



The Impact of Women and Urban Students On Agricultural College Enrollments

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Introduction

Since 1970, the number and percentage of women and urban students enrolling in college agricultural curricula across the nation has risen rapidly. According to the National Association of State Universities and Land-Grant Colleges only 20 percent of agricultural students were women in 1973 as compared to 30 percent in 1979. The percentage of farm students has also decreased on most agricultural college campuses. The College of Agricultural and Life Sciences at the University of Wisconsin-Madison has experienced these enrollment trends, with 1980 statistics indicating 22 percent farm background students and 41 percent women students.

A growing concern on the part of college administrators in the face of declining high school graduating classes is maintaining future enrollments. More schools and colleges are realizing the importance of retaining current students as well as recruiting new freshmen. This paper reports the results of a four year longitudinal study of the 1975 freshman agricultural class at the University of Wisconsin-Madison and draws implications and conclusions about the impact of women and nonfarm background students on student retention and enrollment.

Survey of Related Literature

The selection of a college major plays an important role in retention within a College of Agriculture, since a major field change outside of an agriculture curriculum can adversely affect retention. Retention also encompasses the withdrawal rate for both academic and non-academic reasons. Because of this relationship between major choice and retention in a College of Agriculture, the literature review includes studies in college major choice and student withdrawal.

College Major Choice

Choosing a college major is a difficult vocational task for high school seniors and college freshmen, and the choice at time of college entrance is usually not stable. A study of New York State University seniors

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(Faulman, 1973) found that about half of the seniors had changed both their major field and vocational choice since their freshman year. Similar results were discovered (Piguet, 1971) when a selected group of Oklahoma college seniors who as high school seniors planned to be biology majors were surveyed. Over 70 percent of the respondents had changed their major. A longitudinal study of high school seniors (Fenske and Scott, 1974) showed that 40 percent of the students as college seniors were consistent in their pre-college majors and vocational choices. Women appeared to be more consistent in their choices than men.

Another study of freshmen (Northby, 1965) over a four year period, indicated that over one fourth of the freshmen made one or more school or college changes within the University of Connecticut, thus indicating major changes. However, Northby found that women made more changes than men during the period observed. Fidler and Still (1973) studied entering freshmen classes at the University of South Carolina for three separate years over a six year period. The results indicated more freshmen students each year were actually undecided about a college major. A study of college seniors at Southern Illinois University (Rochester and McBride, 1970) revealed that students solidify their majors at different points in their college careers. Only 23 percent indicated that their major choice was made prior to entering college. It was also found that over one half of the seniors had changed their major during their college years.

College Student Withdrawal/Persistence

The problem of student attrition at institutions of higher education is not a new phenomenon; it has been and is a continuing problem facing higher education. The observed withdrawal rate from four-year colleges according to Summerskill (1962) indicates that 50 percent of those entering college will drop out over a four year period. This study also indicated that only one-third of the dropouts left in academic difficulty. Approximately 65 percent of entering students in four year colleges were found to have completed their baccalaureate degree in a four year period and at least one-third of the entering students never graduate (Panos and Astin, 1968). This problem of attrition takes on added significance for institutions when it is understood that 2.3 new students must be recruited to replace one dropout (Warrington, 1979).

Data on higher education withdrawal from the National Longitudinal Study of the high school class of 1972 (Fetters, 1978), found that more students withdrew for nonacademic reasons than academic. Fetters also found that the withdrawal rate from four year schools decreased as the admission selectivity increased.

There appears to be disagreement in the literature regarding the effect of sex differences on college withdrawal. Cope (1971) and Astin (1972) suggest that women have a higher rate of withdrawal than men because of marriage and unclear goals. Fetters' study indicated insignificant differences among the sexes both for academic and nonacademic reasons. But Fetter confirms Astin's findings that a high proportion, 39 percent, of the females who withdraw for nonacademic reasons did so because of marriage, as compared to 13 percent of the males. Women in another study were found more likely to withdraw voluntarily than men (Spady, 1970).

The predominant focus of withdrawal research has been on the underlying causes and reasons for leaving a college, whether it be for academic or nonacademic reasons. Most researchers agree that persistence in college is directly related to academic ability and grade performance. Endo and Harpel (1979) found that academic dismissals were the lowest group on academic ability measures, while persisters were the highest. They also discovered that advising sources were used most by persisters and least by the academic dismissals. Disagreement exists on the reasons for nonacademic withdrawal, especially in light of research that indicates non-academic dropouts have higher verbal ability and are more intellectually oriented than persisters (Rossman and Kirk, 1970). Withdrawal may be largely a motivational problem (Fetters, 1978).

Pre-College Traits

Pre-college traits (sex, academic aptitude, personality, high school grades, and others) have been reported to explain less than 4 percent of the variation in attrition status (Terenzini and Pascarella, 1978). Instead, they discovered that the frequency of a student's informal contact with faculty members made the largest contribution to the variance. Tinto (1975) also acknowledges that interaction with faculty may influence both social and academic integration of college students.

Endo and Harpel (1979) found that in addition to academic ability and use of advising sources in predicting college persistence, that intellectual goals and a concern for financing of education were also important. Astin (1972) asserts that participation in extracurricular activities, membership in social fraternities or sororities, staying in an on-campus residence, and having an on-campus job significantly relate to staying in college. Husband (1976) found that "significant others" (persons who influence an individual's perceptions about himself) were instrumental in whether a freshman remained in college or dropped out. Both of these studies emphasize the social dimension of the college attrition model.

Statement of the Problem

Administrators of Colleges of Agriculture have a growing concern that in the 1980's, enrollments will experience severe decline because of the lower birth rate of several years ago. This concern places more attention on the attrition rate of current students and methods of increasing student retention. The problem investigated in this study is the degree of impact that the changing nature of undergraduate student enrollment, primarily the increasing number of women and nonfarm students, will have on student retention.

Method

All students applying to the College of Agricultural and Life Sciences at the UW-Madison for the fall of 1975 were asked to respond to an entering student questionnaire. A total of 232 students responded to the initial survey. Data collected at that time included information on major selection, knowledge of the job market, interests, aptitudes, and abilities, and other information thought to affect college choice and major choice.

Four years later, additional data was collected from university records concerning the status of these same 232 students. The information collected indicated the number of students who changed major, never enrolled, transferred, withdrew, as well as the grade point average and progress made toward a degree for each student. Those students who never enrolled initially or who had withdrawn from the university were sent an additional questionnaire which provided more data on these important groups of students.

Another primary goal of this study was to ascertain the degree of major change which took place in the population during college. The researcher devised a categorization system which classified major changes within the College of Agricultural and Life Sciences as being either slight or substantial, depending upon its relationship to the original major. For example, a change from dairy science to meat and animal science or from agronomy to horticulture was said to be slight whereas a change from soils to agricultural journalism or agronomy to dairy science was substantial. Other classifications were no major change and transferred (for those students leaving the College).

Results

The population of students studied is described in Table 1 in terms of sex and residential background. A majority of the farm background students and urban students were men; the rural nonfarm students were equally

Table 1. A Comparison of Freshmen Students in the College of Agricultural and Life Sciences by Sex and Residence

	Men		Women		Total	
	N	% Row	N	% Row	N	% Row
Farm	52	82.3	9	14.8	61	100.0
Urban	70	59.8	47	40.2	117	100.0
Rural Nonfarm	27	50.9	26	49.1	53	100.0
Total	149	100.0	82	100.0	231	100.0

Chi Square 16.84

2 DF

p = .001 Significant

divided between men and women. Women accounted for about one-third of the population, and approximately one-fourth of the population had a farm background.

Table 2. 1979 Status of 1975 Freshmen Class in the College of Agricultural and Life Sciences by Sex

Status Category	Men		Women		Total	
	N	%	N	%	N	%
Never Enrolled	20	13.4	12	14.8	32	13.9
Withdrew Passing	25	16.9	18	22.2	43	18.7
Withdrew Failing	13	8.7	3	3.7	16	7.0
Currently Enrolled	65	43.6	32	39.5	97	42.2
Transferred	21	14.1	16	19.8	37	16.1
Other	85	3.4	0	0.0	5	3.4
Total	149		81		230	

The data in Table 2 indicates the 1979 status of the freshmen first surveyed in 1975. Interestingly more students withdrew in good standing than failing and 14 percent never enrolled, thus changing their mind during a two-month time period between preregistration and the beginning of the fall term. A nearly identical percentage of men and women failed to enroll. Women withdrew while passing and transferred at a higher rate than did men. The "other" category indicates veterinary and medical school applicants. Another interesting percentage is the yield ratio (number of students still enrolled in the College) was less than 50 percent (42.17 percent).

The data in Table 3 compares type of home residential background with the 1979 status. Farm background students persisted in school, were less likely to transfer, and less likely to withdraw while passing than urban students, but were more likely to withdraw failing than urban or rural nonfarm students. Urban students were the least likely to stay enrolled in the College, most likely to transfer, and had the highest percentage (16.2 percent) of nonattendance, twice that of farm students. The effective yield of farm students remaining in school after four years was 54 percent as compared to 36 percent for urban students.

Table 3. The 1979 Status of 1975 Freshmen in the College of Agricultural and Life Sciences by Residential Background.

Status Category	Farm		Residential Background			
	Rural	%	Urban	%	Rur-Nonfarm	%
Never Enrolled	5	8.5	19	16.2	7	13.2
Withdrew Passing	9	15.3	20	17.1	14	26.4
Withdrew Failing	7	11.9	5	4.3	4	7.6
Currently Enrolled	32	54.2	42	35.9	23	43.4
Transferred	4	6.8	28	23.9	5	9.4
Other	2	3.4	3	2.6	0	0.0
Total	59		117		53	

From Table 4 it is evident that men proceeded toward their degree slightly faster than women. This data was collected at the time of last attendance in order to measure progress toward a degree. Men exceeded the numbers of women in both the junior and senior category and four men graduated in less than four years whereas no women were in that category.

It also should be noted that less than half (46.1 percent) of the students were "on schedule" or had already completed a degree in four years.

Table 4. Progress Toward a Degree at Time of Last Enrollment of 1975 Freshmen in the College of Agricultural and Life Sciences by Sex.

Year in School	Men		Sex Women		Total	
	N	%	N	%	N	%
Never Enrolled	20	13.4	12	14.8	32	13.9
Freshmen	24	16.1	15	18.5	39	17.0
Sophomore	12	8.1	11	13.6	23	10.0
Junior	20	13.4	10	12.4	30	13.0
Senior	69	46.3	33	40.7	102	44.4
Graduated	4	2.7	0	0.0	4	2.7
Total	149		81		230	

Data in Table 5 indicates that those students with a farm background proceeded faster toward a degree than did either urban or rural nonfarm students. A higher percentage of farm students had senior and junior status than did urban and rural nonfarm students.

Table 5. Progress Toward a Degree At Time of Last Enrollment of 1975 Freshmen in the College of Agricultural and Life Sciences by Residential Background

Year in School	Farm		Residential Background			
	Urban	%	Rur-Nonfarm	N	%	%
Not Enrolled	5	8.5	19	16.2	7	13.2
Freshmen	8	13.6	18	15.4	13	24.5
Sophomore	4	6.8	15	12.8	4	7.6
Junior	11	18.6	13	11.1	6	11.3
Senior	29	49.2	50	42.7	23	22.6
Graduate	2	3.4	2	1.7	0	0.0
Total	59		117		53	

In analyzing the grade point average (GPA) of the students, no significant differences existed by either sex or residential background. Table 6 presents percentages of GPA categories for the population as a whole.

Table 6. Grade Point Average of 1975 Freshmen in the College of Agricultural and Life Sciences after Four Years or at Time of Withdrawal.

Category	N	%
No GPA	75	32.6
2.00	32	13.9
2.00-3.00	78	33.9
3.00-3.50	31	13.5
3.51-4.00	14	6.1
Total	230	100.0

Very little difference was discovered between men and women pertaining to degree of major change, but a significant difference did exist in major change based on the student's residential background as indicated by the data in Table 7.

Table 7. Degree of Major Change of 1975 Freshmen in the College of Agricultural and Life Sciences by Residential Background

Category of Major Change	Farm		Residential Background			
	Urban	%	Rur-Nonfarm	N	%	%
No Change	37	62.7	45	38.5	22	41.5
Slight	7	11.9	15	12.8	13	24.5
Substantial	6	10.2	10	8.6	6	11.3
Transferred	4	6.8	28	23.9	5	9.4
Never Enrolled	5	8.5	19	16.2	7	13.2
Total	59		117		53	

Chi Square 20.33

8 DF
p = .009

Nearly two-thirds of farm background students did not change their major, and only 6.8 percent transferred out of their college. Approximately one-fourth of the urban students transferred out of their college. The total number of students who enrolled and who did not change their major (approximately 52.5 percent) substantiates the findings of Rochester and McBride, Faulman and others which report that half of all college students change their major after their freshmen year.

The data in Table 8 portray the degree of retention of the original freshman year major four years later by the population.

Table 8. Percentage of 1975 Freshmen Students in the College of Agricultural and Life Sciences Retaining Original Major Over a Four Year Period.

Major	Orig. Major		New Major		Total	
	N	%	N	%	N	%
Ag Bus Management	2	66.8	1	33.3	3	100.0
Ag Economics	1	33.3	2	66.7	3	100.0
Ag Engineering	7	63.6	4	36.4	11	100.0
Ag Journalism	1	100.0	0	0.0	1	100.0
Agronomy	1	100.0	0	0.0	1	100.0
Bacteriology	0	0.0	0	0.0	0	0.0
Biochemistry	2	100.0	0	0.0	2	100.0
CAVE	6	66.7	3	33.3	9	100.0
Dairy Science	14	87.5	2	12.5	16	100.0
Dietetics	4	80.0	1	20.0	5	100.0
Entomology	2	100.0	0	0.0	2	100.0
Food Science	2	100.0	0	0.0	2	100.0
Forestry	8	66.7	4	33.3	12	100.0
Genetics	2	100.0	0	0.0	2	100.0
Horticulture	17	73.9	6	26.1	23	100.0
Land Architecture	7	63.6	4	36.4	11	100.0
Meat and Animal Sci	12	100.0	0	0.0	12	100.0
Nutritional Sciences	3	100.0	0	0.0	3	100.0
Plant Pathology	0	0.0	0	0.0	0	0.0
Prevet	25	52.1	23	47.9	48	100.0
Rec Resources Management	3	60.0	2	40.0	5	100.0
Rural Sociology	1	100.0	0	0.0	1	100.0
Soil Science	1	50.0	1	50.0	2	100.0
Wildlife Ecology	9	64.3	5	35.7	14	100.0
Total					189	

Those majors where the poorest retention in the original major occurred (other than Prevet which is not a bonafide major) included agricultural economics, landscape architecture, soil science, wildlife ecology, forestry, agricultural engineering, and continuing and vocational education (CAVE). These majors for the most part had high numbers of women and urban students.

The students who either withdrew from the university or who never enrolled were surveyed to determine if they were now in school at another institution. Of the 91 students in these categories, 41 responded to the survey questions.

Fifty percent of these indicated that they were presently attending college or technical school. No significant difference existed between men and women or by residential backgrounds.

Of the students attending college elsewhere, 11 of 21 were enrolled in agricultural curricula. More men than women chose the agricultural majors and more students with farm backgrounds chose agricultural majors.

The students who withdrew indicated a variety of reasons for doing so, but the predominant reasons (in retrospect) cited in order of times mentioned were: not sure of major, not motivated, doing poorly academically, poor advising, dislike housing situation, and got married. Very few students withdrew because of jobs or finances which is the usual reason given on withdrawal forms. Several students indicated that UW-Madison was a good school educationally, but they withdrew because of a lack of social contacts, faculty-student interaction, or because they did not feel important. Several students cited the competition level of Madison and the size factor. Surprisingly, many students regretted their decision to withdraw and some planned to come back to graduate school or finish their B.S. degrees at Madison.

The students who did not enroll as freshmen at Madison were asked for reasons why they chose not to enroll. Of the 15 responding nearly half (7) indicated financial reasons. Several others indicated problems with housing and the lack of a Veterinary School.

Summary of Results

The analysis of the status of this group of high school seniors who were accepted for college admission in the fall of 1975 provides several important pieces of information. First, nearly 14 percent of the population decided not to enroll during a two month period. In light of declining enrollments, this enrollment yield ratio must be carefully watched. The other disturbing fact which surfaces is that fewer than 50 percent of those surveyed two months prior to college were still in school four years later. Those students who did withdraw from college, did so more often while receiving passing grades than failing grades.

The initial survey (1975) concluded that farm students had a better perception of their chosen career area than did urban students, based on their knowledge of the job market. The data in this study tend to support that earlier conclusion, since farm students were more likely to remain in school, less likely to change their major, proceeded toward their degrees at a faster pace, and were less likely to withdraw or transfer out of school while achieving passing grades. The earlier study also noted little difference between men and women in the factors affecting major selection and this study for the most part supports that conclusion. Men appear to move toward completion of their degrees faster than do women but no difference was noted in the degree of major change between men and women.

Withdrawal/Persistence in College

The data from this study substantiates Summerskill's finding that less than 50 percent of those students entering a college will still be enrolled after four years. These data also confirm Summerskill's conclusion that only one-third of the students who withdraw do so while failing.

Women were found to withdraw passing more than men, verifying Spady's earlier study. A nearly identical percentage (14 percent) of men and women students fail-

ed to enroll between preregistration and the beginning of classes, while more men (44 percent) than women (40 percent) were still in school after four years. There is no evidence to support Cope and Astin's suggestion that women withdraw more often than men because of marriage.

Farm students were less likely to withdraw passing, had a non-enrollment percentage half that of urban students, and after four years had an effective yield percentage (remained in school) 50 percent higher than that of their urban counterparts.

The reasons given by students for their withdrawal in this study tend to support earlier studies by Tinto, Endo and Harpel, Husband, and others which cite the importance of academic advising, faculty contact, and social contacts. More support is found for Fetter's contention that nonacademic withdrawal is largely a motivational problem.

College Major Choice

The percentage of students who did not change their freshmen year major over the four years supports earlier studies by Rochester and McBride, and Faulman which indicated about half of all college freshmen change their majors by graduation. However, no support was found for Northby's claim that more women than men changed majors or for Fenske and Scott's conclusion that women were more stable in college major choice.

A substantial difference exists between farm background and nonfarm students in the retention of the original college major choice. Two-thirds of the farm students retained their original college major choice compared to a 40 percent retention of original major for non-farm students.

Implications and Recommendations

The major objective of this study was to examine the effect that increasing numbers of women and urban students might have on Colleges of Agriculture enrollments and retention. On the basis of the results, the following recommendations are made:

1) When high school seniors apply and are accepted in the university, a crucial factor in actual enrollment is the degree of assistance received in financial aid, housing, major selection advising, and faculty contact. Colleges of Agriculture need to make special efforts to provide good career and major choice advising prior to the first semester enrollment, especially in light of the changing student population.

2) Since college major choice is crucial to retaining students in Colleges of Agriculture, a career orientation course should be implemented, more career and job placement information should be provided to students, and students should be involved early in internship programs. Students dissatisfied with their initial college major choice need adequate information about other agricultural majors in order to retain them in the college. This is especially important for nonfarm students who may lack practical experience in agriculture.

3) Colleges and universities should place increased emphasis on the interpersonal side of college life. Students need to feel a part of the campus and the school either through strong faculty and advisor relationships, student groups or clubs, or through their housing unit.

4) Most departments should offer a practical introductory course in the major area during the student's first semester on campus. This will assist the student in major selection, provide evidence of practicality, and expose the student to at least one more faculty member in the department.

5) Students who do withdraw from school should be contacted a year later to ascertain their interest in returning to school. An additional contact should be made three years after withdrawal.

Implications

Colleges of Agriculture will continue to face a decrease in the number of farm background students and an increase in the number of women students in the years ahead. Because these "nontraditional" agricultural students lack the experience and knowledge of careers in agriculture, more time and money must be spent to acquaint them with agriculture and consequently retain them as students. Agricultural businesses need to be made more aware of the changing nature of the agricultural graduate. They will need to adapt their hiring patterns to include more women and nonfarm students. Agricultural businesses and industries can also provide internship experiences and speakers for campus groups. They may also need to expand their new employee training programs. The "new" agricultural student is here to stay, and the 1980's will be a decade of change and challenge for Colleges of Agriculture.

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Microcomputer Aided Instruction

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Introduction

There is considerable literature on the use and success of Computer Assisted Instruction (CAI) based farm management teaching. (1, 2, 3, 4, 5). Some of the more popular CAI techniques are farm management simulators and games, budget generators, and linear programming (L.P.). Boehlje, Eidman, and Walker; Kay; and Menz and Longworth reported positive student acceptance in courses centered around CAI. Kendrick reported similar student acceptance, but warned that too heavy a dependence on CAI can become boring and actually erode student interest.

One point is commonly stressed in the literature: care must be taken that CAI tools are used to teach concepts or analytical procedures. That is, CAI should not be used merely as a gimmick without solid relevance to teaching objectives. In Kay's words, "A course should be built around objectives. . . not around teaching tools."

Most past efforts in farm management CAI have relied on either batch processing (via punched cards) or time sharing. Both are adequate for the uses that have been made, as evidenced by positive reports of student acceptance, but both have shortcomings.

Batch processing has two primary faults. First, it often lacks user-orientation. Thus, students - many of whom are unfamiliar with computer use - must learn to punch data onto cards, assemble cards in the proper order for processing, and read cards into the computer. The margin for error and opportunities for student frustration are large. The alternative of providing students with such services is quite costly. Second, batch

processing systems frequently have substantial turn-around time (hours in some cases) between data input and output of results, or notification of error. The result is (1) a limit on the amount of CAI students actually receive, and (2) actual student-computer interaction is limited. A slow computer response means the opportunity to reinforce concepts or show errors in logic may be missed.

Time sharing reduces these problems. However, the user-orientation and interactive nature of time sharing services is often accompanied by a substantial "get acquainted period." Kendrick reported that four hours of computer instruction were given to students in one class before a feed ration formulation program could be run. Some systems exhibit slow response times and poor accessibility during periods of heavy use. To use the computer a student may have to be available at 10:30 at night or 6:00 a.m. in the morning. System logon and account number protection procedures can also be confusing to students.

Microcomputers have the potential to overcome some deficiencies of both batch processing and time sharing; not, however, without introducing unique problems of their own. Because microcomputers are a relatively untested tool for CAI, their classroom use merits evaluation.

Procedure

Six microcomputer programs were written to be as user-oriented as possible so that students could operate them with a minimum of instruction. The programs were farm management/farm finance-related, dealing with (1) comparison of loan repayment options and finance charges, (2) comparison of the margin over direct cash costs of two crops at various prices and yields (the Minnesota CROPEQUAL program), (3) tax consequences of alternative depreciation methods and useful life, (4) linear programming for whole farm planning or least-cost feed ration formulation, (5) capital budgeting concepts (internal rate of return and benefit cost ratio), and (6) a breakeven analysis of equipment purchase vs. custom hire.

All students were instructed in the microcomputer's operation. The instruction given consisted of less than one hour of group instruction plus, in some cases, fifteen

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