~~ABCDEFGHIJKLMNOPQRSTUVWXYZ~~

<https://drive.google.com/file/d/1bfr3KexTeBwSK6AvzCtLq3hozgCziqyi/view?usp=sharing>

Young, C. A. (2015). Determining the relationship of Supplemental Instruction to student

attitudes. (Ph.D. dissertation), Texas A &amp; M, College Station, TX.

Attendance patterns of students enrolled in Supplemental Instruction (SI) study groups were

examined to determine if attendance could explain outcomes related to student success.

Students took the College Learning Effectiveness Inventory (CLEI) early in the semester and

again at the end of the semester to measure student attitudes and behaviors that are usually

associated with student success. Mean scores were calculated for each participant in the study

fo each administration of the CLEI. Change scores were calculated by subtracting mean scores

of the second administration from mean scores of the first administration. Student attendance at

SI groups was reported at the time of the second administration of the survey. Comparisons

were made to determine whether there were differences in gains on mean scores on scales of

the CLEI based on SI attendance, as well as **ethnicity and gender**. The results of the study

showed no significant differences in change scores on the CLEI scales based upon SI

attendance. There were also **no significant changes based upon SI attendance and ethnicity** or

gender.

Yockey, F. A., &amp; George, A. A. (2000). **The effects of a freshman seminar paired with**

**Supplemental Instruction.** Journal of the First-Year Experience and Students in Transition,

10(2), 57-76.

This study examines the impact on student performance of one section of a new model of first-

year seminar, which is paired with an introductory-level core social science course. The

freshman transition seminar instructor attends the core course, takes notes and exams, does

class projects, models good student behaviors, and leads a weekly review of the core course

material which is presented in a model similar to Supplemental Instruction (SI). The authors

collected data over three semesters on core course grade and semester grade point average **for**

**students in the first-year seminar and students in a control group selected from a matched**

**sample. Their results indicate that students in the first-year seminar paired with SI achieved**

**significantly higher grades in the paired core course, attained significantly higher semester**

**grade point averages for the semester of intervention, and had significantly better retention**

**rates after two years than students in the control group.**

Wolfe, R. F. (1988). A model retention program for the community college. Maryland

Association for Higher Education Journal, 11, 18-20.

This article describes the implementation of the Supplemental Instruction (SI) program at Anne

Arundel Community College (Arnold, MD). In addition to a descriptive overview of the SI

program, data from a 1987 research study suggests that SI participants received higher mean

final course grades (2.6 vs. 1.9) and lower rates of D, F and withdrawals (24% vs. 44%). Using

the same data set, **when developmental education students and students of color were studied**

**regarding the impact of SI attendance, the results were more pronounced than when examining**

**the entire class of students. SI participants earned higher mean final course grades (3.1 vs.1.8).**

Wisniewski, E. O., Shapiro, R. L., Kaeli, E., Coletti, K. B., DiMilla, P. A., &amp; Reisberg, R. (2015).

The impact of Supplemental Instruction on the performance of male and female engineers in a

freshmen chemistry course. Paper presented at the American Society for Engineering

Education Annual 122nd Conference, Seattle, WA. Available online:

http://scholar.google.com/scholar\_url?url=http://www.asee.org/file\_server/papers/attachment/file

/0005/7218/2015ASEEPaperFinal2BSubmitted\_\_1\_.pdf&amp;hl=en&amp;sa=X&amp;scisig=AAGBfm2RUFrb

H8ykmIPHWOz8V\_XntzKToQ&amp;nossl=1&amp;oi=scholaralrt.

This study used statistical analysis to examine correlations between first year engineering

students’ use of SI and their performance in a required general chemistry course at Northeastern University. Overall we found that students who used SI were more motivated in

General Chemistry than their counterparts. We also draw the following specific conclusions from

our data: Students who were more confident that they would receive a high grade in General

Chemistry at the beginning of the course had a higher average grade threshold for seeking SI.

Students who sought SI exhibited a positive correlation between grade threshold for seeking

help outside the classroom and final grade received. Females who used SI had significantly

higher grades than females who did not. SI in the form of Chem Central, the Connections

Chemistry Review, and the COE Tutoring Office were all found to have the potential to have a

significant positive impact on students’ grades. Students who did not use SI were significantly

more likely to skip lecture than students who do attend SI. Increased absenteeism in lecture

was associated with lower final grades in both fall 2013 and fall 2014. Females were more likely

to attend lecture regularly than males. When extra credit incentives were offered to attend

lecture, both genders skipped significantly fewer lectures and received significantly higher

grades. We believe the results we have found regarding relationships between students’ use of

SI and their success in General Chemistry for Engineers can be applied to improve SI across

the freshman engineering curriculum. For example, as Chem Central, the Connections

Chemistry Review, and the COE tutoring office were all found to have a positive impact on

students’ grades, resources like these could be created to help freshman students in their other

courses. Further study of possible interaction effects among these and other variables for which

we have data are ongoing. Our results also show that the students who often skip lecture are

the students who do not take advantage of resources for SI and receive lower course grades.

**These may be students who need additional advising and mentoring during their freshman year**

**in order to succeed.** The issues raised are important topics of focus for future work in order to

gain a further understanding of the impact of SI on freshman engineering students.

Wilson, B., &amp; Rossig, S. (2014). Does Supplemental Instruction for Principles of Economics

improve outcomes for traditionally underrepresented minorities? International Review of

Economics Education, 17, 98-108. doi: 10.1016/ire.2014.08.005.

Principles of Economics typically have a high non-success rate and traditionally

underrepresented minorities (URMs) generally have a higher non-success rate than non-URMs.

This paper describes our Supplemental Instruction (SI) course and tests the effectiveness of SI

on grade improvement, while accounting for self-selection bias. **We find that SI improves grades**

**by a bit less than half a letter grade in the full sample and by a larger amount for URMs and a**

**smaller amount for non-URMs. We also find evidence that weaker URM students and stronger**

**non-URM students are more likely to enroll in our SI course.**

Williams, T. S. (2014). Influences on science education: The use of Supplemental Instruction on

academic success in introductory science courses t a two-year community college. (Ph.D.

Dissertation), Colorado State University, Fort Collins, CO. Available online:

https://dspace.library.colostate.edu/bitstream/handle/10217/88547/Williams\_colostate\_0053A\_1

2680.pdf?sequence=1&amp;isAllowed=y

This dissertation uses a mixed method design model to investigate the influences of

Supplemental Instruction (SI) on student final grade outcomes in introductory science courses at

the community college level. The literature states that student comprehension in the field of

science is critical; however, educators are discovering that certain student demographics are

falling behind in science comprehension. The research focuses on the issue of disparity among

different demographics and analyzes whether the introduction of the academic intervention

technique, Supplemental Instruction (SI), increases the academic success of students in

introductory community college biology and chemistry courses. A series of Two Way ANOVA

analyses revealed that the use of SI had a positive effect (i.e., increased final grade outcomes)

on community college student demographics; however, in some sections, a negative final grade

outcome was found. In this study, data indicate that SI supported biology classes had a greater

effect (or positive direction) on Black Non-Hispanic overall final grades. However, White Non-

Hispanic students enrolled in SI supported introductory biology courses showed a slight

decrease (or negative direction) in marginal means (d = -0.180). Hispanic students enrolled in

SI supported courses showed a very slight increase (or positive direction) in final grade

outcomes (d= 0.11). Another analysis outlined in this study showed the impact of SI on student

grades in introductory science courses and first-generation student status. The analysis

indicates a positive direction between the use of SI in an introductory science course on overall

student final grades and student first-generation status. **The data indicate that with the use of SI**

**in an introductory science course, student final grades in the first generation student population**

**showed an effect size of d= 0.1897. These data indicate that SI supported science courses had**

**a positive effect on First Generation student overall final grades.** The research examined the

impact of SI on the principle SI Student Leaders (SISL) and found that student participation in

the program had positive influences on SISL discipline comprehension, engagement, overall course satisfaction

Tran, C., Hartmann, K., Olsker, T. C., &amp; Bonsangue, M. (2016). The impact of Supplemental

Instruction on the SI leader. Supplemental Instruction Journal, 2(1), 6-18. Available online:

http://info.umkc.edu/si/wp-content/uploads/2016/09/siJ-Volume-Two-Issue-One.pdf.

This study conducted at California State University, Fullerton, examined the impact of SI upon

the leaders. Variables included sex, **first generation status, and underrepresented minority**

**group status.** Men increased incresed confidence and communication effectiveness at higher

rates than women. The **underrepresented group reported higher ability to handle student conflict**

**and communicate with peer** than majority students.

Summers, E. J., Acee, T. W., &amp; Ryser, G. R. (2015). Differential benefits of attending

Supplemental Instruciton for introductory, large-section, university U.S. history courses. College

Reading and Learing, 45(2), 147-163. doi: doi:10.1080/10790195.2015.1030516.

The authors investigated students’ academic achievement in three high-enrollment,

introductory-level history sections at a large, public, Hispanic-serving university. Using a

conditional indirect-effects model, they analyzed Supplemental Instruction (SI) attendance and

class absences as predictors of course success, after accounting for sex, ethnicity/race, and

SAT/ACT scores. Results suggested a positive direct effect of SI attendance on course success

and a negative direct effect of absences. A significant interaction effect between **ethnicity/race**

**and SI suggested that Hispanic students reaped stronger benefits from SI than Caucasian**

**students, and that the course achievement gap between these groups was smaller when**

**students attended more hours of SI.** Their study contributes new findings to research supporting

the effectiveness of SI by examining mediation and moderation effects and controlling for

confounding variables.

Stockly, S. K. (2000). Performance of minority students in economics: An econometric

evaluation of Supplemental Instruction [Dissertation, University of Texas at Austin, 1999].

Dissertation Abstracts International, 60(12), 4541.

The scarcity of minority scholars in Economics is well-recognized, though few studies have

addressed the issue. This dissertation identifies the introductory coursework in economics as a

significant stumbling block for African American and Hispanic students and analyzes the effects

of an extensive Supplemental Instruction (SI) program initiated to improve minority student

achievement in these courses. Data were collected for over 9,000 students enrolled during two

academic years, 1990-1991 (prior to the inception of SI) and 1993-1994 (after the program was

fully operational). The data include independent variables that measure or proxy student-

specific characteristics, academic maturity, relative high school quality, and institutional

characteristics. Econometric testing of probit and ordered logit models indicate that minority

students earn average grades that are significantly lower than those earned by their non-

minority counterparts. Decomposition methodology, derived from analysis of wage differentials

in Labor Economics, is used to quantify the gap in average grades into proportions that are

explained and unexplained by the data. The analysis of the effects of SI on student performance

reveals that women and minority students attend the adjunct sessions at higher rates than other

students and that students who chose to participate in the program earn average grades that

are significantly higher than those earned by students who either chose not to participate or

were in course sections where SI was not available. Use of the decomposition methodology to

control for the effects of self-selection indicates the SI program offers real value added.

Students in the data set were followed for up to four years after the targeted semesters, allowing

for an analysis of the long-term effects of participation in SI. Probit and ordered logit models

tested whether SI enhanced student interest in taking additional coursework in economics,

whether students who participated in SI were then able to achieve significantly higher scores in

subsequent coursework, and whether the skills gained through participation in SI helped

students achieve higher retention and graduation rates. Overall, the effects of SI in the longer

term are positive and statistically significant.

Stockly, S. K. (1996). Closing the gap in technical skills: Supplemental Instruction and Mexican-

American undergraduate women. Unpublished manuscript. Annual Meeting of the Southwestern

Sociological Association. Houston, TX.

This quasi-experimental study in Spring 1994 examines the performance of Mexican American

women in an Introductory Economics course (Economics 302, Principals of Macroeconomics) at the University of Texas at Austin. Supplemental Instruction (SI) was offered as an academic

enrichment program for students. SI participation rates were higher for women than men and

students of color when compared with White students. The data suggest that SI participation

had a positive correlation with increased mean final course grades in all comparison groups

except Asian American women (White: men, 2.84 vs. 2.37 and women, 2.77 vs. 2.06; African

American: men, 1.60 vs. 1.50 and women, 3.00 vs. 1.25; Asian American: men, 3.20 vs. 2.46

and women, 2.78 vs. 3.00; Hispanic: men, 2.10 vs. 1.60 and women, 2.38 vs. 1.46; and all

students: 2.68 vs. 2.19).

Staff. (2019 April 16). University of Missouri-Kansas City&#39;s innovative group study program

(Supplemental Instruction) boosts student persistence. Available online

https://www.prnewswire.com/news-releases/university-of-missouri-kansas-citys-innovative-

group-study-program-boosts-student-persistence-300832528.html

The University of Missouri-Kansas City (UMKC) today released the results of an ambitious effort

to quantify the impact of student success initiatives, in collaboration with Civitas Learning.

Designed to determine what works, and target resources at the most effective programs, the

UMKC-Civitas Learning partnership was focused on identifying the best strategies to boost

persistence among historically underrepresented minority students. According to data released

today, the institution&#39;s supplemental instruction program (which utilizes tailored group-study in

lieu of remedial education) boosts student persistence by 7.8 percentage points. &quot;Like most

institutions, we face the challenge of quickly and accurately evaluating the impact of our

initiatives. By understanding the impact of a program that works on persistence -- and helps us

retain tuition -- we can make a clear and compelling case for investments that are making a

difference for our students,&quot; said Barbara Bichelmeyer, provost at the University of

MissouriKansas City. &quot;Civitas Learning enables us to quantify the impact of programs and

translate data into strategies we can use to scale and replicate success.&quot; Although UMKC first

pioneered its targeted, group-study program in the early 1970s, university leaders have

struggled to quantify its impact. Using its patent-pending Impact analysis, in just hours, Civitas

Learning was able to draw upon historically siloed data to identify a 7.8 percent overall increase

in persistence for students who attended sessions three or more times each semester,

compared to similar students who attended less than three sessions or not at all. The

improvement was even more significant for part-time students and African American students in

their first semester. Additionally, the analysis found a 9.9% overall increase in persistence for

students who attend seven or more times each semester, indicating a potential to improve

outcomes by encouraging students to make greater use of this resource. The Civitas Learning

analysis also shows that gains achieved through the institution&#39;s **supplemental instruction**

**program should generate $590,000 in additional retained tuition per term, with the potential to**

**generate an additional $1 million in revenue by encouraging students to attend group study**

**sessions more frequently.** Equipped with this evidence of the program&#39;s success, UMKC is now

proposing expanding the program **to serve all first-year students** -- and using nudge campaigns

-- to reach students most likely to benefit from the program.

Staff. (1997). Supplemental Instruction and minority students. Journal of Developmental

Education, 20(3), 38.

This article describes a national research study of Supplemental Instruction (SI) with students of

color. **Students of color participated in SI at rates equal or exceeding those for White students**

(White, 33.3%; African-American, 42.0%; Hispanic-American, 50.9%; Asian-American, 33.3%;

and Native-American, 42.9%). Students of color who participated in SI earned higher mean final

course grades (2.02 vs. 1.55) and lower rates of D, F and withdrawal rates ( 36% vs. 43%) than

similar students who did not.

Rath, K. A., Peterfreundt, A., Baylisst, F., Runquist, E., &amp; Simmonis, U. (2012). Impact of

Supplemental Instruction in entry-level chemistry courses at a mid-sized public university.

Chemistry Education, 89(4), 449-455.

This paper examines the impact of supplemental instruction (SI)—nonremedial workshops that

support regularly scheduled courses—on four different chemistry courses: General Chemistry I

and II, and Organic Chemistry I and II. Differences in how SI impacts student performance in

these courses are discussed, p**articularly in terms of whether students from underrepresented**

**minority groups are affected differently from their peers.** We found that SI appears to be most

effective in courses at the beginning of the chemistry sequence and least effective in those in

which students have already had to demonstrate effectiveness with the material in order to

succeed in the course; its impact on performance in General Chemistry I appears to be quite

high compared to a negligible impact in Organic Chemistry II. Impacts appear to be due to SI

itself rather than the academic fitness of the students who opt to enroll in it. **In the four courses**

**examined, SI did not appear to have a different impact on students from underrepresented**

**minority groups than it did on their peers.**

Rath, K. A., Peterfreund, A. R., Xenos, S. P., Bayliss, F., &amp; Carnal, N. (2007). Supplemental

Instruction in Introductory Biology I: Enhancing the performance and retention of

underrepresented minority students. CBE-Life Sciences Education, 6, 203-216.

Supplemental Instruction (SI) was used at San Francisco State University in an Introductory

Biology I class. Participation in the voluntary SI program was beneficial and especially so for

students who are underrepresented minority students in the sciences. Data was analyzed

between 1999 and 2005 consisting of a pool of approximately 1,500 students in the classes

where SI was offered. Following national averages, about one-third of the students participated

in SI. The SI participants had higher outcomes in comparison with the non-SI participants: (a)

proportion receiving a &quot;C-&quot; final courses or higher, 82% vs. 72%; (b) average final course grade, 2.29 vs. 1.99; (c) proportion ultimately graduating from SFSU, 67% vs. 59%. The SI participants

reenrolled in the class multiple times by a slightly higher rate, 19% vs. 16%. In comparing the SI

and non-SI participants, the SI participants had lower college entrance scores, lower high

school graduation rank percentile, and higher rate of underrepresented student population in

science majors. **When comparing only the underrepresented students in the class, the results**

**favored even more dramatically the SI participants: (a) earned final course grade of C- or**

**higher, 80% vs. 55%; (b) average final course grade, 2.22 vs. 1.49; (c) proportion ultimately**

**graduating from SFSU, 73% vs. 50%.** The authors share several theories as to why SI was

more beneficial to the underrepresented minority students including that they benefited the most

since they had the most disadvantages to overcome in college due to their academic

preparation in high school.

Ramirez, G. M. (1997). Supplemental Instruction. Conference Proceedings of the Proceedings

of the 13th and 14th Annual Institutes for Learning Assistance Professionals: 1992 and 1993.

Available online: http://www.lsche.net/?page\_id=1201

This article provides a basic overview of Supplemental Instruction (SI). Data is reprinted from a

1983 research study by Drs. Martin and Blanc on the effectiveness of SI. The SI program was

customized at California State University, Long Beach to more effectively **target first-generation**

**and economically-disadvantaged students for service**. Participating students attended SI

sessions on a weekly basis and received academic credit. Research studies from 1990 suggest

that **students from less academically-prepared backgrounds benefitted twice as much as**

**traditional students who attended SI.** Results were highest in SI sessions where the SI leader

emphasizes both content mastery and development of critical thinking/study skills in comparison

with SI leaders who focused primarily on mastery of the academic course material.

Ramirez, G. M. (1997). Supplemental Instruction: The long-term impact. Journal of

Developmental Education, 21(1), 2-4, 6, 8, 10, 28.

This study addresses two questions about the impact of Supplemental Instruction (SI) on

students in a large urban university (California State University, Long Beach): 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. A unique

feature of the SI program at Long Beach is that students enroll for a one-unit prebaccalureate

class to gain admission to SI sessions. In this way SI becomes a part of the student&#39;s weekly

schedule and student participation is higher than programs where SI attendance is voluntary.

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 (grade range:

4.0 to 0.0; target course: 2.86 vs. 2.27 and semester GPA: 2.77 vs. 2.49) on traditional students;

however, **it has a substantial impact on performance [2.52 vs. 1.82] and retention [70% vs. 51%]**

**for special-admit students and a definite benefit for underrepresented or underprepared**

students. Low motivated students, as evidenced by their prior college performance, maintained

consistent improvement after SI participation.

Rabitov, E. R., Hoffman, J. L., &amp; Person, D. R. (2005). Supplemental Instruction: The effect of

demographic and academic preparation variables on community college student academic

achievement in STEM-related fields. Journal of Hispanic Higher Education. doi:

10.1177/1538192714568808.

This study evaluated variables associated with academic preparation and student demographics

as predictors of academic achievement through participation in supplemental instruction (SI)

programs for community college students in Science, Technology, Engineering, and Math

(STEM) fields. **The findings suggest a differential impact of SI outcome for students based on**

**gender and ethnicity. Furthermore**, the study underscores the importance of evaluating the

influence of academic achievement and student demographic variables when considering the

development of SI programs on community college campuses.

Okun, A., Berlin, A., Hanrahan, J., Lewis, James, &amp; Johnson, K. (2015). Reducing the grade

disparities between American Indians and Euro-American students in introduction to psychology through small-group, peer-mentored, supplemental instruction. Educational Psychology: An

International Journal of Experimental Educational Psychology, 35(2), 176-191. doi:

doi:10.1080/01443410.2013.849324.

Supplemental instruction (SI) is a small-group, peer-mentored programme which is compatible

with the learning preferences of American Indian students. We tested the hypothesis that SI is a

compensatory strategy that reduces the differences in the grades earned in introduction to

psychology by Euro-American and American Indian students. The sample consisted of 129

American Indian students and 4588 Euro-American students enrolled in introduction to

psychology at a US university. As hypothesised, a multi-level model yielded a **significant (p &lt;**

**.01) interaction between SI and ethnicity on course grade. Whereas for non-SI users, the gap**

**between Euro-American and American Indian students was .71 grade points, for SI users, it was**

**only .15 grade points.** Strategies should be devised for increasing SI visits by students enrolled

in introduction to psychology, particularly those who belong to American Indian tribes.

Munoz-O&#39;Laughlin, J. (2012). Supplemental Instruction as a remedy for the developmental

mathematics university student (Master of Arts thesis), California State University, Dominguez

Hills, Dominguez Hills, CA.

Research was conducted at California State University, Dominguez Hills to determine the

impact of Supplemental Instruction (SI) on underprepared first-year Educational Opportunity

Program (EOP) students&#39; successful completion of mathematics remediation. Course

completion rates were tracked and a chi-square test was used to examine the relationship between the number of SI courses taken and completion of math remediation. Results indicated

that EOP students who participated in the full sequence of SI courses offered completed their

remediation at significantly higher rates than students who did not participate in SI. Requiring

academic support like SI for underprepared students may be an effective way for universities to

increase retention rates. The researcher suggested a follow-up study could include a third group

for comparison, non-EOP students who entered the university at the same lowest math levels

but did not participate in SI. Another issue was understanding the influence of motivation why

the EOP students decided to participate in the full sequence of SI courses and worded hard to

complete the developmental math requirements.

Mitra, S., &amp; Goldstein, Z. (2017). Impact of Supplemental Instruction on business courses: A

statistical study. Informs Transactions on Education, 1-13. doi: doi:10.1287/ited.2017.0178.

Available online: http://pubsonline.informs.org/doi/pdf/10.1287/ited.2017.0178.

Many students in quantitative business courses are struggling. One technique designed to

support such students is Supplemental Instruction (SI), which is most popular in the science,

technology, engineering, and mathematics (STEM) disciplines. In this paper, we show the

positive impact of SI on student performance in two bottleneck business courses in a large

university. Our evaluation results establish that (i) SI has a statistically significant effect on

students’ likelihood of passing both courses (after controlling for background variables), (ii) SI is

more helpful for students identified as at risk than for those who are not, and (iii) it is important

to consistently attend SI sessions for greater success. We also present models to predict

consistent student attendance based on background factors with 90% accuracy and conclude

with a brief qualitative study about students’ self-perception of SI and the professional

development attained by SI leaders.

Millard, M. (1995, 1995, October 19). First African-American to hold post: New Chancellor at

City College helps win $1.67 million grant, The Sun Reporter, p. 1.

This newspaper article describes how Del Anderson, the new Chancellor of San Francisco City

College (CA), will use a $1.67 Title III grant from USDOE to help students in &quot;high risk&quot; courses

and to bring the Internet into the classroom. The chancellor, formerly president of San Jose City

College, mentioned that she had developed many programs for students of color to help them

achieve higher transfer and graduation rates.

Meling, V. B., Kupczynski, L., Mundy, M.-A., &amp; Green, M. E. (2012). The role of Supplemental

Instruction in success and retention in math courses at a Hispanic-serving institution. Business

Education Innovation Journal, 4(2), 20-31. Available online:

http://busedinnovation.com/images/BEI\_Jnl\_Dec\_2012\_text.pdf#page=20.

Student retention has been a challenge for higher education institutions, an urgent issue that

must be reassessed and improved at these institutions. One of the biggest challenges is not

only increasing retention at Hispanic-serving institutions (HSIs), but additionally supporting the

Science, Technology, Engineering, and Math (STEM) courses at these institutions.

Supplemental Instruction (SI) has been confirmed by multiple researchers to increase retention

and academic success among students in higher education, particularly among minority

students. **The purpose of this study was to evaluate and discover the impact SI had on retention**

**and academic success for Hispanic students in mathematics courses at a south Texas HSI. The**

**results showed a significant difference in final course grades and course completion for**

**Hispanic students between select groups. The significant main effect that impacted academic**

**success and course completion among Hispanic students at an HSI was SI participation**.

Meling, V. B. (2012). The role of Supplemental Instruction in academic success and retention at

a Hispanic-serving institution. (Ph.D. dissertation), Texas A&amp;M University.

Student retention has been a challenge for higher education institutions, an urgent issue that

must be reassessed and improved at these institutions. It is essential for many Hispanic-serving

institutions (HSIs) that have a high percentage of Hispanic populations to find ways where they

will support and retain a growing number of minority degree-seeking students. Furthermore, one

of the biggest challenges is not only increasing retention at HSIs, but additionally supporting the

Science, Technology, Engineering, and Math (STEM) courses at these institutions.

Supplemental Instruction (SI) has been confirmed by multiple researchers to increase retention

and academic success among students in higher education, particularly among minority

students. The purpose of this ex post facto study was to evaluate and discover the impact

Supplemental Instruction had on retention and academic success for Hispanic students in

mathematics, chemistry, and physics courses at a south Texas HSI. The sample for the study

consisted of 720 undergraduate Hispanic students who were enrolled in selected gateway

STEM courses, College Algebra, University Physics I, or Inorganic Chemistry I, at this particular

Hispanic-serving institution during the 2009-2010 academic year. Data collected for all students

in the sample included student demographic information, SI attendance, final course grade, and

course completion rates. Based on attendance data, students were classified into three SI

attendance levels: non-SI, low, and high attendance. **The results showed a significant difference**

**in final course grades and course completion for Hispanic students between select groups**.

There was a significant difference between the non-SI group (0 sessions) and the low (1-10

sessions) level of SI participants in math, chemistry, and physics. There was also a significant

difference between the non-SI group (0 sessions) to high level (11 and more) of SI participants

in math, chemistry, and physics. There was no significance between the low to high SI level

groups. The significant main effect that impacted academic success and course completion

among Hispanic students at an HSI was SI participation. The study helps provide insight into the

effectiveness of SI at a Hispanic-serving institution, particularly with Hispanic students. It also contributes to the existing research that shows that SI is an effective student success

intervention in improving academic success and course retention among Hispanic students in

STEM related courses.

Meling, V., Mundy, M.-A., Kupczynski, L., &amp; Green, M. E. (2013). Supplemental Instruction and

academic success and retention in science courses at a Hispanic-serving Institution. World

Journal of Education, 3(3), 11-23. doi: 10.5430/wje.v3n3p11 Available online:

http://sciedu.ca/journal/index.php/wje/article/view/2711/1688.

This study provides insight into the effectiveness of Supplemental Instruction (SI) at a Hispanic-

serving institution (HSI), particularly with Hispanic students. The United States Department of

Education (2010) defines an HSI as having a 25% or greater full-time, Hispanic student

enrollment and 50% or more of all students are eligible for need-based financial aid. It is

essential for many Hispanic-serving institutions (HSIs) that have a high percentage of Hispanic

populations to find ways where they will support and retain a growing number of minority

degree-seeking students. One of the biggest challenges for HSIs is not only increasing

retention, but additionally supporting the Science, Technology, Engineering, and Math (STEM)

courses at these institutions. The study contributes to the existing research that shows that SI is

an effective student success intervention in improving academic success and course retention

among Hispanic students in STEM related courses. The results showed a significant difference

in academic success and course completion among Hispanic students at an HSI with SI

participation in Chemistry and Physics courses.

Martin, D. C., &amp; Arendale, D. R. (1992). Review of research on Supplemental Instruction. In D.

C. Martin &amp; D. Arendale (Eds.), Supplemental Instruction: Improving first-year student success

in high-risk courses (2nd ed., pp. 19-26). Columbia, SC: National Resource Center for The

Freshman Year Experience and Students in Transition. Available online: ERIC database.

(ED354839).

This chapter compares a national research study concerning the effectiveness of Supplemental

Instruction with studies from the University of Missouri-Kansas City. The National Center for SI

collects SI data from a diverse sample of higher education institutions from across the U.S. The

national study included data from 49 institutions that had offered SI in 1,477 courses of diverse

curriculum areas. The findings suggest that SI participants in comparison with non-SI

participants earn higher final course grades (2.46 vs. 2.12), earn a higher percent of A and B

final course grades, and receive a lower percent of D, F and withdrawal final course grades

(23% vs. 38%). Data collected from 1980 to 1992 in 217 courses with an enrollment of 9,365

students at UMKC confirms the national studies. Additional studies conducted at UMKC

suggested higher academic achievement for SI participants with reenrollment (90.0% vs. 81.5%

) and graduation rates (30.6% vs. 18.2%). Several studies from UMKC studied the potential

impact of student motivation levels, ethnicity, and previous levels of academic preparation.

These were not found to have a statistically significant impact upon the research studies.

Malm, J., Bryngfors, L., &amp; Morner, L.-L. (2011). Supplemental Instruction: Whom Does it Serve?

International Journal of Teaching and Learning in Higher Education, 23(3), 282-291. Available

online: http://www.isetl.org/ijtlhe/pdf/IJTLHE1025.pdf.

Supplemental Instruction (SI) is today a well-known academic assistance program that provides

help for students in “difficult” courses. SI has repeatedly been shown to decrease the

percentage of failures in the course as well as increasing course grades for students who

attended SI sessions. Although SI is open for all students, its main objective is to come to terms

with students’ high failure rates and retention problems. And even if SI has been shown to

reduce failure rates and increase reenrollment figures, surprisingly few studies have been

devoted to determine how well it benefits students with different prior academic ability. These

studies tend to show that “weaker” students benefit from SI. The results for “average” and

“strong” students are not as clear. The present study focuses on the benefit of SI for “weak”,

“average,” and “strong” first-year engineering students in a calculus course. The results show

that all three groups benefit from SI and that the failure rates among students with low prior

mathematics achievement who had high SI attendance are almost as low as for students with

high prior mathematics achievement who do not attend SI.

Madyun, N., Grier, T., Brothen, T., &amp; Wambach, C. (2004). Supplemental Instruction in a

personalized system of instruction General Psychology course. The Learning Assistance

Review, 9(1), 7-15.

At the General College in the University of Minnesota the Supplemental Instruction model was

modified to better meet the needs of the TRIO students enrolled in a general psychology

course. Rather than the traditional voluntary attendance model, these students were required to

attend a college credit course that resembled a mandatory version of SI that meet twice each

week throughout the semester. The SI course had six objectives: (a) teach the students to use

the textbook as a primary resource; (b) build critical thinking skills; (c) self-regulation, selfing

monitoring, meta-cognitive awareness, concentration, and peer support; (d) develop peer

support for learning; (e) final exam preparation; and (f) provide explicit instruction and

exercise3s geared toward helping students understand the nature and structure of the

psychology course. A quasi-experimental evaluation design was used. The TRIO students

enrolled in the SI course had higher grades than a comparison group of nonparticipating TRIO

students.

Mack, A. C. (2007). Differences in academic performance and self-regulated learning based on

level of student participation in Supplemental Instruction. (Ph.D. dissertation), University of

Central Florida, Orlando, FL.

This study examined differences in academic performance and self-regulated learning based on

levels of student participation in Supplemental Instruction (SI) sessions in two introductory

undergraduate biology and chemistry courses offered at University of Central Florida in the

Spring 2006 semester. The sample consisted of 282 students enrolled in the biology class and

451 students enrolled in chemistry. Academic performance was measured using students&#39; final

course grades and rates of withdrawal from the courses. The self-regulated learning constructs

of motivation, cognition, metacognition, and resource management were measured using the

Motivated Strategies for Learning Questionnaire (MSLQ). Relationships between students&#39;

gender and ethnic background and levels of SI participation were also analyzed in this research.

Findings in both biology and chemistry courses revealed a statistically significant decrease in

student motivation from beginning to end of semester. In chemistry, frequent SI participants also

showed statistically significantly higher levels of motivation at the end of the semester than

occasional and non-SI participants. There were no statistically significant gains in cognitive,

metacognitive, and resource management strategies from beginning to end of semester.

However, statistically significant differences in resource management were observed at the end

of the semester among SI attendance groups in both courses. Students in the high SI

attendance group were more likely to use learning resources than those who did not participate

regularly or did not participate at all. Statistically significant differences in academic performance

based on students&#39; SI participation were found in both biology and chemistry courses. Frequent

SI participants had significantly higher final percentage grades and were more likely to receive

grades of A, B, or C, than those who either did not attend SI regularly of did not participate at all.

They were also less likely to withdraw from the course than occasional or non-SI participants. In

biology, no relationship between SI participation, gender, and student ethnic background was

found. In chemistry, female students were significantly more likely to attend SI regularly than

males. Chemistry minority students had significantly higher representation among occasional SI

participants. An important implication involved the use of pedagogical approaches that make

lecture classrooms more interactive and encourage student motivation and engagement. This

study could be replicated in other science and non-science courses that offer SI sessions.

Additional factors in the success of SI programs and student motivation can be added, such as

SI leaders&#39; experience and major. Follow-up studies on students who completed the courses

included in this study can be conducted to determine whether they reenrolled in other science

courses, continued attending SI sessions, and gained self-regulated learning skills.

**MacIsaac, D. L., Falconer, K., A, Maglione, C. A., &amp; Masxka, C. (2002). Using Supplemental**

**Instruction to improve minority success in gatekeeper science courses. Conference**

**Proceedings of the 225th American Chemical Society National Meeting, New Orleans, LA.**

This paper provides a post-hoc study of the use of Supplemental Instruction (SI) in the

department of physics at SUNY Buffalo State College (Buffalo, NY). The study examined the

impact of SI with 6,000 students over six semesters. Irrespective of student preparation level,

the SI participants earned higher grades than non-participants. There were significant academic

achievement gaps between the minority and majority student regarding preentry attributes.

These differences were reduced to non-significance for students who participated in SI.

**Qualitative research confirmed the effectiveness for minority students, especially for those who**

**were Native-American.**

Lupkin, M. (1994, 1994, July 28). Linking science to students&#39; lives. This summer program offers

academic aid to minorities., Philadelphia Inquirer Newspaper, p. 3.

This newspaper articles mentions that Supplemental Instruction (SI) is a component in a **special**

**program for minority students at Rutgers University** at Camden (PA) called &quot;Success in the

Sciences.&quot; Students are brought in for a special four-week enrichment program before the

beginning of the freshman year to prepare them for the rigor of courses at Rutgers. SI is offered

in connection with their first-year courses in math, chemistry and biology. The program has

been partly funded with a $500,000 grant from the William Penn Foundation and $50,000 grant

from the Coca-Cola Foundation.

Lindsay, K., Carlsen-Landy, B., Boaz, C., &amp; Marshall, D. (2017). Predictors of student success in Supplemental Instruction courses at a medium sized women’s university. International

Journal of Research in Education and Science, 3(1), 208-217. Available online:

http://dergipark.ulakbim.gov.tr/ijres/article/viewFile/5000202370/5000179703.

Supplemental Instruction (SI) is a program that seeks to improve student success by targeting

classes with high failure rates, as defined with a failure percentage of 30% or more. It is

organized by an administrative SI supervisor who supervises SI leaders, which are students that

have successfully completed the courses that they have been assigned. The SI supervisor also

collaborates with the course instructors who aid in screening the competency of the SI leaders.

Improved self-confidence, teamwork, independence and course performance have been

reported as benefits of SI. This project sought to explore the effect of SI on success and failure,

**along with gender, age and race.** The type of course was also used as a factor in order to

control for it as a confounding variable. In order to ascertain the effect of these variables on

success, a technique called logistic regression was used. Caucasian female students who took

bacteriology and did not attend SI were used as the reference group. Students were about twice

as likely to succeed if they completed the required number of SI sessions and one fifth as likely

to succeed if they were in a SI class and did not meet the minimum number of sessions.

Hispanic students were 40% as likely to succeed, and African American students were about

one third as likely to succeed when compared to Caucasian students. Students between 20 and

29 years old were half as likely to succeed, and those 30 or older were one quarter as likely to

succeed when compared to teen students. Those in algebra were about three times more likely

to succeed than those in bacteriology, chemistry and statistics. When the students that withdrew

were removed, the chances of success were about the same, except for African American

students which were one quarter as likely to succeed, and those that did not meet minimum

sessions were one quarter as likely to succeed. The model explained more variation when the

students that withdrew were included. As SI had a strong influence on success, it should be

considered as a tool to enable retention of students in high risk courses.

Lilley, L. L. (1997). Retention of racial-ethnic minority students within Virginia baccalaureate

schools of nursing (nursing education) [Dissertation, George Mason University, 1997].

Dissertation Abstracts International, 58(07), 3559B.

The purpose of this dissertation research study was to examine the relationship between

retention strategies and retention rates of racial-ethnic minority baccalaureate nursing students

attending public universities and colleges within the State of Virginia. Tinto&#39;s Model of Student

Departure was used as the framework for the study. A cross-sectional one-part mailed survey

design was used for this study. A descriptive methodology was used to summarize and describe

the data. Qualitative comments were also analyzed for themes about retention. Statistically

significant findings included: lack of close tracking of retention of racial-ethnic minority students

by the schools; no statistical significance between the variable of retention problems and the

variables of tutoring for racial-ethnic minority students; and fewer than 37% of the schools had

Supplemental Instruction or related programs available at the department or school level,

although they may have been offered elsewhere on campus.

Levy, T. (1991, 1991, October 14). Students get into the upliftment business, Business Day

Newspaper, p. 10.

This newspaper article describes the use of Supplemental Instruction (SI) at Wits University in

South Africa. The SI program will be started by commerce students at the university. **The SI**

**program will be aimed at assisting Black students who have been disadvantaged by the**

**secondary school system.**

Javaher, N. (2010). Outcome differences in participating and nonparticipating Hispanic students

in Supplemental Instruction classes supporting Organic Chemistry I and II at New Mexico State

University. (Ph.D. dissertation), New Mexico State University, United States.

Lack of academic success by Hispanic students in higher education has caused university

administrators to seek alternative programs to improve rates of retention and their academic

success. Hispanic students are less likely than White students to complete advanced science

classes, including chemistry (National Center for Education Statistics, 2006). With the shortage

of an educated workforce, the nation is dependent on educating the fastest-growing ethnic/racial

population. Of the 17,200 students enrolled in New Mexico State University (NMSU) in fall 2008,

40% were Hispanics, which makes the university a Hispanic-serving institution. Many programs

at the university support Hispanic students, including Supplemental Instruction (SI). This study

investigated whether participation in the SI program was associated with retention and better

course performance among Hispanic students in Organic Chemistry courses at NMSU from

2001 through 2005. The study also examined gender differences among Hispanic students with

respect to SI. The results revealed that participation in SI was, statistically, associated with

retention of Hispanic students in both Organic Chemistry I and II classes and with fewer grades

of D&#39;s and F&#39;s in Organic Chemistry I classes at NMSU during the mentioned semesters. The

examination of gender differences revealed no significant difference; however, it was apparent

that there were more female Hispanics enrolled in life sciences at NMSU compare to male

Hispanics during the semesters of fall 2001 through spring 2005.This study was significant

because it examined a **method to retain Hispanic students in a Hispanic-serving Institution.**

Jacquez, R., Gude, V. G., Hanson, A., Auzenne, M., &amp; Williamson, S. (2007). Enhancing critical

thinking skills of civil engineering students through Supplemental Instruction. Conference

Proceedings of the ASEE.

This conference proceeding describes the use of Supplemental Instruction (SI) at New Mexico

State University with civil engineering students. SI has been offered for these students since

2003. In addition to focusing on enhancement of final course grades, the SI program requires

the students to exercise critical thinking skills as it involves design oriented open-ended problem

solving. SI participants outperformed the nonparticipants through both their work examples as

well as exam scores. There was a dramatic reduction of grades of C-D with a corresponding

increase of final grades of A or B for the SI participants. Surveys of students indicated high

satisfaction with the SI program. **Special attention was paid during the evaluation process for**

**the potential impact of SI with Hispanic and female students. This was important since the**

**institution serves a high percentage of Hispanic students due to its location in New Mexico.**

**Attention was paid for female students since they are historically underrepresented in the**

**engineering degree programs. On both accounts, the Hispanic and female students participated**

**at similar rates in the SI program in comparison with students from other demographic**

**backgrounds.**

Holek, D. D. (2008). The impact of Supplemental Instruction on the retention and graduation of

students of color at &quot;Mid-Western University&quot;. (Ph.D. dissertation), Central Michigan University,

Mount Pleasant, MI.

**Understanding how students of color become socially and academically integrated into college**

**is critical to improving their retention. Although a variety of retention programs exist, programs**

**such as Supplemental Instruction (SI) focus on lowering the rate of attrition by promoting**

**academic success through peer instruction, teaching effective learning methods, and study**

**skills training. A recent study demonstrated that SI significantly improved the GPA for students**

**of color that attended SI sessions at MWU.** It was important to determine if the SI program also

had an impact on the retention and persistence to graduation of students of color at MWU

attending SI. The study site was unique since MWU has the only SI program, nation-wide,

administered in an institutional diversity office. This unique location provided in-depth data on

students of color that will contribute significantly to current research. Although much research

has been conducted in the areas of SI and academic achievement, there has been minimal

research performed analyzing the effect SI has on the retention and graduation rates on the

population of students of color. Given this paucity of research, the purpose of this quantitative

investigation was to fill this research gap by measuring the extent to which there was a

difference between the retention and graduation rates of students of color at MWU who attend

SI to students of color at MWU who do not attend SI. The null hypotheses was that there would

be no significant increase in the retention rate and graduation rate within each group of students

of color who attend SI in comparison to student of color who do not attend SI. This quantitative

investigation involved a causal-comparative, ex post facto method of research, using the

Cochran-Mantel-Haenszel chi-square technique. The population of this investigation included

MWU undergraduate students of color. Archival data for the time period beginning in the Fall

semester of 2001 through the Fall semester of 2002 was utilized in this investigation. The

students&#39; reenrollment and graduation status at the end of the Spring semester of 2007 was

analyzed in the comparison, and collected from the MWU Minority Student Services (MSS)

records and MWU Office of Institutional Research. The F tests were performed on the main

effects for the two factors and the interaction between the two factors. In the post hoc analysis,

three summary Cochran-Mantel-Haenszel (CMH) correlation statistics were used to test for the

hypothesis of no association. Differences were determined to be significant at the associated p -

value of &lt;.0005. This study concluded that SI had a significant impact on the retention and

persistence to graduation for African-American, Hispanic/Latino, and Native American students

at MWU. However, this study concluded that SI did not have a significant impact on the

retention and persistence to graduation for Asian students at MWU. To decipher the reasons for

differences by ethnicity, factors relating to ethnic identity development, learning styles and

academic achievement, self-concept of academic ability, and specific social and cultural

experiences and needs were reviewed to explain how and why these factors play a role in the

academic achievement and retention of students of color. The literature supports that African-

American, Hispanic/Latino, and Native American students often develop networks and support

systems when entering college (i.e., cultural organizations), and having strong and active ties to

the campus community may play a role in increased SI attendance and the impact on retention

and persistence to graduation. Previous research indicated that Asian students are influenced

by three key factors that may contribute to SI attendance not having a significant impact on their

retention and persistence to graduation: experiences with reverse stereotype threat (i.e., living

up to the stereotype that Asian&#39;s are academically superior, making it more difficulty to ask for

assistance, therefore, not attending SI); being influenced by relationships and external forces;

and the reaction and focus on social political consciousness identity development in the college

years. It is important to note that the Asian students graduated at the same rate as the students

from other ethnic groups, indicating they achieved academically through other methods. This

study demonstrated the significance intervention programs such as SI have on retention, and

persistence to graduation of students of color. Measurable data attained from studies such as

this support the acquisition of funding, institutional understanding and buy-in, and continuation

of diversity initiatives and retention programs, such as SI.

Hensen, K. A. (2005). Examining the relationship between Supplemental Instructors (SI) and

student retention at a doctoral extensive institution. (Ph.D. dissertation), Iowa State University,

Ames, IA.

This study tracked 3,286 students over a five-year period who were enrolled in entry-level

biology, chemistry, mathematics, and physics courses offering SI in the fall 1999 to see if they

were retained or graduated at a Midwestern doctoral extensive institution and identified which

predictor variables (demographic, achievement, and level of SI participation) most significantly

predicted student retention or graduation. Chi-square analysis, based on two-way contingency

tables indicated that SI participants are retained at higher rates than non-SI participants while

having lower mean ACT composite scores and fewer semesters of high school preparation in

calculus, chemistry, and physics. Backward stepwise multiple logistic regression analysis was

used to determine that the most significant predictor of student retention/graduation was high

school rank. Positive predictors for the various disciplines across the five year period included

the number of SI sessions attended the number of transfer credits earned, and the number of

semesters of high school calculus, chemistry, or physics. **Negative predictors of student**

**retention or graduation included Pell Grant eligibility and being a member of ethnic minority**

**group.** The results of this study, in addition to making a significant contribution to literature on

retention and SI, also have implications for institutional practice. Specifically, this study provides

a model for evaluating SI programs or other academic support programs to demonstrate how

the program helps retain students. The findings also may be used to inform institutional leaders,

policymakers, and the public about how SI is a useful tool to retain students and encourage the

expansion of SI programs to meet the needs of additional learners.

Flores, K. (2018). Effect of Supplemental Instruction in a community college. Paper presented at

the 2019 Southern California Conference for Undergraduate Research. Available online:

https://www.sccur.org/sccur/FALL\_2018\_CONFERENCE/MULTIDISC\_TALKS/7/.

Community colleges provide an accessible pathway to complete higher education for many

students. Researchers found that within a cohort of nationally representative students who

enrolled in postsecondary educational institutes, only 12% of those who first enrolled in public

two-year institutions obtained a bachelor&#39;s degree within six years; however, 54% of students

who were enrolled at four-year institutions had received their bachelor’s degree within six years.

This is troublesome, as within the California Community College System the majority of

incoming students express interest in transferring but only 4% transfer within 2 years, 25%

within 3 years, and 38% within six years. Some of the strongest positive predictors of transfer

from a community college to a four-year institution include cumulative grade-point-average

(GPA) and cumulative credits. Among community college students, remediation in math courses

have a negative effect on bachelor’s attainment. This may be a result of different academic and

financial resources across community college campuses compared to four-year institutions.

Supplemental Instruction (SI), created by the University of Missouri-Kansas, is a peer-led

academic support program in which students participate in discussion groups outside of the

class. SI has been consistently correlated with academic success across multiple disciplines

including but not limited to Science Technology Engineering and Math (STEM), humanities, and

social science courses. **The current study examines the effect of SI in one community college.**

**The effect of SI will be examined across different groups of students including disproportionately**

**impacted students and first-generation college students.** The effect of SI will also be examined

across different courses, including remedial courses as well as STEM and non-STEM courses.

Existing SI data is currently being analyzed.

Fallon, D. M. (2005). An analysis of academic assistance programs on at-risk students at the

United States Naval Academy. (Master&#39;s of Science thesis), Naval Postgraduate School,

Monterey, CA. Available online: http://stinet.dtic.mil/cgi-

bin/GetTRDoc?AD=ADA435690&amp;Location=U2&amp;doc=GetTRDoc.pdf

The purpose of this research is to examine the impact of academic assistance programs on at-

risk students at the United States Naval Academy. Each year, students determined to be at-risk

are enrolled in an academic assistance program known as the Plebe Intervention Program. In

addition, other academic assistance programs are available to these students. In particular, the

Naval Academy administers a program known as the Midshipmen Group Study Program, which

is based on the Supplemental Instruction model. This study examines the impact of participation

in each of these programs as a determinant to persistence beyond the freshman year. Other

determinants examined included demographics (**ethnicity and gender**), course grades, athletic

status, and preadmittance data (SAT scores).

Eroy-Reveles, A. A., Hsu, E., Rath, K. A., Peterfreund , A. R., &amp; Bayliss, F. (2019). History and

Evolution of STEM Supplemental Instruction at San Francisco State University: A Large, Urban,

Minority-serving Institution. In Z. S. Wilson-Kennedy, G. S. Byrd, E. Kennedy &amp; H. T. Frierson

(Eds.), Diversity in Higher Education (Vol. 22): Emerald Publishing Available online:

https://www.emerald.com/insight/content/doi/10.1108/S1479-364420190000022010/full/html.

Supplemental Instructions (SIs) were introduced into the San Francisco State University College

of Science &amp; Engineering curriculum in 1999. The goal was to improve student performance and

retention and to decrease the time to degree in STEM majors. While for the most part we

followed the structure and activities as developed by the International Center for Supplemental

Instruction at the University of Missouri, Kansas City, we discovered several variations that

significantly improved our outcomes. First and foremost, we created SI courses that require

attendance, which results in higher students’ performance outcomes compared to drop-in

options. Second, at SFSU the SI courses are led by pairs of undergraduate student facilitators

(who are all STEM majors) trained in active learning strategies. Each year, more than half of our

facilitators return to teach for another year. Thus, each section has a returning “experienced”

facilitator who works with a new “novice” facilitator. Third, the SI courses were created with a

distinct course prefix and listed as courses that generate revenue and make data access

available for comparison studies. Results are presented that compare **SI impact by gender and**

**with groups underrepresented in STEM disciplines**.

Englert, A. (2016). Addressing student performance in the classroom: A case study of the

University of Alaska Fairbanks Supplemental Instruction program. (Ph.D. dissertation),

University of Alaska Fairbanks.

The Supplemental Instruction (SI) program, developed and headquartered at the University of

Missouri Kansas City, is a peer-to-peer mentorship program that seeks to aid post-secondary

education students in passing historically difficult courses. The University of Alaska Fairbanks

Supplemental Instruction program was established in 2003, and to date no external study has

been completed as to its effectiveness despite the university’s unique student population. To

empirically evaluate the program’s main user groups and impact on final course grade, three

models were created: a probit model identified the demographic factors that led to a student

self-selecting to participate; a negative binomial regression model was used to predict the

number of SI sessions students attended; and an ordered probit model quantified the effect of

SI attendance on final course grades. The results suggest that the program had a positive

impact on final grades, with SI attendees being approximately 92% more likely to receive an A,

and 94% less likely to receive a D or an F, than non-attendees. Older and married students

were consistently found to be more likely to participate, as were students with large high school

grade point averages. However, **minority males** were found to be almost 9% less likely to

participate in SI than their white male counterparts.

Eddy, S. L., &amp; Hogan, K. A. (2014). Getting under the hood: How and for whom does increasing

course structure work? CBE-Life Sciences Education, 13(3), 453-468. Available online:

http://www.lifescied.org/content/13/3/453.full.pdf+html.

At the college level, the effectiveness of active-learning interventions is typically measured at

the broadest scales: the achievement or retention of all students in a course. Coarse-grained

measures like these cannot inform instructors about an intervention’s relative effectiveness for

the different student populations in their classrooms or about the proximate factors responsible

for the observed changes in student achievement. In this study, we disaggregate student data

**by racial/ethnic groups and first generation status** to identify whether a particular

intervention—increased course structure—works better for particular populations of students.

We also explore possible factors that may mediate the observed changes in student

achievement. We found that a “moderate-structure” intervention increased course performance

for all student populations, but worked disproportionately well for black students — halving the

black–white achievement gap—and first-generation students — closing the achievement gap

with continuing-generation students. We also found that students consistently reported

completing the assigned readings more frequently, spending more time studying for class, and

feeling an increased sense of community in the moderate-structure course. These changes

imply that increased course structure improves student achievement at least partially through

increasing student use of distributed learning and creating a more interdependent classroom

community

Dawson, P., van der Meer, J., Skalicky, J., &amp; Cowley, K. (2014). On the effectiveness of

Supplemental Instruction: A systematic review of Supplemental Instruction and Peer-Assisted

Study Sessions literature between 2011-2010. Review of Educational Research, 20(10), 1-31.

doi: 10.3102/0034654314540007. Available online:

http://dro.deakin.edu.au/eserv/DU:30070540/dawson-ontheeffectiveness-post-2014.pdf.

Supplemental instruction (SI)—variously known as peer-assisted learning, peer-assisted study

sessions, and other names—is a type of academic support intervention popular in higher

education. In SI sessions, a senior student facilitates peer learning between undergraduates

studying a high-risk course. This article presents a systematic review of the literature between

2001 and 2010 regarding the effectiveness of SI. Twenty-nine studies met the inclusion criteria.

Due to methodological heterogeneity and lack of consistency defining the SI treatment,

qualitative synthesis methods were applied. For seven included studies, however, an effect size

of SI participation on final grades was calculated, ranging from d = 0.29 to d = 0.60. The findings

of the review are consistent with claims validated by the U.S. Department of Education in

the1990s that participation in SI is correlated with higher mean grades, lower failure and

withdrawal rates, and higher retention and graduation rates. Specifically, those three claim

statements were: 1. Students participating in SI within the targeted high-risk courses earn higher

mean final course grades than students who do not participate in SI. This finding is still true

when analyses control for ethnicity and prior academic achievement. 2. **Despite ethnicity and**

**prior academic achievement, students participating in SI within targeted high-risk courses**

**succeed at a higher rate (withdraw at a lower rate and receive a lower percentage of [fail] final**

**course grades) than those who do not participate in SI.** 3. Students participating in SI persist at

the institution (reenroll and graduate) at higher rates than students who do not participate in SI.

Dancer, D., Morrison, K., &amp; Tarr, G. (2015). Measuring the effects of peer learning on students&#39;

academic achievement in first-year business statistics. Studies in Higher Education, 40(10),

1808-1828. doi: 10.1080/03075079.2014.916671. Available online:

http://srhe.tandfonline.com/doi/pdf/10.1080/03075079.2014.916671?needAccess=true.

Peer-assisted study session (PASS) programs have been shown to positively affect students&#39;

grades in a majority of studies. This study extends that analysis in two ways: controlling for

ability and other factors, with focus on international students, and by presenting results for

PASS in business statistics. Ordinary least squares, random effects and quantile regression

models have been used to model data from first-year business statistics students. The findings

indicate that the impact of PASS has remained highly significant in both years for both local and

international students but is more pronounced for international students. We also find that lower-

achieving students derive a higher marginal benefit from attending PASS than higher-achieving

students using quantile regression. These findings are significant for institutions implementing

similar programs as well as institutional efforts to enhance student performance and improve

student retention, **or specifically to support international students more effectively**.

Curtis, E., Wikaire, E., Kook, B., Honey, M., Kelly, F., Poole, P., . . . Reid, P. (2014). What helps

and hinders indigenous student success in higher education health progammes: A qualitative

study using the Critical Incident Technique. Higher Education Research &amp; Development, 34(3),

486-500. doi: 10.1080/07294360.2014.973378.

Tertiary institutions aim to provide high quality teaching and learning that meet the academic

needs for an increasingly diverse student body including indigenous students. **Tātou Tātou is a**

**qualitative research project utilising Kaupapa Maori** research methodology and the Critical

Incident Technique interview method to investigate the teaching and learning practices that help

or hinder Maori student success in non-lecture settings within undergraduate health

programmes at the University of Auckland. Forty-one interviews were completed from medicine,

health sciences, nursing and pharmacy. A total of 1346 critical incidents were identified with

67% helping and 33% hindering Ma¯ori student success. Thirteen sub-themes were grouped

into three overarching themes representing potential areas of focus for tertiary institutional

undergraduate health programme development: Māori student support services, undergraduate

programme, and Ma¯ori student whanaungatanga. Academic success for indigenous students

requires multi-faceted, inclusive, culturally responsive and engaging teaching and learning

approaches delivered by educators and student support staff.

Carter-Hanson, C., &amp; Gadbury-Amyot, C. (2016). Implementing Supplemental Instruction online

to create success in high-stakes coursework for pre-doctoral dental students. Supplemental

Instruction Journal, 2(1), 53-75. Available online: http://info.umkc.edu/si/wp-

content/uploads/2016/09/siJ-Volume-Two-Issue-One.pdf.

There is a critical shortage of culturally diverse dental practitioners in the United States. In

addition, many underrepresented minority (URM) and disadvantaged students have difficulty

with the course material needed to pursue a dental degree. One strategy for helping students

achieve higher grades and persist in difficult course work is the implementation of Supplemental

Instruction (SI). The purpose of this study was to describe the outcomes of using SI online for

the first time as part of the University of Missouri-Kansas City, School of Dentistry’s (UMKC-

SOD) Admissions Enhancement Program (AEP). The AEP program was designed to provide

URM and disadvantaged pre-dental students with increased academic skills training in Biology,

Chemistry, Organic Chemistry, and Math via online modules. Students met with their SI Leader

three times per week at a specified time in a synchronous format to review course material,

problem solve, and work collaboratively with fellow classmates. Twelve URM and

disadvantaged students participated in the AEP from 2011 to 2014 for a total of 48. Success in

the AEP was measured by an increase the student’s Dental Admission Test (DAT) score and

admission to dental school. At the end of each year’s program, students completed a survey

regarding all aspects of the AEP. The study found that AEP students who were admitted to

dental school had a significantly higher DAT score than those students who were not admitted.

Students also reported that the required time for SI sessions and test taking instruction helped

them prepare for the DAT. Over 72% of students responded favorably that SI contributed to

their success in the AEP and to taking the DAT. Students reported that attending the SI

sessions helped them work through problems in the course material**. This study found evidence**

**that SI is a viable strategy for helping URM and disadvantaged students be successful in high**

**stakes courses needed to move forward and pursue health profession degrees.** SI sessions

were conducted using Blackboard Collaborate, a synchronous two-way audio-video platform

allowing online users to “meet” in real time. Prior to starting the online modules, students and SI

Leaders completed an online training session for navigating the Blackboard Collaborate

interface. Upon completion of the training sessions, students were given access to the module

material 24/7.

Buchanan, E. M., Valentine, K. D., &amp; Frizell, m. L. (2018). Supplemental Instruction:

Understanding academic assistance in underrepresented groups. Learning, Instruction, and

Cognition, 288-298. doi: 10.1080/00220973.2017.1421517.

Student retention rates are increasingly important in higher education. Higher education

institutions have adopted various programs in the hopes of increasing graduation rates and

grade point averages (GPAs). One of the most effective attempts at improvement has been the

Supplemental Instruction (SI) program. We examined our SI program relative to three facets:

attendance, attendance&#39;s influence on final scores, and graduation rates for students who had

participated in these courses. **These questions were also investigated focusing on specific**

**comparison groups, as we looked into how these effects differed for minority students and**

**nontraditional students compared with those of White and traditional peers.** Overall, SI

attendance led to positive outcomes— increased final course grades and graduation

rates—even after adjusting for previous achievement.

Arendale, D. R., &amp; Martin, D. C. (1997). Review of research concerning the effectiveness of

Supplemental Instruction from the University of Missouri-Kansas City and other institutions.

Unpublished manuscript. The University of Missouri-Kansas City. Kansas City, MO. Available

online: ERIC database. (ED370502).

This report provides both a narrative overview of the Supplemental Instruction (SI) model and a

review of the major research studies concerning SI. A major portion of the research concerns a

meta-analysis of SI research from 270 institutions from across the U.S. The analysis reviewed

4,945 research studies of 505,738 college students between 1982-83 and 1995-96. Regardless

of institutional type or academic discipline, SI participants in comparison with non-participants

receive mean final course grades that are higher (2.42 vs. 2.09), higher rates of A or B final

course grades (46.8% vs. 35.9%) and mean percentages of D, F and withdrawal rates that are

lower (23.1% vs. 37.1%). Even when the data is separated by broad academic disciplines or

individual departments or classes, the positive differences for SI participants remain. In a

national study of 13 institutions and 2,410 students, the question of helpfulness of SI for

students of color was examined. The study found that students of color participated in SI at

rates equal or exceeding those of White students (White, 33.8%; African American, 42.0%;

Latino, 50.9%; Asian/Pacific, 33.3%; and Native American, 42.9%). Students of color received

higher grades than similar students (2.02 final course grade vs. 1.55, rate of 36% for D, F, or W

vs. 43% for non-SI participants). Studies from the University of Missouri-Kansas City mirror

those from the national studies. A study of UMKC that examines 375 courses with an enrollment

of 14,667 students year by year from 1980-81 to 1995-96 found that SI participants earned high

mean final course grades, higher rates of A and B final course grades and lower rates of D, F

and course withdrawals. In a Winter 1996 study concerning the potential bias of student

motivation the results favored the SI participants. SI participants received: final course grade of

2.78, rate of 58.9% for final grades of A or B, rate of 17.2% for D, F or W. The non-SI

motivational control group received lower levels of academic achievement: final grade of 2.16,

33.9% A or B, and 26.8% for D, F or W. All other non-SI participants received grades similar to

the motivated non-SI group: final grade of 2.38, A or B rate of 42.7%, and 38.6% D, F or W. In a

study of UMKC students separated into quartile groups on the basis of standardized entrance

test scores, the SI participants outperformed their non-SI counterpart quartile group in nearly all

comparisons. Top quartile: SI group 3.29 final course grade vs. 2.83 for non-SI, 92.9%

reenrollment vs. 93.1% for non-SI; Middle two quartile groups: SI group 2.67 vs. 2.28, 90.5%

reenrollment vs. 77.9% for non-SI; Bottom quartile: SI group 2.10 final course grade vs. 1.77 for

non-SI, 85.6% reenrollment vs. 77.9% for non-SI. A study of SI attendance during Winter 1996

suggested a positive correlation between higher academic achievement and higher levels of SI

attendance: no SI attendance: 2.37 final course grade, 42.2% A or B, 39.3% D, F or W;

attended one to three times: 2.77, 56.3% A or B, 21.4% D, F or W; attended four to seven times:

2.82 final course grade, 63.0% A or B, 17.4% D, F or W. In a study of UMKC students who were

first-time freshmen students in 1989, SI participants had graduated at a rate of 46.0% by Fall

1996 as compared with 30.3% of students who had never participated in SI. Other studies

include research questions concerning demographic variables and rival hypotheses.

Arendale, D. R. (1993). Fostering multicultural education with a learning assistance model that

works: Supplemental Instruction. Unpublished manuscript. The University of Missouri-Kansas

City. Kansas City, MO. Available online: http://www.arendale.org/storage/pdf-

documents/peer/SIMULTX.pdf

This paper describes the use of Supplemental Instruction (SI) to serve as a part of a campus

multicultural education program. Since the primary focus of SI sessions is on the academic

content, the sessions attract students of different ethnicities and cultures who share a common

concern for improving their personal academic performance in the course. Cultural differences

naturally emerge as students deal with the common academic task and they share their

perspectives concerning the academic material from their personal and cultural point of view.

The small group allows students to see a multiplicity of realities concerning the academic

content. Some researchers argue that collaborative learning environments -- such as provided

through SI sessions -- are more conducive for learning of students from diverse cultures. This is

because some are field sensitive learners and find the traditional classroom environment of

abstract learning unhelpful and find opportunity during SI sessions to make connections

between the course material and their personal frame of reference. Included in the article is a

research study directed by May Garland and partially funded by the National Association for

Developmental Education. The study included 3 institutions across the U.S. regarding academic

performance of students separated by ethnicity. Students of color participated at rates equal to

or exceeded rates of White students in SI sessions. Students of color who participated in SI

received mean higher final course grades than students of color who chose not to participate.

The results were the same regardless whether the group was all students, top quartile, and

bottom quartile.

Abraham, N., &amp; Telang, N. (2019). Effectiveness of the Supplemental Instruction program in

first-year engineering courses - A longitudinal report (2015 - 2018). Paper presented at the 2019

ASEE Annual Conference &amp; Exposition, Tampa, FL. https://peer.asee.org/32692.

This Complete Research Paper examines the effectiveness of the Supplemental Instruction (SI)

program implemented at our university in first year engineering courses from its inception in

2015 through 2018. As student retention and four-year graduation rates are of institutional and

national interest and frequently referred metrics for college success, the historically successful

and well-studied Supplemental Instruction (SI) program was introduced in 2015 through a

collaboration between the School of Engineering and the campus Learning Center. The

supported courses included, Introduction to Electrical Engineering, and Introduction to

Computing. These are required courses for the Electrical and Computer engineering students at

the university, and report high percentages of D’s, F’s, Q’s (drops), and W’s (withdraws). In the

fall of 2016 this program was expanded to the Network Analyses course in the Biomedical

Engineering department at the university. To improve academic success, the Supplemental

Instruction (SI) program provides optional, non-remedial sessions designed to deliver content

review and additional practice opportunities while developing transferable skills to benefit the

student in all coursework at the institution. The SI program is an academic support program

created in 1973 at the University of Missouri in Kansas City, to improve grades in traditionally

“difficult” classes, promote student retention and increase graduation rates. In the thirty years

since its creation, it has become widespread and is considered an effective academic support

model (Dawson et al., 2014). The program uses a peer-assisted learning model to review class

material and develop transferable study skills. SI leaders, undergraduates who have completed

the course successfully, are selected for interest in teaching and learning, offer two sessions per

week that incorporates peer and collaborative learning strategies married with course material

review. This report provides a longitudinal view of the effects of SI, an examination of aspects of

the program that are successful and areas for improvement, as well as provide evidence for

expansion to other courses. The study utilizes a mixed-methods approach, incorporating

quantitative data relating to grades and attendance with qualitative data relating to student

perceptions about SI. Over the course of three years, the collaborators have collected multiple

types of data, including students’ SI session attendance and academic performance in the

current course, as well as subsequent courses and semesters, students’ demographic data, and

the D’s, F’s, W’s and Q drop rates (QDFW rates) for attendees and non-attendees. Qualitative

data was collected in the form of surveys administered to attendees from 2015-2018. An

analysis conducted for every semester starting in 2015 showed a minimum of 15 percent

decrease in QDFW rates for SI attendees (students who attended 2 or more sessions) vs. non-

SI attendees (students who attended 0 or 1 session). In spring semesters, the difference was

even more pronounced, with SI attendees’ QDFW rates at minimum being less than half of that

for non-SI attendees (see the Table 1 below). In 2017, the collaborators were able to compare

students with similar SAT scores and found a more pronounced positive effect on end of

semester course GPA for those students who had low SAT scores and attended SI regularly

compared to those who did not attend. As the SI program’s effectiveness is assessed by aiming

to reduce the QDFW rates in first year engineering courses and in turn retain more students to

the ECE program, especially those students who are most at risk (**first generation, women, non-**

**dominant, etc.**), we plan to provide an in-depth analysis of how the SI program affects these

specific demographics, as well as compare students outcomes in the three year period using

SAT scores for a more accurate reflection of the effects of SI. Table 1: % DFQW for Introduction

to Electrical Engineering Non SI SI Fall 2015 11.6% 9.3% Spring 2016 44% 16% Fall 2016

17.2% 4.7% Spring 2017 25.7% 0% Fall 2017 12.7% 9.35% Spring 2018 27.9% 9.5%