
Supplemental Instruction: The Long-Term Impact

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Supplemental Instruction: The Long-Term Impact

By Gen M. Ramirez

In both the SI and the non-SI groups, those with the highest SAT scores often did poorly, whereas those predicted to fail earned higher grades.

ABSTRACT: This study addressed two questions about the impact of SI on students in a large urban university: what academic performance benefit is realized beyond the target course supported by SI, and whether SI participation strengthens the persistence patterns of particular student populations. Participants from various student groups were tracked for a period of 8 semesters beginning in Fall 91, and their performance and retention patterns were compared with those of control peer groups of nonparticipants. SI was found to have essentially an immediate impact (target course and semester gpa) on traditional students; however, it has a substantial impact on both performance and retention for special-admit students and a definite benefit for underrepresented/underprepared students. Low motivated students, as evidenced by their prior college performance, maintained consistent improvement after SI participation.

Supplemental Instruction (SI) is a unique form of student academic assistance designed to help students in "high-risk" college courses master course content while developing effective learning and study strategies applicable to that course (Martin, Arendale, & Associates, 1994). Unlike services which focus on the needs or deficiencies of the students, SI recognizes the inherent difficulty of a course, designating it as being high risk when at least 30% of the grades assigned are typically "D," "F," or "W." Distinctive features of the SI model, developed at the University of Missouri-Kansas City (UMKC) in 1975 and now widely disseminated nationally, include the following:

1. SI sessions are offered several hours per week; all students enrolled in the target course supported by SI are eligible and are encouraged to attend on a voluntary basis.
2. The SI sessions are facilitated by a student leader, who attends all target class sessions and models the study practices of a successful student; the discussion and collaborative activities in SI sessions help students think about and process content as well as identify appropriate or critical learning strategies.
3. The program is administered by a professional staff member, who, among other duties, trains and supervises the

day-to-day work of student SI leaders and is responsible for evaluating the effectiveness of the program each semester.

Institutional studies, and especially the nationwide data compiled and analyzed by the Center for Academic Development at UMKC in each of the past several years, have demonstrated that across institutional types, disciplines, precollege student preparation levels, and ethnic groups, SI participants consistently outperform their peers who attempt the same classes on their own (Blanc, DeBuhr & Martin, 1983; Congos & Schoeps, 1993; Kenney, 1989; Lundeberg, 1990; Martin, Arendale, & Associates, 1992, 1994; Martin & Blanc, 1991; National Center for Supplemental Instruction, 1995, 1996; Wolfe, 1987). With the national model clearly established and program effectiveness repeatedly confirmed, institutions seeking to address special needs have been encouraged to adapt the program model in ways that those needs dictated.

Background

It was precisely because of emerging institutional needs that the established SI program at California State University, Long Beach (CSULB), was modified in 1987. SI was already recognized as a valuable resource for all students, especially for those with the greatest support needs. Then the Learning Assistance Center was charged with increasing the participation of at-risk students, the group who—as is typical at most large institutions—was least likely to avail itself of such resources (Abrams & Jernigan, 1984; Levin & Levin, 1991). Directing at-risk students into high-risk courses clearly placed an added burden on all those involved, and heavy dependence on state and federal affirmative action resources made it especially critical that these students be active participants in the SI program. To address these special considerations, the following modifications were made in the institutional SI program:

1. SI was made a one-unit prebaccalaureate class for which students enrolled; in this way it became part of the student's weekly schedule.
2. SI met the same number of hours as the target class, typically the hour following the lecture; this change was intended to

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- mitigate the increased needs of academically at-risk students and the larger size of the group, with enrollment limits set at 25-30 to maximize access.
3. SI leaders worked 10 hours per week, as they attended the target course, prepared more systematically to work with a larger group 3 hours per week, held an office hour, and participated in weekly inservice training.

By Fall 1991, SI had grown to support 33 courses involving a broad spectrum of lower division science, social science, humanities, prebusiness and preengineering courses; two upper division gateway courses—required to continue in the major—were also included. SI enrollment that semester numbered 567 students from among the 3767 enrolled in the corresponding target courses. Approximately 50% of SI participants were members of the various academic assistance programs for at-risk students, which at that time included the developmental education program, Student Support Services Program (federal TRIO), state Educational Opportunity Program, Disabled Student Services and Adult Learning Disability Programs, Minority Engineering Program, Minority Business Program and student athletes. A majority of these students qualified to participate in two or more of the listed programs, a factor found in other institutional research to indicate greater rather than lesser academic risk.

Analysis over 8 consecutive semesters found the modified SI program equally effective compared with the national model; these outcomes were consistent across disciplines and with both traditional and all of the previously identified at-risk population groups. With immediate benefits firmly established, questions about the broader impact of SI emerged. We sought to determine whether the program had longer term benefits for student participants and, if so, for whom. In an era of fiscal constraints, retention and graduation rates became significant considerations, and the strategic allocation of resources was a high priority. The following research questions thus emerged:

1. Does the enhanced performance realized through SI extend beyond the target course to overall performance? For how long? Who benefits the most in that regard?

2. What impact does SI have on long-term

¹ Programs such as EOP, Student Support Services, Developmental Education, Disabled Student Services, Minority Engineering and Minority Business serve academically at-risk students; program affiliation, rather than ethnicity, was found to be the significant factor.

retention and, ultimately, on graduation? Are there particular groups for whom this impact is greatest or most critical?

Design and Methodology

To address these questions, a longitudinal study was designed to track a stratified random sample of Fall 1991 SI and non-SI participants in the courses supported by SI. Students from both the traditional and at-risk groups previously identified (hereafter designated "program students") were followed for 8 semesters beginning in Fall 1991 through Spring 1995. Sample sizes for each of the four principal groups in the study ensured a confidence interval of 95% ($\pm 5\%$):

Traditional SI students (n=161):

SI participants in any of the supported courses from "mainstream" socio-economic backgrounds and whose academic preparation at entry met university requirements

Traditional non-SI students (n=316):

students from the same, traditional background enrolled in any of the supported courses who did not participate in SI

Program SI students (n=337):

SI participants in any of the supported courses found to be academically underprepared at entry or having special academic needs (e.g., learning disabilities), and/or socio-economically or educationally disadvantaged students (per state or federal guidelines)

Program non-SI students (n=379):

students from the same at-risk backgrounds enrolled in any of the supported courses who did not participate in SI

For those students included in the study, the following data elements were compiled and analyzed:

- Background information: (a) SAT scores of entering freshmen (b) admission status (regular/special) (c) ethnicity¹
- Initial (Fall 91) status: (a) class standing and prior units completed (b) prior campus gpa (pgpa) of continuing students (c) academic assistance program affiliation(s)¹
- Fall 91 performance: (a) target course grade and semester gpa
- Subsequent performance: (a) gpa & SI experience in subsequent semesters (b) cumulative gpa and academic status after Spring 95

Background factors, even in the case of traditional students, indicated a clear disadvantage for the SI groups compared to their non-SI counterparts. At entry, both the traditional and program SI groups had lower SAT averages than their counterpart non-SI peers (by 75 and 60 points, respectively), and the SI program population included three times the proportion of special admits (24%) compared with its counterpart non-SI group (7%). Though nearly all SI target courses were introductory lower division offerings, the SI population as a whole was also less experienced academically than the nonparticipant group (80% freshmen and sophomores in SI compared with only 68% in the non-SI population).

Characteristically, immediate outcomes for the Fall 1991 semester were in large measure consistent with national data (Martin, Arendale, & Assoc., 1994): Traditional SI students improved their course grade by +0.60 compared with non-SI peers; program SI students' grades showed an even stronger impact of +0.70. In these instances as well as in prior institutional studies, the immediate impact of SI was statistically significant. Closer analysis indicated that the benefits of SI were best understood in relation to how these student groups had performed before Fall 1991.

In essence, what SI allowed students to do was to maintain the academic record they had established previously despite the inherent difficulty added by the high-risk course; traditional SI students actually superseded their prior gpa. All participants in the study who elected not to use the resource performed poorly (relative to their prior gpa) when the grade for the target course became part of that computation, and program students dropped firmly into the probation zone in the target course and moved much closer to it in their semester gpa.

For program students, SI has a particu-

continued on page 4

Table 1 Comparison of Traditional/Program Students	
SI participant group	Non-SI group
<i>Traditional students (161)</i>	<i>Traditional students (316)</i>
prior gpa=2.74	prior gpa=2.67
target course=2.86*	target course=2.27*
semester gpa=2.77*	semester gpa=2.49*
cum gpa=2.77	cum gpa=2.61
4-yr. persistence rate=62%	4-yr. persistence rate=63%
<i>Program students (337)</i>	<i>Program students (379)</i>
prior gpa=2.51	prior gpa=2.33
target course=2.52*	target course=1.82*
semester gpa=2.55*	semester gpa=2.10*
cum gpa=2.56*	cum gpa=2.29*
4-yr. persistence rate=70%**	4-yr. persistence rate=51%**

* C.I. gpa 95% $\pm .05$; difference significant at $<.001$ using independent t-test

** C.I. persistence rates 95% $\pm 5\%$; level of significance of difference $<.01$ using chi-square test

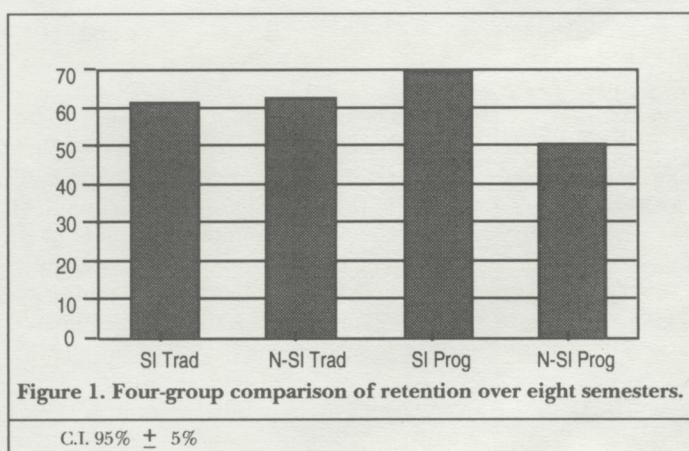


Figure 1. Four-group comparison of retention over eight semesters.

continued from page 3

larly striking correlation with their retention in college. Program students in the SI group showed significantly higher rates than their own peer group who declined SI participation in the semester in question. More strikingly, they had the highest persistence rate of all four groups over the 8-semester period (see Figure 1), despite the fact that they entered college with considerably weaker precollege preparation (SAT mean scores were 124-200 points lower than those of the traditional student groups identified previously) as well as lower prior grades than traditional students. With the freshman year known to be a key juncture in the retention process (Tinto, 1987), the fact that the SI group contained a higher proportion of freshmen (52%) than the non-SI group (47%) makes the retention correlation with SI all the more important.

Although aggregate data such as these were indicative of positive SI impact, closer analysis of student records within these four groups revealed frequent inconsistencies in performance patterns. Comparisons of the students' academic backgrounds and initial status with the academic outcomes both in that semester and subsequently indicated that the population actually fell into five identifiable groups with sufficiently unique characteristics to be considered distinct populations: (a) traditional continuing freshmen; (b) traditional sophomores, juniors, and seniors; (c) program continuing freshmen; (d) program sopho-

mores, juniors, and seniors; and (e) special-admit students. First-time students were excluded from the study because there were so few of them in SI, especially in the case of program freshmen. With many SI programs targeting new freshmen as a group, the impact of SI on that group is firmly established by national data (Martin, Arendale, & Assoc., 1994; National Center for Supplemental Instruction, 1995, 1996).

Patterns became more consistent and results more meaningful when the five populations were examined closely, but even then irregularities remained. Student performance was inconsistent with the traditionally accepted academic predictors of college success: In both the SI and the non-SI groups, those with the highest SAT scores often did poorly, whereas those predicted to fail earned higher grades. Due to rampant but erratic grade inflation patterns in feeder school districts, high school performance had to be disregarded as a reliable measure of prior achievement in this very diverse student mix. The discrepancies between predictors and performance suggested that motivation was playing a very strong role in student performance.

Early SI studies conducted by the University of Missouri-Kansas City established the use of a Likert scale to determine student levels of interest in SI before the schedule of SI sessions was announced (Blanc, DeBuhr, & Martin, 1983). Based on expressed interest, students who responded affirmatively but did not participate in SI (due to scheduling conflicts or other factors) were assigned to a motivational control group. The performance of these students, presumed equally motivated with those who utilized SI, was compared with that of SI students to demonstrate that the performance of SI participants cannot be attributed to higher motivation levels among participants.

At CSULB, because SI offerings are announced in each semester's schedule of classes, a preliminary survey of interest is not feasible. Furthermore, similar efforts by the tutorial program—also a course support resource—have shown that students who enthusiastically request assistance at

the beginning of a semester are inconsistent in their use of support as the term progresses, even where schedule compatibility is not a consideration. In this instance, then, on an experimental basis, students in each of the five populations were grouped on the basis of performance above (high motivation) or below (low motivation) the mean prior college gpa of their peers.² When data were analyzed using these groupings, clear patterns emerged which allowed for conclusions about SI impact to be drawn. Using actual university performance measured against a nationally normed predictor of collegiate performance (SAT score) strongly affirmed the role of motivation as the stronger influence on academic outcomes and on persistence to degree objectives.

Discussion

Traditional Students

Among the five student populations analyzed, the impact of SI varied somewhat. For traditional students, both freshmen and continuing students, the major benefit of SI participation was its immediate impact: the grade in the high-risk course. As shown in the following two tables, the entry level skills of these subgroups, as measured by SAT scores, were considerably weaker in the SI groups than in their corresponding non-SI groups. With the support of SI, these weaker students not only did better in a historically difficult course than what their prior gpa might have suggested, but often did better in that course than they had done in the mix of their earlier college work.

Traditional students beyond the freshman year (sophomores, juniors, and seniors) were reasonably well equipped to handle the rigors of a historically difficult addition to their study load. As is true of all population groups in the study, the SI students in this group (see Table 2) entered college less well prepared (by a mean of 100 points on the SAT) than their non-SI peers but had already earned a higher gpa in university courses than their counter-

continued on page 6

Table 2	
Traditional Sophomores, Juniors and Seniors	
SI participant group	Non-SI group
High Motivation (31)	High Motivation (73)
SAT cum score=840 prior gpa=3.30 target course=2.97 semester gpa=2.93 cum gpa=2.96 4-yr. persistence rate=77%	SAT cum score=951 prior gpa=3.24 target course=2.85 semester gpa=3.02 cum gpa=3.09 4-yr. persistence rate=85%
Low motivation (30)	Low motivation (83)
SAT cum score=801 prior gpa=2.24 target course=2.80*	SAT cum score=880 prior gpa=2.24 target course=1.98

* p<.000 using independent t-test

** p<.05 using independent t-test

Table 3
Traditional Freshmen

SI participant group	Non-SI group
<i>High Motivation (19)</i> SAT cum score=798 prior gpa=3.13 target course=3.25* semester gpa=3.20* cum gpa=3.14 4-yr. persistence rate=55%	<i>High Motivation (30)</i> SAT cum score=901 prior gpa=3.01 target course=2.43 semester gpa=2.75 cum gpa=2.95 4-yr. persistence rate=63%
<i>Low motivation (20)</i> SAT cum score=815 prior gpa=2.25 target course=2.45* semester gpa=2.32 cum gpa=2.43** 4-yr. persistence rate=55%	<i>Low motivation (24)</i> SAT cum score=895 prior gpa=2.02 target course=1.56 semester gpa=1.99 cum gpa=2.11 4-yr. persistence rate=60%

* p<.0001 using independent t-test

** p<.01 using independent t-test

continued from page 4

parts who declined SI support (2.78 vs. 2.70). When the population was divided with respect to evidence of motivation, there was a slight advantage in precollege skill to the higher motivation groups (approximately 50 points on the SAT). However, the extent to which they surpassed their low-motivation peers in college performance greatly exceeded what the difference in SAT scores might predict. Class distribution of the groups was relatively similar, eliminating the possibility that college experience might account for these variances. The general improvement manifested by the low-motivation SI group suggests that the adjunct course gave these students a strong boost, which they were able to sustain in large part over several semesters, including a stronger cumulative gpa. Though the cumulative gpa difference is not statistically significant because of the small sample size, the differences in both the target grade and Fall 91 gpa were visibly stronger subsequent to SI.

Persistence rates for this group were good, predictably so given that the freshman-to-sophomore dropout had already occurred, with especially strong rates among the high-motivation group (persistence of the low-motivation groups is fairly consistent with institutional norms). For the non-SI students, the drop in course/semester grades relative to their prior gpa was modest, suggesting that one or more years of college experience had probably equipped these students with necessary skills to handle the university's more difficult general education courses. The fact that the non-SI low-motivation group consisted of 70% upper division students (10% more than the corresponding SI group) should not be overlooked as a contributing factor. Had the groups been more equal with respect to class standing, there would probably have been a favorable advantage in persistence to the SI students, since a greater part of the normal attrition should already have occurred in a more academically advanced group.

Traditional freshmen
in SI (see Table 3) entered college clearly less well prepared than their non-SI peers, with 90 points separating their mean cumulative SAT scores when the entire group of 93 was examined. The SI group averaged only 808, compared with the non-SI group at 898.

The prior gpa's of SI and non-SI groups were similar, with SI students apparently stronger (at 2.69) than those who de-

clined SI support (2.56) for their high-risk course. However, separating the high-and low-motivation groups strikingly divided the subpopulations of freshmen. Yet despite relative homogeneity within both the SI and non-SI groups at entry, the high-motivation students had already established a full letter grade difference in performance (pgpa) compared to their own low-motivation counterparts.

Freshmen not utilizing SI saw their semester gpa drop substantially at the end of Fall 1991 due to the impact of the target course grade; the low-motivation subgroup actually fell onto probation that semester. These non-SI students ultimately recovered, and in fact demonstrated stronger persistence rates than their SI counterparts. Those who availed themselves of SI superseded their prior gpa in both the target course and their semester gpa, despite the added work load/difficulty of the target course. It seemed that SI gave these students an experience of success that carried them forward.

Program Students

It is with program students that SI appeared to have the most pronounced impact in both the long as well as the short term. It seems that program students, being less prepared (if SAT scores and prior gpa's are considered indicative of prior preparation), are less able than their peers to recover from the setback of a historically difficult course.

The program students beyond the freshman year
(see Table 4) saw their grades drop slightly the semester they took the high-risk course if they didn't participate in SI. It seems that they, like their traditional counterparts, had

already acquired the skills needed to reestablish their previous performance level in subsequent semesters.

The program sophomores, juniors, and seniors began college much weaker than their traditional peers, with a mean SAT score 130 points lower than that of their traditional counterparts (see Table 2). However, their college gpa was only .20 below that of their traditional peers, a much lesser difference than expected. This performance record might be attributed to the prior participation by members of this group in a variety of resources such as Summer Bridge, tutoring, prior SIs, and developmental coursework, as well as to the fact that standardized tests are less accurate as predictors of achievement for underrepresented students than for their traditional peers (most program students are from various ethnic minority groups; McCauley, 1988). As a whole, the SI students in this group were academically much less experienced than the non-SI students (71% of the SI group were sophomores, compared with only 45% of the non-SI group).

When this group was divided on the basis of evidence of motivation, interestingly, the SAT scores of the high-motivation students surpassed those of the low-motivation group by a substantial margin, a pattern not seen in the traditional student groups. No explanation is readily apparent. It may be that the motivation factor precedes college attendance in the case of economically disadvantaged (and, frequently, educationally disadvantaged) students to a much greater degree than it does for a traditional population, that these students worked harder in earlier years of schooling to develop the skills measured by the SAT.

Though the high-motivation group did fairly well with or without SI, the low-motivation group was unable to sustain a mean grade of "C" in the high-risk target course without the support of SI. The fact that their semester gpa actually superseded their own prior per-

continued on page 8

Table 4
Program Sophomores, Juniors and Seniors

SI participant group	Non-SI group
<i>High Motivation (52)</i> SAT cum score=745 prior gpa=2.96 target course=2.79 semester gpa=2.84 cum gpa=2.92 4-yr. persistence rate=83%	<i>High Motivation (55)</i> SAT cum score=859 prior gpa=2.95 target course=2.53 semester gpa=2.65 cum gpa=2.81 4-yr. persistence rate=71%
<i>Low motivation (49)</i> SAT cum score=669 prior gpa=2.21 target course=2.33* semester gpa=2.48 cum gpa=2.39 4-yr. persistence rate=78%**	<i>Low motivation (49)</i> SAT cum score=743 prior gpa=2.12 target course=1.85 semester gpa=2.24 cum gpa=2.32 4-yr. persistence rate=53%

* p<.05 using independent t-test

** level of significance of difference <.01 using chi-square test

Table 5 Program Freshmen (Regular Admits)	
SI participant group	Non-SI group
<i>High Motivation</i> (60) SAT cum score=742 prior gpa=2.79 target course=2.83* semester gpa=2.55 cum gpa=2.71* 4-yr. persistence rate=75%****	<i>High Motivation</i> (49) SAT cum score=797 prior gpa=2.71 target course=1.98 semester gpa=2.37 cum gpa=2.54 4-yr. persistence rate=53%
<i>Low motivation</i> (42) SAT cum score=690 prior gpa=1.97 target course=2.38** semester gpa=2.39* cum gpa=2.32*** 4-yr. persistence rate=57%****	<i>Low motivation</i> (54) SAT cum score=779 prior gpa=1.89 target course=1.80 semester gpa=1.78 cum gpa=2.04 4-yr. persistence rate=33%

* p<.001 using independent t-test ** p<.05 using independent t-test
** p<.01 using independent t-test **** level of significance of difference <.05 using chi-square test

continued from page 6

formance suggests that they withdrew energies from the "lost cause" that the target course became in order to invest much more in their remaining course work.

The SI program students beyond the freshman year remained in college or graduated at extraordinary rates for program students; at 83% (high motivation) and 78% (low motivation) persistence, they demonstrated the second and third highest retention rates of the 20 subgroups analyzed in this study. These are students who, though they began college less prepared than their traditional counterparts, had developed the skills initially lacking. Though these rates are not first-time freshman retention rates, the fact that both SI groups (high- and low-motivation) were populated heavily by sophomores (71%, vs. only 45-46% of their non-SI counterparts) makes the persistence of this group noteworthy. The change correlated with SI is not statistically significant for the high-motivation group; had the two groups been more similar in college experience (54% of the non-SI students were juniors and seniors, compared with only 29% of the SI students), the outcome differences are likely to have been greater, more accurately reflecting the value of SI to their persistence.

It is with the low-motivation group that the retention impact of SI is most dramatic. Contrasted with the non-SI group's 53%, their 78% persistence rate stands out. The SI students in this group began college far less prepared with an SAT mean of 669 (76 points below the high-motivation SI group and nearly 200 points below the high-motivation non-SI group). Though their average grades are lower than those of the other groups, they have been able to continue their pursuit of the baccalaureate degree at very respectable rates. For this group, the sophomore year may have been the optimum time for them to benefit from the SI experience and to appropriate that support as encouragement to complete their de-

gree objectives. For all program students, in fact, participation in SI during the sophomore year, irrespective of motivation, seems to be a significant contributor to persistence ($p<.005$ using chi-square test).

Program continuing freshmen

as a group (see Table 5) entered college weaker (by a full 100 points) than their counterpart population of traditional students (see Table 3). Within the group, however, comparisons between

SI and non-SI students show very similar patterns to those seen in the populations already discussed (SI weaker than non-SI on SAT, SI stronger than non-SI in prior gpa, minimal differences in precollege preparation between motivation groups but substantial differences in prior college performance).

With SI, program freshmen actually did better in the target course than what they had done in previous college work, suggesting that the support mitigates the gap caused by underpreparation, irrespective of motivation, in an especially demanding course. But it is in the separation of motivation groups that the importance of SI is especially evident.

Like their traditional counterpart group (see Table 3), high-motivation non-SI students struggled in the target course but eventually recovered the drop in performance (semester gpa) seemingly attributable to the demands of the high-risk course. However, unlike their traditional freshmen counterparts, they did not persist in similar proportions to the high-motivation SI group, whose retention rates were nearly 50% higher and markedly beyond institutional persistence rates for freshmen. In fact, the retention rate of high-motivation SI program freshmen exceeded that of any group of traditional freshmen, including those who participated in SI.

For the low-motivation group, 8-semester persistence rates of SI students were again significantly greater than those of non-SI students. This is true despite the fact that the SI group entered college with a mean SAT score (690) nearly 100 points below the mean of the low-motivation non-SI group (786). The SI experience helped

them in the target course and allowed them to increase their grade point averages overall, overcoming many of these initial difficulties and contributing to their retention at stronger rates than those of the high-motivation non-SI group, whose entry skills and prior performance were already so much stronger.

Special-Admits

The performance of special-admit students in particular offers the most striking evidence of beneficial SI influence, seen in the course grade, the semester average, and the persistence rate.

Students admitted to the university through admission exceptions are unquestionably at the highest academic risk of any population group. SAT scores confirm that reality, with no group surpassing the 700 mark (see Table 6), below which a university is considered an open admissions institution (American College Testing Program, 1993). Still, as an entire group, these students had performed in college as well as regularly-admitted program freshmen, with prior gpa's in the solid "C" range.

However, with the separation of motivation groups, differences within this population surface. Despite seemingly similar precollege preparation, the prior performance of high-motivation students approached a "B" average, whereas the low-motivation students were on academic probation. The entire special-admit population was predominantly freshmen and sophomores, much more so than the other postfreshman groups. That may indicate high attrition in the first years, or it may reflect a greater tendency among these students to concentrate on first- and second-year course work, the primary focus of the SI program.

Special admits as a group struggled considerably in the target course; regardless of motivation, only SI allowed them to earn a

continued on page 10

Table 6 Special-Admit Students	
SI participant group	Non-SI group
<i>High Motivation</i> (80) SAT cum score=650 prior gpa=2.72 target course=2.45* semester gpa=2.57* cum gpa=2.62 4-yr. persistence rate=74%	<i>High Motivation</i> (39) SAT cum score=692 prior gpa=2.51 target course=1.48 semester gpa=1.93 cum gpa=2.45 4-yr. persistence rate=68%
<i>Low motivation</i> (31) SAT cum score=655 prior gpa=1.29 target course=2.06** semester gpa=2.21** cum gpa=2.21 4-yr. persistence rate=52%***	<i>Low motivation</i> (49) SAT cum score=687 prior gpa=1.78 target course=1.41 semester gpa=1.62 cum gpa=1.85 4-yr. persistence rate=29%

* p<.0001 using independent t-test *** level of significance of difference <.05 using chi-square test
** p<.01 using independent t-test

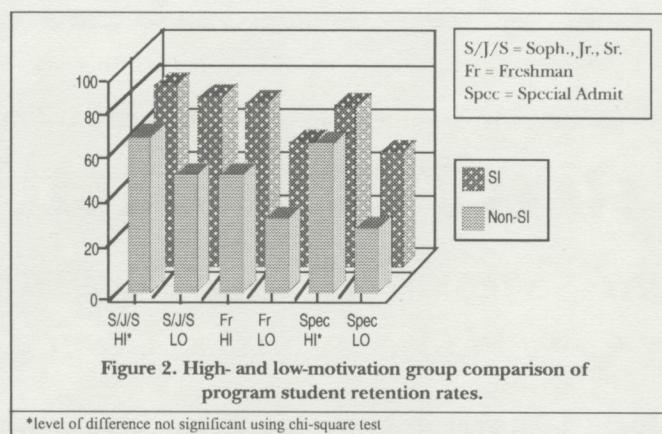
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passing grade in that course and to maintain a satisfactory grade point average in that semester. High-motivation students not availing themselves of SI eventually recovered their good academic standing and went on to persist at respectable rates, in a manner similar to what the more advanced program students achieved. Low-motivation students, however, were successful only with SI. Those who participated in SI actually managed to get off probation as well as to do satisfactorily in the target course. Those who didn't, however, had the lowest retention rate of all groups, undoubtedly influenced by myriad reasons associated with their special-admission circumstances and sealed by low motivation. It is the high correlation of SI with the persistence of this population of university students that is particularly striking, since this is a group that, by definition, was deemed unlikely to succeed academically at the time they were admitted. The near doubling of their persistence rate (+79%) is clear evidence of SI impact on the highest risk group in this study.

Further data analysis indicated that for program students in general, there appears to be an "SI track" which correlates with overall persistence. Sixty percent of all SI program students in the study persisted for 8 semesters or had graduated within that interval; in total, 75% of all program students in the study who persisted in the university participated in SI, either in Fall 91, in a previous semester, in a subsequent semester, or more than once! It seems that for students entering college with either academic underpreparation or especially rigorous academic obligations, SI does address realistic needs in effective ways that enable students to succeed both immediately and long term. It is clearly effective for the more ambitious or more determined individuals who have the wisdom to seek that support in their most demanding course work. Students who decline SI due to undue confidence in their ability to handle academic rigors, and add the complications of historically difficult courses, provide evidence of their poor judgment in the form of unsatisfactory progress, discouragement leading to withdrawal, and in some cases disqualification. Their peers were able to avoid these consequences with the support of the SI program.

Conclusions

The questions posited at the beginning of this study addressed SI impact beyond the target course and the identification of particular student characteristics or student populations for whom SI impact is especially beneficial or critical. Data from this study offers answers to those questions as follow:



*level of difference not significant using chi-square test

1. In both the immediate and the longer term, the greatest beneficiaries of the SI program are at-risk students, regular and special admits. These students need support resources to do well academically, and they fail or flounder semester-to-semester to a greater degree than traditional students when they decline participation. Eight-semester retention rates

The greatest beneficiaries of the SI program are at-risk students, regular and special admits.

- have been found significantly greater for at-risk SI students who participated in the study. Only 51% of non-SI users had persisted over the period in question, versus 70% of the SI participants, a stronger rate than that of traditional students with or without SI (see Figure 1). And when the three more discrete at-risk populations are considered, the students least likely to persist clearly have held some of the highest retention rates, even stronger than those of traditional students, when they participated in SI (see Figure 2).
2. The data discussed here indicate that for at-risk students, motivation alone is insufficient to account for the much stronger persistence patterns (continued enrollment or graduation) among SI participants. Multiple regression analyses of the data elements included within this study indicate that motivation accounts for less than 5% of that outcome.

3. For at-risk students, some of the highest persistence rates involve second-year students. In an institution where students attempt a mix of developmental and general education course work, the freshman year involves more carefully selected offerings; it is in the sophomore year that many actively pursue those high-risk

courses for which study strategies and critical thinking skills are particularly vital.

4. For special-admit students, SI is a particularly valuable investment. Special admits in this study who participated in SI had approximately 50% higher retention rates than their peers who didn't. For low-motivation special admits, SI was found to be more than beneficial—it was critical.

Institutions make a substantial investment in recruiting, admitting, and enrolling new students, often a greater one in those who are academically at-risk when accepted. Once a student has been admitted, the campus assumes both a moral and a fiscal responsibility to maximize the possibility of persistence to graduation. Prior studies have documented the success of SI in mitigating the difficulty of high-risk courses. This study has shown strong evidence that for students who are academically at-risk, the dual emphases of the SI program can both strengthen academic performance and significantly enhance retention. As such, it effectively addresses the institution's moral commitment to at-risk students while proving a wise investment of campus resources.

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continued on page 28

continued from page 26

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NADE News: Denver Conference Follow-Up

By Don Garnett, NADE President

On behalf of the NADE Board, greetings:

The Denver Conference registered more than 1,200 educators from all over the United States and several other countries. Because the conference produced profits of more than \$50,000, NADE will be able to offer more services to our members than ever before. The CASP Conference (a combined effort of TxCRLA and TADE) will include a preconference institute featuring Susan Clark-Thayer and Georgine Materniak training Texas Academic Skills Program (TASP) educators in the use of the CAS Standards and the *NADE Self-Evaluation Guides*. Last year Hunter Boylan and others from the National Center conducted an extensive examination of the TASP. Included among more than 100 recommendations was the implementation of program evaluation during the 1997-98 biennium. With assistance from the Texas Higher Education Coordinating Board, NADE will cosponsor the institute with the CASP. We believe the workshop will attract large numbers of TASP educators from across Texas.

NADE Conference participants in Denver expressed interest in James Anderson's speech and the video taped acceptance speech by Michael

Spigelman, Outstanding Alumnus of a Developmental Education Program 1997. We are working on mixing audio and video to produce a high quality videotape of Anderson's speech over the summer. We are taking orders for the Spigelman video. Spigelman was a self-described "shop kid" in high school who never planned to enter college. When he finally accepted his wife's dare to enroll in a developmental reading course, he realized that he was smart enough to do college work. After completing developmental math, Spigelman became "intrigued with math," eventually earning B.S. and M.S. degrees in Mechanical Engineering from Drexel University. Quoting Spigelman, "it took me eleven years to get my bachelor's degree and another five to get my master's." To order the tape send \$14.95 to NADE, P.O. Box 5922, Carol Stream, Illinois 60197-5922. Both Spigelman and Anderson have given permission for reproduction of their speeches with any profits going to the NADE Scholarship Fund.

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