

Academic Performance of Transfer and Non-transfer Students in Introductory Agriculture Courses

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Abstract

A substantial component of student populations at four-year institutions is comprised of transfer students from community colleges. Successful academic transition to a university or college is affected by acclimatization to college courses through the community college. The objective of this study was to compare the characteristics of transfer students to non-transfer students by gender, area of study, and academic credentials, and determine if transfer students and non-transfer students performed equally well in introductory agriculture courses. Transcripts of 275 students in the School of Agriculture at Tennessee Technological University were examined to determine differences in academic success between transfer students and the non-transfer sample. Both groups were similar in respect to gender and ACT scores. Overall grade point average was 0.10 points higher for transfer students. In five introductory agriculture courses, transfer students generally had higher grades than their non-transfer counterparts. This was especially apparent in freshman level courses in plant science and animal science, where transfer students had approximately 30 more earned credit hours than the non-transfer group. Generally, transfer students had gleaned the benefit of the college experience, were more mature, and more focused than the non-transfer students at the time of enrollment in most introductory agriculture courses.

Introduction

Transfer students comprise an integral component of the student population at four-year institutions. In 2004, 45% of first-time freshmen chose to begin the higher education experience through community colleges (Dicroce, 2005). In a study of more than 740,000 science and engineering students receiving bachelor's degrees in 1999 and 2000, almost half had attended a community college (Tsapogas, 2004).

Motivation to attend a community college may be influenced by several factors. Geography, financial status, social climate, and academic standing may affect the decision making process. While the difficulty of college courses can be inherently stressful to

freshmen, anxiety increases with social and geographical changes of environment and the higher financial costs associated with four-year institutions. Proximity of the community college to home and community as well as lower cost alleviates some of these tensions. For students unable to fulfill academic admission requirements of universities, the community college provides an opportunity to improve academic standing for future acceptance to a four-year institute (Bryant, 2001; Montondon and Eikner, 1997).

Perceptions of educational quality at community colleges have been variable. Critics have argued that course requirements are less strenuous (Laband and Piette, 1995) with more 'coddling' than four year institutions (Mellander and Robertson, 1992). Advocates counter that these schools provide opportunities for students who otherwise would not have obtained further education (Vaughan, 1982).

Course of study is a major facet in the successful attainment of a baccalaureate degree by transfer students. In some cases, transfer students have been less prepared for upper division courses than their non-transfer counterparts (Carlan, 2001; Lewis and Lewis, 2000). Other studies have found preparation for upper level courses of both transfer students and their non-transfer counterparts to be equivalent (Montondon and Eikner, 1997).

The objective of this study was to 1) compare the characteristics of transfer students to non-transfer students by gender, area of study, and academic credentials, and 2) determine if transfer students and non-transfer students performed equally well in introductory agriculture courses.

Methods

Completion of five introductory agriculture courses is required of all students completing a Bachelor of Science degree in the School of Agriculture at Tennessee Technological University. The term 'introductory' as utilized in this study refers to fundamental courses that provide students with their first introduction to five major disciplines of agriculture. Two courses are at the freshman level, while three are listed as sophomore level courses. One option includes an Agricultural Engineering

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Technology course with a junior level classification. These include Plant Science (AGRN 1010), Animal Science (ANS 1010), Economics of Agriculture (AGBE 2100) and Soils (AGRN 2210). Depending on major, students have a choice of two courses in Agricultural Engineering Technology: Engineering Technology in Agriculture I or II, (AGET 2110 or 3110, respectively).

Soils has a prerequisite of two semesters of chemistry. No prerequisite courses are required for the other introductory courses. Plant Science and Animal Science are recommended for freshmen. The remaining courses are usually recommended for the sophomore year or later.

With the assumption that most students had completed the introductory courses before enrolling in the Soils course; transcripts for 275 students enrolled in AGRN 2210 between 2000 and 2006 were examined. Of these 275 students, 206 had graduated, 12 had left the university, and 57 were still in school at the time of this study. Students were separated into two groups: transfer students and non-transfer students. Transfer students had completed at least 12 hours of course work at a community college before admittance to the university. Non-transfer students began their higher education experience at the university or had less than 12 earned hours of community college coursework. Some students choose to take general education courses such as English, Math, and History at local community colleges during the summer prior to entering a four-year institute for the fall term. Since these students had not experienced a full semester, it was assumed these students had not become acclimated to college life at this point.

Variables examined included GPA (grade point average), ACT scores, individual grades in introductory courses, hours earned upon enrollment in each course, and gender. Cumulative grade point average (GPA) at graduation or the last semester of course work was used as a measure of academic performance. This reflected all course work including credits transferred from community colleges. Values were based on a 4-point scale. An additional grade point average, indicated as GPA(5), was calculated based only on an average of the five introductory classes. Statistics were determined using the Chi Square frequency of probability test.

To determine the experiential preparation each student had acquired prior to entering an introductory course, total hours earned at time of enrollment was employed. Regarding repeated courses, only the first grade earned was used. Withdrawals were disregarded.

Results and Discussion

Of 275 students evaluated, there was no significant difference between transfer and non-transfer students based on gender ($P < 0.1$) (Table 1). Ninety-six (35%) were transfer students. Of these 96 students, 41% were female and 59% were male. The 179 non-transfer students were similarly divided into 35% female and 65% male. Of all females and males, 38% and 33%, respectively, had attended community college.

Table 1. Comparison of student populations based on attendance at community college and gender

	Male	Female	Total
Transfer	57	39	96
Non-transfer	117	62	179
Total	174	101	

These results are in agreement with statistics from the National Science Foundation which found that community college students comprised 37% of the 41,100 students earning degrees in physical science or related fields. Females in science and engineering were more likely to have attended community college when compared to males (Tsapogas, 2004).

Results of a study of 120 agriculture majors at Mississippi State University indicated ACT scores of non-transfer students (20.53) were higher than those of transfer students (17.08). However, transfer students were able to achieve GPA's equivalent to the non-transfer students at 2.57 and 2.60, respectively (Johnson, 1992).

Results for the Tennessee Tech population were not in complete agreement with those of the MSU study. ACT scores of Tennessee Tech non-transfer students averaged 1.4 points higher than those of transfer students. Conversely, cumulative grade point averages of transfer students were 0.10 points higher overall than the non-transfer students (Table 2). However, statistically there was no significant difference ($P < .05$).

Table 2. Average cumulative grade point average at graduation or the last semester or course work and ACT scores of both student groups

	GPA *	ACT
Transfer	2.88	20.6
Non-transfer	2.78	22.0
*based on a 4.00 point system		

There was no difference ($P < .05$) in propensity to attend community college among the major concentrations except for students majoring in Animal Science and Environmental Agriscience. Environmental Agriscience concentration majors comprised 14% of the non-transfer student population, but 24% of the transfer student group. However,

Animal Science concentration majors tended to begin study at the university level rather than at a community college. Compared with total group population, 27% of animal science concentration majors were non-transfer students and 18% were transfer students (Table 3).

the significant difference ($P < .01$) in the averaged grades with transfer students 0.26 points higher than non-transfer students. Earned hours were significantly different ($P < .001$) with transfer students completing 34 more hours than non-transfer students prior to entering the course.

Table 3. Composition of transfer students and non-transfer students based on major concentration

Major	Number of transfer students	Percent	Number of non-transfer students	Percent
Ag. Business	11	12	22	13
Ag. Education ^z	9	9	16	9
Environmental Agriscience ^y	23	24	23	14
Ag. Engineering	18	19	33	19
Animal Science/Pre-Vet	17	18	46	27
Horticulture ^x	17	18	30	18

^z Ag. Education includes Ag. Communications majors

^y Environmental Agriscience includes Agronomy and Soils majors

^x Horticulture includes Nursery Management and Turfgrass Management majors

In all courses examined, approximately 36% were transfer students and 64% were non-transfer students. To determine the success rate of each student group (transfer or non-transfer), the proportion of students earning a specific letter grade was determined for each course (Table 4). An overall average grade point average was calculated by group. The average number of hours earned prior to beginning the specific course was also calculated by group.

In the introductory plant science course, AGRN 1010, there was a significant difference ($P < .01$) in grades received by transfer students compared to non-transfer students. Grades of A, B, or C were earned by 34%, 38%, and 26%, respectively, of transfer students, while 18%, 45%, and 29% of non-transfer students earned an A, B, or C, respectively (Table 4). Transfer students had a greater tendency to earn an A than non-transfer students. The average grade for transfer students was 0.28 points higher (on a 4.00 scale) than their non-transfer counterparts. This was a significant difference ($p < .01$).

Much of the difference in grades can probably be attributed to the time when the course was taken. Non-transfer students tended to take this course early in their college career. Although transfer students normally took this course within two semesters following transference, they did gain a significant advantage over the non-transfer students. Completion of 59 credit hours provided two semesters of additional college experience compared to the average of 29 hours earned by non-transfer students prior to enrollment in AGRN 1010 (Table 4).

Individual grades of B, C, D, or F in Animal Science (ANS 1010) were not significantly different ($P < .01$) (Table 4). However, 40% of transfer students earning a grade of A compared with 25% of the non-transfer group was significant. This contributed to

There was a significant difference ($P < .05$) in grades earned by the two groups in AGBE 2100 (Economics of Agriculture (Table 4). More transfer students received a grade of B compared to non-transfer students. No difference was observed at grade levels of A, C, D, or F. Transfer students had an average of 22 more earned credit hours than non-transfer students. While this was statistically significant ($P < .001$), there was little implication of an influence on grades earned.

In AGET, non-transfer students earned a higher percentage of grades of A and a lower percentage of grades of B than transfer students (Table 4). These differences were not statistically significant ($P < .1$). Numerical grade averages were almost equal. Transfer students did average 13 more earned hours upon enrollment compared to non-transfer students. Even though this difference was significant ($P < .01$), it had relatively little impact on actual grades earned. There was little difference in this pattern depending on whether the student completed AGET 2100 or 3100.

Of the 273 students enrolled in AGRN 2210, proportions of students receiving grades of A, D, or F were almost equal for both transfer and non-transfer students (Table 4). Forty seven percent of the transfer students received B's and 19% received C's, while 35% of the non-transfer students received B's and 35% received C's. Transfer students had completed 9 more hours on average than non-transfer students when beginning the course. The overall numerical average of 2.64 for transfer students was only 0.02 points higher than that of non-transfer students.

Of 275 students in the study, 235 had completed all five introductory courses. Thirty-one had completed four out of five courses and nine had completed three or fewer courses. Least squares means analyses

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of GPA (5), average grade point average (based on a 4.0 system) of only the introductory courses completed, indicated no significant difference between groups ($P < 0.1$). Non-transfer students had a GPA (5) of 2.51 out of 4.00, while transfer students had a GPA (5) of 2.57 out of 4.00.

Assuming most students average 15 hours per semester, transfer students were further separated according to number of hours earned at a community

college (Table 5). There was no significant difference due to earned hours while at community college. Transfer students with more than 60 earned hours had a GPA (5) for the introductory courses that was 0.15 points higher than the next highest group. However, this group represented only 10.5% of the total population (29 of 275 students). Taking only these five classes into consideration, transfer students did not have a significant advantage or disadvantage compared to non-transfer students.

Logic dictates that time and experience at a community college would result in a more mature and goal oriented student entering a university. This hypothesis is corroborated when examining the rate of change of major. Thirty-three percent (89 of 273) of all students surveyed changed their major at least once during their tenure at the university (Table 6). Only 19% (17 of 89) were transfer students. Eight had changed majors from one concentration to another within the school of agriculture. The remaining nine came from a wide variety of majors. Only two students had changed majors more than once.

The first change in major occurred following completion of an average of 69 credit hours. Since transfer students averaged 47 hours earned at community college, this indicated the decision to change majors would occur after completion of one full semester at the four-year institution. This could be explained by several possible factors. Misperceptions about a course of study or introduction to previously unknown areas of study may have instigated a desire to pursue an alternate concentration.

Of the non-transfer students changing majors, 25 were from general curriculum, 12 from engineering, and 23 from

Table 4. Percentage of transfer and non-transfer populations by course and grade in course. Average grade based on a 4.0 point value system in each course and average earned hours at time of completion of each course by sample population

AGRN 1010

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade	Earned Hours
Transfer	93	34**	38 ^{NS}	26 ^{NS}	1 ^{NS}	1 ^{NS}	3.03**	59***
Non-transfer	174	18**	45 ^{NS}	29 ^{NS}	9 ^{NS}	0 ^{NS}	2.75**	29***

ANS 1010

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade	Earned Hours
Transfer	95	40**	33 ^{NS}	24 ^{NS}	3 ^{NS}	0 ^{NS}	3.09**	60***
Non-transfer	172	26**	38 ^{NS}	30 ^{NS}	6 ^{NS}	1 ^{NS}	2.83**	26***

AGBE 2100

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade	Earned Hours
Transfer	95	4 ^{NS}	34 ^{NS}	36 ^{NS}	24 ^{NS}	2 ^{NS}	2.14 ^{NS}	70***
Non-transfer	167	8 ^{NS}	22 ^{NS}	37 ^{NS}	26 ^{NS}	7 ^{NS}	1.98 ^{NS}	48***

AGRN 2210

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade	Earned Hours
Transfer	94	19 ^{NS}	47*	19 ^{NS}	9 ^{NS}	6 ^{NS}	2.64 ^{NS}	84*
Non-transfer	179	20 ^{NS}	35*	35 ^{NS}	8 ^{NS}	2 ^{NS}	2.62 ^{NS}	75*

AGET (AGET 2110 and 3110 combined)

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade	Earned Hours
Transfer	87	7 ^{NS}	33 ^{NS}	39 ^{NS}	18 ^{NS}	2 ^{NS}	2.24 ^{NS}	82**
Non-transfer	150	12 ^{NS}	25 ^{NS}	40 ^{NS}	18 ^{NS}	5 ^{NS}	2.23 ^{NS}	69**

AGET 2110

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade
Transfer	45	7 ^{NS}	38 ^{NS}	33 ^{NS}	22 ^{NS}	0 ^{NS}	2.29 ^{NS}
Non-transfer	82	11 ^{NS}	24 ^{NS}	37 ^{NS}	22 ^{NS}	6 ^{NS}	2.12 ^{NS}

AGET 3110

Type of Student	Number of students	A %	B %	C %	D %	F %	Average Grade
Transfer	42	7 ^{NS}	29 ^{NS}	14 ^{NS}	5 ^{NS}	2 ^{NS}	2.19 ^{NS}
Non-transfer	68	15 ^{NS}	25 ^{NS}	13 ^{NS}	3 ^{NS}	2 ^{NS}	2.35 ^{NS}

^{NS} Nonsignificant

*Significant at $P < 0.05$

**Significant at $P < 0.01$

***Significant at $P < 0.001$

Using Chi Square frequency of probability

Table 5. No significant difference (P <0.1) indicated when number of hours completed at a community college was compared to average GPA(5) (based on a 4.0 point system) calculated only on the introductory agriculture courses completed

Community College Hours	Average Grade Point Average In All Introductory Courses Completed	Total Number Of Students
0 (non-transfer students)	2.56 ^{NS}	179
1 to 15 hours	2.46 ^{NS}	13
16 to 30 hours	2.51 ^{NS}	14
31 to 45 hours	2.59 ^{NS}	16
46 to 60 hours	2.50 ^{NS}	24
> 60 hours	2.76 ^{NS}	29

^{NS} Nonsignificant

other areas of agriculture. Twelve had changed majors more than once. Maturity level and lack of experience with the diversity of available majors would make change more probable for non-transfer students early in their education. The average first change occurred at 39 earned hours following a year of coursework.

Higher grades for transfer students in Plant Science and Animal Science courses as opposed to other core courses were a reflection of their educational experience. In both instances, transfer students had 30 or more hours of coursework than the non-transfer students. Acclimation to college work, testing, and established study habits would have been advantageous to transfer students when compared to freshmen just beginning to experience the college environment. As both groups entered higher level courses (2000 and 3000), the difference in earned hours decreased and difference in grades became less acute.

Transfer students benefited from the greater amount of experience and established study habits gleaned during their tenure at the community college level. They entered the four-year institution with greater maturity and more focus as exhibited by the low number of changes of major. Attendance at a community college for these students was a facilitating factor for success, rather than an impediment.

This paper reflects the characteristic of a small population and inferences to larger populations may be difficult. However, excluding land grant type institutions, smaller entities with schools of agriculture or agriculture departments would probably have student populations with many commonalities to those at Tennessee Tech University. The concerns about sources of future students and how the community college system affects small universities need to be explored. If more students choose to begin at two-year institutions, will they be competitive when transitioning to a four-year institution? Results of

Table 6. Actual number of students changing their major from the discipline listed to one of the concentrations in Agriculture

	Agriculture*	Engineering	General Curriculum	Business	Other	Total
Transfer	8	1	3	1	5	17
Non-transfer	23	12	25	8	4	72

* Reflects a change in concentration, but remaining within the discipline of Agriculture

Summary

Sample populations of transfer and non-transfer students were similar in composition by gender and ACT scores. Transfer students had higher cumulative GPA's (on a 4.00 basis) than non-transfer students due to better performance in the introductory courses. In Plant Science and Animal Science, more grades of A were earned by transfer students than non-transfer students. Similar results occurred in Soils and Economics of Agriculture, but at the B level. Non-transfer students excelled with grades of A in Engineering Technology in Agriculture courses, but not with great significance.

this project indicate the answer is 'Yes.' TTU draws students from numerous community colleges in all regions of Tennessee and some from other states. The authors assume these students are a representative sample of students attending community college. Thus, inferences should be applicable to similar four-year institutions.

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