

Arendale, D. R. (1996). *Front loaded academic support: Supplemental Instruction in two-year colleges*. Unpublished manuscript. The University of Missouri-Kansas City. Kansas City, MO.
www.arendale.org/storage/pdf-documents/peer/SI2YR.pdf

This paper describes the role of Supplemental Instruction (SI) in providing academic support for new students in two-year colleges. Included are both interviews with campus SI Supervisors at two-year institutions across the U.S. and a data study of SI at 59 two-year public institutions that offered SI in 480 courses with an enrollment of 23,979 students. The data suggests that SI participants earn a final course grade that is half a letter grade higher than non-participants. In addition to examining the data in aggregate, similar findings occur when the data is separated by academic disciplines.

Arendale, D. R. (1997). *Supplemental Instruction: Review of research concerning the effectiveness of SI from The University of Missouri-Kansas City and other institutions across the United States*. Conference Proceedings of the 18th Annual Institutes for Learning Assistance Professionals, Tucson, AZ. (ERIC Document Reproduction Service ED457797). www.lisched.net/?page_id=1044

This paper provides a narrative overview of the Supplemental Instruction (SI) model and a review of the major research studies concerning SI. The studies are based on data from the University of Missouri-Kansas City and a separate data base of nearly 5,000 research reports describing the use of SI at 270 institutions with a total student enrollment of more than 500,000 in the classes where SI was offered.

Arendale, D. R., & 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 Unpublished manuscript.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. 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.

Barrett, M., Sutcliffe, P., & Smith, B. (1994, 1994). *Students as mentors: The case of management education*. Conference Proceedings of the Proceedings of the Conference of the Australian and New Zealand Academy of Management, Wellington, Australia.

This paper describes the use of Supplemental Instruction (SI) to have advanced-level students (peer mentors) help commencing students (mentees) overcome the teaching and learning problems often associated with large lecture-based introductory courses in management in several courses at Queensland University of Technology (Australia). "Management and Organization" has the primary focus for this study. Students who attended six or more sessions had significantly higher final course grades than those who attended less than six times. It appears that motivation or self-selection was not a major variable since the students who attended six or more times had a similar academic profile to students who did not attend at the same frequency. Surveys of students suggested that the mentoring program helped them to develop new study strategies and approach the material in a more effective manner. Mentors reported that they improved their interpersonal communication skills, ability to manage group dynamics, and enhanced their personal study skills.

Beasley, C. J. (1997). *Students as teachers: The benefits of peer tutoring*. Conference Proceedings of the 6th Annual Teaching Learning Forum, Murdoch University.

Supplemental Instruction (SI) has been customized for use at several institutions in Australia. Program results for SI participants include: improved understanding and performance in the subject area involved, improved confidence and study skills, as well as on-going friendships. SI leaders also report improvement in content knowledge and personal skills. This paper focuses quantitative and qualitative analysis concerning the use of SI at Murdoch University with business students in 1995. The two courses studied were Principles of Commercial Law and Introduction to Accounting. Many of the participants were international students.

Bin Ibrahim, M. D., & Aaijaz, N. . (2011). Dynamics of peer assisted learning and teaching at an entrepreneurial university: An experience to share. . *International Journal of Humanities and Social Science*, 1(12), 93-99.

The process of Peer Assisted Learning (PAL) is a situation in which "people from similar social groupings who are not professional teachers help each other to learn and learn themselves by teaching. It is this reciprocity of learning among other things that makes PAL such an attractive idea to educationists. One mission of the FKP (in Malay language - Fakulti Keusahawanan dan Perniagaan) i.e. Faculty of Entrepreneurship and Business at University Malaysia Kelantan is to teach a curriculum developed on the model of "Continuous or Lifelong Learning Process" and "Learning Outcomes" (LO) for students with the help of novel processes like PAL, Collaborative Learning, PBL (Problem Based Learning) etc. We prepare our undergraduate students for successful transition into the entrepreneurial world. For this reason, most of our teaching experience at the University has been focused in this area. Noteworthy researches done in this area are - Jean Piaget (1896-1980), a Swiss psychologist, whose cognitive development theories have been widely discussed in both psychology and educational fields, identified that students must be active agents in creation of their own knowledge. Lev Vygotsky, a Russian psychologist, was interested in applying Marxist social theory to individual psychology (1978). Vygotsky's research also differentiated between our higher and lower mental functions conceiving our lower or elementary mental functions to be those functions that are genetically inherited, our natural mental abilities. In contrast, he saw our higher mental functions as developing through social interaction, being socially or culturally mediated (Wertsch, 1991:18)

Brookshire, R. G., & Palocsay, S. W. (2005). Factors contributing to the success of undergraduate business students in management science courses. *Decision Sciences: Journal of Innovative Education*, 3(1), 99-108.

This article examines the use of Supplemental Instruction (SI) in an introductory management science course that has been historically-difficult within the business school curriculum. This study uses multiple regression to examine the potential usefulness of SI to meet the needs of the students.

Capstick, S., Aisthorpe, A., Fleming, H., Haynes, S., & Spiers, M. (2003). *Peer assisted learning in Business Education: Innovative student support with wide-ranging benefits*. Unpublished manuscript. Bournemouth University. Bournemouth, United Kingdom.

Peer Assisted Learning (PAL), an adaptation of the Supplemental Instruction (SI), was used at Bournemouth University (United Kingdom) in the Business School. The manuscript describes the PAL program, short history of the introduction of SI to the United Kingdom, theories of group and individual learning, and operational issues associated with implementing the PAL program. PAL is offered by 80 PAL leaders in 13 courses: computing, conservation sciences, hospitality, business information technology, business information systems management, communication, and law.

Capstick, S., & Fleming, H. (2002). Peer assisted learning in an undergraduate hospitality course: Second year students supporting first year students in group learning. *Journal of Hospitality, Leisure, Sport, and Tourism Education*, 1(1), 69-75.

This article describes the use of Peer Assisted Learning (PAL) in the Management Foundation Course within the School of Services Industries at Bournemouth University (United Kingdom). The PAL program is an

adaptation of the Supplemental Instruction (SI) program. The article first provides an overview of the PAL program and how it has been adapted from the SI model for use within the UK education system.

Carr, R. A., Evans-Locke, K., Abu-Saif, H., Boucher, R., & Douglass, K. (2018). Peer-learning to employable: learnings from an evaluation of PASS attendee and facilitator perceptions of employability at Western Sydney University. *Journal of Peer Learning*, 11(1), 41-64.
www.ro.uow.edu.au/cgi/viewcontent.cgi?article=1127&context=ajpl.

This study examines student experiences of Peer Assisted Study Sessions (PASS) at Western Sydney University (WSU), investigating attendee and facilitator perceptions of the relationship between peer-learning and employability. It defers to contemporary higher education scholarship and related sector definitions of employability as an objective criteria for evaluating outcomes which may result from student experiences with PASS. This investigation observes the extent to which such definitions are evident in the skills and attributes students have acquired via their participation in PASS through both quantitative and qualitative research. Quantitative and qualitative data was collected across two consecutive semesters at WSU (Autumn and Spring) in 2015. Survey responses were collected from 297 PASS attendees and 45 PASS facilitators, further incorporating data collected via focus groups with 46 PASS attendees. The evidence allowed the researchers to examine how students perceived they had gained attributes from PASS that render them more employable. The research results highlight the benefits and limitations of the methods utilised to collect data from PASS participants, and this article elaborates key insights gained as a result of the research process that may be useful to peer-learning practitioners beyond WSU. The study found that attendees and facilitators of the WSU PASS program perceive that the program contributes to student employability in a variety of ways such as improving participants' core technical skills, organisational skills, social skills, professionalism and business acumen, appreciation of mentoring, and critical thinking skills.

Clulow, V. G. (2000). An analysis of a peer tutoring experience in a first-year business subject. *Journal of Institutional Research*, 9(1), 89-99.

This article describes a study of the use of Supplemental Instruction (SI) in an introductory business course in Australia called statistics for marketers. This study focused on the students' perceptions of the influence of SI as a learning strategy. Positive outcomes for the participating students included: freer flow of questions about the course material, less inhibition to participate in the discussion, greater confidence that they problems were not isolated, better understanding of the course material, environment to express their questions in an unhurried manner and know that they were heard, and finally the opportunity to work through a problem until they had understood it.

Couchman, J. A. (1997). *Report on the pilot study of the Supplemental Instruction program: 51002 Introduction to Accounting*. Unpublished manuscript. University of Southern Queensland. Toowoomba, Queensland, Australia.

A 1997 research study at the University of Southern Queensland (Toowoomba, Queensland, Australia) involved all enrolled students in Introduction to Accounting (51002). By use of the external student cohort as a control group, it was claimed by the researchers that Supplemental Instruction resulted in a positive impact on the overall pass rate for the unit, raising it from 39% in 1996 to 55% in 1997. SI participants averaged 1.15 of a grade point higher on a 7 GPA scale than non-participants. SI participants were: only one-third as likely to fail; nearly four times more likely to gain an HD, approximately equally likely to gain an A grade; over twice as likely to gain a B grade; and three-quarters as likely to gain a C grade than non-participants. When examining a subpopulation of international students, they had a 78% pass rate compared with 48% for those international students who did not participate.

Couchman, J. A. (1997). *Supplemental Instruction: Peer mentoring and student productivity*. Conference Proceedings of the Researching education in new times, Brisbane, Toowoomba, Australia.

The Supplemental Instruction (SI) program was implemented in a first year accounting subject (51002: Introduction to Accounting) in the Faculty of Commerce at the University of Southern Queensland (Australia). The results, in both quantitative and qualitative terms supported the utility of SI regarding student achievement and higher institutional revenue. While the failure rate did not change between the control and treatment groups, the rate of final course grades of high distinction tripled. SI Leaders reported increases in both their communication and leadership skills.

Couchman, J. A., & Pigozzo, R. (1997). *Report on the Supplemental Instruction program: 51008 Economics*. Unpublished manuscript. Unpublished manuscript, University of Southern Queensland. Toowoomba, Queensland, Australia.

This 1997 Supplemental Instruction (SI) study was conducted at the University of Southern Queensland (Toowoomba, Queensland, Australia) in the 51008 Economics course. SI participants averaged 0.83 of a

grade point higher on a 7 GPA scale than non-participants. The results suggested that only one-fifth of SI participants were likely to fail; one-third more likely to gain an HD, two and a half times more likely to gain an A grade; twice as likely to gain a B grade; and over one and a half times as likely to gain a C grade than non-participants. International students who attended SI sessions regularly had a 93% pass rate compared with 63% for those international students who chose not to attend regularly.

Cui, J., Kevin, H. T., Cortese, C. L., & Pepper, M. (2015). Reflections on a bilingual peer assisted learning program. *International Journal of Educational Management*, 29(3), 284-297. doi: 10.1108/IJEM-12-2013-0175.

The purpose of this paper is to identify and evaluate faculty and academic staff perceptions, experiences and expectations with respect to a voluntary, bilingual peer assisted learning (PAL) program, which operates for the benefit of students studying in the Faculty of Business at a regional Australian University. A survey instrument and semi-structured interviews were used to faculty executive and academic staff in order to collect information about the perceived benefits of the program and identify opportunities for improvement. Based on an analysis of student results, the bilingual PAL program is shown to have a positive effect on performance of students participating in the program. Results from interviews with executive and academic staff indicate a high level of support for this type of student learning program. Although the value of both bilingual teaching and PAL has been explored in the teaching and learning literature, few studies have examined the integration of these two approaches. This research contributes to the literature by exploring the practical contribution of integrating these approaches. This research also provides valuable information regarding executive and academic perceptions of PAL programs, which is infrequently addressed in the literature. Findings may be used to inform institutions of the value of bilingual PAL programs in relation to international student retention and learning support and provide a starting point for discussions around the practical implications of such programs.

Dancer, D., Morrison, K., & Tarr, G. (2015). Measuring the effects of peer learning on students' academic achievement in first-year business statistics. *Studies in Higher Education*, 40(10), 1808-1828. doi: 10.1080/03075079.2014.916671.
www.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' 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.

Dobson, G., Frye, R., & Mantena, R. (2013). Leadership training in an MBA program using Peer-Led Team Learning. *American Journal of Business Education*, 6(2).

Leadership training is an important part of any MBA program, but is often difficult to provide in an effective way. Over the last three years, we implemented a program of Peer-Led Team Learning in two core courses of our MBA curriculum, which we believe provides a good solution. The program combines leadership training with practical hands-on application of the ideas taught, and provides for an effective feedback loop. Response to the program has been overwhelmingly positive. The program and benefits for learning leadership are discussed in this paper. Eaching innovations in undergraduate and graduate education are nothing new. The spread of teaching and learning centers across the country at many colleges and universities demonstrates this. Active learning, which engages students in the learning process, is often the centerpiece of new and popular methods (for example, Svinicki & McKeachie, 2010; Fink, 2002; Bain, 2004; Bean, 1996). An especially salient active learning technique is the use of student peers as mentors, facilitators, and leaders (for example, Libarkin & Mencke, 2001, 2002; Triesman, 1992; Sawada et al., 2002; Platt, Roth and Kampmeier, 2003). Peer-led team learning is one such practice that has been used successfully in the U.S., particularly in the Northeast, with undergraduates for over a decade (Tien, Roth & Kampmeier, 2002 and 2004; Platt, et al. 2008). The model is incorporated widely and very successfully on the University of Rochester campus, principally in large undergraduate lecture courses, including Chemistry and Biology. The program has been so successful that it has expanded over the years to include a wide variety of courses such as Optics, Computer Science, Physics, and Philosophy, among others. While the main goal of this approach is to improve student learning with difficult subject material, peer leaders have consistently and repeatedly reported considerable positive benefits of being a peer leader (Gafney & Varma-Nelson, 2007). MBA programs, which emphasize the development of future business leaders, seem ideally suited for such

a model. In their extensive study of business education, Datar, Garvin & Cullen (2010) argue, quite cogently, that business education is at a crossroads. Based on interviews with business school deans, executives and MBA students, they conclude that in order to remain relevant, business education needs to emphasize the development of leadership skills and more broadly utilize new pedagogies, including hands-on or experiential learning. Peer-led team learning, which we refer to as the Workshop Model, has the potential to achieve both of these goals. Weekly workshop sessions are interactive by design and workshop leaders develop leadership skills by attending weekly leader training seminars and immediately putting the ideas into practice leading the weekly workshops.

Douma, S. R. (1988). *Supplemental Instruction: An alternate approach*. (Master's of Science thesis), Mankato State University, , Mankato, MN.

This Master of Science thesis study from 1986 had two purposes. The first was to provide a descriptive review of the Supplemental Instruction (SI) program (e.g., program overview, SI leader training program). The second purpose of the study was to evaluate the effects of SI at Southwest State University (MN) during Fall 1986, Winter 1987 and Spring 1987. Between 36 to 42 percent of students participated in the SI program. Findings include the following: 1) SI participants earned a higher final course grade. F86, 2.34 vs. 2.01, W87, 2.31 vs. 2.01, S87, 2.55 vs. 2.04. 2) SI participants earned a higher rate of A and B final course grades. F86, 42% vs. 31%, W87, 41% vs. 35%, S87, 54% vs. 36%. 3) SI participants earned a lower rate of D and F final course grades or withdrawals: F86, 21% vs. 33%, W87, 21% vs. 35%, S87, 19% vs. 35%. Several data tables from an article by Blanc, DeBuhr, and Martin (1983) are reproduced in this report. Individual course reports from Southwest State University that were used to generate the previous summary research studies are included: Natural Science, Biology I, Food for Thought, Everyday Chemicals, Accounting I, Introductory Algebra, Business Statistics I, General Psychology I, A.C. Circuits, Critical Thinking, and General Biology II.

Durante, K. A., & Caputo, C. (2022). Teaching statistics: Can Supplemental Instruction facilitate student success? *College Teaching*. doi: <https://doi.org/10.1080/87567555.2022.2081123>.

Social science students are often uninterested in studying statistics, and only take these courses because they are required. This disinterest can lead to lower performance. We employ regression analysis to examine the impact of attending Supplemental Instruction sessions on final grades earned in a required social sciences statistics course at a small, regional public Hispanic-serving institution in the Southwest United States. We find that attending voluntary Supplemental Instruction sessions is an effective way to help our predominantly Latinx and female student body improve their final grades. Collaborative learning programs can be important tools for improving academic outcomes for undergraduate students of diverse backgrounds taking required statistics courses.

Eastmond, J. N., Bartlett, G., & Terblanche, N. (1997). Planning for student involvement in a program of Supplemental Instruction. *Educational Technology Research and Development*, 45(3), 134-140.

Supplemental Instruction (SI) is used at Border Technikon (South Africa) to increase student achievement in the Accounting and Management academic departments. The article describes the ways student involvement has been maintained through enlisting support from the Student Representative Council (SRC). Article topics include: training, funding considerations, effectiveness, student response, and student achievement results. A grant provided through the United States Agency for International Development (USAID) Tertiary Education Linkages Project (TELP) was used to start the SI program. The grant's major goals are to enhance staff and student development, both of which were enhanced through the SI program. SI leaders reported the following benefits to them from participation in the SI program: gained confidence in public speaking; developed new teaching strategies; and enjoyed more interaction with the course lecturers. Surveys of SI participants identified the following suggestions to improve the SI program: assign the same place each week for SI sessions; SI leaders should prepare before SI sessions to provide structure in case the attending students do not have a full agenda of items; SI leaders should receive additional interpersonal discussion group skill training; and that times should be set aside in class scheduling to allow for SI sessions to be scheduled. Analysis of final course examinations revealed that the number and percent of students who passed the final examination had doubled after the introduction of the SI program. The author found stated that this was remarkable considering that the class size had increased significantly, straining the ability of the course instructor to deal with the additional workload of students.

Edwards, S., Willey, T., & Griggs, F. (2013). *The impact of a Structured Learning Assistance Program on performance in a managerial finance course*. Conference Proceedings of the 2013 SOBIE Annual Academic Conference, Destin, FL.

The purpose of this research is to measure the performance of students in a conventionally taught required course in Managerial Finance at a large Midwestern university versus a section taught by the same instructor using a Structured Learning Assistance (SLA) Program. The content for a SLA course is identical to a non-SLA

course. The difference in the SLA approach is if a student grade falls below a C, the SLA student is required to attend weekly workshop sessions until the grade returns to the required level, or higher. Our hypothesis is the overall course grade for the experimental class (SLA section) is significantly different from the overall course grade in the control section (non-SLA section). We have collected the core data and are in the process of analyzing the results.

Eklund, M. A., Eklund, A., & Leick, B. (2021). An essay on the effects of web-based platforms and Supplemental Instruction in accounting education. In A. Strømme-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Student learning processes, volume 2* (pp. 103-122). Munster and New York: Waxmann. www.waxmann.com/index.php?eID=download&buchnr=4325.

During the uncharted time, such as the coronavirus (COVID-19) pandemic, e-learning has become more important than ever. Drawing on the tenet of the connectivism learning theory, this chapter discusses digital transition and Supplemental Instruction in education, especially in accounting education. A printed questionnaire was administered to the students who enrolled in introductory accounting courses at one of the American public universities. Descriptive statistics, independent t-test, and ANOVA were employed to examine student perceptions of the web-based platform (WBP) – a digital homework platform – and SI and to test the differences between the groups. In line with prior research, although 49% of the students perceive SI as a helpful service, voluntary participation in SI is low (30%). 20% out of this 30% attended the SI maximum of three times during the semester. Even though 52% find WBPs time-consuming activity, 59% prefer WBPs to traditional paper-and-pencil homework, and 87% find WBPs helpful. In simpler terms, students have a positive perception of WBPs but a neutral perception of SI. For the independent t-test and ANOVA, it is found that there is no significant difference between the groups' mean values. It indicates that respondent age, gender, class standing, and prior accounting knowledge do not create any significant perception difference. Even though the results are not generalizable for all blended accounting education, the study still contributes to the online education literature by exploring and investigating the status quo in the undergraduate introductory accounting courses at one of the American higher institutions. Thus, it opens the door to generalizable future research on digital learning and SI in the accounting discipline. The results also serve as a foundation for continuous theoretical advancement and decision base for instructors and policymakers in higher education

Etter, E. R., Burmeister, S. L., & Elder, R. J. (2000). Improving student performance and retention via Supplemental Instruction. *Journal of Accounting Education*, 18, 355-368.

This study reports on student performance, and failure and withdrawal rates for 9,053 students enrolled in 132 Principles of Accounting classes from 21 four-year colleges and universities that have adopted the Supplemental Instruction (SI) program. The overall SI participation rate was 26.8 percent. After providing an overview of the SI model, the data study concerning accounting occupies the rest of the paper. SI participants were found to have statistically significant higher average course grades (2.44 vs. 2.12), lower failure rates (5.9% vs. 15.3%) and lower withdrawal rates (10.6% vs. 19.8%) than non-participants enrolled in the target courses.

Geerlings, P. M., Cole, H., Batt, S., & Martin-Lynch, P. (2016). Peer Assisted Study Sessions (PASS): Does gender matter? *Journal of Peer Learning*, 9(1), article 3. www.ro.uow.edu.au/cgi/viewcontent.cgi?article=1108&context=ajpl.

Peer-learning is an effective way to assist students to acquire study skills and content knowledge, especially in university courses that students find difficult, and it is an effective adjunct to improve student retention. In 2014, Murdoch University in Perth, Western Australia, commenced Peer Assisted Study Sessions (PASS) in two first-year undergraduate subjects: a mathematics (statistics) unit and a business unit. The key finding in this evaluation was that while female mathematics students improved their final marks in response to attending a greater number of sessions per semester, male students achieved lower final marks on average. Although several studies have shown that in PASS-like programs gender tends to not be a significant factor relating to achievement, our results suggest otherwise. In this article we posit the observed differences in achievement attributed to gender arise from complex gender-related issues, including gender stereotypes, student gender ratios in class, the gender of the teacher relative to the gender of the student, and gender-related motivation, engagement, and subject choice.

Ghazali, R., & Ali, M. C. (2015). Peer-assisted learning program: A creative and effective learning approach at higher education. *Journal of Applied Environmental Biological Science*, 4(10), 39-44.

The primary purpose of this article is to review the effect of Peer-Assisted Learning (PAL) program on higher education. Thus, this paper tries to explain the educational theories and concepts which support the effectiveness of the program. It also to identify the benefits and shortcomings of the program to the students who participated in the program based on the existing researches and experiences of some universities

which had undertaken the schemes. The review is expected to highlight the best practices of PAL program adopted by universities. Lastly, recommendations from previous researches for a successful implementation of PAL were taken that to be used in the implementation of the program in the university, particularly for the accounting faculty.

Goldstein, J., Sauer, P., & O'Donnell, J. (2014). Understanding factors leading to participation in Supplemental Instruction programs in introductory accounting courses. *Accounting Education: An International Journal*, 23(6), 507-526. doi: :10.1080/09639284.2014.963132.

Although studies have shown that supplemental instruction (SI) programs can have positive effects in introductory accounting courses, these programs experience low participation rates. Thus, our study is the first to examine the factors leading to student participation in SI programs. We do this through a survey instrument based on the Theory of Planned Behavior. Our study shows that students' attitudes toward the sessions affect their intent to participate in them. This attitude is influenced by students' perceptions that the sessions can help them in various ways. Results also show that influential others can influence student intent to participate in SI sessions. We also note that students' perceptions of the amount of personal control that they have over going to SI sessions have no effect on their participation in the sessions. We discuss how these findings can be leveraged to increase SI participation rates.

Hallman, R. (2014). Re-envisioning course-embedded programs at the graduate level: A tutor's experience in a doctoral, translingual marketing course. *Praxis: A Writing Center Journal*, 12(1), 57-62.
https://repositories.lib.utexas.edu/bitstream/handle/2152/62318/Hallman_12.1CourseEmbeddedWritingSupportPrograms-10.pdf?sequence=2&isAllowed=y.

We were halfway through our Summer 2014, PhD-level, required University of Houston,2 Bauer College of Business class, MARK 8397: Communicating Academic Research, when Carol,3 a five-foot tall, thick-skinned, straight-shooting, endowed chair and Marketing professor explained my role in her course as “hand holding.” I raised my eyebrow and waited for her to continue. “You know, confidence building,” she continued. I felt slightly better. Then she said, “Academic writing is confusing for students because they don't know which way to go. They might know when and why they need to make changes, but they don't really know how to do it.” This was better. Carol's idea of me as a guide for students through the “how” of academic writing was something I felt matched my own understanding of my role in the course.

Helde, R. (2021). Supplemental Instruction (SI): Learning leadership and leadership development. In A. Strømme-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Organisation and leadership, volume 3* (pp. 53-73). Munster and New York: Waxmann.
www.waxmann.com/index.php?eID=download&buchnr=4326.

The topic of this chapter is the student-active form of learning Supplemental Instruction (SI), and the students who lead the SI sessions – the SI leaders. Increased leadership competence for SI leaders is highlighted in descriptions of the SI programme (Helde & Suzen, 2019), but relatively few studies focus on SI leaders with respect to the leadership dimension. This article takes a closer look at how SI leaders learn leadership through the SI programme, and presents the results of a survey and interviews conducted among SI leaders at Nord University Business School, Road Traffic Division, in 2017. The main focus of this chapter is on whether and how SI leaders have learnt leadership, understood their role as leaders, and experienced development as leaders in the context of the SI programme. The research question is: what is SI leaders' understanding and experience of the SI programme's contribution to learning about leadership and leadership development?

Hillis, T., Guarcello, M. A., Levine, R. A., & Fan, J. (2020). Causal inference in the presence of missing data using a random forest-based matching algorithm. *Stat*, 10(1).

Observational studies require matching across groups over multiple confounding variables. Across the literature, matching algorithms fail to handle the issue of missing data. Consequently, missing values are regularly imputed prior to being considered in the matching process. However, imputing is not always practical, forcing us to drop an observation due to the deficiency of the chosen algorithm, decreasing the power of the study and possibly failing to capture crucial latent information. We propose a missing data mechanism to incorporate within an iterative multivariate matching method. The underlying framework utilizes random forest as a natural tool in constructing a distance matrix, implemented with surrogate splits where there might be missing values. The output is then easily fed into an optimal matching algorithm. We apply this method to evaluate the effectiveness of Supplemental Instruction (SI) sessions, a voluntary program where students seek additional help, in a large enrollment, bottleneck introductory business statistics course. This is an observational study with two groups, those who attend multiple SI sessions and those who do not, and, as typical in educational data mining, challenged by missing data. Additionally, we perform a data simulation on missingness to further demonstrate the efficacy of our proposed approach.

Hoi, K. N., & Dowing, K. (2010). The impact of Supplemental Instruction on learning competence and academic performance. *Studies in Higher Education*, 35(8), 921-939.

This study investigated the effects of Supplemental Instruction, a peer-assisted learning approach, on students, learning competence and academic performance. The Supplemental Instruction intervention facilitated by senior students focused on developing students' use of study skills and enhancing their motivation and academic performance. Pre- and post-intervention learning competence measures (the 10 scales of the Learning and Study Strategies Inventory) were available for 430 first year undergraduate business students (Supplemental Instruction, n = 109; Non-Supplemental Instruction, n = 321) from a university in Hong Kong. Structural equation modeling demonstrated that Supplemental Instruction had a significant effect on academic performance, both directly and indirectly via enhancement of student learning competence, after controlling for pre-intervention learning strategy scores and previous academic achievement. This study provides evidence that Supplemental Instruction can be a very effective instructional strategy for promoting undergraduate student learning.

Huang, T. K., Pepper, M. P. J., Cortese, C. L., & Rogan, S. (2013). Faculty and academic staff perceptions, experiences and expectations of the PASS Program. *Journal of Peer Learning*, 6(1), 118-132.
www.ro.uow.edu.au/ajpl/vol6/iss1/10.

Current research largely explores the evaluation and perceptions of Peer Assisted Study Sessions (PASS) from the student perspective. PASS is a common name used to describe Supplemental Instruction (SI) in Australia. The purpose of this study was to identify and evaluate institutional, faculty, and academic staff perceptions, experiences, and expectations of an established PASS program in the Faculty of Business in an Australian University. A survey and semi structured interviews were used to collect responses from participants from each level of the university, including the PASS program coordinators, Dean of Faculty, Head of School, and subject coordinators. Results highlight the importance of "closing the communication loop" between PASS leaders and academics to maintain the efficacy of such programs and aid in their continuous improvement. This research contributes to the literature concerning peer learning. The findings may be used in the future development of programs such as PASS to further inform the engagement of academic staff to enhance the student learning experience in such programs.

Hundeland, P. S., & Pettersen, P. (2021). A comparative study of Supplemental Instruction and Small Group Teaching. In A. Strømme-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Student learning processes, volume 2* (pp. 65-82). Munster and New York: Waxmann.
www.waxmann.com/index.php?eID=download&buchnr=4325.

The development of Supplemental Instruction started in 1973 at the University of Missouri–Kansas City. At the same time at Agder College in Kristiansand in Norway (now University of Agder), small group teaching (SGT) was born as a teaching method. At Nord University, the students at the driving instructor education use SI in service courses in law and physics. The students at the Business school use SGT in service courses in mathematics and statistics. In this chapter, we present a comparative study of these two teaching methods. The research question that directed the study was what significant differences can be identified between SI and SGT. We investigated this question both from literature studies and from written responses from students from both groups. From the written response we identified similarities and differences in the two student groups with respect to the following aspects: The preferred learning arena, the students' own descriptions of the organisation of the sessions, how the students characterize the collaborating process, whether they gain insight in any learning strategies, and the role of the senior student that is responsible for the sessions. From our results, we have identified many similarities between the two principles for collaborative learning. The main conclusion is that the two methods can learn from each other. The SGT method will benefit if the teacher assistants that are responsible for SGT get a formal training similar to the training given to the SI leaders. The availability of small group room areas in SI sessions will increase the cooperative learning between students since the groups then can work together without interruption from other students.

Ilserver, J., & Leung, R. (2014). Measurement of the impact of supporting and Supplemental Learning Intervention Strategies (SSI) in introductory accounting classes at the University of Fraser Valley. *Business Studies Journal*, 6(1), 59-71. www.alliedacademies.org/articles/bsjvol6si12014.pdf#page=67.

This study highlights the importance of such tutorial services as Student-Learning-Group (SLG) for elementary accounting students in university education. In their first year of the bachelor program, fundamental concepts of various accounting topics such as accrual accounting are the corner-stones for students who move up to higher and more challenging accounting courses. With some help and guidance from senior students in the SLG program, freshmen students who are willing to receive help will receive the benefits of learning better and getting higher grades. Such experience will help those students who are well equipped

with the fundamental concepts, able to study better in the intermediate and advanced accounting courses, and ultimately go back to become the tutor and leader in the SLG program and help other junior accounting students. Consequently, this on-going, reciprocal cycle of helping each other will become a positive culture that promotes better tutors and learners in the university.

Im, S. W. T., Chiu, P. H. P., & Ng, M. (2019). Comparative study between traditional and peer assisted learning of business management students on accounting Module *IAFOR Journal of Education*.
www.iafor.org/archives/journals/iafor-journal-of-education/10.22492.ije.7.2.pdf#page=97.

Candidates who study business disciplines are trained to be all-round administrative staff to handle business-related issues. Knowledge of a basic accounting principle for supporting financial decisions is vital in business operations, and is especially crucial for managerial workers of a listed company. Indeed, the accounting module is one of the core modules for higher education students who are studying in business disciplines. With the College Heads' endorsement when departments joined the Peer-Assisted-Learning using Supplemental Instruction (PALS) scheme, the academic results of two accounting modules were collected anonymously for research purposes. The subject registration information shows that each cohort had at least 300 enrolments and, at most, over 800 enrolments. A review of academic results throughout four academic years was performed, the sample size of the study consisting of a total of 1,815 PALS students and 5,869 non-PALS students. This article focuses on the quantitative analysis in comparing the performance of PALS students and non-PALS students by monitoring their academic results consecutively in different cohorts. In this study, a t-test is implemented to evaluate the effectiveness of the peer-assisted learning scheme by identifying the academic results of each cohort to ascertain if there is a significant difference between the two groups. Similar investigation on the effectiveness of the PALS scheme with different accounting knowledge background before joining the undergraduate programmes is implemented in the latter part. The findings of the analysis provide remarkable academic enhancement for students with PALS support, and it is concluded that the scheme is worth extending to different subjects in the business discipline in the future.

Johnston, C. (1995). *Peer tutoring in economics at the University of Melbourne*. Conference Proceedings of the Australian Economic Education Symposium, Adelaide, Australia.

This paper describes an adaptation of the Supplemental Instruction (SI) model used at the University of Melbourne (Australia) in 1993. The model integrates Diploma of Education students in an undergraduate economics group learning program (Macroeconomic theory and Macroeconomic Policy). Several adaptations of the SI program: the group facilitator was a volunteer postgraduate Diploma of Education student; two wine and cheese evenings were scheduled to provide the facilitator and students to interact socially and exchange experiences with one another. It found that small groups operate more effectively in terms of group cohesion, longevity and perception of improved performance when supported by postgraduate students. Postgraduates developed an enhanced range of skills in relation to group management, cooperative learning and communication.

Jones, J. P. (2013). The impact of the Supplemental Instruction leader on student performance in introductory accounting. *American Journal of Business Education*, 6(2), 247-254.
www.cluteinstitute.com/ojs/index.php/AJBE/article/view/7690.

This study explores the association between a supplemental instruction (SI) program and student performance in an introductory accounting course. SI is a proactive academic support program that is aimed at improving student learning in traditionally "high-risk" college courses by integrating learning and critical thinking strategies with technical course content. This paper examines and describes the classical SI model as it has been applied in both non-business and business disciplines. We then extend the work of Etter, Burmeister, and Elder (2000) and Jones and Fields (2001) which examine the effectiveness of the SI model in introductory accounting by providing empirical tests after controlling for differences in SI group leaders. The SI leader's duty is to provide structure to the collaborative learning environment and to integrate study skills and learning strategies with course content. However, empirical analysis incorporating controls for differences in SI leaders is lacking. Results, based on both nonparametric chi-square analysis and analysis of covariance (ANCOVA) indicate that SI is an effective program that increases academic performance as measured by total points earned in the course. Further, results suggest that the SI program remains effective across multiple SI leaders.

Jones, J. P., & Fields, K. T. (2001). The role of Supplemental Instruction in the first accounting course. *Issues in Accounting Education*, 16(4), 531-547.

This study investigates empirically the role of Supplemental Instruction (SI) as a means of enhancing student performance in the first accounting course. ANCOVA-based results from 1,359 students in nine sessions of

Principles of Accounting indicates that SI was effective at increasing academic performance; after controlling for self-selection bias, participation in both voluntary and mandatory SI sessions was found to be positively associated with the total points earned in the course. Additionally, a step pattern is observed in the increased performance for both the voluntary and mandatory attendance phases of the study, indicating that the level of SI attendance may play a role in the benefits obtained. The implications of this analysis for the accounting curriculum are addressed.

Kenney, P. A. (1989). Effects of Supplemental Instruction (SI) on student performance in a college-level mathematics course [Dissertation, The University of Texas at Austin, 1988]. *Dissertation Abstracts International*, 50(02), 378A.

This doctoral dissertation describes a research study that used Supplemental Instruction (SI) in a first-semester calculus course for business and economics majors at the University of Texas at Austin. The experimental design for this study used Campbell and Stanley's Nonequivalent Control Group model. The study used two lecture classes with the same instructor. Each class was divided into two discussion sections, and of those, one from each received the SI treatment. In the control sections the teaching assistant performed typical duties. In the SI sections the assistant performed the same duties but in addition she provided instruction on the study skills relevant to the course as it progressed and other activities that SI leaders would perform or facilitate. The results showed a statistically significant difference favoring the SI treatment group: the control group mean course grade point average of 2.43 and that for the treatment group of 3.00; the control group mean semester grade point average (GPA) of 2.51 and that for the treatment group GPA of 2.95. A multiple linear regression model was then chosen as a more complete method of analysis. Three of the independent variables had coefficients which were significant at the .05 level -- high school class rank, discussion section attendance, and control/treatment group membership. This helps to answer the question of whether SI was just a form of "double exposure" to the course content. Since SI sessions were qualitatively different than the traditional discussion sections (as evaluated by outside observers using a observation protocol) and that the students who participated in the SI sessions earned higher mean final course grades, it appears that SI sessions were more than double exposure. A multiple regression analysis of semester grade point average found that three of the variables were significant at the .05 level -- the SAT Mathematical score, discussion section attendance, and group membership. Controlling for exposure, it was suggested that these gains were due to the benefits of SI, not to the increased exposure of the group to course material. To investigate any residual effects from the SI program, the students from the initial study were tracked for an additional semester. Results from the follow-up study showed that students who had experienced SI had a pattern of fewer F grades in and withdrawals from the second-semester business calculus course. Of the 26 students who failed or withdrew from the original calculus course, former SI participants were more likely to immediately reenroll in the course (six students) than the non-SI participants (one student). Another study focused on the academic performance of SI and non-SI participants in a succeeding academic term in courses where SI was not offered. Former SI participants earned no F grades or withdrew from the second-semester business calculus course. The former SI participants earned a slightly higher mean final course grade (2.63 vs. 2.48), though it was not a statistically significant difference. The researcher speculates that the absence of SI with the second calculus course may had a bigger impact on former SI participants -- narrowing the positive difference in academic achievement with the control group -- since a support service which they were used to accessing was not available in the next course in the sequence.

Kenney, P. A. (1989). *Effects of Supplemental Instruction on student performance in a college-level mathematics course*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. ERIC database. (ED347874).

This paper describes a research study that used Supplemental Instruction (SI) in a first-semester calculus course for business and economics majors at the University of Texas at Austin. The experimental design for this study used Campbell and Stanley's Nonequivalent Control Group model. The study used two lecture classes with the same instructor. Each class was divided into two discussion sections, and of those, one from each received the SI treatment. In the control sections the teaching assistant performed typical duties. In the SI sections the assistant performed the same duties but in addition she provided instruction on the study skills relevant to the course as it progressed and other activities that SI leaders would perform or facilitate. The results showed a statistically significant difference favoring the SI treatment group: the control group mean course grade point average of 2.43 and that for the treatment group of 3.00; the control group mean semester grade point average (GPA) of 2.51 and that for the treatment group GPA of 2.95. A multiple linear regression model was then chosen as a more complete method of analysis. Three of the independent variables had coefficients which were significant at the .05 level -- high school class rank, discussion section attendance, and control/treatment group membership. This helps to answer the question of whether SI was just a form of "double exposure" to the course content. Since SI sessions were qualitatively different than the traditional discussion sections (as evaluated by outside observers using a observation protocol) and that the

students who participated in the SI sessions earned higher mean final course grades, it appears that SI sessions were more than double exposure. A multiple regression analysis of semester grade point average found that three of the variables were significant at the .05 level -- the SAT Mathematical score, discussion section attendance, and group membership.

Kenney, P. A. (1990). *Effects of Supplemental Instruction on student performance in a college-level mathematics course: A report of additional results*. Unpublished manuscript. Annual Meeting of the American Educational Research Association. Boston, MA.

This paper details additional results from an experiment on the effects of Supplemental Instruction (SI) on student performance in a college business calculus course. The paper is a continuation of research first reported at the 1989 AERA Annual Meeting. SI participants who withdrew from the course most often cited their perceived lack of prerequisite skills or to problems with calculus concepts. The author postulates that the exposure to SI raised their awareness of their lack of skills. Non-SI participants who withdrew from the course most often cited "personal" reasons. Of the 26 students who failed or withdrew from the original calculus course, former SI participants were more likely to immediately reenroll in the course (six students) than the non-SI participants (one student). Another study focused on the academic performance of SI and non-SI participants in a succeeding academic term in courses where SI was not offered. Former SI participants earned no F grades or withdrew from the second-semester business calculus course. The former SI participants earned a slightly higher mean final course grade (2.63 vs. 2.48), though it was not a statistically significant difference. The author speculates that the absence of SI with the second calculus course may have had a bigger impact on former SI participants -- narrowing the positive difference in academic achievement with the control group -- since a support service which they were used to accessing was not available in the next course in the sequence.

Kenney, P. A., & Kallison, J. M. (1992). *Learning to study college-level mathematics: Effects of a Supplemental Instruction (SI) program in first-semester calculus courses*. Conference Proceedings of the American Educational Research Association 1992 Annual Conference, San Francisco, CA.

This paper details results from a Supplemental Instruction program designed for students in college-level calculus courses during Fall 1989. The studies were conducted at the University of Texas at Austin by two teaching assistants employed by the mathematics department and were selected and trained by the SI program by the staff of the University's Learning Skills Center. The first study compared the performance of students in Business Calculus. While SI was beneficial to all SI participants (2.39 vs. 1.96 for non-SI participants), it was especially helpful for lower-ability students. The second study focused on an Engineering Calculus course. While the difference was closer for the two groups (2.01 vs. 1.91 for non-SI participants), SI provided disproportionate help to the lower-ability students as measured by SAT quantitative scores. More than 70 percent of students felt that the study strategies introduced by the SI leaders were either "very helpful" or "helpful." Almost 80 percent indicated that exposure to study strategies for calculus changed the way they studied either "very much" or "somewhat," and that the techniques that these skills would help them in future courses either "very much" or "somewhat." More than 80 percent of the students responded that it was either "very important" or "important" that all SI leaders incorporate study strategies into discussion sections. SI leaders mentioned the positive impact of the SI program on themselves as well: reflect about their teaching methods; develop new teaching methods; and learned how to integrate learning strategies with content instruction.

Kenney, P. A., & Kallison, J. M. (1994). *Research studies of the effectiveness of Supplemental Instruction in mathematics*. New Directions for Teaching and Learning No. 60. San Francisco, CA: Jossey-Bass, Inc.

Given the emphasis on the need to succeed in college-level mathematics courses, these authors take a careful look at the effects of Supplemental Instruction participation on student performance. In addition to reviewing other research studies, this chapter focuses on the use of SI in Fall 1989 at the University of Texas at Austin in Calculus for Business Students and Calculus for Engineering and Natural Science Students. This paper describes a research study that used Supplemental Instruction (SI) in a first-semester calculus course for business and economics majors at the University of Texas at Austin. The experimental design for this study used Campbell and Stanley's Nonequivalent Control Group model. The study used two lecture classes with the same instructor. Each class was divided into two discussion sections, and of those, one from each received the SI treatment. In the control sections the teaching assistant performed typical duties. In the SI sections the assistant performed the same duties but in addition she provided instruction on the study skills relevant to the course as it progressed and other activities that SI leaders would perform or facilitate. The results showed a statistically significant difference favoring the SI treatment group: the control group mean course grade point average of 2.43 and that for the treatment group of 3.00; the control group mean semester grade point average (GPA) of 2.51 and that for the treatment group GPA of 2.95. A multiple linear regression model was then chosen as a more complete method of analysis. Three of the independent variables had coefficients which were significant at the .05 level -- high school class rank, discussion section attendance, and control/treatment group membership. This helps to answer the question of whether SI was just a form of "double exposure" to the course content. Since SI sessions were qualitatively different than the traditional discussion sections (as evaluated by outside observers using a observation protocol) and that the students who participated in the SI sessions earned higher mean final course grades, it appears that SI sessions were more than double exposure. A multiple regression analysis of semester grade point average found that three of the variables were significant at the .05 level -- the SAT Mathematical score, discussion section attendance, and group membership. Additional studies were conducted concerning SI. The first study compared the performance of students in Business Calculus. While SI was beneficial to all SI participants (2.39 vs. 1.96 for non-SI participants), it was especially helpful for lower-ability students. The second study focused on an Engineering Calculus course. While the difference was closer for the two groups (2.01 vs. 1.91 for non-SI participants), SI provided disproportionate help to the lower-ability students as measured by SAT quantitative scores.

Kilpatrick, B. G., Savage, K. S., & Wilburn, N. L. (2011). *Supplemental Instruction in the first intermediate accounting course: Investigation of an intervention strategy to improve student performance*. Working Paper Series 11-13. W. A. Franke College of Business. Northern Arizona University. Flagstaff, AZ.
www.franke.nau.edu/images/uploads/fcb/11-13.pdf

Supplemental instruction (SI) is an academic assistance program that utilizes peer-assisted study sessions for students in targeted historically difficult courses. The SI model was developed at the University of Missouri, Kansas City (UMKC) to provide an approach to learning that targets high-risk courses rather than high-risk students (Center for Supplemental Instruction, UMKC). The UMKC SI model, followed by our university, requires the SI Leader to attend all classes and to facilitate regularly scheduled study sessions. The SI Leader is a peer tutor who has previously demonstrated superior academic achievement in the target course. In contrast to regular tutoring, SI is presented as a non-remedial, proactive, voluntary opportunity for all students to increase their study skills and understanding of course material. Although the effectiveness of SI has been examined in prior literature for lower-division students in accounting principles courses, there is a lack of research regarding its effectiveness for upper-division accounting students. Therefore, the objective of this research is to gain insight into the use and effectiveness of SI for upper-division accounting students in the first intermediate accounting course (financial accounting and reporting I, or FAR I). This class is typically considered the "gateway" upper-division accounting course because its successful completion is a key prerequisite for the subsequent accounting curriculum, yet it is historically characterized by high student withdrawal and failure rates. We assess the effectiveness of SI on the performance of upper-division accounting students in our FAR I course, after controlling for variables that have been shown in prior research to be determinants of student grades in the first intermediate course. Additionally, we present qualitative information regarding which students used SI, purposes for which students used SI and perceived level of help on each, perceived benefits of SI from the students' perspective, and why some students did not use SI. This paper is organized as follows: the next section provides background information on SI and determinants of performance in the first intermediate accounting course. The third section describes our methodology and data collection process and the fourth section discusses the data analysis and results. The last section provides a summary and conclusions.

Kimmins, L. R. (2014). Meet-up for success: The story of a peer led program's journey. *Journal of Peer Learning*, 6(1), 103-117.

Technological advancements have forced space and time to evolve to present a virtual university that allows increasing numbers of students to study from a university rather than at university. This study examined the

impact of a version of Supplemental Instruction (SI) with students. The best people to guide and advise students through their university journey are experienced students. As Longfellow, May, Burke, and Marks-Maran (2008, p. 95) put it, teachers may be content or subject experts, but current “students are experts at being students.” Studies by Falchikov (2001) found that student leaders provide “expert scaffolding” that steps students from one level of learning to the next within the discipline area. Peer-assisted programs contribute to the development of a caring learning community as their trained leaders scaffold learning and negotiation between lecturer and student, both of which are desirable for student success and sustainable learning practices. Peer-assisted programs also provide a body of students with leadership qualities. This paper briefly explores the history and evolution of an on-campus peer led program to one that is embracing technology and online modes of peer learning. The program’s endurance hints at excellence and its dynamic nature is founded on innovation. Peer led programs have been found to benefit student leaders as much as the students who attend the sessions. Recent research on student leadership is uncovering the benefits to universities, as well as to individual students, of creating a pool of student leaders who can be retained after graduation as quality lecturers and tutors. It also produces graduates who possess the leadership skills prized by employers. Engagement with leadership activities such as those provided by peer led academic programs is a means of benefitting all participating students. This area is under-researched at this point. It is an area that needs further exploration and extension.

Kirkham, R., & Ringelstein, D. (2008). Student Peer Assisted Mentoring (SPAM): A conceptual framework. *e-Journal of Business Education & Scholarship of Teaching*, 2(2), 39-49.

This paper presents a conceptual framework for the Student Peer Assisted Mentoring (SPAM) program and describes the theories that support it. SPAM is an adaptation of Supplemental Instruction (SI). SPAM was first piloted in an accounting course in Australia. Three categories of SPAM sessions are held each academic term for the students: more formal session in which the academic lecturer for the course reviews and explains the issues and problem solving techniques related to current class topic. The second category of SPAM is a less formal session when the SPAM mentors work with the students in the class in a cooperative fashion to discuss the academic content. The third category of SPAM sessions are those that are formed by students in the class without the help of the SPAM mentors. Students take responsibility for these groups and develop more skills as a result. In addition to the academic benefit to the participating students, the SPAM Mentors also benefit: their own learning improves due to reworking the material a second time; and develop communication skills, leadership skills, and learning how to deal with the dynamics of managing a group.

Loviscek, A. L., & Cloutier, N. R. (1997). Supplemental Instruction and the enhancement of student performance in economics principles. *American Economist*, 41(2), 70-76.

The authors presented an empirical evaluation of Supplemental Instruction (SI) in an economics principles course at the University of Wisconsin-Parkside. Using a two-equation model and student transcript data readily available to instructors and academic researchers, the authors evaluated the effectiveness of the SI program in economics principles. The analysis explicitly considers the confounding factor of self-selection in program participation. They found that ordinary least squares significantly underestimates the positive impact of SI. The results suggest that formal programs designed to increase the intensity of instruction can have a demonstrable payoff in the form of increased student learning.

Mangold, N., Shima, K., & Yang, J.-W. (2021). Long-term impact of Supplemental Instruction in improving student performance in intermediate accounting courses. *Academy of Accounting and financial Studies Journal*, 25(3), 1-15.

This study is the first to explore the role of Supplemental Instruction (SI) in the second and third intermediate accounting course sequence. This study used Heckman’s two-stage estimation method to address potential sample selection bias in evaluating the impact of SI on student performance, which was not directly addressed in prior studies. Furthermore, this analysis is the first to investigate the long-term impact of continuous SI attendance in an accounting setting. Using data collected during the period 2015 to 2018 from a public four-year university in the United States, our results show that SI attendees earn 0.309 additional grade point, approximately one letter grade, compared to non-SI attendees, after controlling for the potential sample selection bias. We find students who continuously participate in SI outperform those who stop attending. Our findings have important implications for administrators in managing university resources and promoting student success.

Marrone, M., & Draganov, L. (2017). Peer assisted learning: Strategies to increase student attendance and student success in accounting. In L. N. Wood & Y. A. Breyer (Eds.), *Success in higher education: Transitions to, within, and from the university* (pp. 140-165). Singapore: Springer.
www.researchgate.net/publication/310494402_Peer_Assisted_Learning_Strategies_to_Increase_Student_Attendance_and_Student_Success_in_Accounting.

It is well known that extracurricular peer-learning programs such as Peer Assisted Learning (PAL) have an impact on student retention, success, and overall student satisfaction. However, for PAL to work as intended, higher participation rates are needed as student attendance remains one of the challenges faced by program administrators. In our study, we analysed the reasons why students attend PAL, and which strategies can be followed to increase students' interest in the program. This chapter outlines how targeted messages can encourage different cohorts to attend PAL, and assists PAL administrators with how to conduct their recruitment campaigns to consistent with their universities' needs. The aim of this research was to understand how the reasons for attending SI might be influenced by students' demographics and characteristics. From the existing literature on the topic, we identified seven main reasons why students participate: Improve my grade; Pass the unit; Receive additional help; Lecturer's prompting; Check my knowledge; To make friends; and Studying with people. In this research, we have incorporated the reason "SI Leader's prompting" as it was being trialled at Macquarie University at the time. Through ordinal regressions, the study revealed a link between certain student characteristics and the reasons why students might attend. On the one hand, students with a higher GPA might be more likely to participate as a result of wanting to "improve my grade". On the other hand, verbal prompts offered by lecturers or SI Leaders could tend to be more persuasive in attracting students with a lower GPA. Domestic students could rate the reasons such as "get extra help", "pass the unit", and "improve my grades" higher than the international students.

Martin, D. C., Blanc, R. A., & Arendale, D. (1996). Supplemental Instruction: Supporting the classroom experience. In J. N. Hankin (Ed.), *The Community College: Opportunity and Access for America's First-Year Students* (pp. 123-133). Columbia, SC: University of South Carolina: The National Resource Center for The Freshman Year Experience and Students in Transition. ERIC database. (ED393486).

This chapter reviews the impact of the Supplemental Instruction program with fifty-nine two-year colleges across the U.S. The research study contained reports from 480 classes that enrolled 23,979 students. The data suggests that SI participation was correlated with higher academic achievement: higher mean final course grades (2.30 vs. 1.63); higher percentage of A or B final course grades (50.6% vs. 32.9%); and lower rates of D, F and withdrawals (25.9% vs. 46.3%). Similar findings occurred when the data was separated by broad academic disciplines: business, health science, mathematics, natural science, social science/humanities, and technical/vocational. In addition, the themes of attrition identified by Tinto (adjustment, isolation, difficulty, and incongruence) are used as a paradigm to examine the possible reasons for the positive impact of the SI program. Several SI programs reported the use of SI for faculty development: faculty serve as SI supervisors and adopt SI sessions strategies into their own lectures; faculty SI supervisors provide requested feedback to the course professors that they observe concerning class presentation activities; and faculty who observe SI sessions report using more student-led collaborative learning activities during their class sessions.

Mason-Innes, T. A. (2015). *The leadership identity development of Supplemental Instruction leaders: A case study*. (Ph.D. dissertation), University of Alberta, Calgary, Alberta.
www.theses.ucalgary.ca/jspui/bitstream/11023/2126/4/ucalgary_2015_masoninnes_tracey.pdf

Much of our understanding of leadership theory is based on hierarchical systems and is grounded in research from business settings. Although researchers have presented more collaborative, relational leadership models for post-secondary students, these models have not been widely applied to Supplemental Instruction (SI) leader training programs. Having a better understanding of how students become SI leaders, the influences that shape their experiences, and how the SI experience shapes their leadership development has the potential to not only help SI program administrators, but also to assist all student affairs practitioners as they develop leadership programs that address institutional leadership learning outcomes. This descriptive case study describes the background characteristics and experiences of the SI leaders at a mid-size, regional, western Canadian university (WCU). The leadership identity development (LID) model was applied as a conceptual lens for this study—a model that is well-respected in the student affairs field. Six participants volunteered to participate in three interviews as well as reflective writing exercises. A document review of the SI program was also conducted. Based on the findings of this study, four conclusions were identified. First, when looking at student LID with SI leaders or any student leader, it is important to understand, acknowledge, and know the whole student. Secondly, many learning outcomes associated with the SI leader position were found in this study and warrant more emphasis in the SI literature and SI leader training. Thirdly, leadership identity development occurred for the SI leaders because of the structure and the nature of the SI program philosophy itself, as well as from the specific SI program training for the SI leaders. Finally, post-secondary institutions and the institutions' student leadership programs need to adopt a leadership philosophy and ground their student leadership development in leadership scholarship, language, and theory to inform their programs. In the case of supplemental instruction, although the leadership identity development of the SI leaders is not a prominent or identified outcome, the findings from this study demonstrate that LID is likely

occurring.

Merwin, D. D. (1991). A comparative analysis of two tutoring methods assessing student achievement and retention [Dissertation, Montana State University, 1990]. *Dissertation Abstracts International*, 52(02), 438A. (University Microfilms No. 9109700).

The purpose of this doctoral dissertation research study was to compare the effectiveness of two tutoring methods with regard to achievement and retention for high-risk undergraduate students at Northern Montana College (Havre, MT) enrolled in English 150 during the 1986-87 academic school year (eleven courses sections over the fall, winter and spring academic terms). Supplemental Instruction (SI) was compared with another form of tutoring. English 150 is a three-credit course considered to be developmental in content since it encompassed the basic skills areas (sentence structure, parts of speech, grammar, usage, punctuation, and paragraph development). The two tutoring methods were group tutoring (i.e., Supplemental Instruction, or SI) and individual tutoring. The treatment was randomly assigned to each of the eleven course sections and attendance was mandatory by the students. The problem was investigated by: (1) examining how the tutoring methods and other independent variables affected student achievement and student retention, and (2) comparing the two tutoring methods in terms of cost effectiveness. Achievement was measured by the pretest-posttest gain score from the Tests of Adult Basic Education (TABE). The TABE test for English measured students' competency in capitalization, punctuation, expression, and spelling. Retention was measured by the ratio percentage of the number of student credit hours earned compared to the number of hours attempted for the first and second years following treatment. The cost effectiveness of both tutoring methods was compared by determining the cost of one grade level of improvement. Some of the major findings were: students in SI tutoring had higher retention rates than students receiving individual tutoring for the first and second years following treatment; the combined results of the two tutoring methods did make a significant difference in student achievement; the SI tutoring method compared to the individual tutoring method was more cost effective (\$3.46 average cost for SI program to improve one grade level of one students vs. \$16.30 for one-on-one tutoring to do the same); and individual tutoring had a relatively short-term effect. An unexpected finding was that students who participated in SI groups continued to meet at other times outside of class and that the groups were heterogeneous groupings. Interviews with these students revealed that they had met the other students through the SI sessions. It was assumed that students would tend to meet with their own homogeneous affinity groups. The SI students revealed that they enjoyed the social interactions in the groups and felt more comfortable working with other SI participants when they needed additional academic assistance with the English 150 course. The SI program also had an impact upon the SI leaders. Three of the seven SI leaders changed their degrees -- two were business majors and one was a vocational-technical major -- to education so they could become professional teachers. One-on-one tutors reported frustration with the

tutoring program when students canceled their scheduled tutoring sessions. Since SI leaders worked with groups, they did not encounter that problem.

Miller, C. J. M., & Packham, G. A. (1999). Peer-Assisted Student Support at the University of Glamorgan: Innovating the learning process? *Mentoring & Tutoring*, 7(1), 81-95.

Peer-Assisted Student Support (PASS) is based upon Supplemental Instruction (SI) and is the predominate name used in the United Kingdom. This article provides an overview of PASS. This article describes the use of PASS at the University of Glamorgan Business School. Comparisons were made between participants and nonparticipants regarding achievement on unit exams. The results favored the participants.

Mitra, S. (2022). Teaching statistics and data science to business students. *Chance*, 35(4), 27-35. doi: <https://doi.org/10.1080/09332480.2022.2145133>.

<https://www.tandfonline.com/doi/epdf/10.1080/09332480.2022.2145133?needAccess=true&role=button>.

Data and the analyses thereof are more important than ever for driving critical decision-making in different business applications today. Hence, statistics forms an integral part of most business curriculum across colleges and universities at both undergraduate and graduate levels. This article explores the different facets of teaching statistics (and data science, by extension) to non-STEM majors at a minority-serving institution located in the western United States. It starts with a brief overview of their business statistics course curriculum along with assessment outcomes reported in recent years. It then presents some of my own research in understanding factors that impact student performance and success in this course for potential early detection of “at-risk” students, the role of academic support services like Supplemental Instruction (or SI) in potentially improving student outcomes, the differences in student outcomes between traditional face-to-face and online sections of the course, and lastly the challenges faced during the virtual instruction period precipitated by the COVID-19 pandemic since March 2020. The article concludes with some of my own reflections from teaching this course for over 10 years and the future opportunities to further improve student outcomes in this course, particularly for underserved students.

Mitra, S., & Goldstein, Z. (2017). Impact of Supplemental Instruction on business courses: A statistical study. *Informations Transactions on Education*, 1-13. doi: :10.1287/ited.2017.0178. www.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.

Mokhampanyane, M. C. (2021). Strategies for effective Supplemental Instruction to enhance academic performance of first year accounting students. *TECHNIUM Social Sciences Journal*, 25. doi: doi.org/10.47577/tssj.v25i1. www.techniumscience.com/index.php/socialsciences/article/view/4906/1732.

Substandard academic performance of first year accounting students is a challenge experienced in certain institutions of higher learning worldwide. Literature shows that institutions have put in place interventions to mediate the underperformance and failure rate to improve academic performance. Supplemental instruction (SI) programmes, for example, were initiated to minimise deteriorating academic performance. However, challenges persist in implementing supplemental instructional intervention effectively. Therefore, this paper explores strategies for effective SI to enhance academic performance of first year accounting students. The qualitative research method was undertaken using an interpretivist approach. The participants for the study consisted of one supplemental instruction coordinator, two SI student leaders, two Accounting lecturers, and two first year accounting students. All participants were purposively sampled from the faculty of Management Sciences at a selected university for the study. Data collection by means of interviews was employed. A thematic analysis was assumed to sort, interpret, and analyse the collected data, as they include the replication of categorised objectives. The findings of the study reveal that challenges hindering effective implementation of supplemental instruction on academic performance includes inadequate content knowledge of SI leaders, timetable clashes, lack of timely feedback, and incompetency in leading others. These are the major challenges; on the other hand, strategies to solve the problem were retraining of SI student leaders and planning of their sessions and timetable.

Moorhead, L. (2020). Peer-based learning in reporting class. *Teaching Journalism & Mass Communication*, 10(1), 8-20.

www.aejmc.us/spig/wp-content/uploads/sites/9/2020/06/TJMC-10.1-Moorhead-Peer-based-learning.pdf.

Supplemental instruction (SI) is a peer-guided non-remedial academic support program that has proved valuable in a range of college courses and for historically underrepresented (HU) students. Its value for undergraduates in STEM courses is well established, and increasingly, researchers are documenting that value in other disciplines. This study extends SI to a reporting course offered by a journalism program at a large urban institution. The program identified the course as high risk, with 22 percent of students failing and a 15 percent achievement gap between HU and non-HU students. This study considers the impact of SI on 76 students via pre- and post-tests, final grades, and exit surveys over two consecutive semesters. Results reveal formal supplemental instruction is a factor in student success, with no students who attended SI more than twice failing, and those who attended more sessions experienced additional gains. Still, only half of all students opted to attend SI.

Mottley, J. G., & Roth, V. (2013). *Peer-Led Team Learning: Adjunct to lectures in an electrical engineering course for non-majors*. Conference Proceedings of the Frontiers in Education Conference, 2013 IEEE, Oklahoma City, OK.

Peer-Led Team Learning (PLTL) is a recognized model for teaching and learning in which select students in a course return in later semesters to serve as peer leaders who facilitate small learning groups. At our institution (a small, private, research-intensive university), this technique is adopted in Workshops; our peer leaders meet weekly with small groups of students to guide them through sets of exercises designed by the instructor(s) of the course. Peer leaders receive instruction and support in pedagogy and group dynamics in a course jointly taught by a learning specialist from the Center for Excellence in Teaching and Learning (CETL) and the instructor of the course. Workshops have been adopted in many courses, ranging from Chemistry, Biology, Earth Sciences, Physics, and Optics, to Economics and Business. This paper describes the use of Workshops for several years in an Electrical and Computer Engineering (ECE) course intended for non-ECE majors. We discuss the processes and pitfalls for initiating the use of Workshops in this and other courses, present an example of Workshop problems and questions currently in use, and discuss the value of the Workshops to students, peer leaders, and faculty as told to us in surveys, course journals, and reflective sessions held after the course.

Ng, R., Kaur, A., Farina, S., Mohamed, S., Latif, A., & Ramli, B. (2009). E-mathematics : pre-instructional and supplement instruction and their impact of student's online participation and final exam score. *AAOU Journal*, 4(1), 27-36.

Open University Malaysia (OUM), Malaysia's first open and distance learning with over 70.000 students, offers more than 51 programs to-date. More than 90% of its students are working adults who are unable to leave their jobs or families behind to pursue their dream of getting a degree. The blended learning approach adopted by OUM provides the flexibility for working adult's to obtain the required paper qualification and to upgrade their knowledge. One of the important elements of blended learning is the use of online discussion forum where learning takes place beyond classroom. Mathematics, a traditionally difficult course, forms part of the prerequisite for students to obtain a business degree at OUM. The adult learners at OUM generally have left school for at least five years and most of them have low grades in Mathematics at O' Level. Thus it is a big challenge for these adult learners to undertake a Mathematics course via online with minimum Face-to-Face contact with their tutors. This paper focuses on the implementation of pro-instruction workshop and Supplemental Instruction to find its impact on student's online participation and exam results of 88 students. The contents of the online forum were also analyzed using a 34-item instrument derived from the Community of Inquiry model. Results obtained showed that there was a strong correlation between workshop participation and final exam score. Independent samples t-test conducted showed that there was a significant difference between the mean score of online discussion ratio and final examination between participants attached to a tutor conducting the workshop and extended coaching compared to participants attached to another tutor using the normal teaching guide. The means COI score obtained for mathematics between the two tutors indicated that there is a difference in the teaching and cognitive presence but almost similar in the social presence.

Ng., R., Kaur, A., & Latifah, A. L. (2009). *Online Supplemental Instruction: An alternative model for the learning of mathematics*. . Conference Proceedings of the International Conference on Information., Kuala Lumpur, Malaysia.

More than 90% of Open University Malaysia (OUM)'s learners are working adults who are unable to leave their jobs or families behind to pursue their dreams of getting a degree. The blended learning mode adopted by OUM provides the flexibility for working adults to obtain their paper qualifications and to upgrade their knowledge.

Mathematics, a traditionally difficult course, forms part of the pre-requisite for learners to obtain a business degree at OUM. The adult learners at OUM generally have left school for at least five years and most of them have low grades in Mathematics at O' Level. Thus it is a big challenge for these adult learners to undertake a Mathematics course via online with minimum Face-to-Face contact with their tutors. This paper proposes an alternative model of learning mathematics known as Online Supplemental Instruction (OSI) model which involves three components; pre-tutorial workshop, online mentoring, and online video support. The research which involved 132 learners under the tutorship of two tutors was carried out to find the impact of the model on learners' online participation and final exam score. The contents of the online discussion forum were analyzed using a 34 item instrument derived from the Community of Inquiry (COI) model. Learners' online participation behavioral pattern was also analyzed. Results obtained showed that there was a strong correlation between learners who have participated in the OSI model of learning and their online participation and final exam score.

Ning, K., & Downing, K. (2010). The impact of Supplemental Instruction on learning competence and academic performance. *Studies in Higher Education*, 35(8), 921-928.
www.tandfonline.com/doi/pdf/10.1080/03075070903390786.

This study investigated the effects of Supplemental Instruction, a peer-assisted learning approach, on students, learning competence and academic performance. The supplemental instruction intervention facilitated by senior students focused on developing students' use of study skills and enhancing their motivation and academic performance. Pre- and post-intervention learning competence measures (the 10 scales of the Learning and Study Strategies Inventory) were available for 430 first year undergraduate business students (Supplemental Instruction, n = 109; Non-Supplemental Instruction, n = 321) from a university in Hong Kong. Structural equation modeling demonstrated that Supplemental Instruction had a significant effect on academic performance, both directly and indirectly via enhancement of student learning competence, after controlling for pre-intervention learning strategy scores and previous academic achievement. This study provides evidence that Supplemental Instruction can be a very effective instructional strategy for promoting undergraduate student learning.

O'Donnell, R. (2004). *Introducing peer-assisted learning in first year accounting in Australia*. Unpublished manuscript. Department of Economics, Macquarie University. Sydney, New South Wales, Australia.
www.econ.mq.edu.au/Econ_docs/research_papers2/2004_research_papers/PALDec04.pdf

At Macquarie University in Australia, Peer Assisted Learning (PAL) is an adaptation of the Supplemental Instruction (SI) model. PAL was piloted in an accounting course. The paper describes the pilot program regarding its design, outcomes, benefits, costs, and lessons learned. There was a positive correlation between higher grades and more frequent attendance in the PAL sessions. There were also benefits for the PAL facilitators: development of key skills such as leadership, communication, group management; deeper understanding of course content; valuable enhancement to employability; and financial payment.

Packham, G., Cramphorn, C., & Miller, C. (2001). Module development through Peer-Assisted Student Support: An initial evaluation. *Mentoring & Tutoring*, 9(2), 113-124.

Peer-Assisted Study Sessions (PASS), based upon the Supplemental Instruction (SI) model, are used with institutions within the United Kingdom for improvement of the course curriculum. Feedback is provided to the course instructors in such a way that is not easily obtainable through more traditional means. Data is collected through meeting logs, observations, interviews, and questionnaires. This article focused on the use of PASS for this purpose at the University of Glamorgan's Business School.

Packham, G., & Miller, C. (2000). Peer-Assisted Student Support: A new approach to learning. *Journal of Further and Higher Education*, 24(1), 55-65.

Peer-Assisted Student Support (PASS) is based upon Supplemental Instruction (SI) and is the predominate name used in the United Kingdom. This article provides an overview of PASS with specific information about its use at the University of Glamorgan during the 1997-98 academic year in the Business School. PASS is most popular with female students and those under 21 years of age. Evaluation of the positive impact of PASS participation is limited to the course in which the students attended PASS sessions. Higher rates of PASS attendance was correlated with higher final course grades.

Po, Y. K. (2004). *An evaluation of a Supplemental Instruction program*. (Master's of Arts thesis), University of Hong Kong, Hong Kong. www.hku.hk/handle/10722/31605

Supplemental Instruction (SI) has been introduced at the University of Hong Kong. The focus for this masters' thesis was on the usefulness of SI with a business statistics course during 2003 and 2004. The study involved both a comparison of SI and non-SI participant grades as well as semi-structured interviews and observations to further evaluate the utility of SI. While there was no improvement in final course grades, interviews with the

SI participants revealed the following themes: more opportunities to discuss the course, increased confidence in the subject matter, and reduced test anxiety.

Price, M., & Rust, C. (1994). Introducing Supplemental Instruction in business courses in a modular programme. In C. Rust & J. Wallace (Eds.), *Helping students to learn from each other: Supplemental Instruction, SEDA Paper 86* (pp. 31-36). Birmingham, England: Staff and Educational Development Association

Oxford Brookes University in the United Kingdom is using the Supplemental Instruction program in the School of Business. SI was implemented with larger business courses (400 to 500 students) to enhance the learning environment for the students enrolled in these elective courses that are outside their field of study. Rather than paying the SI leaders, they were given academic credit for the experience. The research studies of students enrolled in the targeted courses suggested a positive correlation ($p < .05$) between SI participation (two or more times) and higher final course grades (Introduction to Business, 61.4 percentile vs. 56.2 percentile for non-SI participants; Managing Concepts, 60.7 vs. 54.6; and Changing Environment of Business, 56.6 vs. 46.2). The SI participants attracted a higher percentage of female and older students than represented in the total class.

Price, M., & Rust, C. (1995). Laying firm foundations: The long-term benefits of Supplemental Instruction for students in large introductory courses. *Innovations in Education and Training International*, 32(2), 123-130.

This article contains the results of the use of Supplemental Instruction (SI) to support student learning in business modules at Oxford Brookes University in the United Kingdom. The courses were selected due to their large size and the need to ensure mastery of course material that was prerequisite for the next course in the sequence. Quantitative and qualitative studies in 1993-94 suggest that SI was beneficial in increasing mean final course grades in the courses supported by SI (Introduction to Business: 61.4 percentile for SI participants vs. 56.2 percentile for non-SI; Managing Concepts: 60.7 vs. 54.6; Changing Environment of Business: 59.6 vs. 46.4). Further analysis showed that there was no correlation between entry qualifications and performance in the classes. In comparison with non-SI participants, former SI participants earned mean final course grades that were higher in subsequent courses in the business sequence that did not have SI support provided (54.9 percentile for former SI participants vs. 48.8 percentile for former non-SI). This finding was confirmed through interviews with students who reported using learning strategies from SI sessions in other classes. This suggests that SI provided transferable benefits for additional courses in the sequence.

Prior, J. (2004). *Development of PAL Online: An analysis of the first part of a two-stage trial*. Unpublished manuscript. Oxford Brookes University.

This report abstract describes the use of Peer Assisted Learning (PAL) at Oxford Brookes University (England) in the Business School. PAL is an adaption of the Supplemental Instruction (SI) program. The researcher are studying the impact with online academic support through the use of PAL leaders. Their role would be slightly different with a shift towards being more interventionist and less of a facilitator. This trial will form the first stage of a two stage trial. Stage two will be the implementation of online discussion on a large core module next term. The ultimate aim of the research is to develop a model for PAL online that covers areas such as site design, PAL leader training and support, the needs of both participant and leaders and the potential benefits for both groups.

Rust, C., & Price, M. (1994). *Improving students' skills through Supplemental Instruction*. Conference Proceedings of the 2nd International Symposium on Improving Student Learning, Oxford, England.

Oxford Brookes University in the United Kingdom is using the Supplemental Instruction program in the School of Business. SI was implemented with larger business courses (400 to 500 students) to enhance the learning environment for the students enrolled in these elective courses that are outside their field of study. Rather than paying the SI leaders, they were given academic credit for the experience. The research studies of students enrolled in the targeted courses suggested a positive correlation ($p < .05$) between SI participation (two or more times) and higher final course grades (Introduction to Business, 61.4 percentile vs. 56.2 percentile for non-SI participants; Managing Concepts, 60.7 vs. 54.6; and Changing Environment of Business, 56.6 vs. 46.2).

Ruth, D. (1987, 1987, March 7). Education bill helped economy, *The Times Picayune*, pp. A-18.

This newspaper article mentions that Supplemental Instruction (SI) is being used at the University of New Orleans with introductory courses in business administration, sociology and Afro-American culture. In these classes students are passing the courses at a rate of 73 percent. Before introduction of SI the pass rate was less than 50 percent.

Saunders, D., & Gibbon, M. (1998). Peer tutoring and peer-assisted student support: Five models within a new

university. *Mentoring & Tutoring*, 5(3), 3-13.

This article describes the use of Supplemental Instruction (SI) -- called Peer Assisted Student Support (PASS) by the local institution -- in the Business School at the University of Glamorgan in Glamorgan, Wales, United Kingdom. SI has been offered in the School of Applied Sciences since 1991. It is called PASS within the Business School. Most of the PASS group facilitators are volunteers and have previously been participants in groups when they were first year students. Positive reports from facilitators included: satisfaction gained from being able to positively help their peers, improved self-confidence, better communication and oral presentation skills as a result of running sessions, and being able to strengthen their job resume. The author identified several challenges with the PASS scheme: student attendance was erratic due to perceived time conflicts of students; difficulty to maintain the voluntary program as committed PASS facilitators graduated and new leaders needed to be recruited to take over responsibilities.

Shuhidan, S. M., Awang, Y., Mohamed, N., & Zakaria, N. N. Z. (2018). Non-accounting students; perception on the development of study skills using In-Class Supplemental Instruction. *e-Academica Journal*, 7. doi: 10.24191/e-aj.v7iSI-TeMIC18.5380. www.gids.mohe.gov.my/index.php/JeA/article/view/5380.

Challenges such as different background and abilities of universities' students, reluctance of academic staff in understanding students' learning style and lack of study skills knowledge among students and lecturers are to be resolved by public universities. Resolving these challenges will provide better learning environment in public universities. Thus, the objectives of this study are to identify the reflective measures of study skills and to examine the students' perception on the development of study skills by using In-Class Supplemental Instruction (ICSI). Using the questionnaires survey, this study found 10 reflective measures of study skills with Cronbach Alpha of 0.930 which indicates all reflective measures have good internal consistency reliability. The respondents are satisfied with the ICSI sessions in helping them to develop their study skills with an average mean of 4.09. It is concurred that ICSI approach assists in developing study skills such as deeper understanding, discussing and solving problem, teamwork and academic skills. Challenges such as different background and abilities of universities' students, reluctance of academic staff in understanding students' learning style and lack of study skills knowledge among students and lecturers are to be resolved by public universities. Resolving these challenges will provide better learning environment in public universities. Thus, the objectives of this study are to identify the reflective measures of study skills and to examine the students' perception on the development of study skills by using In-Class Supplemental Instruction (ICSI). Using the questionnaires survey, this study found 10 reflective measures of study skills with Cronbach Alpha of 0.930 which indicates all reflective measures have good internal consistency reliability. The respondents are satisfied with the ICSI sessions in helping them to develop their study skills with an average mean of 4.09. It is concurred that ICSI approach assists in developing study skills such as deeper understanding, discussing and solving problem, teamwork and academic skills.

Sibert, J., Goeckner, M., Galley, D., & Goldammer, K. (2013). *Lowering barriers to enhance 2 + 2 transfer student success, persistence, and retention: The Dallas STEM Gateways Collaborative*. Conference Proceedings of the 2013 ASEE Gulf Southwest Annual Conference, Arlington, TX. www.aseegsw.com/past%20Proceedings/2013%20Proceedings/Abst_galley.pdf

The University of Texas at Dallas, Collin College, and Richland College of the Dallas County Community College District have established a joint effort, the NSF-sponsored Dallas STEM Gateways Collaborative, to significantly increase the number of undergraduate students completing degrees in Science, Technology, Engineering, and Mathematics (STEM) in the North Texas region. Building upon previous cooperation among these three institutions and the remarkable concentration of high-tech businesses in the Dallas-Fort Worth Metroplex, the Collaborative has implemented best-practice methods to bring about a cultural change that will lead to a sustained increase in the production of STEM-trained graduates. First, the Collaborative has strengthened recruitment into introductory STEM courses and expanded the use of student mentoring within those courses to encourage student selection of STEM majors and classroom success. Second, it has increased opportunities for internships and undergraduate research experiences for students early in their college career to encourage students to remain committed to the pursuit of STEM majors. Finally, a concerted effort of curriculum alignment across all STEM fields at the three participating institutions combined with a formal professional development program aimed at spreading effective pedagogical techniques across all three institutions has been designed to enhance teaching effectiveness at the critical introductory level. The Dallas STEM Gateways Collaborative program is built to enhance the number, quality, and diversity of undergraduates successfully earning STEM degrees.

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).

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.

Stratton, C. B., Commander, N. E., Callahan, C. A., & Smith, B. D. (2001). A model to provide learning assistance for all students. In V. L. Farmer & W. A. Barham (Eds.), *Selected models of developmental education programs in higher education* (pp. 63-88). Lanham, NY: University Press of America

Supplemental Instruction (SI) at Georgia State University, an urban institution with 25,000 students. Due to changing institutional policies, the emphasis was shifted from a traditional developmental education program that focused on the lowest academically prepared students to a campus program that served students from all academic ability levels. SI was a key component of the new mission. Academic achievement data is reported in classes where SI was offered to all students: accounting, biology, history, and political science between 1994 and 1997 and the results favored SI participants. The book chapter reports on a variety of other adjunct instructional approaches to providing academic enrichment for a broader scope of students and the administrative issues that guided the decision making with this change.

Sultan, F. K. P. D., Narayansany, K. S., Kee, H. L., Kuan, C. H., Manickam, M. K. P., & Tee, M. Y. (2014). Helping students with difficult first year subjects through the PASS Program. *Journal of Peer Learning*, 6(1), 59-75. www.ro.uow.edu.au/ajpl/vol6/iss1/6.

The purpose of this action research was to find out if participants of a pilot PASS program found it to be helpful. The PASS program is based on the Supplemental Instruction (SI) model. The program was implemented for the first time in an institute of higher learning in Malaysia. An action research design guided the study, with surveys, documents, and reflections as primary data sources. The findings were largely positive, with participants citing PASS sessions to have helped them in the study of difficult first year subjects and in the development of some study skills. PASS also improved social integration. The collaborative and facilitated structure of PASS sessions were reported to be key aspects that improved student learning. Some issues were also highlighted and discussed, such as misconceptions of the role of PASS leaders.

Supple, B. J., Best, G., & Amanda, P. (2016). "My purpose was to help them with accounting, not English": An exploratory study of languages other than English in PASS. *Journal of Peer Learning*, 9(1), article 6.

www.ro.uow.edu.au/cgi/viewcontent.cgi?article=1101&context=ajpl.

This paper considers when and for what purposes Peer Assisted Study Session (PASS) Leaders at an English medium university use their first language (when that language is not the dominant language of instruction) to facilitate PASS sessions in an English speaking university. This small qualitative exploratory study examines the experiences of eight PASS Leaders who speak a language other than English. The paper explores how and for what purposes the PASS Leaders utilised their first language (referred to as L1) of Chinese or Vietnamese and their second language of English (referred to as L2). The research participants revealed complex and well-considered decision-making processes regarding the language(s) they used in their sessions as PASS Leaders. Broadly, the language they used depended on the linguistic backgrounds and preferences of the session attendees, the concepts covered in the sessions, and the importance PASS Leaders ascribed to learning English over learning the subject's content. We suggest that there may be room for languages other than English as a "medium of instruction" in PASS sessions. Our initial investigations warrant broader discussion and further research within the PASS/SI community about the role L1s can play in enhancing the student learning experience in PASS sessions, for both PASS Leaders and PASS attendees.

Szal, C., & Kennelly, K. R. (2017). The effects of Supplemental Instruction on student grades in a blended learning context. *Developments in Business Simulation and Experiential Learning*, 40, 230-236.

Supplemental Instruction (SI) programs have been used in college and university programs since their inception in the 1970's. The programs are viewed as a cost-effective method of delivering peer-assisted instruction to students in courses deemed difficult by virtue of the fact that they suffer from high failure and drop rates. There have been many analyses that attempt to determine the efficacy of these programs in improving student involvement and grades in the courses and in reducing drop rates and retention. Virtually every analysis has arrived at the conclusion that the SI program is successful in these endeavors. A state school is involved in the transformation of many lower-division classes to a blended learning format in an effort to increase efficiency for the use of teaching staff and classroom space. In the view of the authors, the use of SI programs using student leaders takes on added importance. The paper performs an analysis concerning the results for an introductory business statistics class. The results indicate that SI sessions had a large positive effect on student grades in the class, and the effect of SI sessions is larger than either time spent on homework assignments or participation in lecture activities. For every SI session attended a student's grade improves by 0.73 points on a 100 point scale. The paper concludes by indicating additional data requirements that could help future research clarify the effects of SI on different demographic groups.

Szal, R. (2018). *Gender, statistical anxiety, and Supplemental Instruction* Conference Proceedings of the Developments in business simulation and experiential learning. www.absel-ojs-ttu.tdl.org/absel/index.php/absel/article/view/3153/3089

Supplemental Instruction (SI) programs, which have been used in colleges and universities since the 1970's, are viewed as a cost-effective method of delivering peer-assisted instruction to students in courses that traditionally experience high failure and drop rates. In a previous analysis of students in an introductory business statistics class at a mid-sized university in the Southwest, it was found that SI was very important in a student's grade determination, especially in view of the fact that the course is designed as blended learning meeting one time per week. The analysis also seemed to indicate that there may well be significant differences as between men and women in terms of the effect of SI attendance on grade determination. The present paper investigates the differences between males and females in the course, and concludes that, while both men and women suffer from a fear of statistics (and mathematical courses in general) upon entering the course, their reactions to the anxiety are very different. While men appear to be better prepared than women when beginning the course, at the end of the semester, there is no significant difference in final grades. Several possible reasons for this are given, and the results may hold important lessons for encouraging greater participation of females in STEM activities from an early age.

Tanaka, C. (1995). *Peer Assisted Study Sessions in HUB 661 Japanese*. Unpublished manuscript. Queensland University of Technology. Brisbane, Queensland, Australia.

This research report documents the use of Peer Assisted Study Sessions (PASS) at Queensland University of Technology (Brisbane, Queensland, Australia) in HUB 661 Japanese language course. This course is often chosen as a second-semester, first year subject for International Business students. PASS is the local institutional name for the Supplemental Instruction (SI) program. Benefits of the PASS program for participants included slightly higher mean final course grades and lower rates of withdrawal. The professor who had PASS attached to his class reported receiving helpful feedback from the PASS leader concerning the comprehension level of the students. This afforded them an opportunity to revise lectures and review upcoming examinations. PASS leaders reported the following behavioral changes: learned how to give feedback to the course lecturer in an appropriate fashion; learned to work in harmony with other students

and leaders; improved their own communication skills; improved their content knowledge and skill; and gained valuable insight into the learning process.

Tangwe, M. N. (2016). Students' insights on the implementation of peer academic support programs at one university in South Africa. *Dirasat: Educational Sciences*, 43(3), 2163-2176.

The worldwide business regarding the high dropout and low throughput rates at previously disadvantaged universities in South Africa led to the institution of academic support programs. The report examines the insights of undergraduate students regarding the execution of the supplemental instruction and speech and writing consultant programs at the University of Fort Hare, South Africa. The findings revealed that these programs are very useful and helpful to undergraduate students, though there were some shortcomings that require the attention of the governing body of the university. In this regards, some recommendations were provided in order to improve the implementation of these cherished programs. The evaluation study was conducted at the University of Fort Hare in the Eastren Cape Province of South Africa.

Tjamawaa, A., Murphy, C., & Hakim, T. (2022). Sustaining STEM student learning support and engagement during COVID-19. *Community College Journal of Research and Practice*, 46(1-2). doi: <https://doi.org/10.1080/10668926.2021.1973612>.

<https://www.tandfonline.com/doi/epdf/10.1080/10668926.2021.1973612?needAccess=true&role=button>.

This paper examined how an HSI-STEM grant project at one such college responded, confronting challenges of the transition to an all-online environment head-on and tapping its unexpected benefits. With a focus on STEM student services and programs, two aspects of the situation are analyzed and studied. Facilitating Innovation: STEM administrators had to think outside the box and employ extra effort to continue providing support services such as Supplemental Instruction and Counseling Services to ensure success for their students. We attempt below to identify key issues and obstacles met along the way and how they were addressed: How did peer Supplemental Instruction (SI) Leaders, trained for a classroom setting, modify their approach and engage students through virtual-classroom-supplemented instruction? How did academic counselors incorporate non-verbal communication and document-sharing in their outreach and interaction with their students? How did faculty and staff guide two-year-long student research projects during the pandemic? What sort of challenges did they face and how were they overcome? Looking Ahead and Moving Forward: What started as a shocked reaction in the face of a dizzying crisis had to be transformed, and urgently, into an effective, necessity-dictated response in service of continued STEM teaching-and-learning advancement. Some of the changes adopted through the pandemic may now be pleasantly irreversible. What impact did access to, and experience with, online educational technology has on existing learning processes and support systems? How effective these efforts were? What are the long-lasting effects of implemented change on traditional ways of doing business?

Tuzlukava, S., Giuzel Sahin, N. G., & Gigidemodlu, C. (2022). Extending Peer-Led Team Learning to management education: The effects on achievement, critical thinking, and interest. *The International Journal of Management Education*, 20(2).

As an attempt to extend the implementation of peer-led team learning to management education, this study proposes to investigate business students' achievement, critical thinking skills, and interest in learning environment across academic ability groups and attitudes towards team leaders. Using a one-shot pre/post experimental design, 108 conveniently selected students participated in the treatment throughout ten weeks. Researchers collected data using the critical thinking scale and interest scales both at the beginning and at the end of the treatment. In addition, students' course achievement is used as a dependent variable. To answer research questions, paired-samples t-test, one-way repeated measure analysis of variance (ANOVA), and multivariate analysis of variance (MANOVA) were used. Results indicate that the mean scores of achievement are significantly different for different ability group students and different levels of attitudes towards team leaders. Besides, students' interest scores increased at the end of the implementation; however, their scores on critical thinking skills decreased. Further studies are suggested to consider these issues in implementing peer-led team learning in social science courses.

Wallace, J. (1993). *The use of Supplemental Instruction in sub-degree vocational courses*. Unpublished manuscript. Kingston University. Surrey, England.

This report describes the use of Supplemental Instruction (SI) with sub-degree vocational courses at Kingston University (London, UK). Kingston runs a number of sub-degree courses leading to the Higher National Diploma (HND) in Electronic Engineering which is obtained from the Business and Technology Education Council (BTEC) through the university. In October, 1990 SI was introduced into several courses in the Faculty of Technology at Kingston. Data from 1990 to 1991 suggests that SI participants received statistically ($p < .05$) higher final course grades (Mathematics: 60.9 percentile vs. 48.1 percentile; Circuits & Systems: 64.0 vs. 49.9; Electronic Principles: 60.0 vs. 49.4; Software Principles: 55.3 vs. 41.5; and

Management Studies: 69.4 vs. 53.5). and had lower rates of withdrawal. In addition, interviews with SI participants suggest that they also develop "transferable skills" that help them in other courses.

Watson, J. (2000). *A Peer Assistance Support Scheme (PASS) for first year core subjects*. Conference Proceedings of the 4th Pacific Rim First Year in Higher Education Conference: Creating Futures for a New Millennium, July 5-7, 2000. QUT: Brisbane.

This paper examines a peer assisted study program that has been offered to three core first year subjects in the School of Economics at the University of New South Wales in Australia. While the paper refers to the program as PASS, it is adapted from Supplemental Instruction (SI) originally developed in the United States. Several variations of the SI model include: not requiring the SI leaders to attend class along with the rest of the students and employing faculty members or academic staff members to supervise the program rather than staff from the campus learning center. Common classes supported through PASS were microeconomics and accounting. The PASS program was evaluated through both student questionnaires as well as evaluating their final course grades. The questionnaire data suggested that PASS contributed to higher satisfaction and deeper learning of the course content material. Evaluation of the final grades suggested a statistically significant relationship between attending six or more PASS sessions and higher grades. PASS leaders reported benefits of the program as well with development of personal communication skills as well as deeper understanding of the course material.

Whatman, S. (1995). *Peer assisted study sessions with Aboriginal and Torres Strait Islander students during semester two, 1995*. Unpublished manuscript. Queensland University of Technology. Brisbane, Queensland, Australia.

This report describes the use in semester 2, 1995 of Peer Assisted Study Sessions (PASS) at Queensland University of Technology (Australia) with first year Aboriginal and Torres Strait Islander (A&TSI) students who were attending class at the Gardens Point Campus. PASS is the locally used name for Supplemental Instruction (SI). A&TSI students had typically experienced considerable difficulty in courses such as Information Technology and Business. These courses historically had low Indigenous student enrollments, and consequently, had very few successful graduates. Eight courses were selected for PASS support: Computer Applications, Software Development 1 & 2, Technology of Information Systems, Business Communication & Application Development, Theoretical Perspectives on Communication, Microeconomics, and Reporting Principles. Before introduction of the PASS program in the second semester, the A&TSI students as a group earned fairly low grades. At the end of the semester with PASS support, the students earned higher final course grades. PASS leaders reported the following benefits for themselves: more opportunity to talk with faculty members, greater understanding of course content which helped in other classes, and developed friendships with more students that they would normally would have not met.

Wilson, B., & 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.

Woolrych, T., Zaccagnini, M., Stephens, M., Stace, M., Middleton, R., Stephen, M., . . . Kornhoff, A. (2018). *Peer Assisted Study Sessions (PASS) Online: Investigating the impact of an online format across different first year university subjects*. Conference Proceedings of the 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE), Wollongong, NSW, Australia. www.ro.uow.edu.au/cgi/viewcontent.cgi?article=5571&context=sspapers

As the demand for flexible learning increases, it is important to explore and expand online learning opportunities, especially in student supported learning. Peer Assisted Study Sessions (PASS) is a student led academic support program designed to help students transition into university and increase student retention. PASS is offered in traditionally challenging first year core subjects. Due to increased popularity of PASS, along with limited space and time availability, a synchronous online format (Blackboard Collaborate) was piloted in three first year University of Wollongong (UOW) subjects in the faculties of Business, Nursing, and Psychology. The aim was to test the effectiveness of the online delivery of PASS by comparing student final grade outcomes from online cohorts with face-to-face (F2F) modes, and those students who had not attended PASS. Results demonstrated that students who attended PASS obtained significantly higher marks compared to students that did not attend PASS. Final grade outcomes for F2F versus online also varied between subjects. The different result profiles for the three subjects suggests there may be different drivers

for student success in the online space. This paper presents these findings providing consideration of different factors that may influence student success, with directions for future research.

Worthington, A., Hansen, J., Nightingale, J., & Vine, K. (1995). *Peer teaching and introductory economics: An application using the Peer Assisted Study Scheme (PASS) at the University of New England*. Conference Proceedings of the Australian Economics Education Symposium in conjunction with the 24th Conference of Economists, Adelaide, South Australia, Australia.

This paper discusses the use of Peer Assisted Study Scheme (PASS) with approximately 300 students in an Introductory Microeconomics class at the University of New England (Australia) in 1995. PASS is an Australian contextualization of the Supplemental Instruction (SI) program. After an overview of peer collaborative learning and challenges with student learning in economics courses, the paper shares the results of qualitative and quantitative research. Quantitative data included assessment scores, the final exam results and the responses to a 34 item survey administered to all students in the class. The survey included questions about their experience in the PASS sessions, reasons they did or did not participate in PASS, usefulness of the tests, possible reasons for academic difficulty in the class, and to predict their final grade in the class. Data were analyzed using Item Response Theory and multiple linear regression techniques. Qualitative data were collected by the PASS coordinator from weekly written reports of the PASS facilitators, PASS session observations, and in-depth interviews. About one-third of the students participated in SI. Of these students, more than 50 percent attended more than half of the available sessions during the academic term. The PASS participants listed either "to improve understanding" or "to gain additional information" as the top reason for attending the sessions. Only five percent listed "to learn study skills" as the top reason. Only 22 percent of the nonparticipants said that they had no desire to attend or thought they were unnecessary. The most common reason not to attend related to insufficient time. It appears that the SI programs is directly beneficial to the SI participants and indirectly beneficial to non-SI participants since the program influenced the teaching staff to increase student learning. Before introduction of PASS, the failure rate in the course was 33 percent. Following the introduction of PASS, the failure rates have dropped to 18 percent. Through weekly feedback from the PASS facilitator, the class lecturer reported that he intentionally modified the lecture content and his lecturing style. One change was that the lecturer reduced the volume of information delivered so that more time could be spent on improving student understanding of critical concepts.

Worthington, A., Hansen, J., Nightingale, J., & Vine, K. (1997). Supplemental Instruction in introductory economics: An evaluation of the University of New England's Peer Assisted Study Scheme (PASS). *Australian Economic Papers*, 69-80.

This articles discusses the use of Peer Assisted Study Scheme (PASS) with approximately 300 students in an Introductory Microeconomics class at the University of New England (Australia) in 1995. PASS is an Australian contextualization of the Supplemental Instruction (SI) program. After an overview of peer collaborative learning and challenges with student learning in economics courses, the paper shares the results of qualitative and quantitative research. Quantitative data included assessment scores, the final exam results and the responses to a 34 item survey administered to all students in the class. The survey included questions about their experience in the PASS sessions, reasons they did or did not participate in PASS, usefulness of the tests, possible reasons for academic difficulty in the class, and to predict their final grade in the class. Data were analyzed using Item Response Theory and multiple linear regression techniques. Qualitative data were collected by the PASS coordinator from weekly written reports of the PASS facilitators, PASS session observations, and in-depth interviews. About one-third of the students participated in SI. Of these students, more than 50 percent attended more than half of the available sessions during the academic term. The PASS participants listed either "to improve understanding" or "to gain additional information" as the top reason for attending the sessions. Only five percent listed "to learn study skills" as the top reason. Only 22 percent of the nonparticipants said that they had no desire to attend or thought they were unnecessary. The most common reason not to attend related to insufficient time. It appears that the SI programs is directly beneficial to the SI participants and indirectly beneficial to non-SI participants since the program influenced the teaching staff to increase student learning. Before introduction of PASS, the failure rate in the course was 33 percent. Following the introduction of PASS, the failure rates have dropped to 18 percent. Through weekly feedback from the PASS facilitator, the class lecturer reported that he intentionally modified the lecture content and his lecturing style. One change was that the lecturer reduced the volume of information delivered so that more time could be spent on improving student understanding of critical concepts.

Yates, J., Gill, F., & Webb, C. (1995). *Peer mentoring to facilitate learning in economics*. Conference Proceedings of the Australian Economics Education Symposium, Adelaide, South Australia, Australia.

This paper describes and provides a preliminary evaluation of Supplemental Instruction (SI) used at the University of

Sydney (Australia) in an economics course during 1995. Three quarters of the SI leaders listed the following benefits of involvement with the program: improved teaching skills; improved leadership skills; increased confidence; and/or a change in the way they thought about economics.

Zaccagnini, M., & Verenikina, I. (2014). Peer Assisted Study Sessions for postgraduate international students in Australia. *Journal of Peer Learning*, 6(1), 86-102. : www.ro.uow.edu.au/ajpl/vol6/iss1/8.

Peer Assisted Study Sessions (PASS), a peer led academic support program that has multiple documented academic, social, and transition benefits, is increasingly being utilised in Australian institutions. PASS is based on the Supplemental Instruction (SI) model. Whilst PASS has been evaluated from multiple angles in regard to the undergraduate cohort, there is limited research regarding the benefits of PASS for postgraduate students, particularly international postgraduate students. This specific cohort's perspective is significant as international students constitute a large proportion of postgraduate students in Australian universities. This study investigates the role of PASS in contributing to the experience of international postgraduate coursework students at an Australian university through an investigation of its perceived benefits by this cohort of students.

Zaritsky, J. S. (1989). *Peer tutoring: Issues and concerns, results of a survey*. Unpublished manuscript. La Guardia Community College. Long Island City, NY. ERIC database. (ED315134).

In 1988, a survey was conducted to determine the characteristics and extend of peer tutoring program at two- and four-year colleges in New York. Findings included: 1) 95 percent of institutions had at least one peer tutoring program; 2) 41 percent had centralized tutoring labs; 3) institutions most commonly provided Supplemental Instruction in mathematics, biology, business, chemistry, and English; and 4) 96 percent provided peer tutors with training.

Zaritsky, J. S. (1994). *Supplemental Instruction: A peer tutoring program at La Guardia Community College*. Unpublished manuscript. La Guardia Community College. Long Island City, NY. ERIC database. (ED373859).

This report describes the use of Supplemental Instruction (SI) at La Guardia Community College (NY). In spring 1993, an SI program was pilot tested in Principles of Accounting I, Introduction to Economics I and Fundamentals of Human Biology I courses. In Economics I the SI participants received a higher percent of A, B, and C final course grades (37% vs. 27%) and a lower rate of D, F, and course withdrawals (63% vs. 73%). In Economics I the SI participants received a higher percent of A, B and C final course grades (51.7% vs. 43.6%) and a lower rate of D, F and course withdrawals (48.3% vs. 56.4%). In Human Biology I the SI participants received a higher rate of A, B, and C final course grades (63.2% vs. 48.3%) and a lower rate of D, F, and course withdrawals (36.7% vs. 51.7%). Some SI leaders reported personal improvement in the following areas: higher self-confidence since they helped other students to do better; increased content knowledge through second review of the course; improved interpersonal communication skills; accelerated emotional and intellectual growth.

Zaritsky, J. S. (2001). Supplemental Instruction at an urban community college. In J. E. Miller, J. E. Groccia & M. S. Miller (Eds.), *Student-assisted teaching: A guide to faculty-student teamwork* (pp. 103-108). Bolton, MA: Anker Publishing Company. ERIC database. (ED449713).

Supplemental Instruction (SI) is used at LaGuardia Community College in New York to serve an ethnically-diverse student body. After providing a general overview of the SI model, a 1997-98 research study was shared that analyzed the impact of the program with courses in accounting, computer science, biology, and chemistry. Overall mean final course grades favored the SI participants (2.75 vs. 1.65) and higher percentage of successful grades (82% vs. 53%).

Zonoozi, F., Narayan, M., & Becvar, J. E. (2012). *Foundation of the leaders, by the leaders, and for the leaders*. Conference Proceedings of the Peer-led Team Learning International Society Inaugural Conference, Brooklyn, NY. www.pltlis.org/wp-content/uploads/2012%20Proceedings/Zonoozi-2012.docx

Funding Peer-Led Team Learning (PLTL) initiatives after the grants run out has been a long-standing and often devastating issue within the greater PLTL world. We propose consideration of local independent nonprofit organizations (Local Foundations) or possibly Local Chapters within PLTLIS to advance Science, Technology, Engineering, and, Mathematics (STEM) education through the PLTL model. The proposed Foundations are envisioned as collaborations of: Academics; Industry leaders; University Students; Members of the local education district; and High School teachers to be run and funded locally from the ground up rather than from top down. This will give the Leaders and those directly interacting with them more opportunity to govern their own path without university encumbrances, such as Development Office, Administration, or System/University/College politics, restrictions and fees. The purpose of the Foundations is to provide K – 16 pupils with the requisite skills to enter and succeed in higher education STEM (or any

other) disciplines. The function includes aiding instructors in the K – 12 realm to enable students toward successful transition to higher education. Independent foundations organized and overseen by the Leaders can promote PLTL using outstanding students from Universities/Colleges, High Schools and Community Colleges. Foundations can seek funding from local and federal government entities, individuals and most importantly businesses/industries and other philanthropic organizations.