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**Graduation Time and Rates of 1987 Entrants and
1993 Graduates: A Longitudinal Study of
University of Washington Undergraduates**

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Graduation Time and Rates of 1987 Entrants and 1993 Graduates: A Longitudinal Study of University of Washington Undergraduates

Executive Summary

Two data sets, both taken from the official University of Washington (UW) student data base, were used to study factors that may be related to whether undergraduates obtain degrees and how long it takes them to do so. The freshman data set contained data on students who entered UW as freshmen in the fall of 1987, regardless of whether they graduated. The graduate data set contained data on students who entered as freshmen and who graduated in the spring of 1993, regardless of when they entered the University.

Over all, 64.4% of the students in the freshman data set graduated in the six years and 6.5% were still enrolled fall quarter 1993. A major factor influencing graduation rate was admission status: regularly admitted students graduated at double the rate of specially admitted students. Differences in graduation and persistence rates were found among ethnic groups, but these were not nearly as large as the differences between regularly and specially admitted students. Over 50% of the regularly admitted students from each of the five major ethnic categories graduated. On the other hand, over 40% of specially admitted students from each ethnic group except Asian Americans left with fewer than 90 credits.

Students who graduated had an average UW GPA that was considerably higher than those who did not (3.20 vs. 2.53), although the average GPA of the latter was comfortably above that required to continue. The relationship of graduation and persistence with high school GPA and SAT scores was neither strong nor consistent.

Students in the graduate data set were enrolled for an average of 14.2 quarters and graduated with an average of 197.7 degree credits. The percentage of students who graduated in four calendar years or fewer was 51.5. Another 31.3% graduated in the fifth year and 10.8% took more than five years. Students who took from eleven to 14 enrolled quarters to graduate were differentiated mainly by the number of credits taken per quarter. Students taking greater numbers of quarters also tended to take lower numbers of credits per quarter, but they graduated with substantially greater average total credits.

Seventy-eight percent of the graduates declared only one major (excluding pre-majors). These students graduated with an average of 194.3 degree credits, and they were enrolled for an average of 13.9 quarters and 4.6 years. For those who changed majors, each major change added an average of about 12 total credits, one enrolled quarter, and one-half year in elapsed time. The optimal time to declare one's final major in terms of time to degree appeared to be during the second year. A declaration in the fourth year or after was associated with a fairly large increase in the average total years to graduation.

Generally, professional school students graduated with more credits, more quarters enrolled, and more years than Arts and Sciences students. School of Business students were an exception. A disproportionate number of students who changed majors started in an area of science. Declaring a major outside of the area of one's premajor also appeared to add to the time to graduate.

The study concludes that two major issues are the low graduation rates of specially admitted students and the time to degree more generally. In attempting to lessen time, interventions to reduce total credits may have a larger impact than interventions to increase credits per quarter. also add to time. One implication of the added time of major changes is that UW should provide an opportunity for students to enjoy a broad sampling of disciplines over their first two years in order to make a wise choice of major. However, having then chosen a major at the end of two years, they need to be in a position to complete its requirements in the remaining two years. This strategy may work less well in areas such as Science and Engineering that have a number of necessary prerequisites which need to be fulfilled prior to entry into the major.

Graduation Time and Rates of 1987 Entrants and 1993 Graduates: A Longitudinal Study of University of Washington Undergraduates¹

Gerald M. Gillmore

March 29, 1994

Introduction

The research reported below deals with two inter-related issues: the proportion of University of Washington (UW) undergraduates who obtain bachelor degrees and measures of the length of time of enrollment. In particular, this research seeks to determine variables that are related to graduation rates and time of enrollment and is limited to data found in the UW student database. While the University of Washington has been engaged in on-going research regarding these issues, the specific impetus for this study was legislation passed by the State Legislature in April of 1993. Substitute House Bill 1580 claimed that "... in public colleges and universities, improvement is needed in graduation rates and the length of time required for students to attain their educational objectives" and requested that "... each state institution, as part of its strategic plan, shall adopt strategies to shorten the time required for students to complete a degree or certificate and to improve the graduation rate for all students."² The purpose of this study was to further inform strategic planning efforts at the University of Washington.

In her analysis, Friedman³ identified four factors that might lead a UW student to take more than four years to graduate:

1. ... Students can drop out for a couple of quarters at least once during their undergraduate years, while maintaining a full load while they are in school.
2. ... Students can reduce their academic loads to part-time levels three or four quarters during their undergraduate years.
3. ... The requirements for the most common majors exceed the number that can be reasonably obtained in four years of undergraduate study.
4. ... Students can simply decide to take more classes than are necessary for them to graduate (p. 2).

¹ I would like to thank Ms. Denise Senn who wrote the programs which provided the data and for her patient response to my repeated requests for yet another variable. I also wish to express my appreciation to Dr. Nana Lowell and Ms. Lauren Basson for carefully and thoughtfully editing an earlier draft of this manuscript.

² Substitute House Bill 1580, 53rd Legislature 1993 Regular Session, April, 1993, p. 1.

³ Friedman, D. Getting a Degree: Barriers to Student Progress and Graduation at the University of Washington, October, 1993.

Graduation Rates

Gillmore and Lowell⁴ used official university records to follow students who were regularly admitted as UW freshmen in the fall of 1980. Of the 2929 students studied, 26.8% graduated within four calendar years, 26.1% graduated within five calendar years (but more than four years), 14.2% were still enrolled in the sixth year, and 32.9% had withdrawn. Similar to Friedman, five hypotheses were posed for why students might take longer than four years to graduate. Briefly summarized, these were:

1. Stopping-out (taking quarters off)
2. Taking less than a full time load each quarter
3. Differences in academic talent or preparation, leading to more dropped courses and fewer credits per quarter for the least capable
4. Differences in major requirements
5. Taking longer to decide on a major or changing majors

The study found that taking longer to graduate was associated with being enrolled for greater numbers of quarters — five year graduates averaged two more enrolled quarters than four year graduates. This result was interpreted as supporting the hypothesis that “students progress more slowly because they take fewer credits and courses each quarter” and failing to support the hypothesis that “students who take longer to graduate do so because they take more intermediate quarters off”.⁵ Inferential evidence was presented that students take fewer credits for both academic reasons (students taking longer tended to have lower high school and UW GPA's and tended to drop and repeat more classes) and non-academic reasons (students taking longer tended to be more often found in financial aid's highest need group).

In addition to taking fewer credits per quarter, students taking longer to graduate tended to declare their final major later and to have experienced greater numbers of major changes. There was also clear evidence that certain majors were associated with longer degree completion times than others. This latter result was collaborated in a study of UW students who obtained bachelor degrees during the 1989-90 academic year.⁶ Median credit hours were computed for each major department and for each college. The median across all students was 193 credit hours, 13 over the university minimum, and considerable differences were in evidence by department (from 182 to 255 credit hours for four year programs) and by college (185 to 255 credit hours).

One of the purposes of a more recent survey of seniors was to determine factors that influence the time to degree⁷. The sample of students surveyed was restricted to those enrolled with senior status during Winter Quarter, 1992; thus, the study focused on students who were likely to graduate. The results reconfirmed that the modal time to

⁴ Gillmore, G. M. and Lowell, N. From University Freshman to Graduate: Factors Relating to Degree Completion and Elapsed Time. *EAC Reports*, 87-1, 1987.

⁵ Gillmore and Lowell, 1987, p. 24.

⁶ Gillmore, G. M. The Number of Graduation Credits Obtained by 1989-90 University of Washington Baccalaureate Degree Recipients, *Office of Educational Assessment Reports*, 90-6, 1990.

⁷ Gillmore, G. M. The Winter, 1992, Survey of University of Washington Seniors, *Office of Educational Assessment Reports*, 92-2, 1992.

Graduation Rates

graduation is more than four years. Only 35% of the students surveyed expected to graduate in four years and 44% indicated that the length of time to their expected graduation date was longer than they expected at matriculation.

As a measure of rate of progress, students were subdivided into three groups by year of entry: 1988, 1987, or 1986 or before. These dates of entry correspond to students being in their fourth, fifth, or sixth or greater year at UW. Consistent with earlier results, the 1988 entrants had a considerably higher average University of Washington GPA (3.33) than the 1987 entrants (3.14) whose GPA was higher, in turn, than the 1986 or before entrants (2.93). The same pattern pertained for high school GPA averages (3.69, 3.58, and 3.44, respectively). SAT average scores were higher for the 1988 entrants (1127) than for the other two groups (1058 and 1067, respectively).

Students were given a list of 14 reasons why their rate of progress might be slowed and those who expected to take more than 4 years to graduate were asked to rate the importance or relevance of each in increasing their time. The most important reason across all respondents was "The requirements of my major plus all other university requirements take more than four years to complete." The second most important reason across all respondents was "I have changed majors or decided on a major late which caused me to have to take more classes". The latter was the most important reason for those students who entered in 1986 or earlier. The third most important reason was "I have taken additional courses in order to strengthen my ability to pursue a career after graduation". Students who found this reason to be very important also tended to have higher GPA's than students who rated this as less important.

Reasons of more moderate importance included inability to enroll in needed classes and staying longer to enrich one's education. Reasons that relatively few found important were inability to get into the major of choice, pursuing a second major, financial needs, family commitments, a senior thesis, health or other personal problems, time off for travel, not understanding graduation requirements, and taking fewer credits to get higher grades.

Even though few students offered financial need as an important impediment (62% checked "no importance"), the number of hours of work per week was related to graduation time. 1988 entrants received substantially more of their college expenses from parents, while 1986 or earlier entrants received substantially more support from working. Of the 1988 entrants, 13.9% worked more than 20 hours and 25.6% worked more than 15 hours per week, compared to 46.2% and 74.4%, respectively for the entrants from 1986 or before. Place of residence also made a difference. A comparison of the 71 students in the sample who had only lived in dormitories or fraternities/sororities with the 56 students who had only lived at home or with relatives revealed some huge differences as follows:

	<u>On-Campus</u>	<u>At-Home</u>
Entry in 1988	89%	43%
Expected to graduate in four years	62%	23%
Expected to take more than five years to graduate	4%	36%
Worked more than 15 hours per week	21%	51%
Worked 5 or fewer hours	46%	20%
Financial need of no importance in impeding progress	97%	63%

Graduation Rates

Not surprisingly, these data illustrate that the length of time to graduation is the product of many interrelated factors, such as academic ability, early certainty of a major, and adequate financial support, some of which are more strongly under the control of the institution than others.

Studies have been less informative about reasons for attrition. Gillmore and Lowell⁸ did find that students who left entered with lower high school GPA's (3.34 vs. 3.54) and left with considerably lower UW GPA's than those who graduated (2.53 vs. 3.20).

The current study looks more deeply into factors influencing graduation rates and time to degree, using university records exclusively. By using two distinct sets of data, it addresses graduation rates and attrition by "following" a cohort of freshmen forward to their graduation or departure, and it addresses time to degree retrospectively by "leading" a cohort of students who graduated back to their year of entry.

The Data

The two data sets that were used for this study are as follows:

Freshman Entrants of Fall 1987 (N = 3298). Students were identified who entered UW in the fall of 1987 as freshmen and had one or more graded UW credits. Generally, the term "credits" includes all those that count toward graduation, including transfer, extension and non-graded credits. We shall refer to these data in the aggregate as the **freshman data set**. This data set is used to examine variables that may affect whether students graduate or dropout and the length of time they are enrolled.

Graduates of June, 1993 (N = 1527). The second data set was comprised of students who had entered the university as freshmen at any time, and who graduated spring quarter, 1993. We shall refer to these data in the aggregate as the **graduate data set**. The major purpose of this data set was to determine the effects of major changes on three variables related to time to degree: elapsed years from matriculation to degree, number of enrolled quarters, and total credit hours at graduation.

To contrast the two data sets, students in the graduate data set may have entered UW as freshmen at any time, but had to have graduated in spring, 1993. Students in the freshman data set had to enter UW as freshmen in the fall of 1987 and could have graduated at any time thereafter or not at all. The two data sets happened to have had 110 students in common, but all analyses are conducted as if the two sets are completely independent.

The report begins with considerations relating to the freshman data set, followed by considerations relating to the graduate data set. The last sections contain a summary of findings and implications of the study.

⁸ Gillmore, G. M. and Lowell, N. From University Freshman to Graduate: Factors Relating to Degree Completion and Elapsed Time. **EAC Reports, 87-1, 1987.**

Graduation Rates

Graduation Rate and Attrition

Students in the freshman data set were divided into the following eight groups depending upon, for graduates, the amount of calendar time they were enrolled, and, for non-graduates, the total number of credits they earned.

	<u>Category</u>	<u>Criteria</u>	<u>N</u>	<u>%</u>
1.	First year dropout	Fewer than 45 credits	308	9.3%
2.	Second year dropout	From 45 to 89 credits	275	8.3%
3.	Third year dropout	90 to 134 credits	181	5.5%
4.	Fourth year dropout	135 credits or more	173	5.2%
5.	Still enrolled	Enrolled Fall 1993 with no degree	237	7.2%
6.	Graduated 4 years or fewer (4 years)	Graduated summer, 1991 or before	981	29.7%
7.	Graduated 4 to 5 years (5 years)	Graduated fall, 1991 to summer, 1992	854	25.9%
8.	Graduated more than 5 years (6 years)	Graduated fall 1992 or after	289	8.8%

One can note that through the six years of the study, 64.4% of the students had graduated, 28.3% had dropped out, and 7.2% were still enrolled. Thus, the graduation rate could easily climb to around 70%, which is high for a public institution. One can also note that students drop out at a decreasing rate over four years.

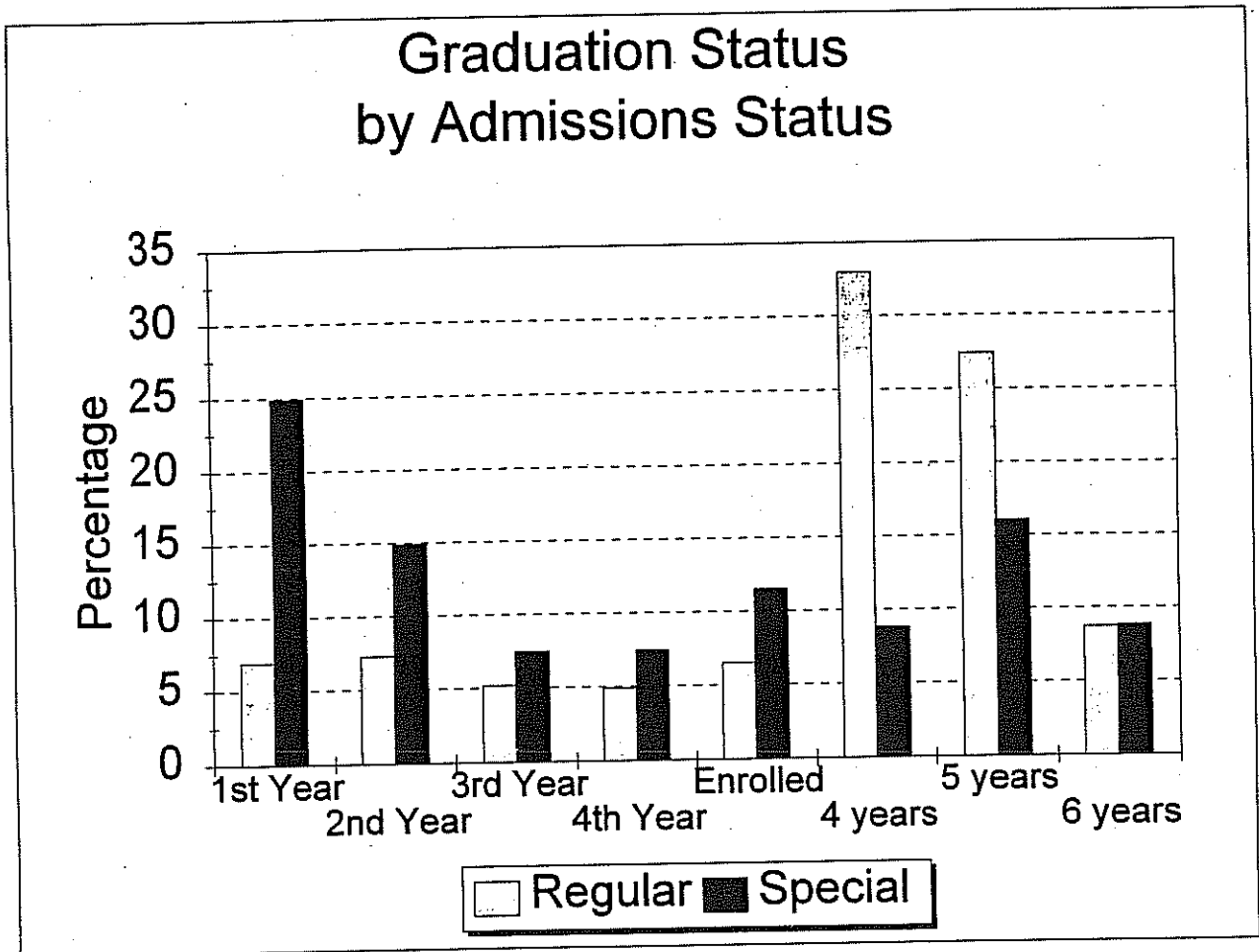
Admissions Status. In Table 1, the number and the percentage of students who were regularly admitted and who were specially admitted within each graduation and progress category are presented. The percentage data are presented in Figure 1 to follow.

Table 1

Graduation Status by Admission Status

		Frequencies			Percentages		
		Regularly Admitted	Specially Admitted	Total	Regularly Admitted	Specially Admitted	Total
Did Not Graduate	1st Year	198	110	308	6.9	24.9	9.3
	2nd Year	209	66	275	7.3	14.9	8.3
	3rd Year	148	33	181	5.2	7.5	5.5
	4th Year	140	33	173	4.9	7.5	5.2
	Enrolled	186	51	237	6.5	11.5	7.2
Graduated	4 years	942	39	981	33.0	8.8	29.7
	5 years	783	71	854	27.4	16.1	25.9
	6 years	250	39	289	8.8	8.8	8.8
Total		2856	442	3298	69.2	33.7	64.4
					30.8	66.3	35.6

Figure 1



As one can see clearly from Table 1 and Figure 1, regularly admitted students were more likely to graduate than specially admitted students: 69.2% of the regularly admitted students in the sample graduated, whereas 33.7% of specially admitted students graduated. Furthermore, for those who graduate, the modal time for regularly admitted students was four years, while for specially admitted students it was five years. Nearly 40% of the specially admitted students left with fewer than 90 credits; only 14.2% of the regularly admitted students did so. Because these differences are so dramatic, we present the following averages for all students and for regularly admitted students.

Graduation Rates

In Table 2, averages within graduation and time categories are presented for a number of variables. The results for each variable are presented graphically and discussed subsequently.

Table 2

Average Credits Earned, UW GPA, High School GPA and SAT Scores, and Percent Out-of-State Residents by Graduation Status

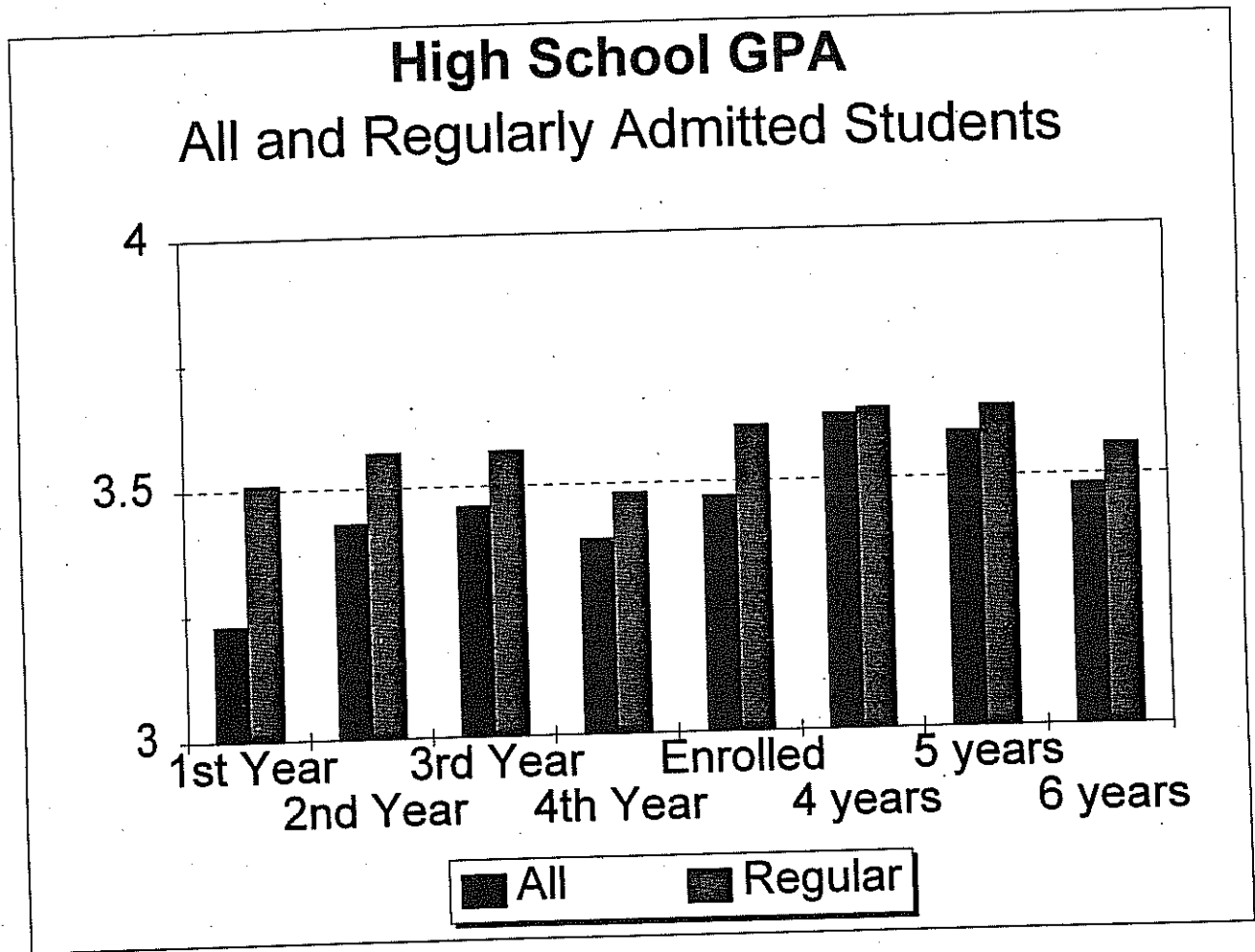
All Students		N	Credits	UW GPA	HS GPA	SATM	SATV	Residence (Percent)
Did	1st Year	308	26.0	2.08	3.23	542	479	19.0
Not	2nd Year	275	67.1	2.59	3.43	542	473	31.0
Graduate	3rd Year	181	107.4	2.71	3.46	568	482	19.0
	4th Year	173	170.2	2.72	3.39	583	515	18.0
	Enrolled	237	167.0	2.75	3.47	570	508	14.0
Grad-uated	4 years	981	184.8	3.28	3.63	572	508	23.0
	5 years	854	196.6	3.17	3.59	580	499	14.0
	6 years	289	208.4	3.03	3.48	568	493	11.0
Total		3298	159.0	2.96	3.52	569	498	19.0
Did Not Graduate		1174	97.9	2.53	3.37	558	490	20.7
Graduated		2124	192.8	3.20	3.59	574	502	17.7

Regularly Admitted Students		N	Credits	UW GPA	HS GPA	SATM	SATV	Residence (Percent)
Did	1st Year	198	26.6	2.32	3.51	592	519	18
Not	2nd Year	209	67.0	2.68	3.57	570	498	26
Graduate	3rd Year	148	107.5	2.81	3.57	599	509	16
	4th Year	140	170.5	2.80	3.48	607	534	12
	Enrolled	186	165.7	2.82	3.61	593	529	14
Grad-uated	4 years	942	184.8	3.29	3.64	577	512	23
	5 years	783	196.9	3.20	3.64	589	506	14
	6 years	250	209.3	3.07	3.56	578	502	8
Total		2856	164.7	3.05	3.61	584	511	18
Did Not Graduate		881	102.0	2.66	3.54	591	517	17.7
Graduated		1975	192.7	3.23	3.63	582	508	17.7

Graduation Rates

High School Grade Point Average (GPA). Average high school GPA's are presented in Figure 4. Although the differences were not as great as for UW GPA, they were nonetheless all statistically significant, mostly in the expected direction; but there were several anomalous results. Regularly admitted students who were still enrolled had a somewhat higher high school GPA than those who graduated in six years. For all students, those dropping out with between 45 and 135 credit hours had a slightly higher GPA than those dropping out after 135 credit hours. Generally, when looking at regularly admitted students, the differences though significant, were not large. For example, the difference between graduates and non-graduates was only .09. Given these results and the reality that UW is very selective in admissions relative to this variable, thus already restricting the range of values, it is unlikely that further increasing the average high school GPA of the entering class of regularly admitted students, even if this were possible, would have much affect on the graduation rate.

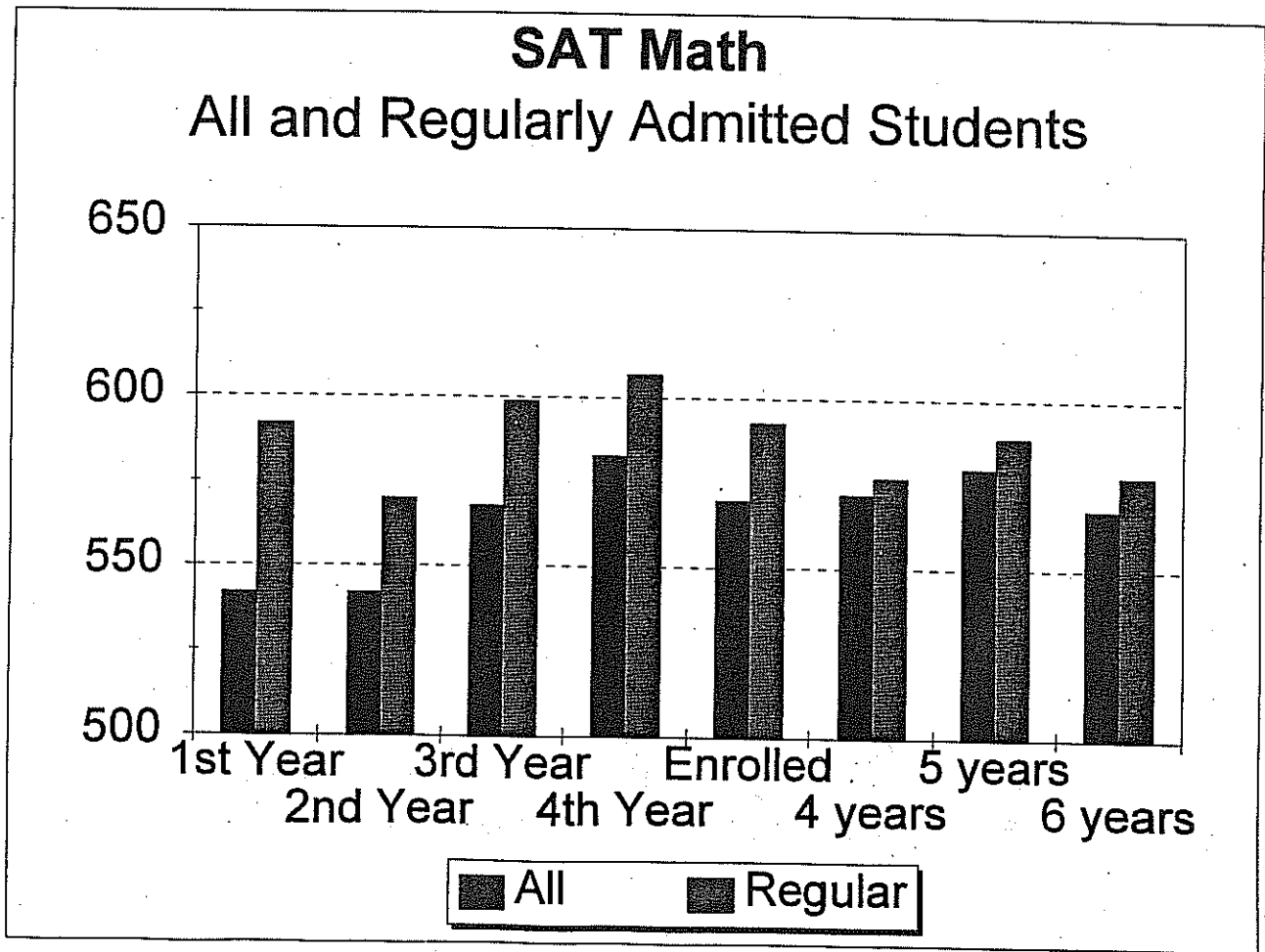
Figure 4



Graduation Rates

SAT Math. In Figure 5, average SAT Math scores are given. The differences were statistically significant among all groups for both all students and regularly admitted students. They also significantly distinguished between graduates and non-graduates for all students. No other differences are significant. In fact, for regularly admitted students, the mean for those who did not graduate was actually higher than for those who did. Obviously, SAT Math scores were not a good predictor of graduation rates or time, probably in part because UW selects students on the basis of SAT scores along with high school GPA, thus restricting the range of scores.

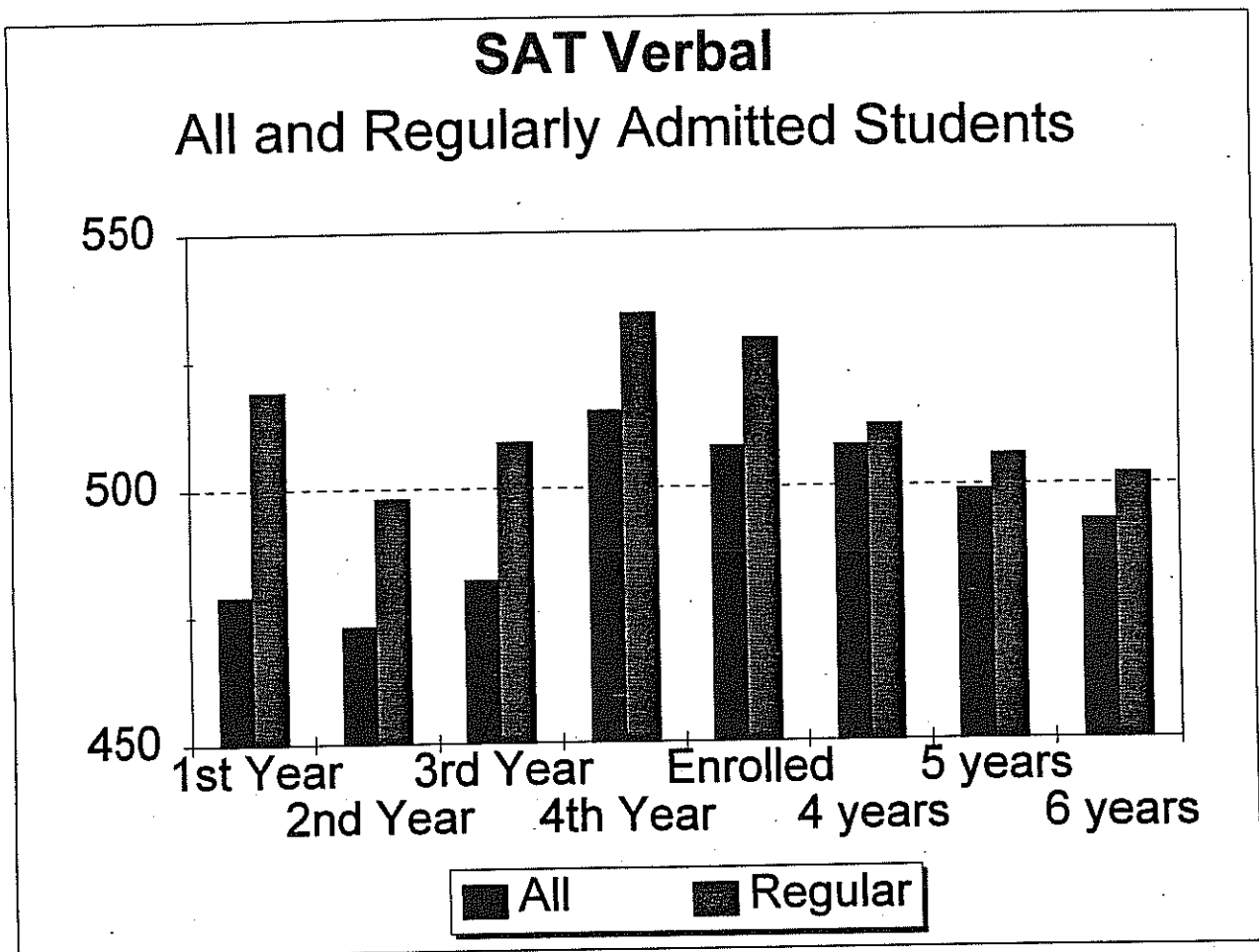
Figure 5



Graduation Rates

SAT Verbal. The average SAT Verbal scores are found in Figure 6. Differences among the groups were statistically significant for all students and for regularly admitted students. However, the patterns are strange. The groups with the highest SAT Verbal scores were the students who dropped out after 135 or more credits and those who were still enrolled. The pattern for the three graduated groups is what one might expect, but the differences are not significant. Looking only at the regularly admitted students, the average SAT verbal score for the students who dropped out with fewer than 45 credits was actually higher than any graduated group, as was the average of all non-graduates. These data suggest that SAT verbal scores are very poor predictors of graduation at UW. Indeed, students with higher scores appear to be those who tended to use the most resources without obtaining a degree.

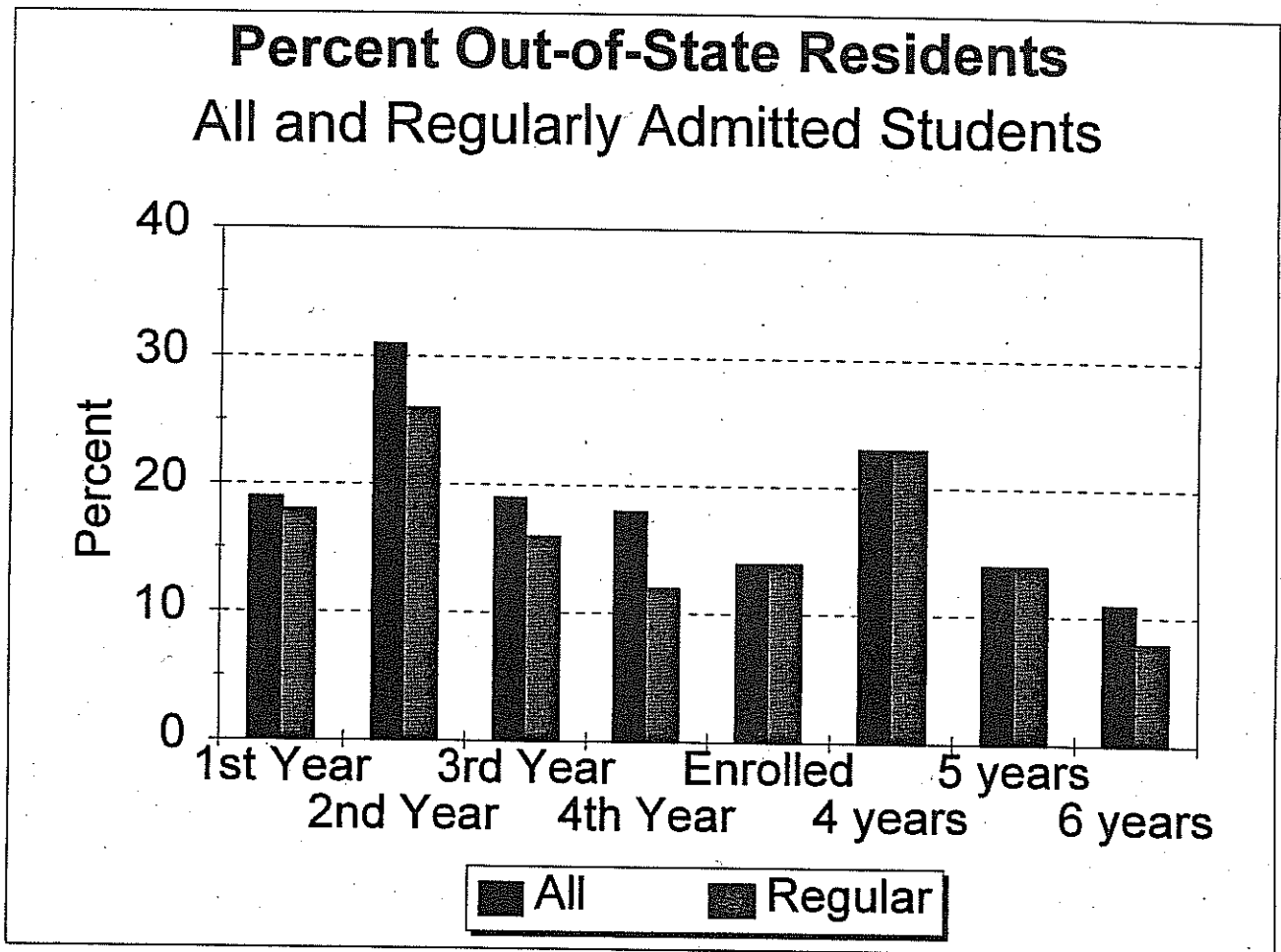
Figure 6



Graduation Rates

Residence. There was little difference between in-state and out-of-state residents in terms of whether they graduate or not. (Figure 7). However, among those who graduated, the proportion of out-of-state residents was higher among students who graduated in four years than among those who graduated in five years, which was higher, in turn than among those who graduated in six years. Also, the proportion of out-of-state students leaving the university with between 45 and 90 credits was higher than the proportion in any other group. Perhaps, some out-of-state students run out of money after two years, but if they make it beyond two years they were more successful at finishing in four years. This relatively early completion of a degree also may be explainable by the higher cost of tuition.

Figure 7



The Effects of the Major

We now turn to the second data set, information on the 1527 undergraduate students who graduated spring quarter of 1993 after having entered the UW at some time as freshmen. It is important to note that most students enter the UW as College of Arts and Sciences pre-majors. These students may select the general pre-majors or a more specialized one, such as pre-science or pre-engineering. Furthermore, students may change from one pre-major to another. As we begin presentation of analyses, we will view the number of majors, disregarding all pre-majors. Analyses of selected pre-majors will be presented subsequently.

In the comparisons to follow, three related dependent variables are heavily used⁹.

Degree credits, defined as the total number of credits counting toward graduation that the student had earned at the time of graduation. This total may include transfer credits, extension credits or advanced placement credit. The average for the sample was 197.7 hours. (A minimum of 180 credits are required for graduation.)

Quarters enrolled, defined as the actual number of quarters the student had been enrolled at UW. The average for the sample was 14.2 quarters.

Years, defined as the number of calendar years from matriculation to graduation. This variable used only whole numbers as follows: 4 or less [4], more than 4 to 5 [5], more than 5 to 6 [6], more than 6 to 7 [7], and more than 7 [8]. The average for the sample was 4.8 years.

Total Credits and Credits Per Quarter. We already know that many students take more than 4 years to graduate. Before looking specifically at variables relating to majors, two graphs will be presented related to two obvious but somewhat competing reasons for the length of time students take to graduate: 1) it depends on the total credits taken or 2) it depends on the number of credits taken per quarter¹⁰. In the 1987 study reported earlier¹¹, there was evidence for both explanations. In Figure 10, below, the *average total credits* is plotted for students who were enrolled for each number of quarters from 11 to 20 or more. The number above each square represents the size of each group.

If only the number of credits per quarter mattered, the line in Figure 10 would be flat; that is, the total number of credits would not vary regardless of the number of quarters enrolled. One can note that the total number of credits does stay fairly constant from 11 to 14 quarters of enrollment. After 14, however, it increases rather rapidly and regularly, from an average of about 190 credits for the students who enrolled for 14 quarters to an average of over 230 for the students who had enrolled for over 19 quarters. These data alone suggest that the difference between students who take 11, 12, 13, or 14 quarters

⁹ The correlation between years and quarters was .60, between years and credits was .41, and between quarters and credits was .63.

¹⁰ For example, more time is needed if one takes considerably more than 180 credits and more time is needed if one enrolls in fewer than 15 credits per quarter.

¹¹ Gillmore, G. M. and Lowell, N. From University Freshman to Graduate: Factors Relating to Degree Completion and Elapsed Time. **EAC Reports**, 87-1, 1987.

Graduation Rates

to finish is largely in the number of credits they take per quarter, but that the total number of credit hours taken is a much larger contributor to the differences among students at the higher number of quarters.

Figure 10

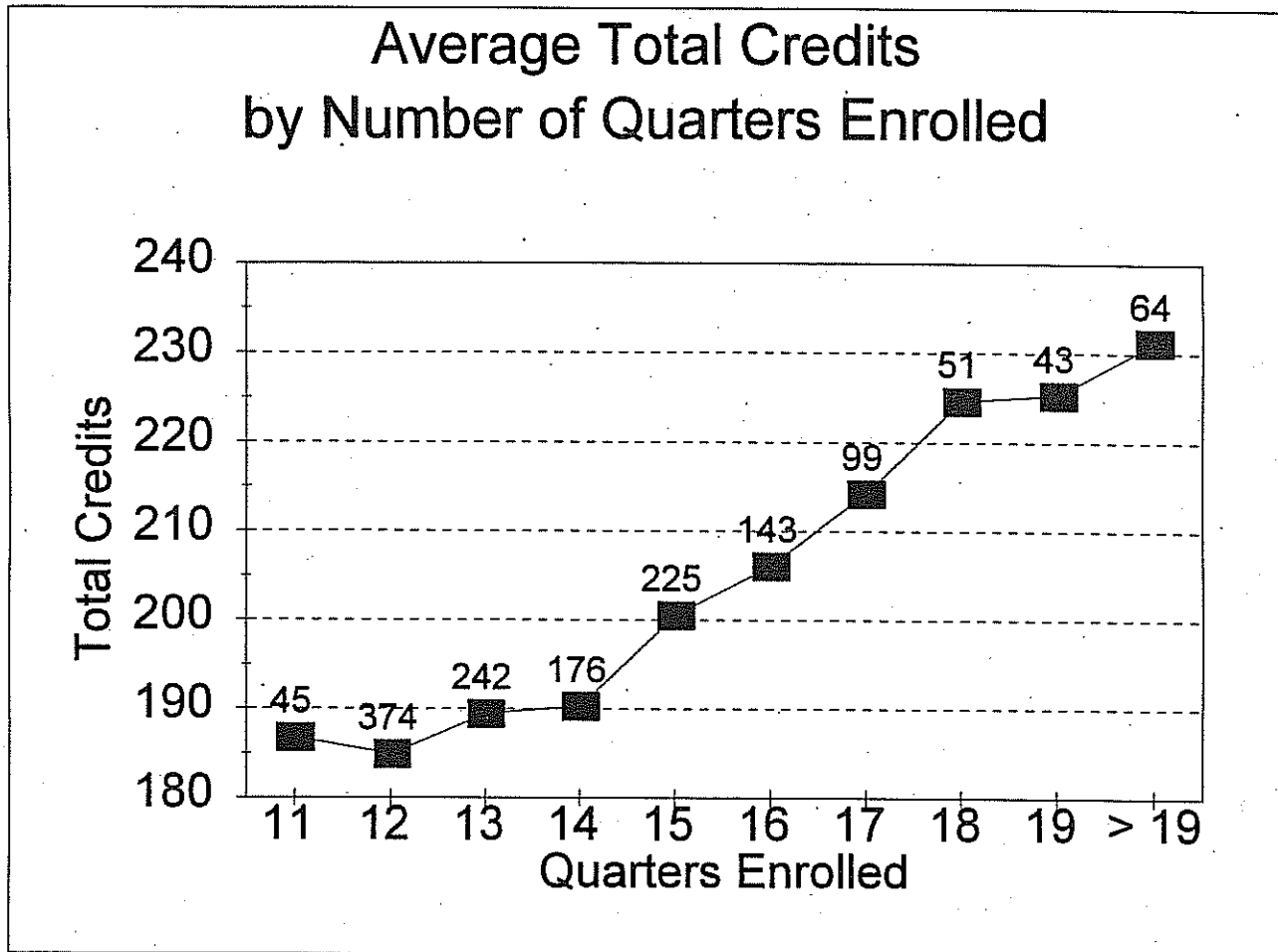
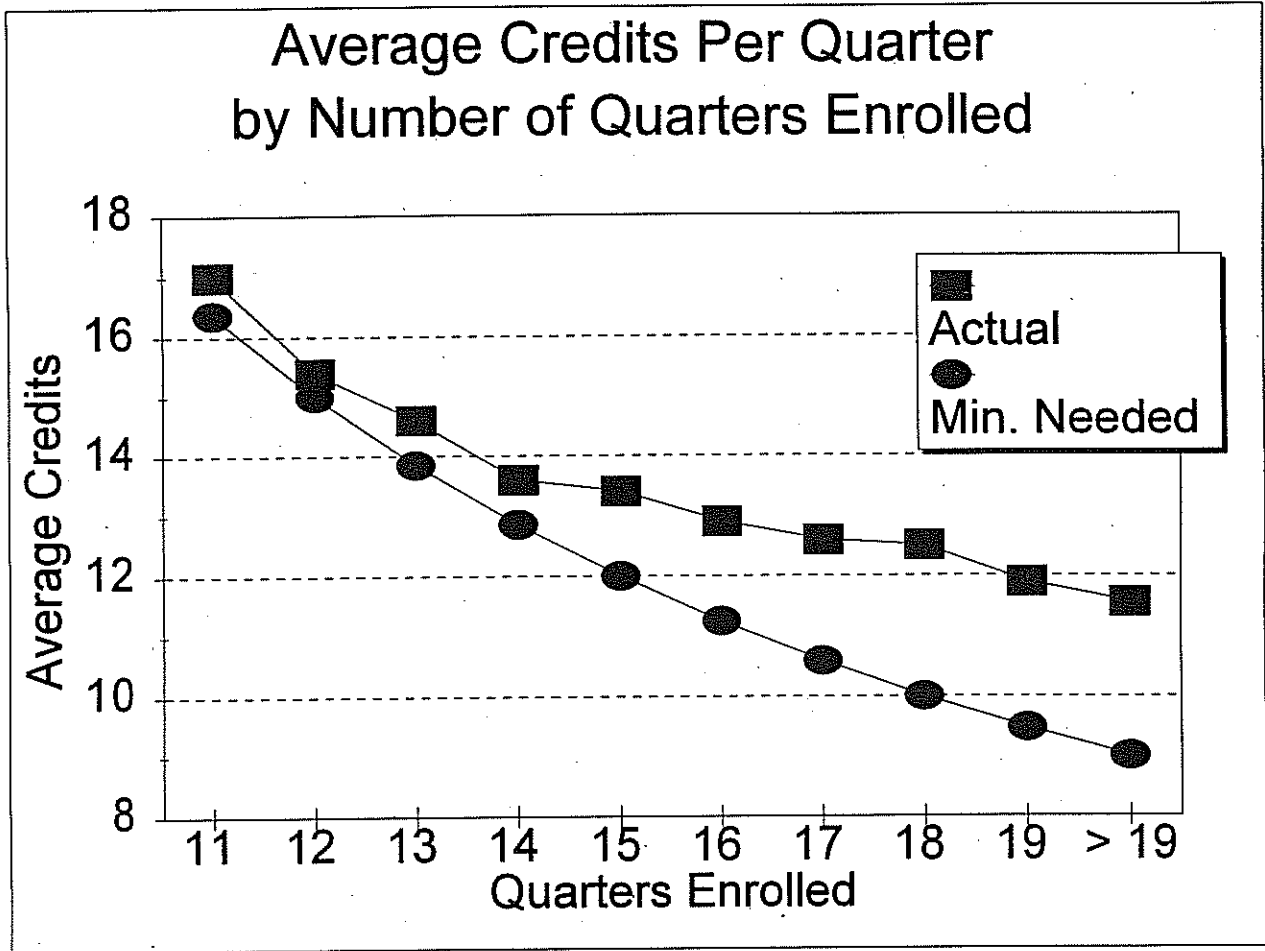


Figure 11 presents the *average number of credits per quarter* for students grouped as in Figure 10. Since average credits per quarter is the ratio of average total credits to number of quarters enrolled, Figure 11 is complimentary to Figure 10 and presents a different look at substantially the same data. In Figure 11, a line representing the average necessary to achieve 180 credits, the minimum needed for graduation, is added. Again we can see that the two lines are fairly close together up to 14 credits per quarter, at which time they begin to diverge. The line for actual credits continues downward, but not nearly as rapidly as the line for minimum needed. Thus, one can say, as above, that the difference between 11 quarters of enrollment and 14 quarters is largely in the number of credits taken per quarter. After 14 quarters, the average number of credits continues to drop (about two credits per quarter from 14 to 20 or more), but the number of total credits also rises (about six total credits per quarter from 14 quarters to 20 or more quarters).

Figure 11



Number of Majors. Students in the sample had from one to five different majors, excluding premajors. Table 4 presents averages on the three variables related to the length of time to obtain a degree for students with each number of majors.

Table 4
Average Credits, Quarters Enrolled and Number of Years
by Number of Majors, Excluding Premajors

Number of Non-PreMajor	N	%	Degree Credits	Quarters Enrolled	Years
1	1191	78.0	194.3	13.9	4.6
2	271	17.7	206.4	14.9	5.1
3	49	3.2	221.3	16.2	5.6
4	12	0.8	231.9	17.4	6.6
5	4	0.3	217.5	18.0	7.5
Total	1527	100	197.7	14.16	4.8

Graduation Rates

As one can see from Table 4, 78% of the students graduated with only one major. Another 17.7% graduated having had two majors, thus changing majors once. The remaining 4.3% changed majors more than once. It would appear that changing majors, once one has been chosen, is not as widespread as might have been imagined. In the graphs to follow, the relationship between number of major changes and variables related to time to degree are explored.

One can see a steady increase in the number of total credits with increasing numbers of major changes in Figure 12. These differences are statistically significant. The only exception is the average for those students with five majors; however, the latter group is very small – only four students. Otherwise, it appears that *each major change requires from 10 to 15 additional hours, on average.* (The number in each group is placed above the corresponding bar for this and the two subsequent graphs because the group sizes are so discrepant.)

Figure 12

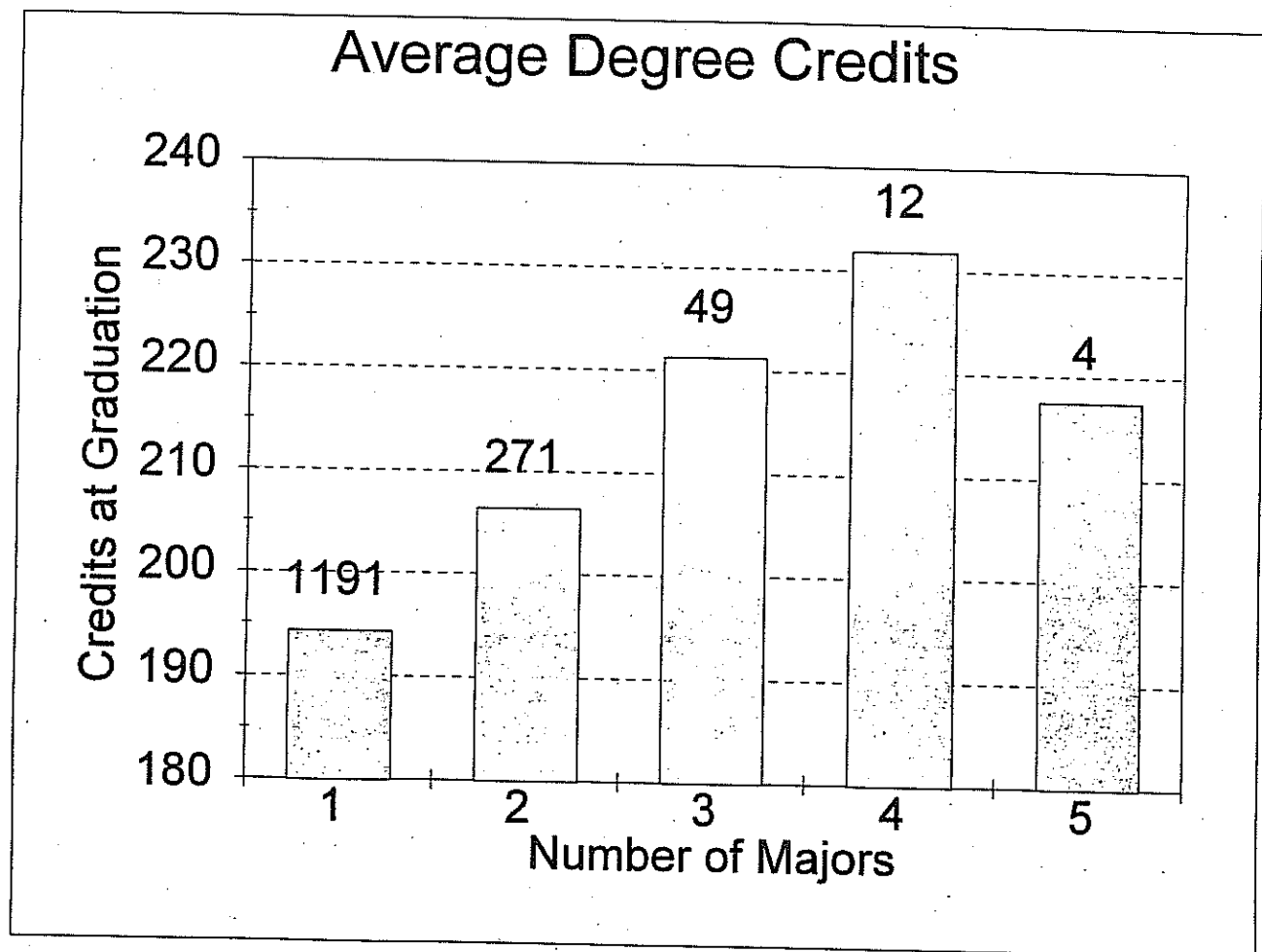
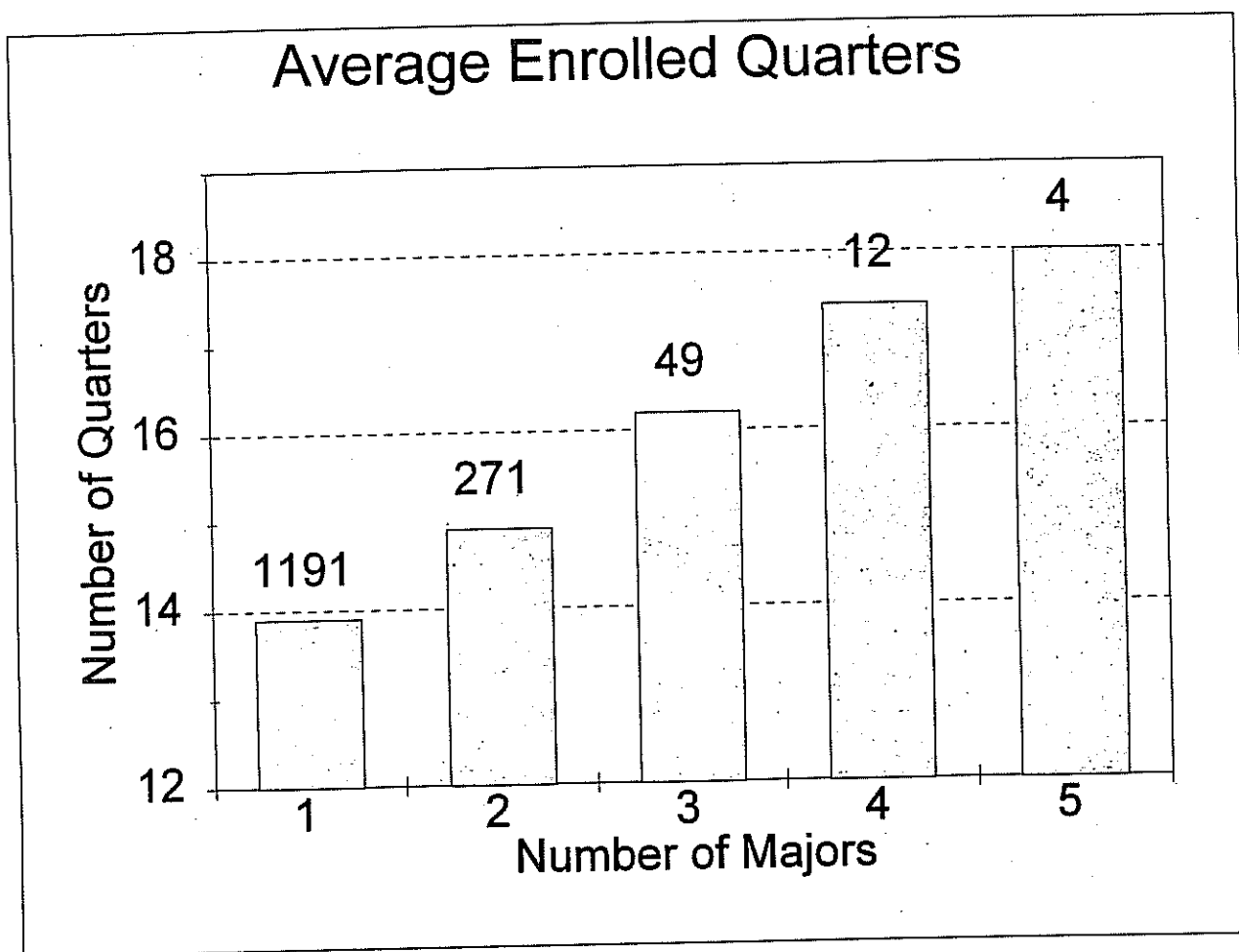


Figure 13 presents the averages for quarters enrolled. Over all students, the average is 14.2 quarters, more than two quarters above what is considered to be "the norm". As found with average total credits, the number of quarters enrolled steadily and significantly climbs with major changes. It appears that *each major change adds about one enrolled quarter to the students' schedule, on average*. However, major changes alone does not explain the greater quarters of enrollment – students with only one major average 13.9 quarters, 1.9 more than the 12 that is considered "normal."

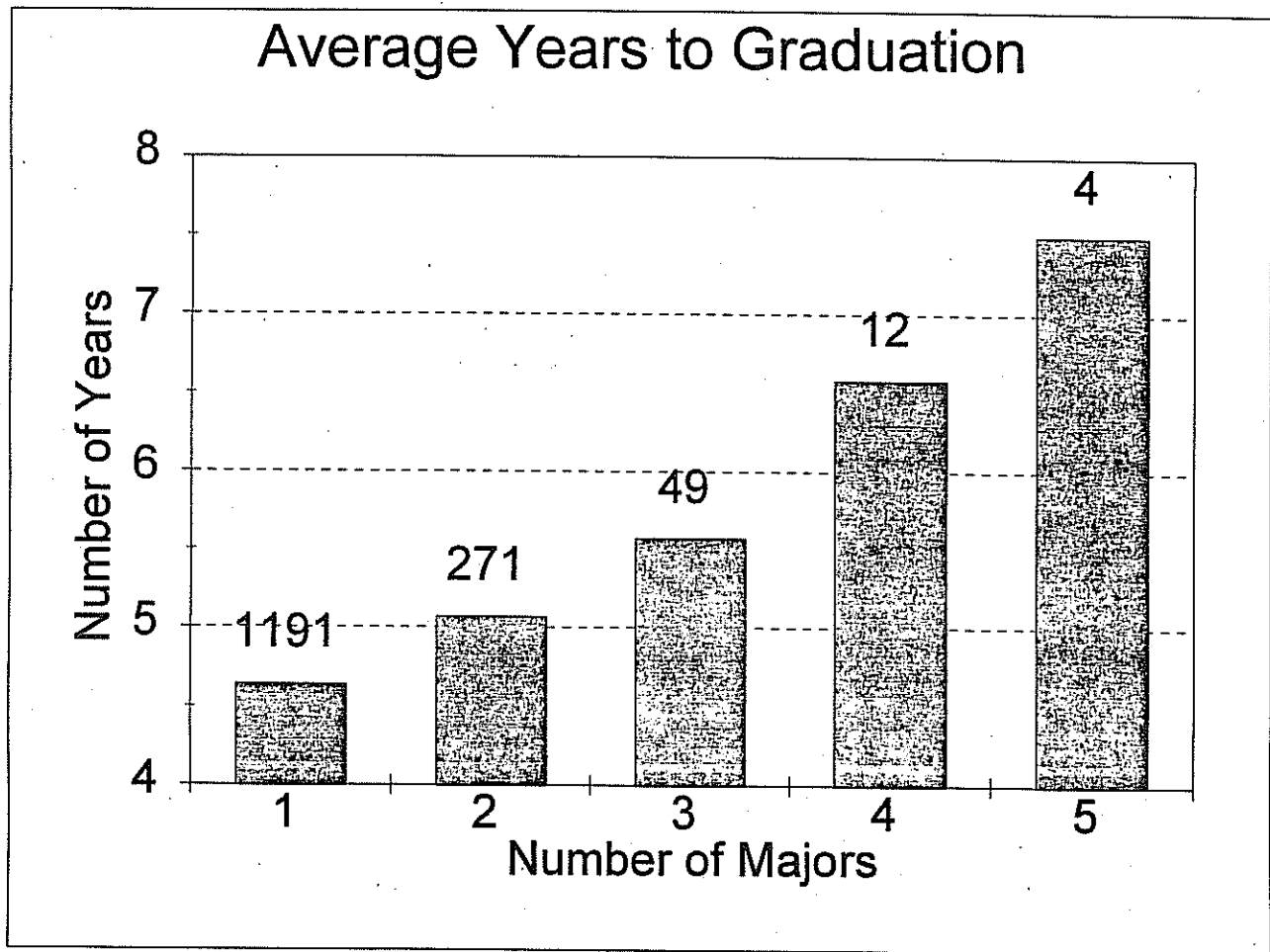
Figure 13



Graduation Rates

Figure 14 presents the average number of years to graduation by number of majors. Number of years contrasts with number of quarters in that the former refers to elapsed calendar time, from admissions to graduation. Students who did not change majors averaged an additional one-half year over the four year standard. The average number of years further increased with each additional major change. *Going from one to two or two to three majors appears to add about one-half of a year. Going for three to four and four to five may add an entire year, although the numbers are too small to generalize.*

Figure 14



Graduation Rates

Area of Major. Majors were classified into a number of areas. Several Arts and Sciences departments had enough students in the sample obtaining degrees to be considered by themselves: English, Political Science, Psychology, Communications, and Economics. The remaining Arts and Sciences areas were classified into science, social science, arts, and other Arts and Sciences. The other category contained departments that were difficult to categorize, such as General Studies and American Ethnic Studies. The professional school majors were classified into Business, Engineering, Architecture, and Other Professional.

Table 5 presents average credits, quarters, and years for each of these department-level areas, as well as averages by professional school and Arts and Sciences graduates. The 81 students who appeared to be double majors were excluded from this and the following tables. The data are presented for all students and for those students who had only one major. The latter is presented because we know from data presented earlier that students with greater numbers of majors take longer to graduate with more credits. This second analysis removes the effects of having graduates who changed majors before entering a particular field.

Table 5

Averages by Area of Degree (Double Majors Excluded)

	All Students				One Major Students			
	N	Degree Credits	Quarters Enrolled	Years	N	Degree Credits	Quarters Enrolled	Years
Arts & Sciences	919	194.3	13.8	4.7	753	192.0	13.7	4.6
Arts	70	211.2	15.3	5.3	58	211.1	15.4	5.3
Science	180	200.4	14.4	4.7	136	196.1	14.0	4.6
English	98	190.2	13.3	4.7	84	188.5	13.2	4.5
Other Humanities	94	194.2	13.7	4.8	77	193.3	13.6	4.8
Political Science	76	186.4	13.2	4.7	68	186.3	13.2	4.6
Psychology	116	192.2	13.8	4.7	93	190.7	13.6	4.6
Communications	68	188.6	13.2	4.3	63	188.6	13.1	4.3
Economics	84	187.5	13.6	4.6	74	183.5	13.3	4.5
Other Soc Sci	89	190.0	13.4	4.6	70	188.8	13.4	4.5
Other A&S	44	200.3	14.5	5.2	30	195.5	14.4	4.9
Professional	556	202.6	14.6	4.9	438	198.2	14.2	4.6
Business	188	188.7	13.4	4.5	153	187.4	13.1	4.3
Engineering	181	205.8	14.9	4.7	157	203.1	14.8	4.6
Architecture	57	212.4	15.5	5.3	42	205.5	15.0	5.1
Other Prof.	130	214.0	15.4	5.5	86	205.3	14.7	5.0
Total	1475	197.4	14.1	4.8	1191	194.3	13.9	4.6

Graduation Rates

One can observe definite differences among areas for both sets of data, though the differences for "one-major-only" students tend to be moderated. As a group, the professional school students took longer and graduate with more credits than the Arts and Sciences students, with the exception of years for one-major-only students. However, the Business School averages were lower than the other professional schools and comparable to the lowest among the Arts and Sciences majors. The other three professional school areas were considerably higher than the Arts and Sciences average, with students taking about fifteen quarters, 5 years, and 30 credits over the graduation minimum, on average, for all students and somewhat less for one-major-only students.

Within Arts and Sciences, Arts majors took the longest time (over five years, on average) and the most credits, followed by Science and Other. Generally students in the social sciences took the least time and credits.

Number of Majors by Area. We know from discussion above that the number of majors held by a student affects total credits and time. In Table 6, the number and percentage of majors in each department by number of different majors is given. The percentages of students with only one major varied from 91.3% in Communications to 49.7% in Other Professional. Generally, the professional schools contained fewer students with only one major (72.9% vs. 81.3% for Arts and Sciences). Within Arts and Sciences, Other, Science, Other Social Science, and Psychology had the smallest percentage of single major students.

Table 6

Number of Majors, Excluding Premajors, by Area of Final Major

	Frequencies						Percentages					
	Number of Majors						Number of Majors					
	1	2	3	4	5	Total	1	2	3	4	5	
Arts & Sciences	753	147	17	7	2	926	81.3	15.9	1.8	0.8	0.2	
Arts	58	11	0	0	1	70	82.9	15.7	0.0	0.0	1.4	
Science	137	36	6	2	0	181	75.7	19.9	3.3	1.1	0.0	
English	84	12	2	0	0	98	85.7	12.2	2.0	0.0	0.0	
Other Humanities	78	15	1	1	0	95	82.1	15.8	1.1	1.1	0.0	
Political Science	67	7	1	1	0	76	88.2	9.2	1.3	1.3	0.0	
Psychology	92	21	3	0	0	116	79.3	18.1	2.6	0.0	0.0	
Communications	63	5	1	0	0	69	91.3	7.2	1.4	0.0	0.0	
Economics	74	9	0	2	0	85	87.1	10.6	0.0	2.4	0.0	
Other Soc.Sci	70	16	2	0	1	89	78.7	18.0	2.2	0.0	1.1	
Other A&S	30	15	1	1	0	47	63.8	31.9	2.1	2.1	0.0	
Professional	438	124	32	5	2	601	72.9	20.6	5.3	0.8	0.3	
Business	153	29	5	1	0	188	81.4	15.4	2.7	0.5	0.0	
Engineering	157	19	4	0	1	181	86.7	10.5	2.2	0.0	0.6	
Architecture	41	12	4	0	0	57	71.9	21.1	7.0	0.0	0.0	
Other Prof.	87	64	19	4	1	175	49.7	36.6	10.9	2.3	0.6	
Total	1191	271	49	12	4	1527	78.0	17.7	3.2	0.8	0.3	

Graduation Rates

Departments and Major Changes. Table 7 shows changes from the first major to the second major in 286 students who had more than one major. The numbers within each area in Table 7 may be different from those in Table 6, because the latter are based on final rather than first major.

In Table 7, the largest number of first majors were in Science (71). This value, while representing less than 5% of the entire sample, suggests that students who choose science first tend to move relatively more than students first choosing other areas. The students whose first major is in science moved mostly to other science departments (28), Engineering (10), and Other Professional Schools (9). These three in combination accounted for two-thirds of these students.

More generally, one can see a tendency for students to change to majors that are similar to the one they are in. Overall, counting English as in the Humanities area and Political Science, Psychology, Communications, and Economics as in the Social Science area, we find that about 40% of the students change to a major in a related area.

Table 7

Changes from First Major to Second Major (Double Majors Excluded)

First Major	Second Major														Total
	SS	Sci	Human	Arts	OA&S	Engl	PSci	Psych	CMU	Econ	Busi	Engr	Arch	Other P	
Arts & Sciences															
Other Soc Sci	3	1			1	1	1	1		1			1	3	14
Science	1	28	2	4	3	1	1	7		3	2	10		9	71
Other Humanities	1	1	6			1	1			3			2		15
Arts	3	3	3	4	5	4		2	3	1	1			2	31
Other A&S	1	4	1	2	4	2	2	3			1	1	1	2	24
English	6	1	2	3			2	2	1	1				4	22
Political Science		2									1				3
Psychology		2				1	1	1			1			1	7
Communications					1		2	2			1				6
Economics			2				1	2			4		1		10
Business		1			1			1		1	22		2		28
Engineering		1										10	1		12
Architecture	1	1				1	1				1		6		11
Other Prof.		5			1	1		1				3	2	19	32
Total	16	50	17	13	16	12	12	22	4	10	34	24	16	40	286

Graduation Rates

Pre-majors. We now turn our attention to the relationship of pre-major to time to degree and final major. For the following analyses, attention is restricted to three pre-majors held by the largest numbers of students: Science, Engineering, and Business. These premajors were held by the largest numbers of students¹². Fifty students in the sample declared pre-science as their major at some point, 296 declared pre-engineering, and 228 declared pre-business. Table 8 presents averages on the three measures of time to degree based on whether or not the students graduated in the area of their particular pre-major.

Table 8

Effects of Going from the Premajor to a Different Major for Arts and Sciences Science, Engineering, and Business Pre-Majors

Science Premajors	N	Credits	Quarters	Years
Non-Science Major	37	211.0	15.3	5.5
Science Major	13	190.9	14.0	4.4
Total	50	205.8	15.0	5.2

Engineering Premajors	N	Credits	Quarters	Years
Non-Engineering Major	125	204.7	15.1	5.1
Engineering Major	171	205.3	15.0	4.7
Total	296	205.0	15.0	4.9

Business Premajors	N	Credits	Quarters	Years
Non-Business Major	70	193.5	14.4	4.8
Business Major	158	187.7	13.3	4.3
Total	228	189.5	13.6	4.5

Due to the small numbers, the differences for science majors were not statistically significant. Yet, they are suggestive that the pre-science curriculum may have had a deleterious effect on the students whose ultimate major was other than science, since these students took an average of 20 more credits, and over a year longer to graduate than the students who remained in science. The differences for engineering were quite small. However, the pre-engineering majors who majored elsewhere as well as those who stayed in engineering showed high averages on all three variables. One suspects that the engineering pre-major may have had the effect of slowing progress of students who left the field. Finally, pre-business majors tended to graduate more quickly with fewer credits if they ultimately majored in business, but the averages of those who did not major in business were similar to the all-university averages.

¹²The largest single category is the general Arts and Sciences pre-major code.

Graduation Rates

What were the final majors of pre-science, pre-business, and pre-engineering students? Data bearing on this question are found in Table 9, which continues on a second page. One will note that there are multiple columns in this table, based on whether the given pre-major was the first, second, or third pre-major declared. (For science, no students chose it as their third.)

Only 26% of the science pre-majors graduated within a science area. Most of the rest went into Other Professional (22%), Engineering (14%), or Psychology (10%). The majority of students who were pre-engineering majors at some point graduated with an Engineering degree (60.3%). Of the students who entered UW as a pre-engineering major, 49% received degrees in Engineering. Those who changed tended to go to Science (10.8%), Business (6.8%), Economics (5.5%), or Architecture (4.9%). With the exception of Economics, they did not tend to go into Social Science, Humanities, or Arts. Finally, 68.4% of the pre-business majors stayed in Business. Economics was the degree major for 9.5% of the pre-business students, with the remainder spreading into other areas.

Table 9

The Final Major of Science Premajors

	First Pre-major	Second Pre-major	Total	Percent
Arts & Sciences				
Other Soc Sci	3		3	6.0
Science	12	1	13	26.0
Other Humanities	1		1	2.0
Arts	1		1	2.0
Other A&S	2		2	4.0
English	0		0	0.0
Political Science	1		1	2.0
Psychology	5		5	10.0
Communications	2		2	4.0
Economics	2		2	4.0
Business	1		1	2.0
Engineering	6	1	7	14.0
Architecture	1		1	2.0
Other Prof.	11		11	22.0
Total	48	2	50	100.0

Table 9 (Continued)

The Final Major of Engineering Premajors

	First Pre-major	Second Pre-major	Third Pre-major	Total	Percent
Arts & Sciences					
Other Soc Sci	2	1		3	0.9
Science	23	10	2	35	10.8
Other Humanities	5	1		6	1.8
Arts	3	1		4	1.2
Other A&S	3	0		3	0.9
English	2	1		3	0.9
Political Science	3	0		3	0.9
Psychology	4	0		4	1.2
Communications	3	0		3	0.9
Economics	14	3	1	18	5.5
Business	17	5		22	6.8
Engineering	94	74	28	196	60.3
Architecture	13	2	1	16	4.9
Other Prof.	7	2		9	2.8
Total	193	100	32	325	100.0

The Final Major of Business Premajors

	First Pre-major	Second Pre-major	Third Pre-major	Total	Percent
Arts & Sciences					
Other Soc Sci	1	5	1	7	3.0
Science		5	2	7	3.0
Other Humanities		2		2	0.9
Arts		0		0	0.0
Other A&S	1	5	1	7	3.0
English		4		4	1.7
Political Science	1	5	1	7	3.0
Psychology		10		10	4.3
Communications		4		4	1.7
Economics	1	19	2	22	9.5
Business	1	146	11	158	68.4
Engineering		0		0	0.0
Architecture		0		0	0.0
Other Prof.	1	1	1	3	1.3
Total	6	206	19	231	100

Graduation Rates

Double majors. Eighty-one students were found to have double majors. Table 10 presents the average number of credits, quarters enrolled and years to graduation for the students with double majors in comparison to those with a single major. Curiously, a double major resulted in more quarters and more credits, but not more years. This result suggests that students declaring double majors tend to attend summer school.

Table 10

Average Credits, Quarters, and Years to Graduation by Double Major or Not

	N	Quarters	Credits	Years
No	1446	14.08	196.9	4.8
Yes	81	15.64	211.5	4.8
Total	1527	14.16	197.7	4.8

Declaration of Last Major. Another variable that may affect graduation times is the length of time it takes a student to declare his/her final major. Presumably, the longer it takes, the more likely it is that students would have taken courses that do not count toward graduation. To examine this issue, the length of time to final major declaration was coded in two ways: by the year in which the final major was declared (one through five or more) and by the number of enrolled quarter which were completed at the time of declaration (zero through eleven or more).¹³ In Table 7, the averages for years, quarters, and total credits are presented for groupings based on the year of last major declaration. One can see from this table that the modal year of last major declaration was the second. Yet, almost half of the graduates declared their final major in the third year or beyond.

Table 11

Average Number of Years to Graduation by Year of Last Major Declaration

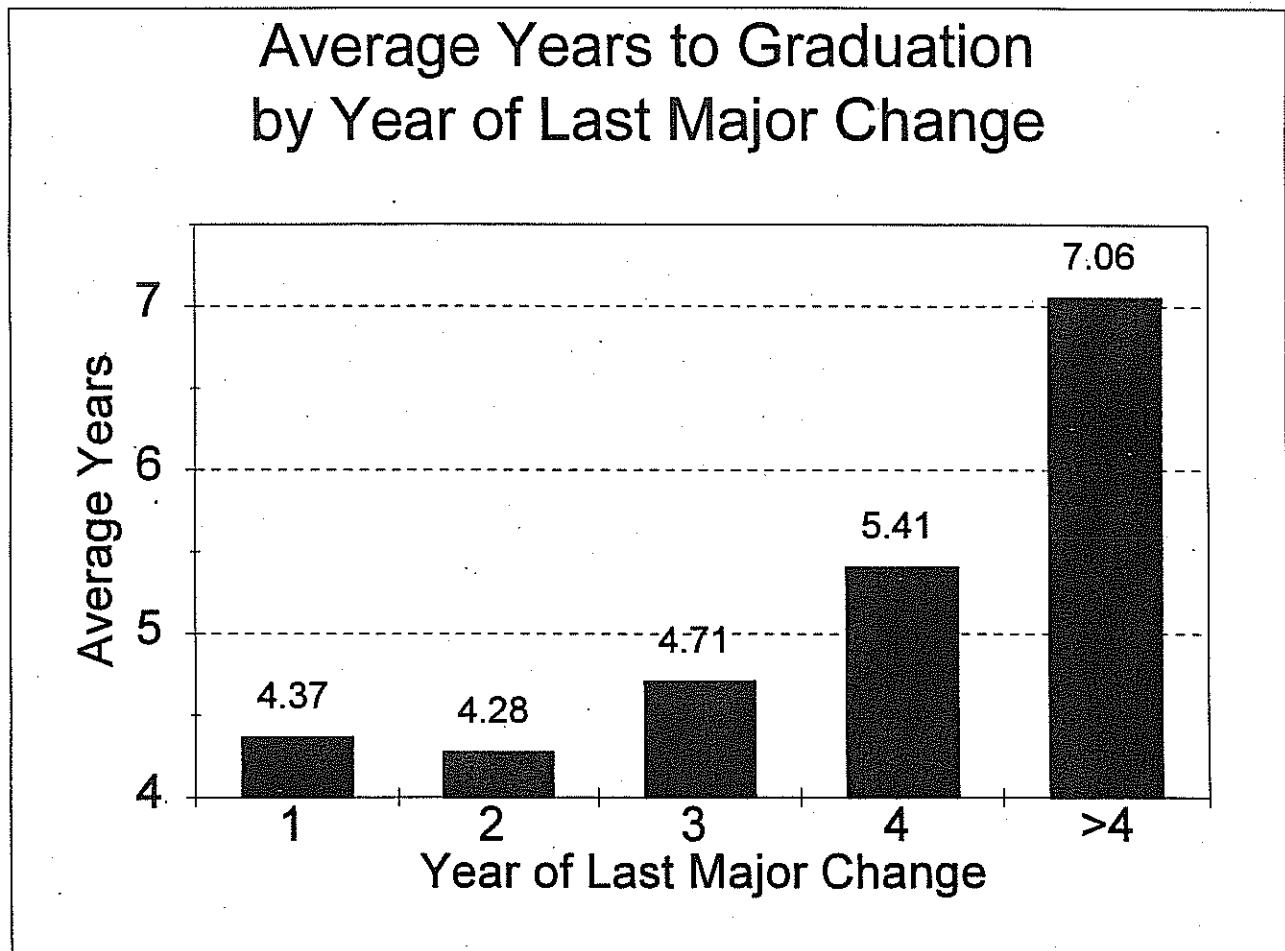
Year of Last Major Declaration	Number	Years to Graduation	Total Credits	Quarters
1	138	4.37	197.1	13.2
2	638	4.28	193.4	13.5
3	471	4.71	196.7	14.4
4	147	5.41	206.0	16.0
5 or more	132	7.06	213.6	15.7
Total	1526	4.77	197.7	14.2

¹³ For a student to declare his/her final major in the 0th quarter simply means that he/her first enrolled as freshmen in that major and did not leave it.

Graduation Rates

Differences among averages of the three time-related variables across categories of years to last major declaration were statistically significant. Figure 15 presents the average years to graduation by year of last major declaration. One can see from the graph that while the number of years to graduation differed significantly by years to declaration of final major, it appears to have mattered little whether the student declared his/her major during the first or second year. Then, the number of years climbed sharply for those declaring their final major in the third year or later. Especially noteworthy was the finding that the 132 students who declared their final major after more than four years averaged over seven years to finish.

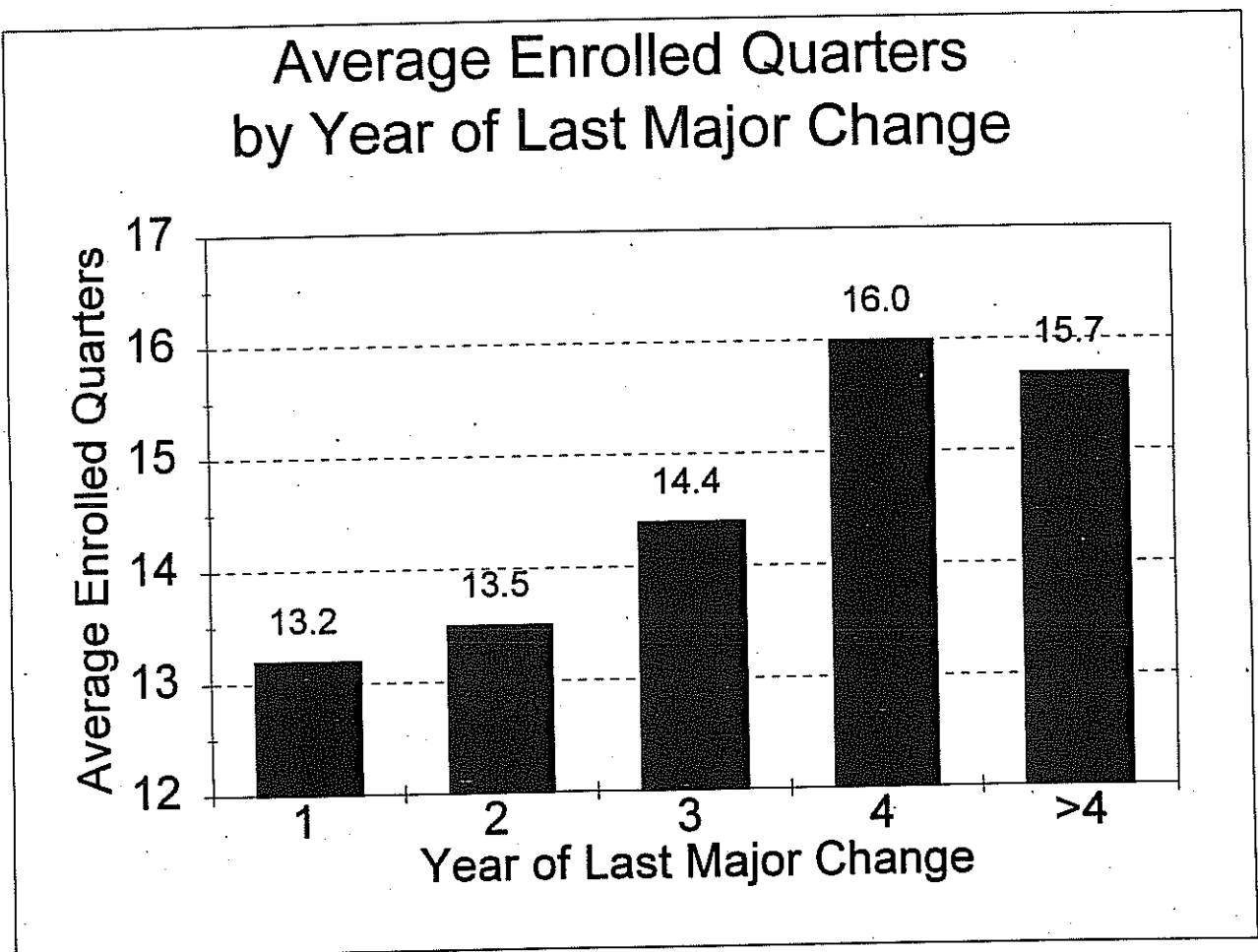
Figure 15



Graduation Rates

In Figure 16, the average number of enrolled quarters is plotted by year of last major change. Here again we see significant differences between one or two years and three or more years. However, it appears that students who declared their last major after more than four years may have tended to take more quarters off, since their average number of quarters is actually smaller than that of the students who declared their last major during the fourth year.

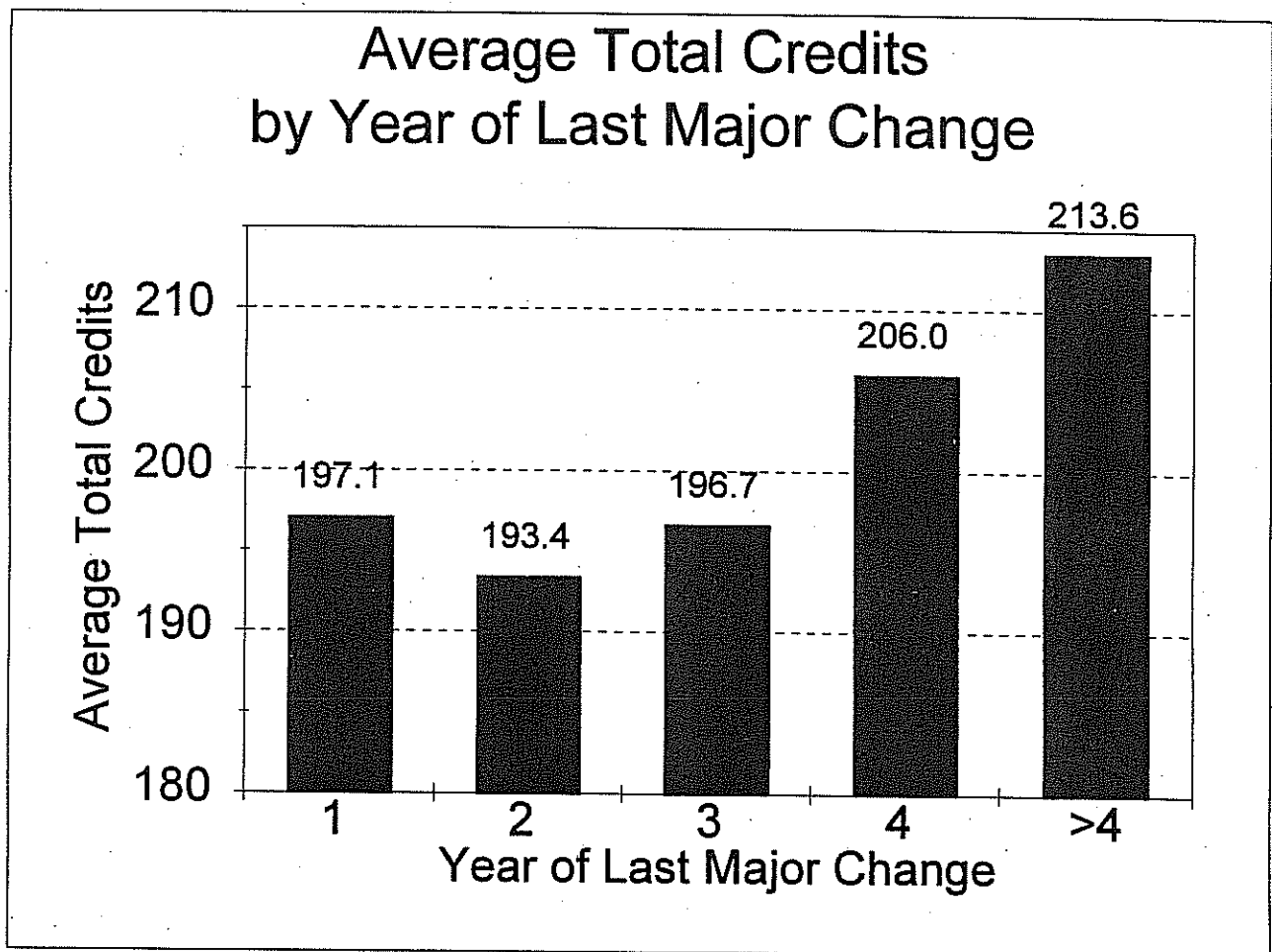
Figure 16



Graduation Rates

In Figure 17, the average total number of credits are plotted by year of last major change. Again we see that the year of last major change seems to have affected the number of credits if the major was changed after the second year. The reason for the drop between the first and the second year is probably due to the nature of majors that students can enter early. This difference will be discussed subsequently in regard to quarter of last major declaration.

Figure 17



Graduation Rates

The second means by which the time of the last major declaration was codified was in terms of the number of enrolled quarters the students had completed. Thus, if a student declared his/her last major during the eighth quarter of enrollment, for example, that decision was coded a seven. In Table 12, the number of students within each category is presented, along with the corresponding mean for the three measures of length of time to graduation.

Table 12

Average Number of Enrolled Quarters to Graduation by Number of Enrolled Quarters to Last Major Declaration

Quarters to Last Major Declaration	Number	Years to Graduation	Total Credits	Quarters
0	44	4.75	200.6	13.7
1	21	4.62	201.5	13.0
2	29	4.68	196.1	12.0
3	50	4.32	190.8	11.9
4	86	4.45	195.7	12.9
5	181	4.37	193.3	13.2
6	303	4.37	192.8	13.3
7	214	4.50	192.6	13.8
8	181	4.80	194.0	14.2
9	142	5.06	201.1	15.0
10	86	5.16	201.8	15.7
11 or more	189	5.96	216.5	17.2
Total	1526	4.77	197.7	14.2

The modal time for declaration was after having completed six quarters. However, it was not until the seventh quarter was completed that over half the students had declared their final majors, and over 12% of the graduates had not declared their final major by the end of their eleventh quarter. To put this latter result in perspective, the twelfth quarter should be the students' last quarter before graduation under the common assumption of normal progress (i. e., a degree in four years without attending summer school).

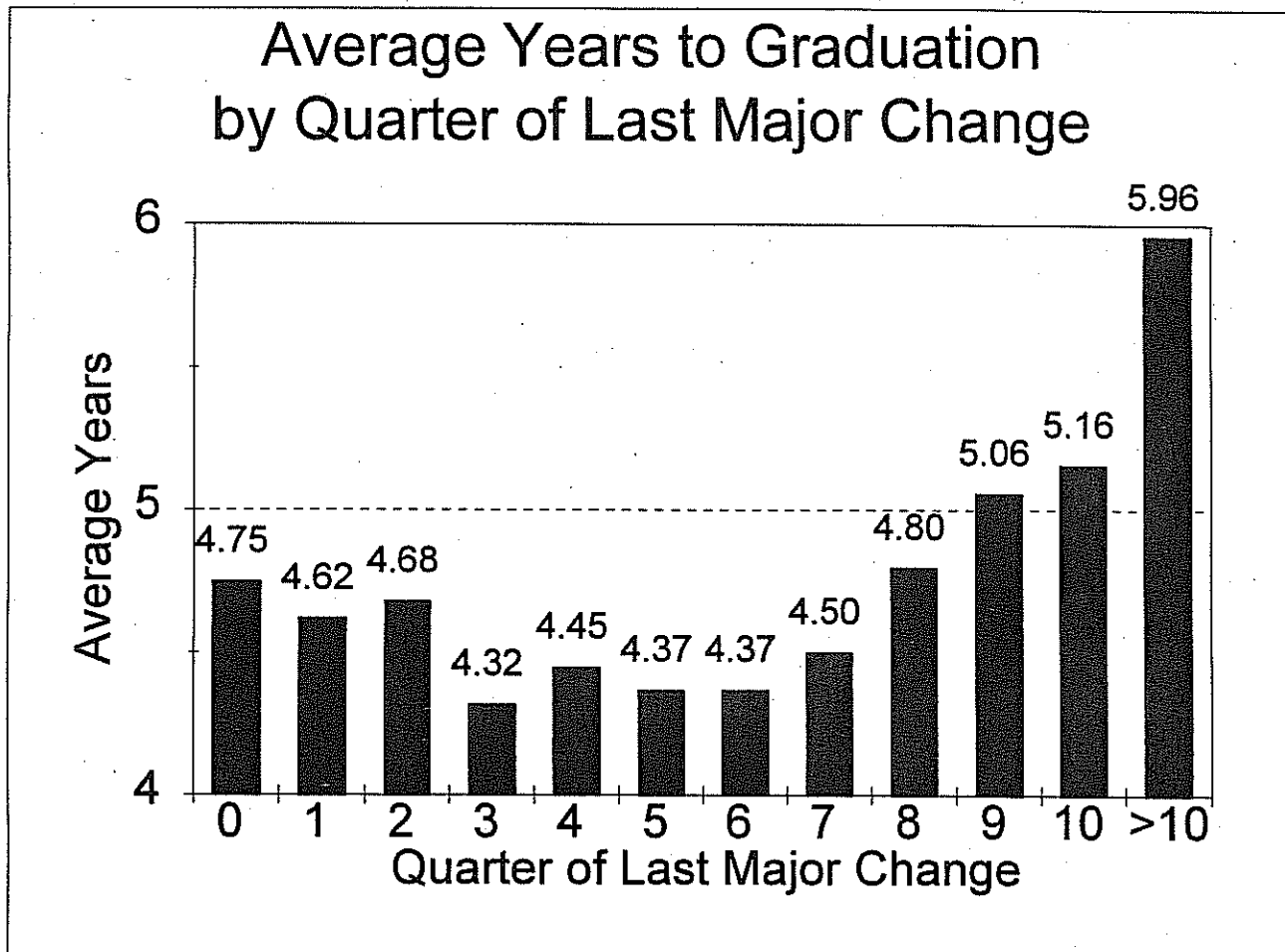
Differences among averages of the three time-related variables across categories of quarters to last major declaration were statistically significant. These means are presented graphically below.

Graduation Rates

Figure 18 presents average years to degree by number of quarters until last major declaration. The "U" shaped curve is somewhat surprising. The optimal time for major declaration for earliest graduation appears to be from the third quarter through the seventh quarter. Students who declared their final major before the end of their first year took longer, as did students who declared after the seventh quarter. However, after the seventh quarter, the years to a degree increased rapidly with increases in quarter of final major declaration.

In examining the majors of those who declared early, sixteen were in Art, a result that would explain the higher average number of years, since Art majors do tend to take longer. However, 20 were in English. English majors as a group do not take longer. The remaining majors were somewhat scattered. Thus, at this point there does not seem to be an obvious explanation for the longer time of students who made up their mind early and stuck to their decision. This result requires further research.

Figure 18



Summary of Findings

The purpose of this study was to isolate factors that influence whether undergraduate UW students obtain degrees and how long it takes them to do so. The study was based on two data sets, both taken from the official UW student data base. The freshman data set contained data on students who entered UW as freshmen in the fall of 1987, regardless of whether they graduated. The graduate data set contained data on students who entered as freshmen and who graduated in the spring of 1993, regardless of when they entered the University.

Over all, 64.4% of the students in the freshman data set graduated in the six years between entry and summer quarter 1993, and 6.5% were still enrolled fall quarter 1993. A major factor influencing graduation rate was admission status. The 2856 students who were admitted under regular standards graduated at a 69.2% rate; the 442 students who were admitted under special criteria graduated at a 33.7% rate.

Students who graduated had an average UW GPA that was considerably higher than those who did not (3.20 vs. 2.53), although the average GPA of the latter was comfortably above that required to continue. The relationship of graduation and persistence with high school GPA and SAT scores was neither strong nor consistent. Considering regularly admitted students, only .09 of a high school grade point, 9 points on the SAT Verbal and 9 points on the SAT Math differentiated those who graduated from those who did not. (Both SAT tests have standard deviations of about 100.) Out-of-state students who graduated tended to do so more quickly; those who did not graduate tended to leave during the second year.

Differences in graduation and persistence rates were found among ethnic groups, but these are not nearly as large as the differences between regularly and specially admitted students. Over 50% of the regularly admitted students from each of the five major ethnic categories graduated. On the other hand, over 40% of specially admitted students from each ethnic group except Asian Americans left with fewer than 90 credits.

Turning to the graduate data set, students graduated with an average of 197.7 degree credits, considerably above the minimum of 180. They were enrolled for an average of 14.2 quarters. The percentage of students who graduated in four calendar years or fewer was 51.5. Another 31.3% graduated in the fifth year and 10.8% took more than five years. Students who took from eleven to 14 enrolled quarters to graduate were differentiated mainly by the number of credits taken per quarter (e.g., students taking 14 quarters enrolled in fewer credits per quarter than those taking 12 quarters, but graduated with about the same number of credits). Students taking greater numbers of quarters tended to take lower numbers of credits per quarter, but they also tended to graduate with substantially greater numbers of credits.

Graduation Rates

Seventy-eight percent of the graduates declared only one major (excluding pre-majors). For those who changed majors, each major change added an average of about 12 credits to the total at graduation, one enrolled quarter, and about one-half year in elapsed time. However, it would be a mistake to think that only students who change majors take above the minimum time and credits. Students who declared only one major graduated with an average of 194.3 degree credits, and they were enrolled for an average of 13.9 quarters and 4.6 years.

Comparing areas of study, students who received degrees from the professional schools were somewhat more likely to have changed majors, especially in schools other than Engineering, Architecture and Business. Generally, professional school students graduated with more credits, more quarters enrolled, and more years than Arts and Sciences students. School of Business students were an exception. These differences reduced slightly when attention was restricted to students who had not changed majors.

In viewing only those 286 students who changed majors, a disproportionate number (25%) declared their first major in an Arts and Sciences Science department. (In contrast, 12% of the degrees granted students in the sample were from science departments). Two-thirds of these beginning science students went to another science department, engineering or another professional school. Generally, students moving from their first major to their second stayed in similar areas.

We looked at the effects of pre-major choice, concentrating on students who chose pre-science, pre-engineering, or pre-business. Pre-science students who graduated in a non-science area took, on average, an additional 20 credits over those who stayed in the sciences. There was no difference for the pre-engineering majors, although the pre-engineering major may have added hours to those who went elsewhere because engineering averages are quite high. The difference for the pre-business majors was only about six credit hours, but a full quarter of enrollment and a half year of time. Only 26% of the pre-science majors received degrees in a science area. This contrasts with 60% of the pre-engineering majors getting degrees in engineering and 68% of the pre-business majors getting degrees in business.

Finally, the optimal time to declare one's final major in terms of time to degree appeared to be during the second year of enrollment. A declaration in the fourth year or after was associated with a fairly large increase in the average total years to graduation. In terms of quarters to degree, the optimal quarter in which to declare one's final major was after completing the third quarter. However, in terms of average total credits or years to graduation, it seemed critical to have declared a final major before the eighth or ninth quarter. The finding that students who declared their final majors particularly late also tended to have long graduation times is somewhat artifactual -- a student had to remain in the university for a long time in order to change majors late. However, the relationship seems stronger than this artifact alone. It appears that for some students changing majors late may have contributed to lengthening what was already a lengthy undergraduate career.

Implications

In the conclusion to her perceptive report on graduation rates at UW, Friedman offered an interesting perspective on graduation rates as an outcome measure.

Graduation rates are important outcome measures, but they subsume a complex and lengthy list of experiences, both academic and non-academic. In trying to improve graduation rates, institutions encounter genuine dilemmas of what to do in the face of values at odds with one another. The University wants to take in more diverse students, but the pressures first-generation or educationally underprepared students face may lead to a longer time to graduation. The University wants its students to experiment and to change as a result of what they learn, yet the structure of majors punishes them for being susceptible to their educational experiences. The University wants its graduates to be skillful and competitive in professional and technical positions, yet those fields demand a longer program of study as their knowledge bases expand. The University values students who try to educate themselves while faced with family responsibilities and financial challenges, but they tend to take longer and consume more of the University's resources. Embodied in these ambitions are principles vital to the citizenry and dear to the institution. To address the problem of graduation rates is not merely a matter of solving problems of the moment but the reexamining – and carefully treading among – the multitude of purposes of the University in its aim to provide excellence in education.¹⁴

Carefully treading among the findings above, we must keep in mind that the research was entirely based on student records – data that readily allow aggregation and mask individual variation, statistics that all too easily push one toward wrongly attributing cause to mere relationships, numbers that are sterile when compared to the richness of each student's story. An example from earlier research illustrates the dangers. Huge differences in graduation-related variables were found when students who had lived in dorms and fraternities/sororities throughout their undergraduate career were compared to students who had lived only at home or with relatives.¹⁵ Three cautions can be illustrated by this example.

1. It would be a mistake to conclude that living at home **causes** lower graduation rates, longer time to degree, and generally poorer academic performance. Rather, there are deeper levels one must go to understand the relationship – financial wherewithal, motivation for graduating, advising networks, commuting time, etc.
2. It would be a mistake to conclude that by giving exclusive attention to student records, we can cancel out or otherwise ignore factors that are not part of these records. For example, the relationship between major changes and graduation times seems quite straightforward, yet, could it be that some students find they must

¹⁴ Friedman, D. *Getting a Degree: Barriers to Student Progress and Graduation at the University of Washington*, October, 1993, p. 15.

¹⁵ Gillmore, G. M. *The Winter, 1992, Survey of University of Washington Seniors, Office of Educational Assessment Reports*, 92-2, 1992, pp 36-73.

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change majors to accommodate a schedule required by their tenuous financial situation or by the care of a chronically ill parent?

3. Following Friedman's point above, it would be a mistake to recruit only students who have the financial ability and desire to live on campus while attending UW, although increasing the mix of students in this way would be likely to improve graduation rates and times. Rather, we need to find ways to help the students who have to or want to live at home to succeed.

Having said these things, let us now turn to some possible policy implications of the research itself. Generally, as indicated by the freshman data set, the graduation rates of freshmen are impressive given that UW is a large, public, research institution in an urban setting. If one restricts attention to regularly admitted students, it appears assured that over 70% of the entrants will eventually graduate. While there is certainly room for improvement, the failure of entering ability measures to predict retention and graduation time suggests that increasing the standards apropos these variables, were that to be possible, would be unlikely to have a significant effect.

While few of the regularly admitted students who left without graduating actually "flunked out," as a group those who left showed a significantly poorer UW GPA than those who graduated. This finding suggests that academic assistance may be beneficial. Otherwise, this study provides no evidence for particular reasons driving the decision to leave without a degree. Further research is clearly needed, and a survey of students who dropped out is currently under planning.

The story is different for specially admitted students whose graduation rate was below 50%. The finding that admission status was an important variable in predicting graduation is hardly news, but merely reaffirms a problem that has plagued efforts to increase access to the university. UW has a strong and long-lasting commitment to enrolling significant numbers of educationally and economically disadvantaged students, and efforts to improve the success of specially admitted students have been accompanied by improvement in the graduation rates. It would be an unfortunate by-product of legislative intent to squash this program in the name of improved graduation rates. Rather, we must continue and redouble our efforts to give these students the additional academic, financial, social, and psychological help to level the playing field and promote their success.

Beyond the low graduation rates of specially admitted students, it may be that time to degree is an issue that demands more attention than graduation rates per se. Of the students who graduated, only about half did so in four calendar years. Over two-thirds of those graduating were enrolled at UW for more than 12 quarters. Finding ways to get more students to complete 15 or more credits per quarter would appear to speed up the time it takes to graduate and improve the number of students who graduate in four years. It appears that many of the students who now enroll for 13 or 14 quarters might be able to reduce it to 12 quarters. Clearly, there are a multiplicity of factors responsible for why students complete fewer credits than 15 credits; e. g., working, illness, dropping courses, and filled courses, some of which are largely immune to university interventions. However, the University might do well to attend to those academic, procedural, and psychological factors over which it can have some control.

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In the two places where attention is needed, interventions to reduce total credits may have a larger impact than interventions to increase credits per quarter. From this perspective, the data point to some things that can be said about majors and major changes. We already know that there are differences in the empirical (as opposed to the catalogue) number of credits that seem to be necessary to graduate across majors. For example, with the exception of the School of Business, professional school students tend to graduate with more hours than Arts and Sciences students.¹⁵ However, across all majors the data show that each major change is likely to add more time to graduate. In this regard, it would be best if students would stick to their first major, and a surprising number do. Furthermore, there seems to be no advantage in forcing students to choose their major early since declarations of a final major near or at the end of two years as opposed to earlier seems to have no deleterious effect on time to degree.

These results suggest that UW should provide an opportunity for students who are unsure of their eventual major to enjoy a broad sampling of disciplines over their first two years in order to make a wise choice of major. However, having then chosen a major at the end of two years, they need to be in a position to complete its requirements in the remaining two years.

This strategy may work less well in areas that have a number of necessary prerequisites which need to be fulfilled prior to entry into the major. Science and Engineering come to mind as two such areas and there is some evidence that beginning in these pre-majors and then majoring elsewhere tends to lengthen time. Better counseling and more relevant early experiences in these fields may be needed for students to make quicker decisions about their interest and competence.

In the meantime, some students will change majors, and we must leave room for that. Understandably, early changes will not have as much impact as late changes. There may be a time at which students should not be allowed to change a major without going through a readmission process or other special approval.

At this point, one can predict that about two-thirds of the students admitted to UW as Freshman will obtain a degree here, and of those who do, about half will take more than four years to complete it. The choice to go elsewhere or not continue in college may be wise for some of those not graduating. Not finishing in four years may be inevitable for some who do graduate. As Friedman pointed out all of these cases are not failures on the part of the institution.¹⁶ Yet, sufficient numbers in both classes remain to attempt interventions and assess their impact. This study has pointed to a few such interventions and to a need for more research to better understand factors which influence student progress and success.

¹⁵ Gillmore, G. M. The Number of Graduation Credits Obtained by 1989-90 University of Washington Baccalaureate Degree Recipients, **Office of Educational Assessment Reports, 90-6, 1990.**

¹⁶ Friedman, D. Getting a Degree: Barriers to Student Progress and Graduation at the University of Washington, October, 1993, Footnote 2, p. 2.