. est. 1.398), transferring from within the system (p. est. 1.619), and transferring from a two-year institution (p. est. 1.138). Negative indicators were age (p. est. 0.965) and being a minority (p. est. 0.722).

**Table 10. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Transfers to an Urban Campus**

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transfer GPA	1.438	1.379	1.498	Positive
Female	1.398	1.287	1.518	Positive
Transfer from within theSystem	1.619	1.353	1.937	Positive
Transfer from two-year institution	1.138	1.041	1.244	Positive
Transfer Hours	1.134	1.096	1.173	Positive
Age	0.965	0.959	0.971	Negative
Minority	0.722	0.644	0.811	Negative
Other variables looked at:				
Transfer from four-year institution				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

For four-year transfer students to the urban institution, transfer GPA (p. est. 1.420) and transfer hours (p. est. 1.102) remained consistent as positive indicators, as did being female (p. est. 1.323). Negative indicators were age (p. est. 0.960) and being a minority (p. est. 0.768).

**Table 11. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Urban Transfers from Four-year Institutions**

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transfer GPA	1.420	1.318	1.529	Positive
Female	1.323	1.139	1.537	Positive
Transfer Hours	1.102	1.040	1.167	Positive
Age	0.960	0.948	0.973	Negative
Minority	0.768	0.614	0.962	Negative
Other variables looked at:				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

When evaluating two-year transfer students to the urban institution, a variable representing whether or not a student had obtained an Associate's degree was added into the logistic regression. An initial chi-square analysis found there to be a significant difference (p

< .01) in graduation rate depending on whether a two-year transfer student obtained an Associate's of Arts degree, Associate's of Science degree, Associate's of Applied Science or other type of Associate's degree, or no degree at all prior to transferring. Overall, the 6,156 two-year transfers to the urban institution graduated at a rate of 50%. Of the 1,865 transfers with an Associate's of Arts degree, 58% graduated within six years of transferring, whereas the 3,688 without a degree graduated at a rate of 47%.

Table 12 also shows obtaining an Associate's of Arts degree to be a positive indicator of graduation (p. est. 1.436). Students who obtained an Applied Associate's of Science or other type of associate's degree were shown to be less likely to graduate (p. est. 0.760) than those students who did not obtain a degree at all. Transfer GPA (p. est. 1.453), transfer hours (p. est. 1.122) and being female (p. est. 1.405) remained positive indicators. Age (p. est. 0.967) and being an underrepresented minority (p. est. 0.672) were consistent as negative indicators of graduation.

Table 12. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Urban Transfers from Two-year Institutions

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transfer GPA	1.453	1.378	1.533	Positive
Associate's of Arts Degree	1.436	1.269	1.626	Positive
Female	1.405	1.262	1.564	Positive
Transfer Hours	1.122	1.068	1.178	Positive
Age	0.967	0.960	0.975	Negative
Other Associate's Degree	0.760	0.614	0.941	Negative
Minority	0.672	0.576	0.785	Negative
Other variables looked at:				
Associate's of Science Degree				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

Logistic regression was also used to evaluate the characteristics of students who transferred to the residential institutions. Table 13 below shows overall results of a logistic regression for these transfer students. As with transfer students to the urban institution, transfer GPA (p. est. 1.588) and transfer hours (p. est.1.256) are positive indicators and age (p. est. 0.947) and being a minority (p. est. 0.710) are negative indicators of graduation. The role of the source institution in determining a student's likelihood of graduation differs from the role it played at an urban institution. For transfers to residential institutions, transferring from within the system increased a student's likelihood to graduate (p. est. 1.460), whereas transferring from a two-year institution had the opposite effect (p. est. 0.679). Lastly, being Asian-American became a significant positive indicator (p. est.1.610).

Table 13. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Transfers to a Residential Campus

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Asian/Pacific Islander	1.610	1.117	2.320	Positive
Transfer GPA	1.588	1.509	1.671	Positive
Transfer from within theSystem	1.460	1.191	1.79	Positive
Transfer Hours	1.256	1.207	1.307	Positive
Female	0.829	0.758	0.929	Negative
Age	0.947	0.936	0.959	Negative
Minority	0.710	0.570	0.884	Negative
Transfer from two-year institution	0.679	0.612	0.754	Negative
Other variables looked at:				
Transfer from four-year institution				
Other Ethnicity				

* p <.05

Source: Institutional data files.

Table 14 and 15 show an analysis of characteristics of transfer students to the residential institutions based on whether the students transferred from a four-year or two-year institution, respectively. For four-year transfers, transfer GPA (p. est. 1.541) and transfer hours (p. est. 1.213) remain positive indicators, while age (p. est. 0.950) and being a minority (p. est. 0.726) remain negative indicators of a transfer student's likelihood to graduate. Neither being female nor being Asian-American are significant characteristics for transfer students from a four-year to a residential institution.

Table 14. Logistic Regression Results, Fall 1991 – 1997 Transfer Success (Grad
Residential Transfers from Four-year Institutions

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Transfer GPA	1.541	1.433	1.657	Positive
Transfer Hours	1.213	1.147	1.281	Positive
Age	0.950	0.934	0.967	Negative
Minority	0.726	0.533	0.990	Negative
Other variables looked at:				
Gender				
Asian/Pacific Islander				
Other Ethnicity				

* p <.05

Source: Institutional data files.

Lastly, characteristics for two-year transfer students to residential institutions were analyzed. The Associate's degree variable was again added into the logistic regression specifically for two-year transfer students. Of the overall 3,088 transfer students in this cohort, 56% graduated within six years. In a chi-square analysis, graduation rates of different groups within this cohort aggregated by type of Associate's degree were significant ($p < .05$). Of the 496 students with an Associate's degree, 61% graduated. Of the 2,492 with no Associate's degree, 55 % graduated.

Although the Associate's degree variable was included in a logistic regression, none of the variations of this variable were significant indicators a student would graduate, as seen in Table 15. Three significant positive indicators were transfer GPA (p. est. 1.686), transfer hours (p. est. 1.348) and being Asian-American (p. est.2.063). Two negative indicators were age (p. est. 0.947) and being female (p. est. 0.784).

Table 15. Logistic Regression Results, Fall 1991 - 1997 Transfer Success (Graduation)
Residential Transfers from Two-year Institutions

	Point Estimate	95% Wald Confidence Limits		Effect
Variables Found as Significant:*				
Asian/Pacific Islander	2.063	1.178	3.613	Positive
Transfer GPA	1.686	1.558	1.824	Positive
Transfer Hours	1.348	1.262	1.441	Positive
Age	0.967	0.930	0.965	Negative
Female	0.784	0.670	0.918	Negative
Other variables looked at:				
Associate's of Arts Degree				
Associate's of Science Degree				
Other Associate's Degree				
Minority				
Other Ethnicity				

* p <.05

Source: Institutional data files.

Limitations

One of the limitations mentioned earlier is size of aggregated groups. The intra-system transfers did not have enough students to analyze when controlling for transfer GPA and transfer credit hours. There were several groups where the cell size was below thirty. The intra-system transfer students are unique from the two-year and four-year transfer students in that they all transferred from institutions with similar admission requirements. Also, within the system, there is a universal articulation agreement. Both of these factors could have a major impact on graduation rates for these students compared to other transfer students.

Another limitation to this study is the data and method used to track students to graduation. The data used were data collected only by the four institutions within the system. Once a student left the system, they were no longer tracked. If a student stopped out for a

semester and returned a semester later, and eventually graduated, they were still not included as a successful graduate. Also, if a student left the institution and transferred out of the system to complete their degree at another institution, they would not be included as a successful graduate. Clifford Adelman discusses this exact situation as a critique of using graduation rates to measure postsecondary institutions (Burd, 2004).

For the two residential campuses, there appear to be some characteristics that are specific to the campus with a strong emphasis on engineering and the physical sciences. The characteristics of being Asian-American or female showed different effects at the residential institutions. Because of this, it would be valuable in any further investigations at this system to separate the data by institution.

The logistic regression was able to predict the dichotomous graduation variable correctly between 60 to 64 percent of the time, depending on the cohorts being analyzed. These percents may not seem to support a high level of confidence in the validity of the findings, however, they are higher than the 50% that would be obtained in a randomized method of determining success for a dichotomous variable.

Conclusions

Intra-system transfers graduate at the highest rate, when controlling for transfer GPA and transfer hours. Transfers from a four-year institution graduate at a higher rate than transfers from a two-year institution when controlling for transfer GPA and transfer hours. Regardless of whether a student enters from a two-year or four-year institution, transfer GPA and transfer hours continue to be positive indicators of graduation. Transferring to a residential institution is also a positive indicator. Age and being an underrepresented minority are negative indicators of graduation for transfers regardless of the type of source institution. Obtaining an Associate's degree prior to transferring increases the likelihood a two-year transfer student will graduate.

When controlling for transfer GPA and transfer hours, transfer students to a residential institutions graduate at a higher rate than those to an urban institution. Within the residential institutions, transfers from a four-year institution graduate at a higher rate than transfers from a two-year institution. The opposite is true at the urban institutions where two-year transfers graduate at a higher rate than four-year transfers.

Transfers to urban and residential institutions have similar characteristics that predict both their likelihood of graduating and of not graduating. For both cohorts, transfer GPA, transfer hours and transferring within the system are positive indicators of graduation. Age and being an underrepresented minority are negative indicators. Being female and transferring from a two-year institution are positive indicators at the urban institution, but are negative indicators at the residential institutions. Additionally at the residential institutions, being an Asian-American is a positive indicator a student will graduate.

Implications and Policy Issues

Due to the nature of this particular system, this study was able to look at specific characteristics unique to two-year and four-year transfers, as well as how well these students perform when transferring into different environments. There have been many studies comparing the success of two-year transfers to native students, but few have compared the two-year transfer student to the four-year transfer student. Due to the transfer mission of community colleges, the success of their students is of particular interest to these institutions. However, four-year transfers appear as drop-outs to their source institutions. Four-year institutions do not

typically track those students who leave their institution to determine whether or not the student actually transferred into another institution, and if they did, whether or not the student ever obtained a Bachelor's degree. This study recognizes the state postsecondary community as playing a role in the education of the system's transfer students.

Additionally, specific to the two-year transfer, this study evaluated the effect of the Associate's degree on the success or degree attainment of the two-year transfers. The ability of a student to persist to the obtainment of an Associate's of Arts or Science degree, seems to acknowledge they also have the ability to persist to the obtainment of a Bachelor's degree. This becomes important information to those who are responsible for advising the two-year students on whether or not they should remain at the community college to gain more credits, or a degree, prior to transferring. It also informs policy makers on the transferability and articulation of the Associate's degree to the four-year institution.

One of the interesting findings was the ability of two-year transfers to be more successful than four-year transfers at the urban institution. One issue surrounding this finding is that more two-year institutions are themselves in urban settings. Also, the urban institutions and community colleges tend to have more commuter students than residential students. The students who transfer from the urban two-year institution to the urban four-year institution, face less culture shock than the students who transfer from the urban two-year institution to the residential institution. Transferring into a similar situation allows the two-year transfers to be more successful.

This study is similar to the initial study which also found the need for programs to assist in the transfer and assimilation of minority students. There was not one combination of type of source institution and destination institution where being an underrepresented minority was a positive indicator of graduation. Further investigations should look specifically at these students and what characteristics, policies, or programs have been beneficial in effecting their persistence to graduation.

For the system, it is important to recognize the success of their intra-system transfers. Within the system, there is an open articulation agreement, where any course taken at a system institution transfers to any other institution within the system. Students are able to move freely between the institutions. The institutions within the system all have similar admission requirements for transfer students and first-time freshmen, as well. To be admitted as a transfer, a student must have at least a 2.0 GPA and twenty-four credit hours. Otherwise, they must meet the initial admission requirements of any first-time entering student. The initial admission requirements ensure that students who have been admitted to the system already have a high probability of graduating. Thus, there is a high graduation rate of intra-system transfers. The findings of the study support the open articulation agreements within the system.

Summary

The multi-campus system accepts transfer students from within the system, as well as from two-year and four-year institutions from outside of the system. All transfer students have diverse needs that must be addressed in order for them to be successful. This study looks at transfer students from different types of source institutions and evaluates how they perform within the system once they matriculate. Overall, the intra-system transfer students graduate at a higher rate than those who transfer from outside of the system. Of the external transfer students, the four-year transfers graduate at a higher rate than the two-year transfers. Additionally, graduation rates differ depending on the type of institution to which students transfer. For

transfer students to urban institutions, students from two-year institutions are more likely to graduate than those from four-year institutions.

It is extremely important to understand how to better serve transfer students as more students are taking alternative paths to the baccalaureate. Further studies should look more in depth at the source and destination institutions and the policies and programs that affect transfer students. Additionally, qualitative analysis of students who enter the system from the different types of source institutions could provide insight into the obstacles they encounter during the process of transfer.

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