A comparison between academic performance of native and transfer students in a quantitative business course

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ABSTRACT

This paper investigates whether there is a difference in academic performance between native students (students who enter the university as freshman) and transfer students from a community college (today called state colleges). Subsequently, it also looks at whether there is a difference in academic achievement between students having a more rigorous prerequisite in a quantitative business class. The study focuses on students in the College of Business Administration in a large (60,000 students) urban university, enrolled in a junior core quantitative business tools course.

Keywords: Transfer students, Native students, Academic performance, Prerequisites, Quantitative

INTRODUCTION

The paper explores whether there is a difference in academic performance between students who transferred to a four year institution from a community college (today, most community colleges are called state colleges in Florida) and students who did not (referred to as "native") in a junior core quantitative business class. According to Johnson (2005) a substantial component of the student body in many 4-year academic colleges is comprised of transfer students. The Office of Institutional Research and Commercialization at The University of Central Florida (UCF) reports that for Fall 2013 UCF had 6,447 newly enrolled applicants that were transfer students from other institutions. In that same semester, UCF had 6,068 newly enrolled full and part time Freshmen students. UCF has a program called Direct Connect to UCF that allows students who complete their AA or select AS degrees at one of four state colleges to have guaranteed admission to UCF in order to pursue a bachelor degree.

The purpose of this paper is not to explore the reasons that there may or may not be discrepancies in the academic achievements of students that started their college career in a community college versus those that started in a 4-year university. There are numerous papers delving into that subject matter with opposing views. For example, Smith (2013) found that the majority of students at a community college are students with different backgrounds, many times first generation students. Those students tend to hold full time jobs. Because of the open door policy at community colleges many students enter community colleges underprepared.

On the other hand, according to the American Association of Community Colleges, their average class size is 25 – 35 students. Urso and Sygielski (2007) think that students at a community college, because of the smaller class sizes, "received the necessary attention they needed to increase their self-confidence as participants and active members of the learning process." To further support this theory, De Paola, Ponzo, & Scoppa (2013) stated that there is a negative effect on student performance in mathematics and larger class sizes. Therefore, having a small class size (which is typical in community colleges) should be beneficial to students.

Additionally, academic performance is not the only factor in determining whether a student attends a 4-year university or a community college. Taking classes at a community college is cheaper. The overall cost of education is cheaper if you start at a community college and then transfer to a 4-year university. According to Fonte (2011) "A comparison of tuition and fees between publicly funded universities and community colleges reveals a significant difference." On average the cost of "a full-time student at a community college is $2,713, while at a public university the cost is $7,605". As an example, the cost of tuition + fees per credit hour (2008-2009) at UCF was $129.26 versus at a state college it was $77.83.

In a course in Numerical Methods, Kaw and Yalcin (2011) found that there wasn't a significant difference in the performance in class between transfer and native students. Therefore, given the data from these previous studies, student achievement should be comparable.

Should there be a difference, however, in achievement between native and community college transfer students the hypothesis of this paper is that the prerequisite taken would better explain the discrepancy between the achievements of the two groups. Consequently, another goal is to examine the academic performance of students having different mathematics prerequisite courses. According to Hailikari, Nevgi, & Komulainen (2008) "specific prior knowledge was the strongest predictor of student success." There are contradicting findings in different studies dealing with the academic institutions where the prerequisite was taken. Jones, Kouliavtsev, &

Ethridge (2013) suggest that "where business students complete their lower level prerequisite courses is simply not that important". Woosleys and Callahan (2011) concluded that on average students that complete their prerequisite at the "home institution outperformed other students". Since there are conflicting schools of thought on this matter, this may be a good subject for further research. It will not be delved in to in this particular paper.

Lastly, gender and age were also taken into consideration. Wolfle and Williams (2014) "confirm previous research that has stated females perform better in higher education." Xueli (2009) stated that transfer students are not homogenous and therefore age of transfer versus native students was looked at.

METHOD

The study was conducted on ECO 3401. This is a 3 credit hour course that is part of the core curriculum required of all students at the College of Business Administration at UCF. The 2011-12 Undergraduate Catalog describes the course as "an introduction to mathematical and statistical analysis of economics and business problems." The Prerequisites are ECO 2023 Principles of Microeconomics, and either MAC 1140 (Pre-Calculus Algebra) or MAC 1105 (College Algebra). The course covers a broad range of topics including matrix algebra, financial mathematics, business calculus, descriptive statistics, and probability.

The study focuses on 741 native students and 456 transfer students from a state college for a total of 1,197 out of a sample of 1,263 students taken over two semesters. Of the remaining students in the sample, 56 transferred from another 4-year university and 10 from "Other.". The sections were taught by the same instructor. In Table 1 and 2 we present a summary of descriptive statistics. This study asked permission from all students to use their data according to IRB (Institutional Review Board) specifications. A survey approved by IRB at the end of each of the two semesters was conducted. Students were required to either buy the book or buy access to the online version of the book inclusive of online homework assignments.

In a study conducted by Arasasingham et al (2011), "online homework system provided an overall benefit" in students' achievements. The notes for the class were available to students on Webcourses (interface used by UCF for faculty to interact directly with students). Students also had access to tutors assigned to the class by the department. Tutors are able to motivate struggling students according to Gleason (2012) to remain engaged. The instructor had 10 years experience teaching Economics at UCF. The achievement of students was measured by their final grade in the class. There were four tests and each test was worth 20% of the final grade with the remaining 20% assigned to the online homework assignments. All tests were taken in a computer lab in charge of delivering tests at the university and the questions were delivered accessing the Webcourses interface. All tests were proctored by the staff of the lab. According to Anakwe (2008) there are no differences in student test scores between the computer based and pen and paper tests.

RESULTS

A series of t-tests were conducted using SAS as our statistical software. All tests were two tailed tests. The level of significance used for each test is .05. The t-test results provided in the tables are dependent on the results of the F test for homogeneity of variances. At first, the sample was divided into native, 741, students versus transfer students from only state colleges,

456. There was a significant difference in the scores of these two groups (Table 3). The average final grade for native students was higher (M = 85.25, SD = 10.45) than the average for the transfer students (M = 78.06, SD = 13.32).

Table 1 presents the information on which math prerequisite was taken. The results in Tables 4 and 5 reveal a significant effect for prerequisite. Of the 741 native students, 350 took MAC 1105, college algebra, and 390 took MAC 1140, pre-calculus. One student did not answer the question. The results in Table 4 show that there was a significant difference between the two groups, with students that took pre-calculus (M = 87.74, SD = 8.2) having a higher average final grade than the students that took college algebra (M =82.4, SD = 11.91). Of the 456 transfer students 299 took MAC 1105, college algebra, and 157 took MAC 1140 pre-calculus. Even in this case the results denote that students that took pre-calculus (M = 79.97, SD = 13.28) fare better than college algebra (M = 77.05, SD = 13.26) students (Table 5).

The results in Tables 6 and 7 show that there is a statistical difference in student achievement for type of students (transfer, only state colleges, or native) with the same prerequisite, with native students doing better. Table 6 illustrates that native (M =82.4, SD = 11.91) students that took MAC1105 do better than transfer (M = 77.05, SD = 13.26) students with the same prerequisite. Table 7 indicates that native students that took MAC 1140 (M =87.74, SD = 8.2) have a higher average course score than transfer students that took MAC 1140 (M = 79.97, SD = 13.28).

Tables 8 and 9 paint two different pictures regarding gender and student performance. Of the 456 transfer students, 177 were female (M =77.60, SD = 14.98) and 279 male (M =78.34, SD = 12.55). The results in Table 8 imply that the academic performance of transfer students for both genders is not statistically different. Of the 741 native students, 238 were female (M =87.02, SD = 10.56) and 502 male (M =84.40, SD = 10.32). One student did not answer the question. Table 9 points out that there is a statistical difference, with female students having a better average for the class.

Lastly, Table 2 shows that 13% of the transfer students are 30 or older versus only 0.5% of the native. Also, the age distribution of transfer (state colleges) students seems more even throughout the age spectrum, while native students tend to be younger.

CONCLUSIONS

The study supports the hypothesis that students with stronger academic prerequisites for this class fair better. The study also shows that native and transfer with the same prerequisite have different academic achievement – native students with stronger academic prerequisites fair better than transfer students with the same prerequisite class. Female transfers seem to do as well as male transfer students. That is not the case between native female students and native male students. Lastly, according to the data, students that transferred from a 4-year university averaged better than students that transferred from a community college.

In summary, this research seems to support the conclusions reached by Friedl et al., (2012). They suggest that the performance of native students is not equal to the performance of transfer students. It is important to note that our findings do not imply that native students are better students than transfer students. The study only supports that they seem not to score the same in this particular quantitative class. Tobolowsky and Cox (2012) suggest that transfers could be helped with more coordination between "the sending and receiving institutions." In fact, the transfer student population can play a big financial role by boosting income through

tuition…..fulfilling institutional and community needs. This is an important issue not only for students, less cost same benefits, but also for universities that are under pressure to be more focused on student achievement and increased graduation rates because of political/funding issues. The issue should be further researched. Specifically, a more relevant question might be whether transfer students fair as well as native in academic graduation since Best and Gerghing (1993) suggest they don't.

APPENDIX

Table 1
Complete Origin Enrollment Data and Pre-requisites

STUDENTS			TOTAL	AVERAGE COURSE GRADE
Native			**741**	**85.24**
MAC 1105 (College Algebra)		350		
Female	109			
Male	241			
MAC 1140 (Precalculus)		390		
Female	129			
Male	261			
N/A		1		
Male	1			
Transfer from a State College			**456**	**78.06**
MAC 1105 (College Algebra)		299		
Female	114			
Male	185			
MAC 1140 (Precalculus)		157		
Female	63			
Male	94			
Transfer from a 4-yr University			**56**	**84.85**
MAC 1105 (College Algebra)		36		
Female	20			
Male	16			
MAC 1140 (Precalculus)		20		
Female	9			
Male	11			
None of the above			**10**	**86.53**
MAC 1105 (College Algebra)		6		
Female	3			
Male	3			
MAC 1140 (Precalculus)		4		
Female	3			
Male	1			
Grand Total			**1,263**	

Table 2
Partial Origin Enrollment Data and Age Distribution

STUDENTS			TOTAL	AVERAGE COURSE GRADE
Native			**741**	**85.24**
Female		238		87.03
18-20	195			
21-23	34			
24-29	6			
30 or older	3			
Male		503		84.40
18-20	386			
21-23	107			
24-29	9			
30 or older	1			
Transfer from a State College			**456**	**78.06**
Female		177		77.61
18-20	44			
21-23	67			
24-29	35			
30 or older	31			
Male		279		78.35
18-20	43			
21-23	140			
24-29	68			
30 or older	28			

Table 3
Results on Average Course Grade by Native and Transfer (State College) Students

	Student		F-test Equality of Variances			t-test Unequal Variances		
	Native	Transfer	*F*	*df*	*p*	*t*	*df*	*p*
M	85.25	78.06	1.62	(455, 740)	< .001*	9.80	*795*	< .001*
SD	10.45	13.32						
n	741	456						

*Significantly Different (α = .05)

Table 4

Results on Average Course Grade by Native Students with Different Pre-requisites: MAC 1105 (College Algebra) and MAC 1140 (Precalculus)

	Native		F-test Equality of Variances			t-test Unequal Variances		
	1105	1140	*F*	*df*	*p*	*t*	*df*	*p*
M	82.44	87.74	2.11	(349, 389)	< .001*	-6.98	610	< .001*
SD	11.91	8.2						
n	350	390						

*Significantly Different (α = .05)

Table 5

Results on Average Course Grade by Transfer Students (State College) with Different Pre-requisites

	Transfer		F-test Equality of Variances			t-test Equal Variances		
	MAC 1105	MAC 1140	*F*	*df*	*p*	*t*	*df*	*p*
M	77.05	79.97	1	(156, 298)	.967**	-2.23	454	.026*
SD	13.26	13.28						
n	299	157						

*Significantly Different (α = .05) **No Significantly Different (α = .05)

Table 6

Results on Average Course Grade by Native and Transfer (State College) Students with same Pre-requisites (MAC 1105)

	MAC 1105		F-test Equality of Variances			t-test Equal Variances		
	Transfer	Native	*F*	*df*	*p*	*t*	*df*	*p*
M	77.05	82.44	1.24	(298, 349)	.055**	-5.45	647	< .001*
SD	13.26	11.91						
n	299	350						

*Significantly Different (α = .05) **No Significantly Different (α = .05)

Table 7
Results on Average Course Grade by Native and Transfer (State College) Students with same Pre-requisites (MAC 1140)

	MAC 1140		F-test Equality of Variances			t-test Unequal Variances		
	Transfer	Native	*F*	*df*	*p*	*t*	*df*	*p*
M	77.97	87.74	2.62	(156, 389)	< .001*	-6.83	206	< .001*
SD	13.28	8.20						
n	157	390						

*Significantly Different (α = .05)

Table 8
Results on Average Course Grade for Transfer (State College) Students according to Gender

	Transfer		F-test Equality of Variances			t-test Unequal Variances		
	Female	Male	*F*	*df*	*p*	*t*	*df*	*p*
M	77.60	78.34	1.33	(176, 278)	.032*	-0.56	336	.577**
SD	14.98	12.55						
n	177	279						

*Significantly Different (α = .05) **No Significantly Different (α = .05)

Table 9
Results on Average Course Grade for Native Students according to Gender

	Native		F-test Equality of Variances			t-test Unequal Variances		
	Female	Male	*F*	*df*	*p*	*t*	*df*	*p*
M	87.02	84.40	1.05	(237, 501)	.669**	3.22	738	.001*
SD	10.56	10.32						
n	238	502						

*Significantly Different (α = .05) **No Significantly Different (α = .05)

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