Using Graduation Rates to Develop Recruitment Strategies at Purdue University

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and Betty M. Suddarth

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American Association of Collegiate Registrars and Admissions Officers

Compiled by
Michael G. Dolence

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CHAPTER 5

Using Graduation Rates to Develop Recruitment Strategies at Purdue University

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INTRODUCTION

Effective strategic enrollment management goes beyond recruiting and the student's first year of enrollment. For most four-year institutions, first-year students account for less than 25 percent of total headcount. Documenting student advancement from the first of enrollment through degree completion is the key to total strategic planning. By understanding student flow dynamics, enrollment managers can forecast long-term trends and develop recruitment strategies.

Generally speaking, however, studies of college student retention do not include an analysis of recruitment strategies. Recruitment analyses rarely pursue the student beyond the first semester of enrollment, instead focusing on applicant pools and conversion rates. While many studies acknowledge a strong connection between recruitment and retention (Hossler, 1987; Lonabocker and Halford, 1984; Langley, et al., 1988; Glover, 1985), few enrollment management models have incorporated the full continuum of recruitment and retention activities.

Many times the administrative structure of an institution tends to separate recruitment and retention activities. At some schools, for example, admissions may analyze recruitment success while the registrar's office or institutional research office develops enrollment projections and conducts studies of student retention. An enrollment management model that would incorporate these diverse yet interrelated areas would allow enrollment managers to make the best decisions regarding both recruitment and retention strategies. The development of this type of integrated enrollment management model is the focus of this case study.

DEVELOPING THE ENROLLMENT MANAGEMENT MODEL

This enrollment management model was designed to meet the following objectives: (1) analyze current enrollments and provide the capability to project future enrollments; (2) analyze applicant flow through graduation; (3) analyze retention rates by subgroups of

cohorts; (4) incorporate previously developed and accepted projection and retention systems (Suddarth, 1991; Roney, 1991); and (5) provide the capability to model effects of various changes in the populations at all points.

Focusing the Model on Academic Ability:
A number of retention studies acknowledge that academic ability is a critical factor in understanding student retention and attrition (Pascarella, et al., 1981; Levin and Wyckoff, 1990; Glover and Wilcox, 1992). Evidence in retention studies conducted at Purdue University indicates that 69 percent of the 1984 beginning students who were ranked in the upper one-third of their high school graduation class earned a baccalaureate degree within five years, compared to 47 percent of the students who ranked in the lower two-thirds of their high school graduating class. Figure 1 provides a graphical comparison of the two groups, as well as a five-year retention summary for the total 1984 cohort.

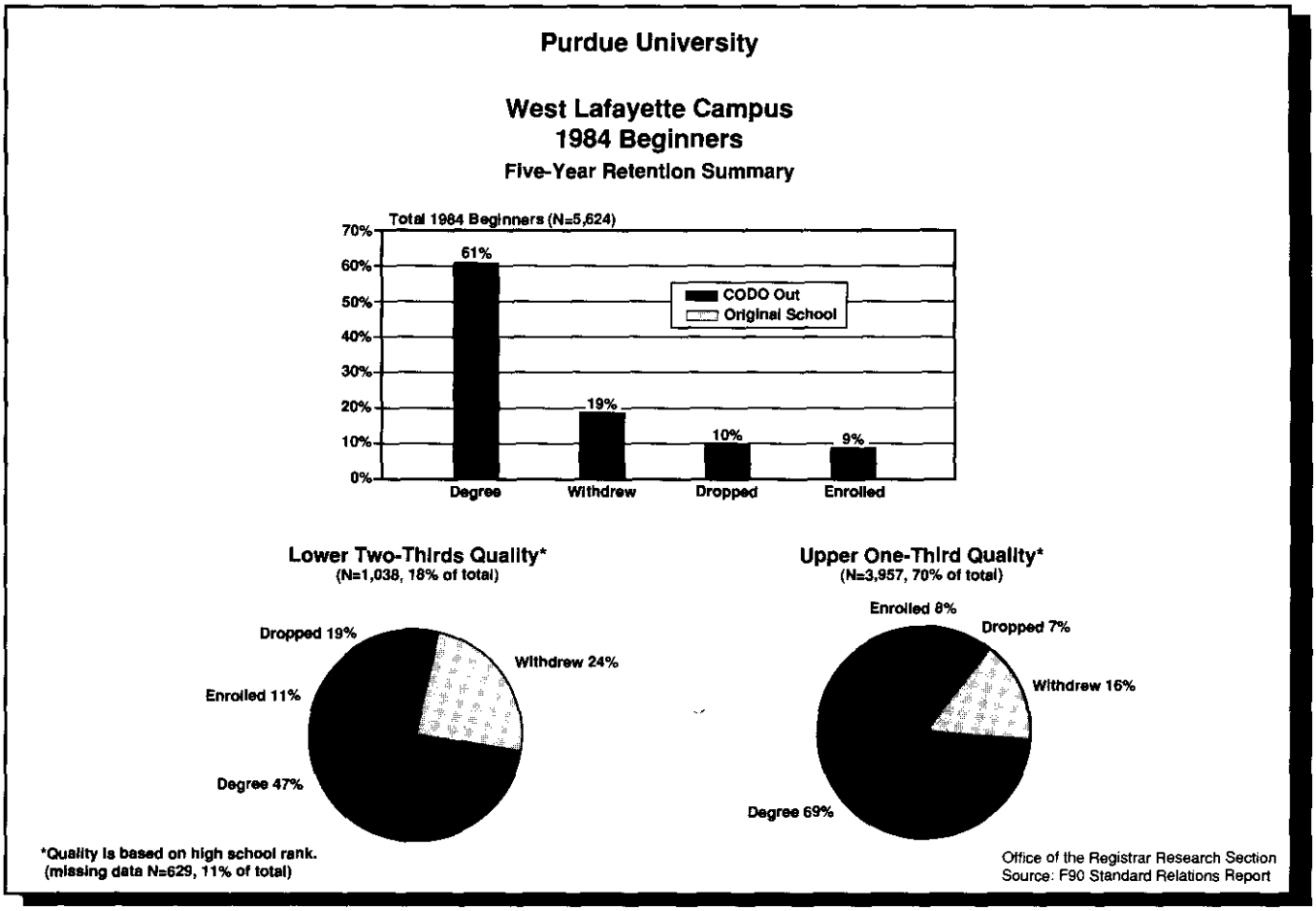

FIGURE 1

This type of analysis by ability group can be expanded to the traditional applicant flow. (Note: a variety of ability measures such as ACT scores, SAT scores, or predicted indices could be used with similar results. High school rank was selected because of its availability and simplicity.) The model developed in this case study targets not only those students most likely to matriculate, but also those most likely to graduate. The result is a net, longitudinal enrollment yield from application through graduation, rather than just the traditional first-semester yield.

The first step in developing the model was to analyze the applicant pool by ability groups. Depending on an institution's admission requirements, this breakdown might look similar to Figure 2. The largest group of applicants (32 percent) was ranked in the 90-99th percentile of their high school graduation class. The next largest, representing 21 percent of the total applicant pool, was ranked in the 80-89th percentile. Those in the 70-79th percentile comprised 14 percent of the applicant pool, 10 percent were ranked between the 60-69th percentile, and 18 percent ranked below the 60th percentile. Five percent of those who applied had no high school rank available. A similar analysis was prepared for students who were admitted (Figure 3) and those who actually enrolled (Figure 4). In this example, there are noticeable similarities among the proportions of each high school rank group shown in Figures 2, 3, and 4. There is, in fact, little difference among the distributions.

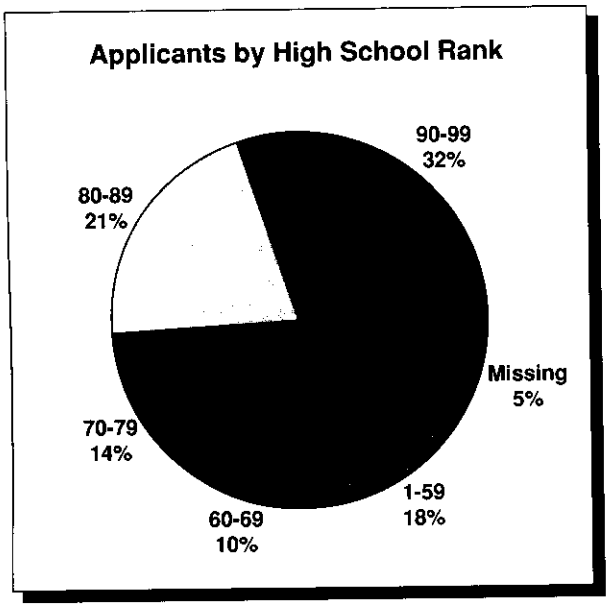

FIGURE 2

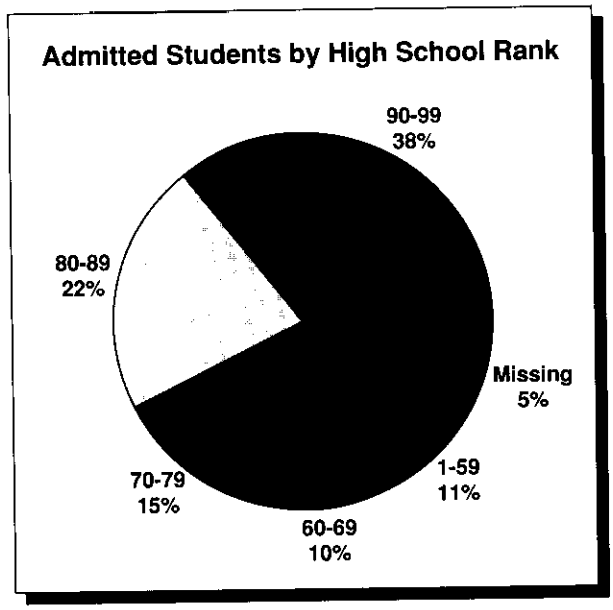

FIGURE 3

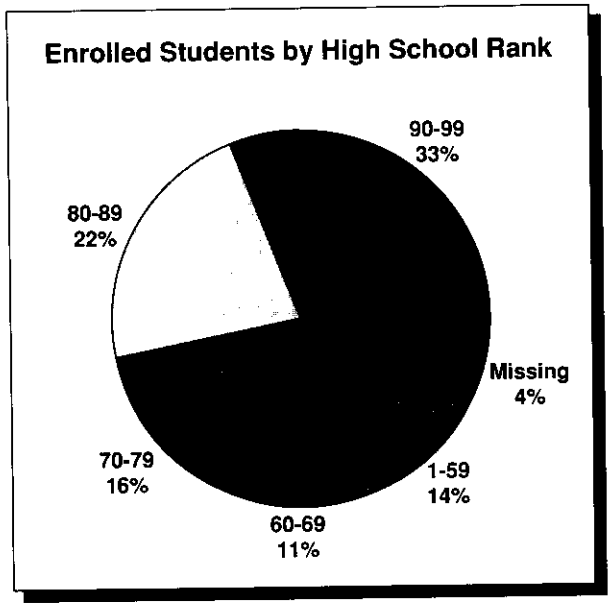

FIGURE 4

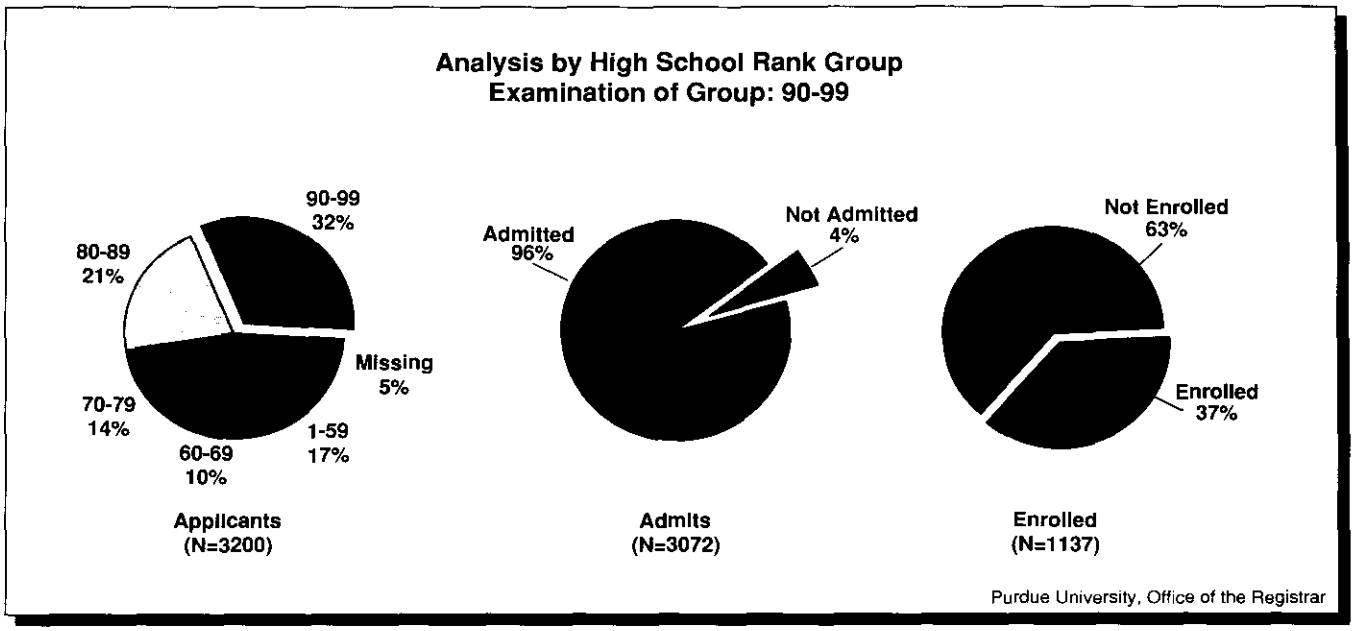

FIGURE 5

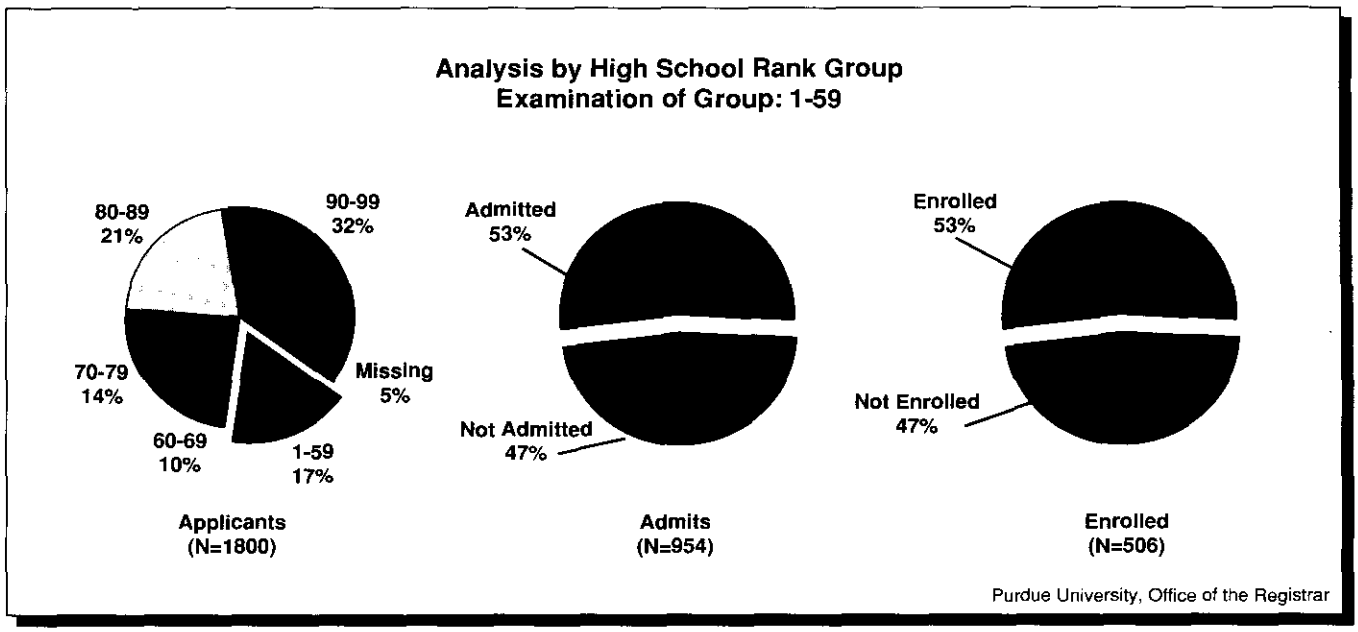

FIGURE 6

If, however, the cohort of applicants in a specific high school rank group is tracked from applicant to admittee to enrolled first-year student, the results are quite different. Figure 5 shows that of the applicants who were ranked in the upper 10 percent of their high school class (32 percent of the total applicant pool), 96 percent were admitted. Of those admitted, 37 percent actually enrolled. The same methodology can be used to track students in each of the ability group cohorts. An example for students whose high school rank was below 60 (the 1-59 group) is shown in Figure 6. Note the differences between Figures 5 and 6. Although the proportions of both the applicants and admitted students in the 1-59 group are smaller than the 90-99 group, the percentage of enrolled students is greater (53 percent compared to 37 percent).

Table 1 summarizes the percentage admitted and enrolled for each of the high school rank groups. The percentage admitted declines from 96 percent for the 90-99 group to 53 percent for those students whose rank was below the 60th percentile. The percentage enrolled, however, increases from 37 percent to 53 percent. Figure 7 illustrates these inverse relationships.

TABLE 1. APPLICANT FLOW BY HIGH SCHOOL RANK

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	100%	100%	100%	100%	100%	100%	100%
Admitted	83%	96%	87%	85%	78%	53%	82%
Enrolled	43%	37%	43%	46%	48%	53%	36%

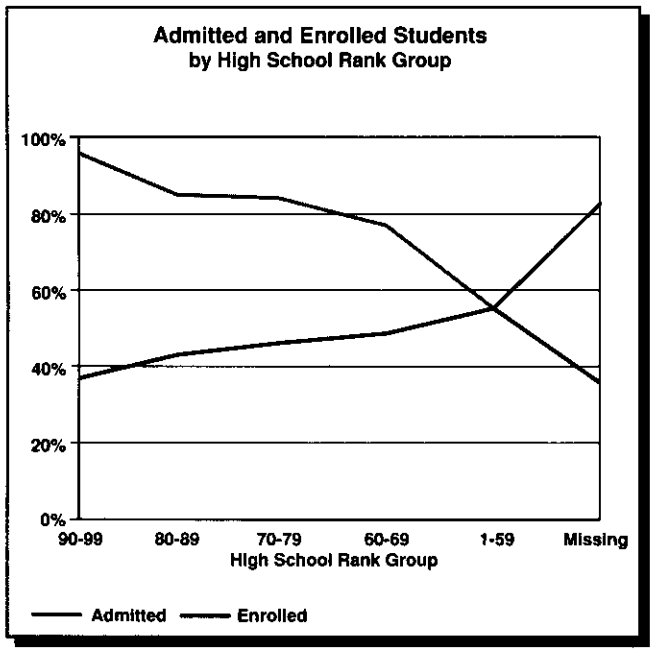

FIGURE 7

These dynamics have an important implication for enrollment managers. The interaction between the admit rate and the enrolled rate results in varying yields for each of the ability groups. Table 2 clarifies this effect by assuming an equal number of applicants in each group. A total of 6,000 applications is shown, with 1,000 applicants per ability group. The model yields a total of 2,071 first-year enrolled students. The 90-99 groups, with 960 admitted students, yielded 355 enrolled students, compared to 391 of the 850 admitted students in the 70-79 group. Interestingly, the first-year yield in both the 80-89 and 60-69 group is 374, even though the number admitted differed by 90 students.

TABLE 2. EQUAL APPLICANTS PER GROUP

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	6000	1000	1000	1000	1000	1000	1000
Admitted	4810	960	870	850	780	530	820
Enrolled	2071	355	374	391	374	281	295

Granted, few institutions attract equal numbers of applicants in each of these groups. A more real-life example based on a total of 10,000 applicants is shown in Table 3. The number of applicants in each group reflects the historical profile shown in Figure 2. This Baseline Model results in a first-year class of 3,497, comprised of 1,137 (33 percent) from the 90-99 group, 786 (22 percent) from the 80-89 group, 547 (16 percent) from the 70-79 group, 374 (11 percent) from the 60-69 group, 506 (14 percent) from the 1-59 group, and 148 (4 percent) whose high school rank was missing.

TABLE 3. BASELINE MODEL

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3200	2100	1400	1000	1800	500
Admitted	8233	3072	1827	1190	780	954	410
Enrolled	3497	1137	786	547	374	506	148

Assume the enrollment manager needs to develop a strategy to enroll 3,600 first-year students instead of the 3,500 students the Baseline Model yields. One possible strategy, Model A, is described in Table 4. Model A is based on small changes in the targeted applicant pool. The proportion of desired applicants in the top group (90-99) drops slightly from 32 percent to 30 percent of the total pool, while those in the 80-89 group increase from 21 percent to 30 percent. The proportion of students in the 70-79 group increases slightly from 14 percent to 15 percent, while the 60-69 group increases from 10 percent to 15 percent of the total applicants. The pool of students with a high school rank below 60 is reduced from 18 percent to 5 percent.

TABLE 4. MODIFYING THE APPLICANT POOL

HIGH SCHOOL RANK GROUP	BASELINE	MODEL A	MODEL B
90-99	32%	30%	20%
80-89	21%	30%	40%
70-79	14%	15%	30%
60-69	10%	15%	5%
1-59	18%	5%	0%
Missing	5%	5%	5%
OVERALL	100%	100%	100%

Model A results in the freshman class of 3,624 students, as shown in Table 5. Twenty-nine percent (1,066) of those enrolled were in the 90-99th percentile of their high school graduating class, 31 percent (1,122) in the 80-89 percentile, and 16 percent in both the 70-79 and 60-69 percentile groups, with 587 and 562 enrolled students, respectively. Only 4 percent (140) of the students were ranked below the 60th decile. Model A not only increased the freshman class by 127 students, but yielded a freshman class where 60 percent ranked in the upper 20 percent of their high school class, compared to 55 percent in the Baseline Model.

TABLE 5. MODEL A

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3000	3000	1500	1500	500	500
Admitted	8610	2880	2610	1275	1170	265	410
Enrolled	3624	1066	1122	587	562	140	148

If the enrollment target is 3,700 students, similar modeling can be used to identify a new applicant pool profile. Model B, also described in Table 4, focuses on students in the 70-89 range. The 90-99 group decreased to 20 percent of the total applicant pool, while the 80-89 group increased to 40 percent and the 70-79 group to 30 percent. Only 5 percent of the applicant pool consists of students whose high school rank was below the 70th decile. The result of Model B, shown in Table 6, is a freshman class of 3,715, 59 percent of whom were in the upper 20 percent of their high school graduation class.

TABLE 6. MODEL B

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	2000	4000	3000	500	0	500
Admitted	8750	1920	3480	2550	390	0	410
Enrolled	3715	710	1496	1173	187	0	148

Focusing the Model by Adjusting the Admit Rate:
Targeting different applicant pools based on ability groups is just one strategy to consider when developing recruitment plans. Another strategy focuses on adjusting the admit rate. As shown in Table 7, Model C is based on minimal changes in the admit rates. The overall admit rate was reduced from 83 percent to 75 percent. The percentage of students admitted in the 90-99 high school rank percentile group was increased from 96 percent to 100 percent, and from 87 percent to 90 percent for the 80-89 group. The admit rate for the 70-79 group was maintained at 85 percent, and was increased from 78 percent to 80 percent for the 60-69 group. Students whose high school rank was below the 60th decile were eliminated completely.

TABLE 7. MODIFYING ADMIT RATES

HIGH SCHOOL RANK GROUP	BASELINE	MODEL C
90-99	96%	100%
80-89	87%	90%
70-79	85%	85%
60-69	78%	80%
1-59	53%	0%
Missing	82%	82%
OVERALL	83%	75%

By applying these admit rates to the applicant pool identified for Model B (shown in Table 6), the result of Model C is a freshman class of 3,801, an increase of 304 students compared to the Baseline Model. Table 8 shows that the overall distribution is similar to the previous models, with 60 percent of the students enrolled graduating in the upper 20 percent of their high school class.

TABLE 8. MODEL C

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	2000	4000	3000	500	0	500
Admitted	8960	2000	3600	2550	400	0	410
Enrolled	3801	740	1548	1173	192	0	148

Focusing the Model by Looking at Graduation Rates:

Models A, B, and C have clarified the usefulness of developing applicant flow models stratified by ability groups, using high school graduation rank as an example. Enrollment management must, however, look beyond the first semester of enrollment. Total enrollment for a traditional four-year institution is based on the re-enrollment of a minimum of four historical freshman classes. The persistence and eventual graduation of students are as critical as the applicant pool, admit rates, and first-year yield are to the overall enrollment plan for an institution. By adding graduation rates to the model, the long-term enrollment impact can be better understood.

Table 9 adds six-year graduation rates for each of the high school rank groups. The overall graduation rate is 66 percent. It ranges from 79 percent for the 90-99 group to 49 percent for those whose high school rank was below 60.

TABLE 9. ADDITION OF GRADUATION RATES

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	100%	100%	100%	100%	100%	100%	100%
Admitted	83%	96%	87%	85%	78%	53%	82%
Enrolled	43%	37%	43%	46%	48%	53%	36%
Graduated	66%	79%	68%	62%	55%	49%	56%

To illustrate the impact of this additional dimension, Table 10 presents the equal-number-of-applicants-per-group example with graduation rates. Although the 70-79 group yielded the largest number of enrolled students (391), the 90-99 group produced the largest number of degree recipients (281). Moreover, this pool of students yields an overall six-year graduation rate of only 62 percent (1,286/2,071) compared to the original 66 percent.

TABLE 10. EQUAL APPLICANTS PER GROUP

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	6000	1000	1000	1000	1000	1000	1000
Admitted	4810	960	870	850	780	530	820
Enrolled	2071	355	374	391	374	281	295
Graduated	1286	281	254	242	206	138	165

The Baseline Model of 10,000 applicants yielded 2,308 graduates over a six-year period (Table 11). Thirty-nine percent of the degree recipients were in the 90-99 high school rank group and 23 percent ranked in the 80-89th percentile. Although over half of the enrolled students (56 percent) ranked below the 80th percentile, this group comprised only 38 percent of the degree recipients (N=876).

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TABLE 11. BASELINE MODEL

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3200	2100	1400	1000	1800	500
Admitted	8233	3072	1827	1190	780	954	410
Enrolled	3497	1137	786	547	374	506	148
Graduated	2308	898	534	339	206	248	83

Each of the models presented in earlier discussions is now shown with the addition of graduation rates. (Refer to Tables 4 and 7 for a summary of Models A, B, and C.) Model A (Table 12), which yielded an increase of 127 enrolled students compared to the Baseline Model, resulted in 121 additional degree recipients. Model B (Table 13) increased first-year enrollment by 218 and yielded 184 additional graduates. Model C (Table 14), which altered both the applicant pool profile and the admit rate, resulted in an increase of 304 enrolled students, and an increase of 245 degree recipients.

TABLE 12. MODEL A

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3000	3000	1500	1500	500	500
Admitted	8610	2880	2610	1275	1170	265	410
Enrolled	3624	1066	1122	587	562	140	148
Graduated	2429	842	763	364	309	69	83

TABLE 13. MODEL B

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	2000	4000	3000	500	0	500
Admitted	8750	1920	3480	2550	390	0	410
Enrolled	3715	710	1496	1173	187	0	148
Graduated	2492	561	1018	727	103	0	83

TABLE 14. MODEL C

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	2000	4000	3000	500	0	500
Admitted	8960	2000	3600	2550	400	0	410
Enrolled	3801	740	1548	1173	192	0	148
Graduated	2553	585	1053	727	106	0	83

Although the enrollment increases resulting from each of these models are substantial, the addition of graduation rates highlights the importance of quality. In these models, the average graduation rate has been maintained at about 67 percent, which actually is an increase of 1 percent over the Baseline Model. If, however, the applicant pool was modified to include a majority of students with high school ranks in the 70-79 group, the overall graduation rate would drop to 62 percent (Table 9). If the applicant pool included only students whose high school rank was below the 60th decile, the graduation rate would fall below 50 percent (Table 9). Moreover, because graduation rates are a product of longitudinal persistence, total enrollment would suffer dramatically because of attrition in the freshman and sophomore years.

Focusing the Model by Looking at Persistence Rates:
To better understand the longitudinal path from first-semester enrollment to graduation six years later, it is useful to examine year-to-year persistence rates. Table 15 shows the persistence rates for each of the high school rank groups. First-year retention (Enrolled End Year 1) averages 84 percent, but ranges from 91 percent for the 90-99 percentile group to 74 percent for students whose high school rank was less than 60. Second-year and third-year rates show similar trends. By the end of the fourth year, graduation becomes a major factor and persistence rates stabilize around 40 percent, with the exception of the 1-59 group at 36 percent. Not surprisingly, the enrollment rates at the end of five years suggest that persisting students with lower high school ranks continue enrollment over a longer period of time (12 percent and 11 percent for the 60-69 and 1-59 groups compared to 8 percent and 9 percent for the 90-99, 80-89, and 70-79 groups).

TABLE 15. ADDITION OF PERSISTENCE RATES

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	100%	100%	100%	100%	100%	100%	100%
Admitted	83%	96%	87%	85%	78%	53%	82%
Enrolled Beginning Year 1	43%	37%	43%	46%	48%	53%	36%
Enrolled End Year 1	84%	91%	86%	83%	79%	74%	78%
Enrolled End Year 2	72%	84%	74%	70%	64%	58%	67%
Enrolled End Year 3	69%	81%	72%	65%	62%	54%	59%
Enrolled End Year 4	40%	42%	40%	38%	41%	36%	39%
Enrolled End Year 5	10%	8%	8%	9%	12%	11%	14%
Graduated Within 6 Years	66%	79%	68%	62%	55%	49%	56%

Table 16 again uses the equal-numbers-of-applicants example to illustrate the interactions among the various rates. Note that the initial headcount advantage for the 70-79 group (N=391) essentially is lost by the end of the first year. In fact, by the end of the second year of enrollment, the headcounts reflect the eventual graduation rates.

TABLE 16. EQUAL APPLICANTS PER GROUP

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	6000	1000	1000	1000	1000	1000	1000
Admitted	4810	960	870	850	780	530	820
Enrolled Beginning Year 1	2071	355	374	391	374	281	295
Enrolled End Year 1	1703	323	322	325	296	208	230
Enrolled End Year 2	1449	298	277	274	240	163	198
Enrolled End Year 3	1369	288	269	254	232	152	174
Enrolled End Year 4	817	149	150	149	154	101	115
Enrolled End Year 5	211	28	30	35	45	31	41
Graduated Within 6 Years	1286	281	254	242	206	138	165

Table 17 illustrates this model using the baseline applicant pool. The total enrollment at the end of the first year is 2,949. By the end of the second year, enrollment has dropped to 2,551, followed by an end-of-third-year enrollment of 2,434, an end-of-fourth-year enrollment of 1,393, and 324 students enrolled at the end of the fifth year. The overall six-year graduation rate is 66 percent, reflecting 2,308 students who completed baccalaureate degrees. Compare the persistence patterns of the various high school rank groups.

TABLE 17. BASELINE MODEL

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3200	2100	1400	1000	1800	500
Admitted	8233	3072	1827	1190	780	954	410
Enrolled Beginning Year 1	3497	1137	786	547	374	506	148
Enrolled End Year 1	2949	1034	676	454	296	374	115
Enrolled End Year 2	2551	955	581	383	240	293	99
Enrolled End Year 3	2434	921	566	356	232	273	87
Enrolled End Year 4	1393	477	314	208	154	182	58
Enrolled End Year 5	324	91	63	49	45	56	21
Graduated Within 6 Years	2308	898	534	339	206	248	83

By applying the year-by-year ability group analysis to the applicant pool and admit rates used in Model B, the overall impact on future enrollment becomes more clear. It was demonstrated earlier that the beginning enrollment for Model B exceeded the Baseline Model by 218 students (3,715 compared to 3,497).

Table 18 demonstrates that this increase continues: 221 additional students were enrolled at the end of the first year (3,170 compared to 2,949), 193 more students were enrolled at the end of the second year (2,744 compared to 2,551), 184 more students continued their enrollment by the end of the third year (2,618 compared to 2,434), and 84 additional students were enrolled as of the end of the fourth year (1,477 compared to 1,393). Degree recipients increased from 2,308 to 2,492, a net gain of 184 students. Although the overall graduation rate increased only slightly from the Baseline Model's 66 percent to 67 percent, the headcount enrollment was greater not only the freshman year, but each of the following four years.

TABLE 18. MODEL B

		HIGH SCHOOL RANK GROUP					
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	2000	4000	3000	500	0	500
Admitted	8750	1920	3480	2550	390	0	410
Enrolled Beginning Year 1	3715	710	1496	1173	187	0	148
Enrolled End Year 1	3170	646	1287	974	148	0	115
Enrolled End Year 2	2744	597	1107	821	120	0	99
Enrolled End Year 3	2618	575	1077	762	116	0	87
Enrolled End Year 4	1477	298	599	446	77	0	58
Enrolled End Year 5	325	57	120	106	22	0	21
Graduated Within 6 Years	2492	561	1018	727	103	0	83

In fact, an additional enrollment management strategy, increased retention, can be included in the model. Table 19 includes small increases in persistence rates that result in an overall graduation rate of 68 percent, a 2 percent increase over the Baseline Model. By applying these increased retention rates, as shown in Table 20, enrollment at the end of the first year increased by 39 students, and total graduates increased by 70. Over four years, these small increases in retention could result in a net yield of over 200 additional degree recipients.

TABLE 19. INCREASED RETENTION RATES

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	100%	100%	100%	100%	100%	100%	100%
Admitted	83%	96%	87%	85%	78%	53%	82%
Enrolled Beginning Year 1	43%	37%	43%	46%	48%	53%	36%
Enrolled End Year 1	85%	92%	87%	85%	81%	74%	79%
Enrolled End Year 2	72%	85%	75%	72%	66%	58%	68%
Enrolled End Year 3	69%	82%	73%	67%	64%	54%	60%
Enrolled End Year 4	40%	43%	41%	39%	42%	36%	40%
Enrolled End Year 5	10%	8%	8%	10%	13%	11%	15%
Graduated Within 6 Years	68%	81%	70%	64%	57%	51%	58%

TABLE 20. INCREASED RETENTION MODEL

	HIGH SCHOOL RANK GROUP						
	TOTAL	90-99	80-89	70-79	60-69	1-59	Missing
Applicants	10000	3200	2100	1400	1000	1800	500
Admitted	8233	3072	1827	1190	780	954	410
Enrolled Beginning Year 1	3497	1137	786	547	374	506	148
Enrolled End Year 1	2989	1046	683	465	303	374	117
Enrolled End Year 2	2590	966	589	394	247	293	100
Enrolled End Year 3	2474	932	573	367	240	273	89
Enrolled End Year 4	1423	489	322	213	157	182	59
Enrolled End Year 5	335	91	63	55	49	56	22
Graduated Within 6 Years	2331	921	534	339	206	248	83

THE BIG PICTURE

To better understand the long-term impact of these enrollment management models on total enrollment, more than one incoming cohort must be included in the model. Current enrollment can be analyzed in terms of entry cohorts and high school ability groups. A simplified example is shown in Table 21. The 1992 fall undergraduate enrollment is 13,448. This total enrollment can be attributed to the admission and retention of seven major groups: the 1987-1992 entry cohorts and a group of "Other" students. "Other" includes students enrolled in 1992 who were not part of the 1987-1992 beginning cohorts (e.g., transfer students, spring beginners, and other students who started prior to 1987).

TABLE 21. FALL ENROLLMENT BY COHORT AND HIGH SCHOOL RANK GROUP

	ENTRY COHORT							
	1987	1988	1989	1990	1991	1992	OTHER	TOTAL
Beginning Year 1						3497		3497
End Year 1					2949			2949
End Year 2				2551				2551
End Year 3			2434					2434
End Year 4		1393						1393
End Year 5	324							324
Other Students							300	300
TOTAL	324	1393	2434	2551	2949	3497	300	13448

Although only the totals are shown in Table 21, each of these groups has been analyzed by high school rank group, similar to the model shown in Table 17. That is, the 2,551 students shown as the 1990 cohort include 995 students in the 90-99 high school rank group, 581 in the 80-89 group, 383 in the 70-79 group, 240 in the 60-69 group, 293 in the 1-59 group, and 99 whose high school rank was missing. Assuming that a constant number of 10,000 students continue to apply each year and the baseline admit rates and retention rates remain stable, undergraduate enrollment will continue at 13,448.

Models showing future enrollment growth can be developed using the same techniques introduced earlier. A different applicant pool could be targeted, admit rates could be modified, and retention could be improved. Table 22 illustrates a seven-year enrollment that targets a different applicant pool (i.e., Model B as illustrated in Table 4).

The breakdown by high school rank group for the Model B cohort is shown in Table 18. As shown in Table 22, when first implemented in 1993, Model B affects only the Beginning Year 1 enrollment, with a net increase of 217 students (13,666 compared to 13,449). In 1994, both the Beginning Year 1 and End Year 1 reflect the impact of Model B and total enrollment is up 438 (N=13,887) compared to 1992. By 1998, Model B's long-term impact is evident: total undergraduate enrollment increased by 900 students: 14,349 compared to 13,449.

TABLE 22. LONGITUDINAL ENROLLMENT MODELING

	FALL SEMESTER						
	1992	1993	1994	1995	1996	1997	1998
Beginning Year 1	3497	3715	3715	3715	3715	3715	3715
End Year 1	2949	2949	3170	3170	3170	3170	3170
End Year 2	2551	2551	2551	2744	2744	2744	2744
End Year 3	2434	2434	2434	2434	2618	2618	2618
End Year 4	1393	1393	1393	1393	1393	1477	1477
End Year 5	324	324	324	324	324	324	325
Other Students	300	300	300	300	300	300	300
TOTAL UNDERGRADUATES	13449	13666	13887	14080	14264	14348	14349

Other long-term models can be designed to illustrate additional enrollment management interventions such as modifying admit rates, improving conversion rates, or developing retention interventions for specific groups of students. Methods of achieving a target enrollment can be developed and compared in terms of costs and benefits. Computerized spreadsheets — particularly those that are three-

dimensional — allow this type of enrollment modeling with relative ease (Roney, 1991) and can include additional categories such as academic classification and school of enrollment.

CONCLUSION

In summary, it is clear that to be most effective, enrollment management models must include the entire process — from application through graduation. The student's academic ability plays a critical role in each of these steps. Significant differences are evident when students representing different high school rank groups are compared on the basis of applicant pools, admit rates, enrollment yields, student persistence, and graduation rates.

While the optimum scenario for many enrollment managers might be to recruit and admit only the top 10 percent of high school graduates, that goal is difficult to achieve. In times when top high school graduates are fewer in number and, as a result, in higher demand, not every college and university will be able to attract the top students. In fact, yield rates for the top-ranked high school graduates are likely to decrease as competition increases. Pressure to maintain high quality academic profiles will continue. Enrollment management models need to consider quality as well as quantity. The likely persistence of the incoming class is equally as important as the number of students in that class.

The models developed in this case study emphasize the use of academic quality group analysis as measured by high school rank in each step of the enrollment management process: applicant pool, admit rate, conversion rate, student persistence, and graduation rate. Enrollment managers can develop baseline models for their own institutions and, using this data as a starting point, create recruitment and retention models that result in meeting enrollment targets — in terms of both quality and quantity.

The foundation for effective enrollment management is based on the ability to understand, estimate, and model long-term enrollment trends that go beyond the first year of enrollment. Enrollment mangers who look beyond recruitment and first-year enrollment will be most successful in developing the plans that will best meet the institution's total needs and goals. Most importantly, though, strategic planning should focus on achieving the optimum balance among headcount enrollments, quality profiles of the students, and graduation rates.

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