

## **Using A Student Flow Model To Track Nontraditional Students**

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### **Abstract**

This study examined significant differences in independent variables including gender, age, race, major, new freshmen/new transfer students, and full-time/part-time status for the one-year retention rate, four-year graduation rate, one-year college GPA, and graduation GPA of nontraditional students. The study was based on the information supplied by the Nontraditional Student Flow Model, which tracked 120 undergraduates of age 25 or older when they first enrolled at Bowling Green State University (BGSU) in Fall 1998. Besides the descriptive results of the cohort, linear regression and logistic regression were also utilized to investigate significant effects upon outcomes for this population. The study found that Caucasian American students, older students, those who began as full-time, and those in the College of Health and Human Services were more likely to be retained after one year. Students who entered as full-time and as transfer students rather than freshmen were more likely to graduate. Students who started as transfer students and those in the College of Education and Human Development and in the College of Health and Human Services were more likely to have higher grade point averages after one year. Caucasian American students were more likely to have higher GPAs at graduation.

### **Introduction**

The traditional student flow model has been used in many campuses, and the resulting information has been published in national periodicals and presented in professional conferences. This study was designed to investigate the enrollment outcomes for nontraditional students, defined as those undergraduates who entered the university when

they were 25 years old or older, at a university that enrolls predominantly traditional-aged students.

The population of traditional undergraduate students will decline in coming years in Ohio as the population of current Ohio high school students decreases. The universities in Ohio are focusing on the enrollment management for the nontraditional students and transfer students in order to keep, or increase if possible, the current enrollment. To meet this need, the Office of Institutional Research at BGSU created a new version of student flow model to track the enrollment of nontraditional students. This tool was developed in partnership with the university's Director of Adult Learner Services in order to help him and others understand the enrollment dynamics of older students. The nontraditional student flow model includes both full-time and part-time students who either started at BGSU as new freshmen or as new transfer students. It tracks not only nontraditional students' enrollment patterns, but also tracks the students' academic performance indicators, such as first-year cumulative GPA and cumulative GPA at graduation.

### **Literature Review**

Dwindling state financial support and consequent higher tuition, concerns about access, and the challenging political and social environment for higher education all point to the need for institutions to engage in enrollment management (Penn, 1999). Succinctly stated, enrollment management is finding, enrolling, and retaining enough of the kinds of students an institution wants (Dixon, 1995). Student flow studies that describe the retention, graduation, grades, credit hours earned, etc. of various cohorts of students serve as an important tool for enrollment managers (Wilkinson & Peterson, 2001). Monitoring the enrollment flow of student sub-populations (e.g., members of demographic and academic

preparation groups, students in various special programs, etc.) is a particular concern (Kroc & Hanson, 2003).

Pusser, et al. (2007) observed, “Millions of adult students are seeking degrees in a system built largely for – and around – traditional students.” Youth, in fact, “who are sent out into life with a dwindling sack full of values, ... face a situation in which they have to keep filling up their sack. This leads adult education to take ‘lifelong learning’ as its motto” (Geissler, 1996). Belanger (1996) pointed out, the question is no longer whether adult learning is needed, and how important it is. The issue today is how to respond to this increasing and diversified demand, how to manage this explosion. By 2010, 50 percent of college students will be adults, experts believe. The need for continuing education is never going to go away. If you don’t cater to adult students, they’ll go find an institution that does. .... Institutions must develop programs to accommodate nontraditional students, who have complicated lives, and make them feel comfortable on campus (Margolis, 2003). Pusser, et al., (2007) concluded in their recent studies on adult education, “In the 21<sup>st</sup> century, our nation needs to maximize the potential of adult learners to face global challenges.”

### **Research Questions**

Unlike the traditional undergraduate students, the nontraditional undergraduates are varied in their ages, from 25 to over 50, have family responsibilities, and are employed, sometimes on a full-time basis. What is the enrollment pattern for this special group of students? How is their academic performance? Based on the information supplied by the nontraditional student flow model, this study examines the following four research questions:

1. Are the nontraditional undergraduate students' one-year retention rates influenced by their age, gender, race, major, entering status (new freshmen/new transfer students), and/or full-time/part-time status?
2. Is there any significant difference in the nontraditional undergraduates' four-year graduation rates between male students and female students, between Caucasian American students and minority students, between full-time students and part-time students, between new freshmen and new transfers, among different age groups, and among the students enrolled in different colleges?
3. How do the age, gender, race, major, entering status, and the full-time/part-time status of nontraditional students influence their academic performance, in terms of one year college GPA?
4. Is there any significant difference in nontraditional student's graduation cumulative GPA between male students and female students, between Caucasian American students and minority students, between full-time students and part-time students, between new freshmen and new transfer students, among different age groups, and among the students enrolled in different colleges?

### **Method**

The study tracked 120 undergraduates at age of 25 or older when they first enrolled at BGSU in Fall 1998. The descriptive statistical analysis included the numbers and percentages of the nontraditional students by gender, race, major, age group, entrance status, full-time/part-time status, and residency status. The one-year retention rate and four-year graduation rate by gender, race, age group, major, entrance status, and full-time/part-time status were also indicated by the descriptive statistic analysis.

In addition to the descriptive statistical analysis, two sets of inferential statistical analyses were also adopted. As noted in Table 1, logistic regression was used to determine if significant differences existed in nontraditional students' one-year retention rate (research question 1) and four-year graduation rate (research question 2) by the independent variables. Also, linear regression was utilized to determine whether there was a significant difference in nontraditional students' one-year college GPA (research question 3) and graduation GPA (research question 4) by the independent variables. The independent variables were gender (male/female), race (white/minority), entering status (new freshmen/new transfers), full-time/part-time status, age group (25-29, 30-34, 35-39, 40-44, 45-49, and 50-54), and college (Arts and Sciences, Business Administration, Education and Human Development, Health and Human Services, Technology, as well as Academic Enhancement for those with undecided majors).

**Table 1 Statistical Procedures for Testing Research Questions**

<b>Research Question</b>	<b>Statistic Procedure</b>	<b>Dependent Variable</b>	<b>Independent Variable</b>
1	logistic regression	number of students retained after one year	gender, race, new freshmen/new transfers, full-time/part-time, age group, college
2	logistic regression	number of students graduated within 4 years	gender, race, new freshmen/new transfers, full-time/part-time, age group, college
3	linear regression	one year college cumulative GPA	gender, race, new freshmen/new transfers, full-time/part-time, age group, college
4	linear regression	college cumulative GPA at graduation	gender, race, new freshmen/new transfers, full-time/part-time, age group, college

The dummy variables were created from independent variables in order to do the regression analyses. Since there were more than two levels in the independent variables of age group and college, age group six and Academic Enhancement, which had small numbers of students (four for each), were chosen as “reference variables.” Thus, no dummy variable was created for these two reference levels: see Table 2 for details.

**Table 2 Dummy Variables**

Dummy Variable	Independent Variable	Value	Reference Variable
Sex	Gender	Male = 0, Female = 1	
Ethn	Race	White = 0, Minority = 1	
Enter	New Freshmen/New Transfers	Freshmen = 0, Transfers = 1	
FP	Full-time/Part-time	Part-time = 0, Full-time = 1	
AGE1 AGE2 AGE3 AGE4 AGE5	Age Group Age Group 1 Age Group 2 Age Group 3 Age Group 4 Age Group 5 Age Group 6	Other age = 0, '25 – 29' = 1 Other age = 0, '30 – 34' = 1 Other age = 0, '35 – 39' = 1 Other age = 0, '40 – 44' = 1 Other age = 0, '45 – 49' = 1 '50 – 54'	Yes
AS BA EHD HHS TEC	College Arts and Sciences Business Education Health Technology Academic Enhancement	Other college = 0, A&S = 1 Other college = 0, BA = 1 Other college = 0, EHD = 1 Other college = 0, HHS = 1 Other college = 0, TEC = 1 ACE	Yes

**Results**

The nontraditional student flow model tracked 120 undergraduate students at age 25 and older when they enrolled first time at BGSU in Fall 1998. Seventy-five of them (62.5%) were female students and 45 (37.5%) were male students. There were 111 Caucasian American students (92.5%) and 9 minority students (7.5%). Part-time students were 55 (45.8%), while full-time students were 65 (54.2%). New freshmen were 15 (12.5%) while new transfers were 105 (87.5%). There were 110 Ohio residents (91.7%) and 10 non-residents (8.3%). The college distribution and age group distribution of this group of students are displayed in Table 3 and Table 4, respectively.

**Table 3 College Distribution**

Total		A&S		BA		EHD		HHS		TEC		ACE	
N	%	N	%	N	%	N	%	N	%	N	%	N	%
120	100	34	28.3	14	11.7	23	19.2	29	24.2	16	13.3	4	3.3

**Table 4 Age Group Distribution**

Total		25 – 29		30 – 34		35 – 39		40 – 44		45 – 49		50 – 54	
N	%	N	%	N	%	N	%	N	%	N	%	N	%
120	100	52	43.3	26	21.7	21	17.5	7	5.8	10	8.3	4	3.3

Among the 120 nontraditional students, 77 re-enrolled in Fall 1999. The one-year retention rate is 64.2%. Twenty-four male students and 53 female students continued to the second fall semester. The one-year retention rate for male students is 53.3% and that for female students is 70.7%.

Table 5 provides the logistic regression results for the one-year retention of the nontraditional students. It was quite clear that there were no statistically significant differences in nontraditional students' one-year retention between male students and female students since  $p = 0.666 > 0.05$ , nor between new freshmen and new transfers as  $p = 0.068 > 0.05$ . There was a statistically significant difference in one-year retention between Caucasian American students and minority students ( $p=0.0136 < 0.05$ ), between full-time students and part-time students ( $p = 0.0133 < 0.05$ ), between older students (age5) and younger students ( $p = 0.0302 < 0.05$ ), and between the students in the College of Health and Human Services (HHS) and the students in other colleges ( $p = 0.0177 < 0.05$ ). The negative estimate number (-2.1396) indicated that Caucasian American Students were more likely to continue to their second year than minority students. The older students, those who began as full-time, and those in the College of Health and Human Services were more likely to be retained after one year.

**Table 5 Logistic Regression Results for One Year Retention**

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.7021	1.8026	2.2470	0.1339
sex	1	0.2358	0.5468	0.1861	0.6662
ethn	1	<b>-2.1396</b>	0.8672	6.0871	<b>0.0136</b>
Enter	1	-1.7043	0.9341	3.3289	0.0681
FP	1	1.2933	0.5221	6.1353	<b>0.0133</b>
Age1	1	1.0441	1.2114	0.7429	0.3887
Age2	1	1.7710	1.2735	1.9340	0.1643
Age3	1	0.9036	1.2241	0.5449	0.4604
Age4	1	0.1864	1.4035	0.0176	0.8943

Age5	1	4.0709	1.8784	4.6966	<b>0.0302</b>
AS	1	2.7094	1.5806	2.9384	0.0865
BA	1	3.0354	1.7143	3.1352	0.0766
EHD	1	2.9042	1.6181	3.2213	0.0727
HHS	1	4.0244	1.6974	5.6210	<b>0.0177</b>
TEC	1	1.9206	1.5546	1.5262	0.2167

Out of the 120 nontraditional students, fifty-eight graduated within four years. The four-year graduation rate for this group of students is 48.3%. Forty-six of them were female and twelve were male. The four-year graduation rates for female students and male students are 61.3% and 26.7%, respectively. Thirty-nine full-time students and nineteen part-time students graduated within four years. The four-year graduation rates for full-time students and part-time students were 60.0% and 34.5%, respectively.

The logistic regression analysis showed that no statistically significant difference existed in the nontraditional students' four-year graduation rate between male and female students, between Caucasian American and minority students, among age groups, nor among colleges ( $p > 0.05$ ): see Table 6. However, there was a statistically significant difference in their four-year graduation rate between new freshmen and new transfers ( $p = 0.0026$ ,  $p < 0.05$ ) and between full-time students and part-time students ( $p = 0.0003$ ,  $p < 0.05$ ).

**Table 6 Logistic Regression Results for Graduation in Four Years**

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-12.8912	231.6	0.0031	0.9556
sex	1	0.7139	0.5715	1.5602	0.2116
ethn	1	-0.0186	0.8372	0.0005	0.9823
Enter	1	3.8014	1.2600	9.1024	<b>0.0026</b>
FP	1	2.3377	0.6396	13.3587	<b>0.0003</b>
Age1	1	-2.8285	3.3967	0.6934	0.4050
Age2	1	-2.7266	3.4005	0.6429	0.4227
Age3	1	-2.3486	3.4165	0.4725	0.4918
Age4	1	-3.5280	3.5312	0.9982	0.3178
Age5	1	-1.9153	3.4828	0.3024	0.5824
AS	1	9.3107	231.6	0.0016	0.9679

BA	1	10.1697	231.6	0.0019	0.9650
EHD	1	9.8224	231.6	0.0018	0.9662
HHS	1	12.1393	231.6	0.0027	0.9582
TEC	1	9.8948	231.6	0.0018	0.9659

Table 7 provides the linear regression results for the nontraditional students' first-year cumulative grade point average (GPA). There were no statistically significant differences in the nontraditional students' first-year GPA between male students and female students, between Caucasian American students and minority students, between full-time students and part-time students, nor among different age groups since the p values for these independent variables were greater than 0.05. Nevertheless, statistically significant differences existed in the first-year GPA between new freshmen and new transfers,  $p = 0.0228 < 0.05$ . The mean first-year GPA was significantly higher for transfer students than for new freshmen. In addition, the students in the College of Education and Human Development and the College of Health and Human Services performed better academically than the students in other colleges, as the p value (0.0418) for the students in the College of Education and Human Development and that (0.0267) for the students in the College of Health and Human Services were less than 0.05.

**Table 7 Linear Regression Results for First-Year Cumulative GPA**

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	1.97761	0.84669	2.34	0.0230
sex	1	-0.07870	0.20184	-0.39	0.6980
ethn	1	-0.64387	0.34987	-1.84	0.0708
Enter	1	0.52885	0.22602	2.34	<b>0.0228</b>
FP	1	-0.12364	0.18522	-0.67	0.5071
Age1	1	-0.53549	0.50004	-1.07	0.2887
Age2	1	-0.41595	0.50219	-0.83	0.4109
Age3	1	-0.38193	0.52700	-0.72	0.4715
Age4	1	-0.21673	0.61564	-0.35	0.7261
Age5	1	-0.17646	0.53927	-0.33	0.7447
AS	1	1.24709	0.71587	1.74	0.0868

BA	1	1.08102	0.74691	1.45	0.1532
EHD	1	1.54261	0.74095	2.08	<b>0.0418</b>
HHS	1	1.62904	0.71661	2.27	<b>0.0267</b>
TEC	1	1.46922	0.74755	1.97	0.0542

The linear regression results for the nontraditional students' cumulative GPA at graduation are shown in Table 8. There were no significant differences in nontraditional students' cumulative GPA at graduation between male students and female students, between full-time students and part-time students, between new freshmen and new transfer students, among different age groups, nor among the students enrolled in different colleges, as the p values were greater than 0.05. However, a significant difference in nontraditional students' cumulative GPAs at graduation existed between Caucasian American students and minority students,  $p = 0.0012 < 0.05$ . The negative parameter estimate (-0.72921) indicated that Caucasian American student's cumulative GPA at graduation was higher than minority students'.

**Table 8 Linear Regression Results for Cumulative GPA at Graduation**

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	2.86671	0.55272	5.19	<.0001
sex	1	0.15388	0.13794	1.12	0.2694
ethn	1	<b>-0.72921</b>	0.21443	-3.40	<b>0.0012</b>
Enter	1	0.39538	0.22933	1.72	0.0902
FP	1	-0.17585	0.12826	-1.37	0.1758
Age1	1	-0.06961	0.26492	-0.26	0.7937
Age2	1	-0.35867	0.27719	-1.29	0.2010
Age3	1	-0.15432	0.27030	-0.57	0.5703
Age4	1	-0.06522	0.31913	-0.20	0.8388
Age5	1	-0.08359	0.28067	-0.30	0.7669
AS	1	0.37255	0.46295	0.80	0.4244
BA	1	-0.19559	0.48076	-0.41	0.6857
EHD	1	0.68738	0.47665	1.44	0.1548
HHS	1	0.36485	0.45877	0.80	0.4298
TEC	1	0.44813	0.46094	0.97	0.3351

## **Conclusion**

The logistic regression results for nontraditional students' one-year retention rates clearly indicate that Caucasian American students, full-time students, older students, and the students in the College of Health and Human Services were more likely to continue to the second year, while male students and female students, new freshmen and new transfers are not significantly different in their one-year retention. The results tell that our endeavor should be to focus on minority students, younger students, part-time students, and the students in all colleges except College of Health and Human Services in raising nontraditional students' one-year retention rate.

It is good to learn from the findings that the nontraditional students' four-year graduation rate was not influenced by student's gender, race, age, and major. It is understandable that new transfers and full-time students were more likely to graduate within four years than new freshmen and part-time students, because transfer students brought some earned credit hours with them when they first time enrolled at BGSU and full-time students took more classes each semester than part-time students did.

The linear regression results for nontraditional students' first-year cumulative GPA reveal that new transfer students' first-year GPA was higher than that of new freshmen and that the students in the College of Education and Human Development and the College of Health and Human Services had higher first-year GPAs, on average, than the students in other colleges. The results suggest that there was no significant difference in nontraditional students' first-year cumulative GPA between male and female students, between Caucasian American students and minority students, between full-time and part-time students, nor among different age groups. To improve nontraditional students' academic performance, the

effort should focus on new freshmen and the students in the colleges other than the College of Education and the College of Health by helping them to increase their first-year GPA.

The linear regression results for nontraditional students' cumulative GPA at graduation show that Caucasian American students' cumulative GPA at graduation was higher than that of minority students. The nontraditional students' graduation cumulative GPA was not influenced by other independent variables, such as gender, full-time/part-time status, entrance status, age, and major. In addition, the nontraditional students' cumulative GPA at graduation (2.88) increased 0.11 from their first-year cumulative GPA (2.77). However, there was a significant discrepancy between nontraditional students' graduation GPA (2.88) and the highest possible of GPA (4.0). Our attention ought to be paid to how to improve adult education quality so as to increase the nontraditional students' graduation GPA.

Succinctly stated, the nontraditional student flow model is a useful tool in tracking older students' enrollment pattern and their academic performance and success.

### **Limitations**

First, the independent variables in the nontraditional student flow model did not include other data, such as students' marital status, family income, family size, current employment status (with full-time job, part-time job, no job), which might be the critical variables in nontraditional students' academic performance (college GPA) and success (retention and graduation). Second, this study was based on the information of the cohort of nontraditional students started at BGSU in Fall 1998; the results might not reflect the actual situation for other cohorts.

## **Recommendation**

Nontraditional undergraduate students' academic performance and success rely upon many factors. A future study is recommended to include analysis of student credit hours earned by gender, race, major, entering status, and full-time/part-time status. The comparison between traditional students and nontraditional students is also recommended to better understand the discrepancy in their enrollment pattern, academic performance, and success. Therefore, university leaders may make sound policies about nontraditional student education and develop suitable programs for nontraditional students based on the research findings.

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