Academic Performance of Transfers from KCC into UH 4-year Institutions

From Academic Year 2011 to Academic Year 2015

1. Introduction

This study investigates the academic performance of students transferring from Kapi'olani Community College into 4-year University of Hawai'i baccalaureate programs. Comparison groups are defined from the subset of UH 4-year students who began and continued their academic career at the same institution, i.e., have never transferred within the UH system. We refer to such students as non-transfers (NT) in this report.[1] The analysis period covers the academic years from 2011 to 2015. A detailed extraction methodology is presented in Section 4.

KCC transfer students grade point ratios (gpr), credits attempted, and credits earned were extracted only in the first semester following transfer. These end-of-semester measurements provide perhaps the best criteria for evaluating how academically well-prepared KCC students are for baccalaureate programs. Other measures, such as graduation and re-enrollment rates are undoubtedly important measures of student success, but are not provided here because they may involve many other competing educational, psychological, social and financial factors.

2. Data

2.1 Total Transfers

The total number of transfers from KCC is broken down by academic program and academic year in Table 1. The total number of transfers has been declining over the analysis period, but total enrollment at KCC has been declining as well. In fact, transfers as a percentage of total enrollments have climbed from about 4.6% of the total KCC population in 2011 to about 6.0% of the population in 2015. Caution is therefore required when interpreting raw numbers in individual academic programs. Transfers from Liberal Arts, for example, have risen from about 3.3% of the general population to 3.8%. These percentages are not reproduced in the table, as most programs are too small to have interpretable results.

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[1] A previous report by the UH System IRAO has referred to these students as "native" 4 year students. While this term has a certain elegance, we are choosing a different terminology to avoid confusion with any interpretations of the word based on ethnicity.

Table 1: Academic-Year Transfers into UH 4-Yr Institutions, By KCC Academic Major

	Year Transferred					All
	2011	2012	2013	2014	2015	
Major						
Accounting	9	19	15	15	17	75
Biotechnician	.	.	1	.	.	1
Community Health Worker	.	.	2	.	1	3
Culinary Arts	4	4	3	2	4	17
Dental Assisting	1	.	1	.	.	2
Educational Paraprofessional	2	.	1	.	.	3
Emergency Medical Technician	.	1	.	3	2	6
Entrepreneurship	1	.	2	.	.	3
Exercise and Sport Science	4	4	2	2	1	13
Food Service	2	2	.	1	.	5
Hawaiian Studies	.	.	.	2	5	7
Hospitality & Tourism	.	.	.	2	1	3
Hotel/Restaurant Operations	7	.	6	.	2	15
Information Technology	5	6	10	11	11	43
Interpreting	.	.	2	1	.	3
Liberal Arts	311	346	328	268	322	1575
Marketing	2	4	6	1	4	17
Medical Assisting	1	.	1	1	1	4
Medical Lab Technician	.	3	2	.	.	5
Mobile Intens Care Technician	1	2	.	2	.	5
Natural Science	16	17	31	36	40	140
New Media Arts	1	.	1	1	.	3
Nursing	.	2	12	17	21	52
Paralegal	3	2	3	5	3	16
Payroll Preparer	.	.	1	.	.	1
Physical Therapist Assistant	1	2	2	.	.	5
Practical Nursing	.	.	1	.	2	3
Radiologic Technology	.	.	.	.	1	1
Respiratory Care	2	.	.	1	3	6
Special - Early Admit	23	36	26	23	30	138
Travel & Tourism	3	3	6	4	3	19
Unclassified	38	37	59	40	30	204
All Transfers	437	490	524	438	504	2393
Total Enrolled Population	9379	8886	8806	8556	8395	n/a

2.2 Credits Attempted

Figure 1 shows the mean number of credits attempted and earned by KCC transfers and the general student population over time. KCC transfers are represented by the red lines and NT students by the blue. In both cases, the value for attempted hours is higher than for earned hours.
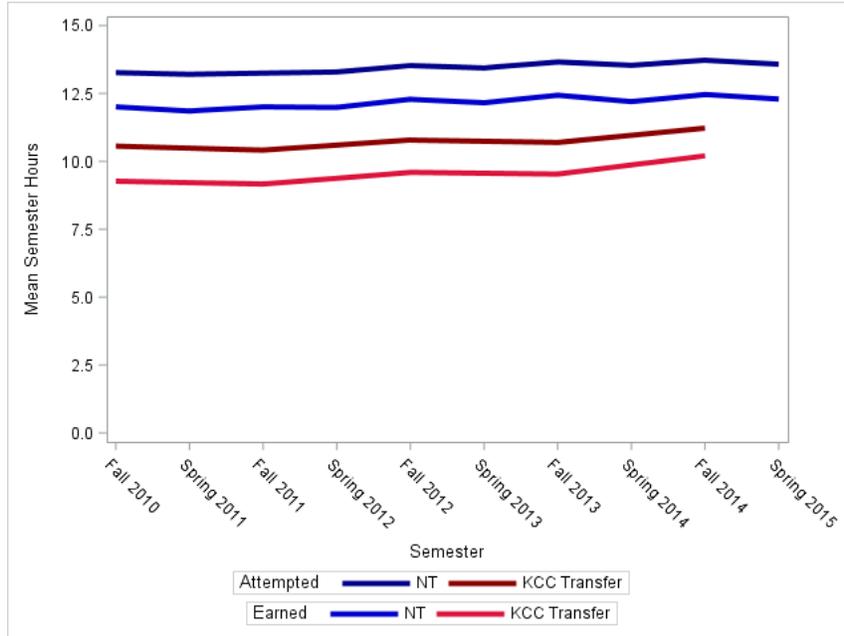

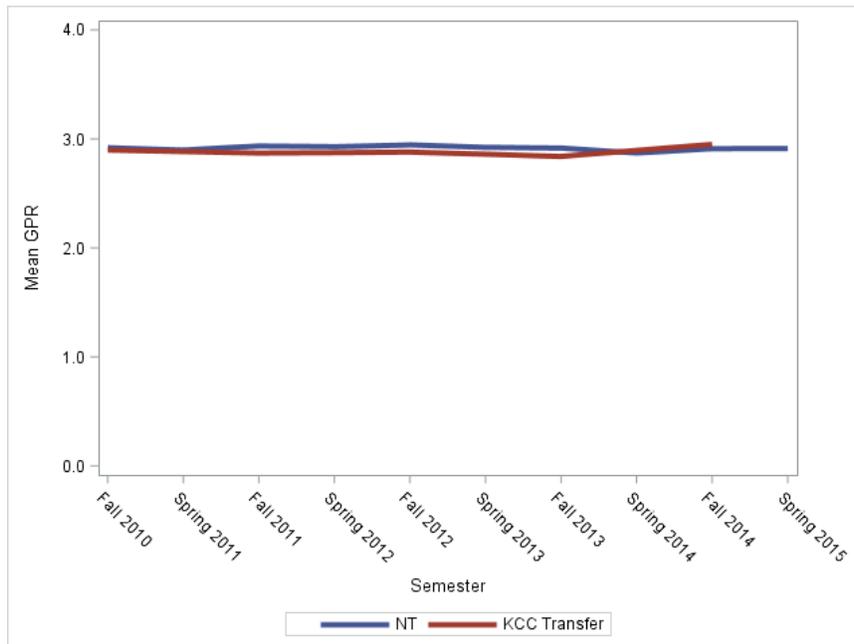**Figure 1: Mean Attempted and Earned Credits**

Figure 2: Mean GPR in first semester following transfer

Transfers from KCC clearly earn fewer credits than their NT peers, but the gap between the attempted and earned lines is about the same for both groups. Figure 2 shows that the mean grade point ratio (gpr) between the two populations is about identical. ANOVA testing for

an interactive model based off academic term and transfer status shows that both academic term (F=33.6, *p*<.01) and transfer status (F=1476.5, *p*<.01) are significant for credits attempted. Based on the GPR plot in Figure 3, we would not expect significance for gpr in a similar model, and it does not test as such (F=3.61, *p*>.05). Also statistically non-significant is the interaction between academic term and transfer status (F=1.23, *p*>.05). We can safely conclude that the reduced value for earned credits is dependent on reduced attempted credits, and not on transfer status itself.

2.3 GPR By Destination Academic Program

Table 2 gives the mean gpr for students by 4-year program of enrollment, along with Ns for students transferring into these majors. KCC students' gpr is limited to their first term after transfer, while the general student body is composed of all undergraduates in a given program during the academic years of study (2011-2015). The overall picture shows that KCC students compare relatively well to their non-transfer peers.

There are noticeable dips for KCC students entering the College of Business and Economics (N=5), the College of Agriculture (N=8), and the School of Social Work (N=7). KCC students perform better than their peers in General Studies (N=6), and the School of Nursing (N=81). The overall arithmetic means between KCC transfers and NT students is equal to one decimal place, and very similar (KCC mean = 2.89, NT mean = 2.92) when carried to two decimal places. With the exception of the Nursing program, each of these programs showing a large difference in mean gpr has very low Ns for KCC students transferring in, and care should be used when interpreting the raw data. To accommodate this problem, we can build an ANOVA model testing the significance of the main and interactive effects on student gpr, where the main effects are destination college and transfer status.

The model as a whole is significant (F=80.42, *p*<.0001), as are the main (F= 162.14, *p*<.0001 for destination college and F=5.95, *p*<.05 for transfer status) and interactive effects (F=4.44, *p*<.0001). KCC students have slightly lower least-square means (2.91 vs 3.00) than the general student population. Lsmeans[2] by destination college are plotted as Figure 3. The College of Education (Mānoa), Education (West Oʻahu), the School of Architecture (Mānoa), and School of Travel Industry Management (Mānoa) all stand out as containing under-performing students, while the School of Nursing and Dental Hygiene (Mānoa) is the only counterexample where KCC students perform much better than their peers.

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[2] Least square means are often considered to be more accurate estimates of population parameters, however, in this case they are actually less preferred than the arithmetic mean for comparing overall group differences. This is because (a) we have extracted data for the entire study population rather than sampling from it and (b) we have no missing data. This means that the arithmetic mean presented in Table 2 is the true population mean. Nonetheless, least square means are a convenient result from ANOVA testing in SAS, and these are presented in figure 3. Differences in values program by program are even more minimal than among the total values for each comparison group so we hope this is not too confusing.

Table 2: Arithmetic Mean GPR in the Semester Following Academic Transfer, by Destination College

Institution[3]	College	KCC Transfer GPR		NT GPR	
		N	Mean	N	Mean
Hilo	Col of Business & Economics	5	2.26	2544	2.80
	College of Agriculture	8	2.38	1169	2.97
	College of Arts & Sciences	74	2.91	17k	2.85
	Ka Haka Ula O Keelikolani	6	3.31	479	2.88
Mānoa	Col of Trop Ag & Human Res	83	3.19	4910	3.09
	College of Arts & Sciences	1267	2.78	58k	2.87
	College of Business Admin	141	3.30	5889	3.21
	College of Education	103	2.92	4349	3.18
	College of Engineering	85	2.82	5937	2.87
	Hawai`inuiakea Sch Hawn Knowledge	33	2.96	1004	3.04
	Schl of Nurs & Dental Hygiene	81	3.74	1967	3.43
	Schl of Ocean & Earth Sci & Tech	10	2.94	778	2.97
	Schl of Pacific & Asian Studies	17	2.68	549	2.91
	School of Architecture	18	2.47	1259	2.82
	School of Medicine	2	2.53	21	2.89
	School of Social Work	7	3.20	230	3.64
	School of Travel Industry Mgt	112	2.46	2008	2.82
West Oʻahu	Education	15	2.51	611	3.03
	General	6	3.44	803	2.45
	Humanities	8	2.63	451	2.97
	Professional Studies	263	3.11	2904	2.92
	Social Sciences	49	2.79	1563	2.81
Total		**2393**	**2.89**	**120k**	**2.92**

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[3] Note that there is almost certainly some underlying effect of institution here as well. For example, "Education" is a West Oʻahu division and the "College of Education is a Mānoa division. In some cases (like for education), the institutional difference does not appear to have much effect, but in others – like the Mānoa and Hilo Agricultural destinations – there does appear to be a difference. Further investigation of the institutional differences may be investigated in a later report.
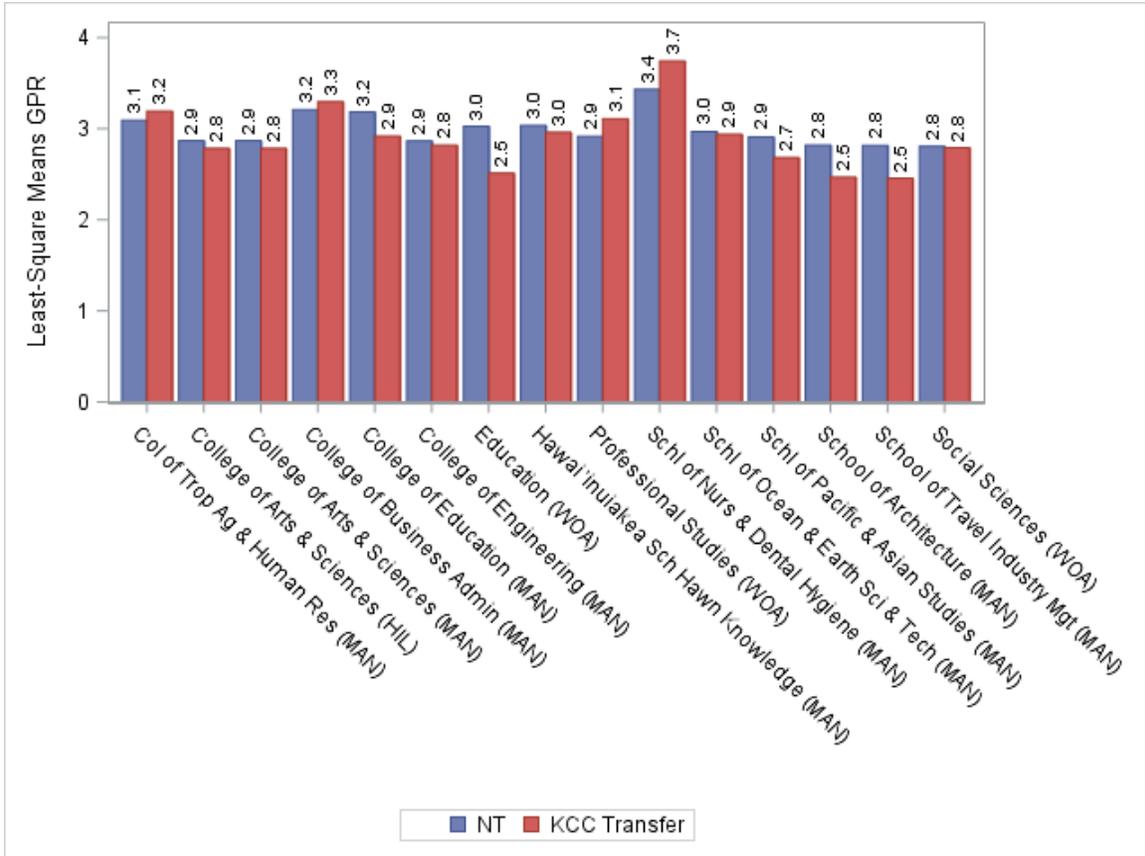
Figure 3: Least-Squares Mean GPR By Destination College at 4-Year Institution

2.4 GPR By Academic Program of Origin

Comparing data from the program KCC students transferred *from* is more difficult, as there is no direct comparison group in the NT population. Nonetheless mean gpr per academic program is given below for KCC transfers only.

T-tests were run against the aggregate general population gpr (arithmetic mean = 2.92) for each program with more than 10 transfers. Liberal Arts, Nursing, and Travel & Tourism were the only programs with significant results. Liberal Arts had a mean slightly lower the NT population (2.85 < 2.92, t=2.43, p<.05), Nursing was significantly higher (3.63 > 2.92, t=-5.46, p<.0001), and Travel & Tourism was significantly lower (2.31 < 2.92, t=2.75, p<.01).

Table 3: Mean GPR in the 1st Semester Following Transfer, By KCC Academic Major

Major	N	GPR
Accounting	75	3.1
Biotechnician	1	2.1
Community Health Worker	3	2.0
Culinary Arts	17	2.4
Dental Assisting	2	3.4
Educational Paraprofessional	3	3.2
Emergency Medical Technician	6	3.1
Entrepreneurship	3	3.3
Exercise and Sport Science	13	2.8
Food Service	5	3.0
Hawaiian Studies	7	2.9
Hospitality & Tourism	3	3.0
Hotel/Restaurant Operations	15	2.7
Information Technology	43	3.1
Interpreting	3	1.5
Liberal Arts	1575	2.9
Marketing	17	2.9
Medical Assisting	4	2.1
Medical Lab Technician	5	2.6
Mobile Intens Care Technician	5	3.9
Natural Science	140	2.8
New Media Arts	3	2.2
Nursing	52	3.6
Paralegal	16	2.4
Payroll Preparer	1	4.0
Physical Therapist Assistant	5	2.7
Practical Nursing	3	3.9
Radiologic Technology	1	3.9
Respiratory Care	6	2.4
Travel & Tourism	19	2.3
Unclassified	204	3.0

Statistical significance for *t*-testing is a function of effect size, the standard deviation of the sample, and the sample size. As the sample grows larger, the effect size can become smaller while still retaining significance. This explains why, for example, there is a significant difference between Liberal Arts majors but not Natural Science majors, despite the two having mean student gprs that are relatively equal. Similarly, both Nursing and Travel & Tourism have large mean differences but smaller population sizes.

3. Conclusion

Overall, KCC students are generally as academically healthy as NT students in the first semester after transfer to a UH 4-year school. The overall arithmetic mean for grade-point ratio for both populations is approximately equal, and only 3 KCC programs show any statistically significant difference in mean gpr from the NT student mean. And in fact, of the three, the KCC mean was higher once and lower twice, with one lower value representing just .08 of a grade point.

4. Appendix: Methodology

Data were extracted from the UH Operational Data Store (ODS) from the past five complete academic years (2011-2015). All data in this report comes from the iro_base_uh data view. Transfers were defined in the same way as in the Kapiʻolani Institutional Effectiveness Measures.[4]

The population of NT students was defined by first extracting every undergraduate student enrolled in a four-year school or program, then removing those students who had a previous home-base at some other school in the system. Four year programs include not only those enrolled at Mānoa, Hilo, or West Oʻahu, but also those enrolled in the BAS program at Maui. Some of these students may have transferred into their school from outside of the UH system, but external transfers were not accounted for.

For Kapiʻolani transfers, we retrieved information on the student's KCC major at Census in the last semester in which he/she was home-based at KCC. For both KCC and NT students, we retrieved student major (major_iro) and the top-level college or program that houses the student major (major_orgstr1_iro) at Census. For KCC transfers, we selected the first semester in which the student was home-based at the 4-year school. For NT students, we selected each semester for which they were enrolled during the analysis period. Student gpr, credits earned, and credits attempted were selected according to the same criteria as above, except that EOS values were used. All gpr calculations are single-semester averages for only those courses in which the student was enrolled at his/her home institution.

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[4] Counts do not line up exactly, as tabulating over several years led to a small amount of unduplication than in the single year IEMs. For example, there are only 504 total transfers for academic year 2015 in this data set, but 514 in the IEMs.

Further, The KCC Institutional Effectiveness Measures for 4-yr Transfers are defined from the OVPCC 2008-2015 Strategic Directives. These measures represent transfer students for only the Fall term of the academic year. This means that there are no credits or gpr values for new transfer students during any Spring term, which explains the missing values for Spring 2015 in Figures 1 and 2.