Annotated Peer Bibliography, David Arendale, Processes used by the study group facilitator during their group session, 42 citations, revised May 17, 2023

Arendale, D. R. (2014). Seminar course approach for study group leader training. *NADE Digest, 6*(2), 1-11. University of Minnesota Digital Conservancy, www.hdl.handle.net/11299/200362

At the University of Minnesota during fall 2006, a college-credit course was created to help group leaders apply educational theories during their study group sessions with the campus Peer Assisted Learning (PAL) program. This course was required of all new group leaders starting during fall semester. Rather than a didactic class format led by me as the instructor, a collaborative seminar model was employed. In the class, these students studied education theory articles and discussed how to apply this information to their weekly sessions. This understanding helped them create new learning activities not contained in the formal training program. It also made better sense of dynamics within the group and how to employ culturally-sensitive learning activities. This course was part of a larger required professional development component for the study group leaders. The course has seven learning objectives: (1) Identify and discuss the application of learning theories with peer-assisted learning groups. (2) Increase skill in small group management skills to achieve learning objectives. (3) Contextualize learning strategy modeling and instruction within the specific academic context area supported by PAL. (4) Learn to analyze the learning needs of others and make modifications to the learning environment. (5) Grow as an independent learner and build upon their current strengths through development of new learning strategies. (6) Further develop intellectual skills of analysis, synthesis, critical evaluation, and application through completion of course activities. (7) Adopt new strategic learning strategies to successfully apply with course material. The course requires students to make weekly journal entries through the course web site which is only viewable by the course instructor. The entries focus on the reflections about their academic and personal changes as a result of this experience. In addition, the PAL facilitators complete an extensive end-of-term experience survey as a capstone reflection of their experience and how they changed academically and personally.

Arendale, D. R. (2020). Lessons learned in 2020 about postsecondary online peer assisted learning (PAL) groups from previous research publications and recent survey of PAL program administrators: University of Minnesota-Twin Cities.www.doi.org/10.13140/RG.2.2.28551.62881

This publication identifies lessons learned from moving traditional face-to-face peer study groups to online operation. Two sources were consulted. First, previous publications concerning online peer study groups were studied to identify approaches, equipment and software used, and reports of effectiveness. Second, during May 2020 administrators involved with managing peer assisted learning (PAL) programs were invited to complete an online survey concerning their experiences with operating online in response to the Covid-19 pandemic. Just to be clear, this report does not advocate that all the items within it need to be implemented to have a quality online program. Just because a listed item is only referenced by one publication or survey respondent, that does not make it less valuable than items listed by numerous publications and survey respondents. It is the wise discernment by individual PAL program directors of which items are relevant and fit the cultural and institutional context and availability of time and resources for their program. Think of this report as an education practice buffet with a wide range of choices.

Arendale, D. R. (2020). Lessons learned in 2020 from taking postsecondary peer assisted learning programs online: Raw survey data: University of Minnesota-Twin Cities. www.doi.org/10.13140/RG.2.2.15129.85609

In early May 2020, invitations to complete a brief survey on postsecondary peer-assisted learning (PAL) programs and their operation online in response to Covid-19 were posted to several national and international email listservs. Directors from 45 programs completed the survey. Since the survey was anonymous, it is impossible to know the institutional type and their locations. It is a reasonable guess that most respondents were from the U.S. with others from Australasia, Europe, and North America. As promised, the survey results are presented as they were received without data analysis. It is with deep gratitude to the program directors for taking time from the busiest time in the academic term in the middle of this pandemic to share valuable information with our world community of PAL professionals. Their comments were candid and honest about the things that went well and those that did not. Considering that the move to online was accomplished without warning, no time for preparation, and under incredible stress, I marvel at what was done all things considered.

Arendale, D. R. (2020). Postsecondary peer assisted learning programs offered online: 2020 annotated bibliography: University of Minnesota-Twin Cities. www.doi.org/10.13140/RG.2.2.18485.29928

This topical annotated bibliography is drawn from a larger database of peer-assisted learning (PAL) programs available at https://www.arendale.org/peer-learning-bib Major national and international models in the bibliography of nearly 1600 citations are: (a) Accelerated Learning Groups (ALGs), (b) Emerging Scholars Program (ESP), (c) Peer Assisted Learning (PAL), (d) Peer-Led Team Learning (PLTL), (e) Structured

Learning Assistance (SLA), (f) Supplemental Instruction (SI), and (g) Video-based Supplemental Instruction (VSI). Some programs are also known by other names such as PASS for the SI Program. Check back throughout the year since the database is frequently updated. Only two of these models provided research studies or implementation information for providing their program online: Peer-Led Team Learning (also known as cPLTL or Cyber PLTL), and Supplemental Instruction/PAL/PASS (also known as iPASS, OPAL, OPASS, and OSI). These publications provide examples from North America, Europe, and Australasia. When available, a weblink is provided so that they can be downloaded.

Arendale, D. R., & Hane, A. R. (2016). Adaptability and flexibility when conducting and planning peer study group review sessions. *The Learning Assistance Review, 21*(2), 9-37. University of Minnesota Digital Conservancy, www.hdl.handle.net/11299/200331.

While many research studies have analyzed the effectiveness of study group programs for the participants, few have examined the process that the study group leaders employ in offering effective sessions. This manuscript focuses on the decisions the study group leaders make before, during, and after these study group sessions. Connections are made between the behaviors of the study group leaders and that of novice and experienced teachers. Understanding the processes that the study group leaders employ provides insights that could be enhanced by additional training by the study group program administrators. The Peer Assisted Learning (PAL) program at the University of Minnesota is a primary academic support program for historically difficult, introductory college courses that serve as gatekeepers to academic degree programs. Based upon operating principles of other programs and educational theories, PAL is integrated into the courses it serves. This manuscript is currently under review by a journal and is not available for review.

Ashwin, P. W. H. (1994). The Supplemental Instruction leader experience: Why SI is not teaching, a student's perspective. In C. Rust & J. Wallace (Eds.), *Helping students to learn from each other: Supplemental Instruction, SEDA Paper 86* (pp. 87-90). Birmingham, England: Staff and Educational Development Association

This chapter provides both a perspective as both a leader and supervisor in the Supplemental Instruction program at Kingston University and Newham College of Further Education in the United Kingdom. SI sessions is not about teaching for a number of reasons: new information is not given in addition to that provided by the professor; SI participants create the agenda for the SI sessions; no formal assessment is taken; equal focus is placed on the process of learning of material as well as the material itself; and students do not perceive themselves in the same type of power relationship with the SI leader as they feel with the course professor. SI leaders focus on involving all students at the sessions and having them process the course material.

Brown, K., Naim, K., van der Meer, J., & Scott, C. (2014). "We were told we're not teachers...It gets difficult to draw the line" Negotiating roles in Peer-Assisted Study Sessions (PASS). *Mentoring & Tutoring: Partnership in Learning*. doi:10.1080/13611267.2014.902559.

Peer learning models in pre-service teacher education are in the early stages of implementation. In this article, we evaluated a pilot Peer-Assisted Study Sessions (PASS) program that supplemented a course for pre-service teachers at one New Zealand university. PASS participants discussed experiences of the program, revealing tensions between what students and facilitators felt should happen in PASS, and how they acted differently. We explained these tensions by considering how social and cognitive congruence operated between students and facilitators. The majority of our peer facilitators were pre-service teachers, suggesting these intersecting roles offered important considerations for reciprocity in near-peer relationships, and joint negotiations of roles and responsibilities. We conclude this article with implications for future training of PASS facilitators, including those training as teachers.

Browning, S., Minkoff, D., Wallace, J., & Zerger, S. (Writers). (1995). The use of Supplemental Instruction for faculty and SI leader development [Videotape]. In D. Arendale (Producer). Kansas City, MO: Center for Supplemental Instruction, The University of Missouri-Kansas City

This videotape records a panel discussion on the uses of Supplemental Instruction (SI) for both faculty and SI leader professional development. Topics covered included: faculty development in the United Kingdom and the U.S.; SI leaders serving as partners with faculty members to improve classroom learning; using SI as an anonymous feedback mechanism for faculty members; and developing a faculty focus on increased student learning. The panelists are campus SI supervisors with the SI program. Wallace is Certified Trainer for the United Kingdom with Minkoff and Zerger trainers for the U.S.

Caldwell, C. (2008). First-time feelings. Peer-Led Team Learning: The experience of leading. *Progressions: The Peer-Led Team Learning Project Newsletter, 10*(1). www.pltlis.org/wp-content/uploads/2012/10/Experience-of-Leading-Caldwell-First

-Time-Feelings.pdf.

Firsts are special – a first rollercoaster ride... a first concert – and the reason these firsts are special is because the person experiencing that first thing, whatever it is, is super sensitive to that experience. She must be because she does not know what to expect so in order to react appropriately, she must be 'on her toes.' This higher state of awareness is valuable for the workshop leader

Capstick, S. (2004). *Benefits and shortcomings of Peer Assisted Learning (PAL) in higher education: An appraisal by students*. Unpublished manuscript. Bournemouth University. Bournemouth, United Kingdom.

The benefits and shortcomings of a Peer Assisted Learning (PAL) scheme [based upon Supplemental Instruction] are described from the perspective of its student participants. Qualitative methodology is used to investigate and describe student outcomes, together with an analysis of influence of PAL on marks in one course. A wide range of benefits are reported for students engaged in PAL, as well as for those students responsible for managing PAL discussion groups. PAL leaders improved presentation skills, group speaking, and confidence. Some PAL leaders said the experience helped them during job interviews as well as promoting interest in teaching as a career. Negative aspects of PAL as described by the PAL leaders was the rule that they are not permitted to make short lectures to clear up confusion by the participants. This rule is common among British SI-like programs to clearly define how SI is different than what professional tutors and the course instructor does. It is argued that qualitative benefits of PAL are more pronounced and demonstrable, and more appropriately portray the scheme, than quantitative outcomes.

Chambers-Turner, R. C. (2017). *Supplemental Instruction and the promotion of construction of knowledge.* (Ph.D. dissertation), Walden University. www.scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=5611&context=dissertations

Supplemental instruction (SI), a peer assisted learning model, improves course performance, retention, and graduation rates of post-secondary education students. Researchers have questioned if the success of SI is due to students becoming more aware of assessment demands or if SI also promotes construction of new knowledge. The purposes of this case study were to describe techniques utilized by SI peer leaders, explore how sociocognitive learning techniques are implemented, and explore the perceptions of Supplemental Instruction program stakeholders regarding sociocognitive learning techniques. The research questions focused on what techniques peer leaders are trained to implement and what peer leaders' perceptions of sociocognitive learning techniques are. Piaget's theories on cognitive conflict and construction of knowledge, Vygotsky's theories on zone of proximal development and sociocognitive learning, and Chi's framework on interactive learning provided the conceptual framework for the study. The case study was conducted at a Northeast United States community college, using interviews with SI administrators and peer leaders (n = 8), voice recordings of SI sessions, and review of training material. The constant comparative method analysis of findings suggest that peer leaders trained in traditional tutoring and sociocognitive learning techniques promote construction of knowledge, and while programmatic and peer leader goals align with sociocognitive learning techniques, student goals do not. One recommendation is to clarify the distinction of SI versus traditional tutoring. This study would lead to positive social change by contributing to expanded goals of SI resulting in enhanced quality of learning for student participants at higher education institutions.

Davies, E., & Vorster, J. (1994). *The SI leader as a teaching resource*. Paper presented at the South African Association for Academic Development Conference, University of Natal, Republic of South Africa.

In 1994 a Supplemental Instruction (SI) program was introduced in the Law Faculty at Rhodes University (South Africa). Two courses were initially selected for a pilot program: Legal Theory I and Commercial Law I with joint funding from the Academic Development Program and the Law School. Interviews with students suggested that the SI leader empowered the students to be more active in their own learning process and take additional responsibility for mastery of content mastery rather than being passive in the classroom. The SI activities were more student controlled while the formal tutorial program was viewed as more rigid and prescriptive.

Donelan, M., & Kay, P. (1998). Supplemental Instruction: Students helping students' learning at University College London (UCL) and University of Central Lancashire (UCLAN). *The International Journal of Legal Education, 32*(3), 287-299.

The Supplemental Instruction (SI) program is used to meet the needs of first year students in their academic and personal development within the Law faculties of the University College London (UCL) and the University of Central Lancashire (UCLAN). The United Kingdom expansion of the SI model develops more holistically in cognitive and affective aspects of learning for both SI participants and SI leaders. The three law courses that

had SI attached to them were English Legal System, Obligations 1, and Lawyers' Skills. There are several variations of SI within the UK use of the model: SI leaders are instructed to focus on facilitating the group discussion and not presenting course content material; SI leaders academic credit for their service through evaluation of a portfolio. Higher grades were recorded for SI participants and SI leaders when compared with non-participants. Interviews with SI participants revealed the following SI program benefits: enhanced academic understanding; enjoyed active learning; opportunity to clarify concepts; enjoyed the social aspects of meeting students of other classes; and developed personal confidence and reassurance. Benefits cited by the SI leaders included: opportunity to help others; developed communication, presentation, and leadership skills; increased knowledge of the academic content of the course.

Dreyfuss, A. E. (2012). *Exploring the phenomenon of leading through the experiences of peer leaders.* (Ed. D. dissertation), Columbia University, New York City, NY. ERIC database. (ED548984)

The concept of leadership has been explored in many contexts, yet it is not a role that is expected as part of a college education. Peer Leaders are in a unique position because they are responsible for leading a group of students to learn. This phenomenological case study explored the experience of leading by Peer Leaders, college students who are selected and trained in adult learning theory to lead a group of students to learn the course material in an introductory science course, in a Peer-Led Team Learning program at an urban commuter public college. Seventeen of the 22 study participants served more than one semester, averaging four, over the past ten years. In-depth interviews were conducted and three emergent metaphors were identified. These are the "Older Sibling," a role based in prior learning of family with informal authority; the "Faces of the Mountain," a more traditional view of leadership combining positional authority and entity attributes; and the "Catalyst" who manages several small groups of learners, giving power back to the group members. The essence of leading by Peer Leaders is proposed as the following: Leading a workshop group is drawn from prior experience, perhaps a familial role of a sibling, or tacit assumptions and expectations of the role of a leader. It has a cognitive foundation in the task of helping students learn course material yet it is in the dynamics of interacting with the students that a relational process occurs. Emergent relational leadership roles are based in communication, discourse, emotions, diversity of learners' needs and abilities. It is through this experiential process that leading becomes a catalytic activity whereby the leader manages smaller groups to enable each group member to help others learn. Relational leadership is inclusive, challenging, and carries with it the burden of responsibilities to fellow students, fellow Peer Leaders, faculty, and the department. It can also be fun, and may flow with energy, and most importantly, it can be transformational in the ways the Peer Leader views being a follower, learning and leadership.

Eastmond, J. N. (1997). Five academic development programs in the Eastern Cape Province: Reactions of an American academic in South Africa. *Educational Technology Research & Development, 45*(3), 129-134.

This article describes the academic development programs at four tertiary institutions in South Africa (University of Port Elizabeth, Port Elizabeth Technikon, Rhodes University, and the University of Ft. Hare) as well as the development of a fifth new program at Border Technikon. Topics include cross-cultural differences; interviews; Supplemental Instruction (SI) that combined staff development and student academic development; integration of media support; and stages of program development. The author describes how a former SI student leader at the University of Port Elizabeth had been hired as an instructor at Border Technikon. Based on interviews, the previous experience as SI leader had a direct impact upon the new instructor's style of instructional delivery which utilized a high degree of academic inquiry and guided classroom discussion. The author commented about how the SI program was able to combine both staff development and student academic development. While this was a common pattern with South African institutions, the author commented that this was largely unknown in the U.S. The author subscribed to a four-stage model for faculty development previously articulated by DeBloois and Alder, 1974: 1). Awareness: through guest speakers, newsletters, and similar low impact activities; 2). Faculty support: small grants to faculty, seminars or workshops on aspects of tertiary teaching; 3). Faculty skills: larger investment in course development, more extensive involvement of individual faculty; and 4). Departmental curriculum: extensive development of a series of courses in the curriculum, organizational development efforts to change the prevailing reward structure.

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. Strømmen-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Student learning processes, volume 2* (pp. 103-122). Munster and New York: Waxmann.www.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

Fredrickson, J., Malm, J., Holmer, A., & Quattara, L. (2020). Attendance numbers at SI sessions and their effect on learning conditions. *Journal of Peer Learning, 13*(1), 21-35. www.ro.uow.edu.au/cgi/viewcontent.cgi?article=1166&context=ajpl.

Supplemental Instruction (SI) is a well-known academic support model to address retention and student performance in higher education. However, in studies reporting the effect of SI, the number of attendees at SI sessions are seldom mentioned or reflected upon. This study investigates whether there is a lower, optimal, and upper number of SI attendees for SI sessions with viable learning conditions. A literature review of 135 publications on studies of SI programmes was conducted along with a survey of 44 SI Leaders and 176 SI attendees at Lund University in Sweden. The literature review shows that there is no consensus regarding minimum, optimum, or maximum numbers of SI session size for viable learning conditions. In the survey, the number of attendees for optimal learning conditions was estimated to be 11–12 by both leaders and attendees. These respondents also estimated that if the number of attendees is below five or above 16 students, the learning conditions are likely to suffer. In the former case, this is attributed to too little collective knowledge, too few viewpoints, and a risk of the SI Leader being too prominent (less active participants). In the latter case, attendees are likely to find the conditions noisy and feel that they do not get seen, while the SI Leader may have difficulty structuring the session as well as getting an overview of the different group discussions. The results hint at the importance of reporting attendance numbers at an SI session. Otherwise, it is impossible for an outsider to determine whether the conditions were favourable for small group learning and thus makes it hard to judge SI's effectiveness.

Fredriksson, J., Malm, J., Holmer, A., & Ouattara, L. (2020). Attendance numbers at SI sessions and their effect on learning conditions. *Journal of Peer Learning, 13*(1). www.ro.uow.edu.au/ajpl/vol13/iss1/3/.

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Frye, R., Barone, M. C., Hammond, N. B., Eloi-Evans, S., Trenshaw, K., & Raucci, M. (2021). Incentives and barriers to participation in PLTL workshop spaces: An exploration of underrepresented students' experiences. *Journal of Women and Minorities in Science and Engineering, 27*(3), 1-31. doi: www.org/10.1615/JWomenMinorScienEng.2021029908.

Peer-led team learning (PLTL) is a well-established method of collaborative learning, particularly in large STEM classrooms. Past research shows that attendance rates at PLTL sessions correlates positively and

significantly with successful course outcomes. Previous studies also support the notion that these small-group collaborative learning sessions particularly benefit underrepresented minority (URM) students. Despite the clear benefits, our data suggest that, on average, URM students often attend fewer PLTL Workshops than majority students and get lower final grades than majority students. We interviewed URM students at our Predominantly White Institution (PWI) about their experiences in PLTL Workshops and about what factors affect their choice to attend or not attend each week. Our data suggest there are many barriers to participation including factors related to facilitation behaviors, the degree to which adherence to dominant culture is accepted and the degree to which personal relationships are cultivated. We also found that race and ethnicity were persistently relevant factors in these students' experiences even though they were often reluctant to talk about them. Our interviewees emphasized the role of the leader, both positive and negative, in affecting the value of their experience in Workshops. We conclude that collaborative learning needs to be carefully planned and implemented in order to have equal potential for learning effectiveness for all participants.

Lilly, M., & Sands, J. (2019). *Guide for Peer Learning Facilitators*. SMART Learning Commons. University of Minnesota-Twin Cities. University of Minnesota Digital Conservancy, www.z.umn.edu/PALfacilitatorguide

The Guide for Peer Learning Facilitators is the foundation of a formal training program at the University of Minnesota, in which undergraduate students learn how to lead weekly study sessions for their peers in a classroom setting for specific courses – primarily ones with high enrollment and prone to higher than average D,F, Withdrawal rates. Training and professional development throughout the academic year have been the cornerstones to the success the facilitators have realized. The eight principles that govern the program – crafted by Dr. David Arendale in his original publication of the same name – address topics such as cooperative learning theory, multicultural competency, metacognition, study strategies, and group dynamics. The book, updated in April 2019, also provides a directory of useable forms and worksheets and a bibliography of related publications.

Maldonado Gonzalez, M. (2000). The Supplemental Instruction culture: A qualitative program evaluation of context-specific patterns [Dissertation, Washington State University, 1999]. *Dissertation Abstracts International, 60*(11), 3904.

This study explores the Supplemental Instruction (SI) world at a land grant university of the United States of America and the peripheral cultural ecologist it generates. The qualitative study was conducted over a period of 10 weeks and it involved 50 students, 6 faculty members, 4 peer instructors and 1 staff member. It followed a two-phase research design. In the first phase, the delimitation of assessment goals and revision of program documents took place. In the second, phase the researcher conducted field observation, interviews, and surveys, and data were screened through several conceptualizations: participation frameworks (Shiffrin), linguistic of discrimination (Fawler), classroom ecology (Bowers & Flinders), teaching paradigms (Brooks & Brooks), and proxemics of communication (Hall). Five themes emerged: (1) Collaborative vs. competitive frameworks of participation: Unlike the discriminatory patterns of communication existing in the at-risk courses, communication in the study sessions is a pro-social activity in which students and leader share participatory roles. (2) Symmetrical vs. asymmetrical patterns of speech visibility: The relationship between the SI leader and the students exemplifies a proactive transmission of power that increases the students' speech visibility. A factor that is minimized in at-risk courses where the teacher's visibility is maximized. (3) Traditional vs. constructivist power ecology: The SI support a constructive flow of authority distributing participatory power among the students, who assume learning responsibilities through processes of collective thinking, negotiation of solutions, and peers' assistance. (4) Linguistic signs of coercive paternalism vs. nurture: The contrast between the superior-subordinate relationship in the at-risk-courses and the egalitarian relationship in the study sessions is exemplified through the linguistic indicators peculiar to the facilitators' discourse in each of these environments. The at-risk courses facilitator's discourse contains linguistic signs of coercive paternalism, whereas the SI leaders' discourse reflects feminist caring linguistic signs. (5) Proxemicist alienation versus proxemicist inclusion: The proxemics and kinetic indicators embedded in the context of the at-risk courses impact the participants' territorial distance creating a climate of exclusion. In the study sessions the territorial distance is reduced, which fosters an atmosphere of students' inclusion. The study profiles the academic environment of SI and the interactions the participants displayed. Attention is given to the students' perceptions of SI and how it affected their academic performance. It proposes a grounded theory about the interplay of two academic cultures, suggests strategies for SI improvement, teaching development and future research.

Malm, J. (2021). A study on learning activities in Supplemental Instruction. In A. Strømmen-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Student learning processes, volume 2* (pp. 25-45). Munster and New York: Waxmann.www.www.waxmann.com/index.php?eID=download&buchnr=4325.

The present study focuses on the learning activities that are used in practice in Supplemental Instruction in basic engineering courses and the extent to which they are meaning oriented. A survey method, based on action verbs, is used and complemented with a student experience questionnaire on SI. The verbs chosen by both the students attending SI and the SI leaders to identify learning activities show a clear pattern. The explanations of the verbs by both groups in an SI context are consistent and give a good description of what actually occurs in an SI session. Thereafter, the SOLO taxonomy is used to determine the learning levels of the chosen verbs and corresponding learning activities. The analysis indicates that learning activities in SI sessions in the present study are largely geared towards a deep approach. This result is supported by the results of the student experience questionnaire on SI.

Malm, J., & Fredriksson, J. (2021). Digital tools in Supplemental Instruction (SI). In A. Strømmen-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Digital technologies, volume 1* (pp. 19-27).www.www.waxmann.com/index.php?eID=download&buchnr=4324

This chapter focuses on digital tools and software programs used in SI. It combines a case study for the SI program at Lund University with an international overview. The digital tools are divided into categories based on where they are used in SI. Digital tools for SI leaders are usually tools for communication with participants between sessions (e.g., Facebook, Messenger, WhatsApp). It also includes sharing good practices, learning activities, and problems that invite discussion using platforms like Google drive, apps for leaders with learning strategies, session planners, and Q & A help for challenges that may occur in sessions. There is a huge variety of software programs and apps that can be used to enhance the SI participants' learning experiences. These tools (e.g., jeopardy, Kahoot, memory) target retrieval and/or reflection practices course material to improve memorization and understanding. SI supervisors or coordinators also use digital tools to manage the SI program. Typical tasks can be to track attendance at SI sessions (e.g., Tutortrac, EAB Navigate, Google sheets), information exchange between supervisors (e.g., list-serves at regional SI centers), administer SI-programmes (e.g., Canvas, Microsoft Teams, Blackboard), create evaluation surveys (e.g., Surveymonkey, Qualtrics,Google forms), store leader training videos and promotions (e.g., Youtube playlists), and document observations (e.g., Notability, One Note). Online SI, using video conferencing/teaching platforms like Zoom, Blackboard collaborate, and WebEx, is a relatively new form of SI created to address the needs of students in distance learning and students that have difficulties attending traditional SI sessions on campus. Online SI is still in its infancy, and its potential and efficiency are yet to be determined. Due to more education going online because of the Coronavirus, there are a huge amount of experiences and data being collected on online SI, which may provide answers about its usability.

McWilliams, A. L., Dreyfuss, A. E., & Becvar, J. E. (2021). *Facilitating Team-Based Learnoing: A peer leader's guide to leading learning activities*: Peer-led Team Learning International Society. www.shop.pltlis.org/index.php/product/facilitating-team-based-learning/

At the heart of PLTL is you, the Peer Leader. As a peer of the students in your workshop group, you serve as a facilitator of learning. Becoming a successful workshop facilitator is a process that requires various means of promoting collaborative, team-based approaches. This work, Facilitating Team-Based Learning: A Peer Leader's Guide to Leading Learning Activities provides creative, team-based learning strategies created by Peer Leaders, learning specialists and faculty. This resource is designed to support you as you plan your weekly workshop. This guide provides structure to peer-led workshop groups through the practice of process techniques and activities. Each is focused on active learning by showing students and yourself: How to approach learning challenging course content; How to explore concepts so that they will be retained for higher-level courses; How to ask the right questions; How to cooperate with, work with, and learn from your peers; How to reinforce your knowledge for examinations and beyond; How to study effectively and efficiently; How to develop a network of reliable colleagues who can positively reinforce your learning environment. Learning these skills is essential for students in entry-level courses and for those who have recently entered a university environment. The hope is that this Guide will enhance your role as a Peer Leader in order to improve student outcomes. Join us in advancing this effort by making contributions for future editions.

Moore, I. (1992). *Undergraduate students as assistant demonstrators in the first year physics laboratory*. Unpublished manuscript. Queensland University of Technology, School of Physics. Brisbane, Queensland, Australia.

This paper describes the use of a modified Supplemental Instruction (SI) program in the School of Physics at Queensland University of Technology (Brisbane, Australia). The pilot project used second and third year physics major students as assistant demonstrators in the first year physics laboratory. In addition to improvement by the students in the class, the assistant demonstrators also showed improvements in their class performance. Through qualitative research, it appears that the assistant demonstrators helped students to improve their own learning process, focus on the process rather than rushing to complete the task, and think of new issues and questions.

Nilsson, G., & Luchinskaya, E. (2021). A reflection on using two models of Supplemental Instruction in teaching mathematics for engineers. In A. Strømmen-Bakhtiar, R. Helde & E. Suzen (Eds.), *Supplemental Instruction: Student learning processes, volume 2* (pp. 83-102). Munster and New York: Waxmann.www.www.waxmann.com/index.php?eID=download&buchnr=4325.

This chapter presents the authors' reflection on introducing different Supplemental Instruction (SI) models in teaching maths-based modules on a range of programmes at University West, Sweden. We share our experience of using a traditional "near-peer" SI model, where senior students act as learning facilitators and a less common "same-peer" model, where learning facilitators come from the same cohort of students. We discuss our views and research on the benefits and drawbacks of each model in achieving a range of objectives that vary from improving students' motivation in learning maths to providing support to students studying maths. The main focus of our reflection is on the students' experience of attending the SI sessions, the SI leaders' experience in running SI sessions and the role of module convenors for successful SI implementation. The SI approach was first used at University West, Sweden in 2009–10 on the "Algebra and Calculus I for engineers" module in the BSc Land Surveyors programme for one year. Its objectives were to improve students' motivation, develop their competences and independent learning. Student learning facilitators were selected from the same cohort acted as the student learners. In recent years, for a number of reasons, the exam failure rate on this and other maths-based modules started to increase, and SI has been used since to counteract this. In these cases, senior students acted as learning facilitators and provided additional maths support for students. The authors used a qualitative approach to evaluate the impact of SI on the students' experience. Analysis of over one hundred students' feedback questionnaires found a positive evaluation of both SI models. The SI group leaders' feedback and interview data provided an insight into how they benefitted from participating in the SI sessions. The interviews with academic staff demonstrated the importance of a close interaction between the course convenor and the SI leaders in achieving successful results in learning maths. The analysis of the collected data enabled the authors to draw up recommendations on how best to use the two SI models and in which contexts. The authors recommend that the same-peer SI model could be better placed to help students with standalone problems, whereas the near-peer model, where senior students are involved, is better suited to help students bridge specific gaps in their maths knowledge.

Omodan, B. I., & Ige, O. A. (2021). Re-constructing the tutors-tutees relationships for better academic performance in universities amidst Covid-19 new normal. *Mediterranean Journal of Social Sciences, 12*(2). doi: www.
.org/10.36941/mjss-2021-0010. www.richtmann.org/journal/index.php/mjss/article/view/12440.

In the past, the success of Supplemental Instruction (Tutorial Sessions) depends on the tutors and tutees' physical and social relationships. However, the assumption exists that when there are no physical connections between the duos may affect their social interrelationships, impeding the success and intention of SI in the University classrooms. This study, therefore, investigates the current relationships amidst new normal towards SI and students performance. The study is underpinned by attachment theory to unravel the extent, importance and shortcomings of the assumed change in the relationship between the understudied. The study is guided by the Transformative Paradigm (TP) and Participatory Research (PR) to identify the possible dichotomies in their relationships. Purposive selection method was used to select five tutors and five tutees in a selected university in South Africa. Online (WhatsApp, email, and telephonic) interview was used to collect data from the participants. The data were subjected to thematic analysis. The result showed that that; struggles with the use and lack of Internet-of-Things and unstructured work-hours were the significant challenges that affected online tutorial sessions. On the other hand, the study also found out that students need ICT training and devices, including motivation for performance. Therefore, we recommend that training of ICT and provision of devices alongside strong motivation should be ensured.

Orozco, C., Becvar, J. E., & Narayan, M. (2020). Creativity in workshop: overlap and underlap card technique for concentration units of second semester general chemistry. *African Journal of Chemical Education, 10*(1). www.ajol.info/index.php/ajce/article/view/193327/182453.

Creativity in the classroom is the goal for peer leaders of the Peer Led Team Learning Program (PLTL) in the Chemistry Department at the University of Texas at El Paso. The goal is to enhance the learning experience for students taking general chemistry in their workshops or classrooms. These ideas allow students to engage in classroom discussions with their peer leader. The ideas can be themed on concepts such as molecular geometries, kinetics, or acids and bases. In second semester general chemistry, a call to utilizing creativity in the classroom has demonstrated a way for peer leaders to efficiently teach students how to convert the following four main concentration units via kinesthetic interaction: molarity, molality, mole fraction, and percent by mass. What this means is that, by arranging cards as fractions in which the concentration units are represented as ratios, they will be maneuvered by grabbing each card and placing them either over or under another card to get the desired unit. Thus, to reach a desired unit in the numerator

and/or the denominator the concept of overlap and underlap is the key to employing these stacks of cards to see how the units relate to one another. This allows students to think about what is needed in the numerator and the denominator. Students gain the opportunity to physically manipulate conversion factors and improve or review their understanding of dimensional analysis.

Read, D. (2016). It's good to talk. *Education in Chemistry*. www.rsc.org/eic/2016/05/good-talk-facilitating-peer-group-learning.

"Researchers are increasingly investigating the factors that influence students' discussions during group work to better understand the learning that occurs during such activities. In this study, a team of researchers led by Regina Frey analyzed students' conversations during peer-led team learning (PLTL) sessions to shed light on the features of their discourse that contributed to the most effective learning. The study took place at a medium-sized selective university in the US Midwest. The researchers collected data from 15 out of a total of 40 PLTL groups involving students on a general chemistry course. During PLTL sessions, students work in groups of 6–8, facilitated by a peer leader who has previously achieved a high grade in the class and works under the supervision of the instructor. PLTL develops problem-solving skills and provides an active-learning environment, with peer leaders responsible for ensuring that collaborative learning takes place with equal participation across the group. The data collection involved recording 60 hours of video footage of PLTL groups working in three different sessions over the course of a term. Conversations were transcribed and coded, allowing the analysis of the language used by students during the sessions. It was found that approximately half of the conversation involved instructive talk, ie directly related to science/chemistry, with the rest being regulative talk, ie supporting the group dynamic and collaborative processes. Analysis of instructional communication showed students often engaged in joint decision making involving questioning and explaining, and building on each other's ideas. Interestingly, it was found that conversations infrequently featured open questioning, deeper conceptual discussions and self-monitoring, which are all considered to be benefits of peer learning. As such, the authors suggest that collaborative-learning activities be designed that prompt students to become aware of their learning and to engage them in questioning and explaining phenomena at a deeper conceptual level. They suggest research is needed into the ways peer leaders can be trained to facilitate groups more effectively, to emphasise the importance of open questions and metacognitive awareness during PLTL sessions. The social and communicative skills that students develop through these kinds of activities are clearly beneficial in preparing students for collaborative working in professional settings, which is interesting to those designing degree programmes for the future." -- Direct quote from blog posting

Redl, T. (2020). Accelerating students successfully through developmental and college-level mathematics and embracing co-requisite models: An 8-week + 8-week model. *Journal of Education and Social Development, 4*(2), 17-21. www.ibii-us.org/Journals/JESD/V4N2/Publish/V4N2_4.pdf.

We describe the framework, supports, successes, challenges, goals, and next steps for a Texas four-year public university's accelerated and co-requisite 8-week + 8-week course model for developmental mathematics students. Through this model, these students can successfully complete both their developmental mathematics and subsequent college-level core mathematics course in the same 16- week semester. The university's award-winning Supplemental Instruction (SI) Program, Center for Mathematics and Statistics Support tutoring lab, and the Gator Success Center all play a major role in supporting this model and contributing to student success. The model also contributes to the goals of the Texas Higher Education Strategic Plan (60x30TX) and is compliant with Texas HB 2223, which requires all Texas institutions of higher education to design and implement co-requisite models for its developmental students. Enhancement of this model, along with essential supports such as monitoring, mentoring, advising, counseling, and tutoring, has enabled the university to continue to provide its first-time-in-college (FTIC) developmental student population with confidence to earn credits in college-level courses and graduate more quickly and with marketable skills-based degrees, as well as contribute to the university's FTIC retention and 6-year graduation rates.

Sawyer, K., Frey, R., & Brown, P. (2013). Knowledge building discourse in Peer-Led Team Learning (PLTL) groups in first-year general chemistry. In D. D. S. e. a. (*eds). (Ed.), *Productive multivocality in the analysis of group interactions. Computer-supported collaborative learnign series 16* (pp. 191-204). New York, NY: Springer Science+Business Media

To better understand the interactional mechanisms that make PLTL effective, we closely examined videotapes of two PLTL groups as they both solved the same chemistry problem. In one group, students engaged in group knowledge building: intellectual conversations where they asked each other questions, provided procedural and conceptual explanations, and closely monitored each others' understanding of the problem. This led to an increasingly accurate understanding of the problem. In the contrasting group, their conversations focused on rote application of formulas as they worked to calculate a "correct" solution. Our analyses help us to

understand what effective collaborative discourse looks like, and have practical implications for how peer leaders are trained and for how peer groups are organized.

Speed, K. D. (2004). *Perceptions of teaching, teaching practices and effectiveness of Supplemental Instruction leaders and selected students at a Research I institution.* (Ph.D. dissertation), Texas A & M University, College Station, TX. www.researchgate.net/publication/26898949_Perceptions_of_teaching_teaching_practices_and_effectiveness_of_supplemental_instruction_leaders_and_selected_students_at_a_Research_I_institution

This study examined students and Supplemental Instruction (SI)leaders perceptions of teaching, teaching practices, and faculty teaching effectiveness. This study also examined the impact of the SI leader's role on those perceptions and subsequent behaviors on end-of-course evaluations and sought to determine whether differences existed between the two groups in order to determine whether or not SI leaders' perceptions should be included in a comprehensive evaluation system. A purposive sample of 17 SI leaders, who had been employed during the spring 2002 semester and returned for the fall 2002 semester, and 17 students, who had attended at least 10 SI sessions during the fall 2002 semester, were selected to participate in this study.Data for the study were collected through individual interviews using a protocol designed to collect their perceptions regarding the following: 1) definitions of teaching and its activities; 2) descriptions of good and bad teaching or good and bad teachers; 3) definitions and descriptions of faculty teaching effectiveness; 4) role of the SI leader; 5) impact of SI leader's role on perceptions of teaching, its activities, and faculty teaching effectiveness; and 6) impact of SI leader's role on behaviors on end-of-course evaluations. A major finding of this study is that SI leaders and students define teaching and its activities in a similar fashion. SI leaders, unlike students, however, report that learning is tied to teaching effectiveness, or lack thereof. This study has three major results: 1) SI leaders end up teaching, rather than facilitating; 2) the SI leader's role impacts views on teaching; and 3) the SI leaders' role impacts behaviors on end-of-course evaluations. A review of the literature on student ratings of instruction and regular attendance at SI indicate that both correlate, to a small degree, with mean end-of-course grades. Claims of validity with respect to both may be somewhat suspect, in light of SI leader's claims that they teach, rather than facilitate. Investigation of the impact of regular attendance at SI on end-of-course grades and end-of-course evaluations may result in the need to draw new conclusions with respect to validity of student ratings of instruction and SI.

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 usedd 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.

Szteinberg, G., Repice, M. D., Hendrick, C., Meyerink, S., & Frey, R. F. (2020). Peer leader reflections on promoting discussion in peer group-learning sessions: Reflective and practiced advice through collaborative annual peer-advice books. *CBE-Life Education, 19*(1). doi: 10.1187/cbe.19-05-0091. www.lifescied.org/doi/pdf/10.1187/cbe.19-05-0091.

As research has shown, collaborative peer learning is effective for improving student learning. Peer-led team learning (PLTL) is one well-known collaborative-group approach in which groups are facilitated by trained undergraduate peer leaders. This paper contributes to the literature on peer-leader training by examining how peer leaders for a large introductory science course translate their training into practice during their sessions. By conducting qualitative analysis on annual advice books written by emergent peer leaders, we examined the practiced advice and strategies of these peer leaders as they facilitate PLTL groups in a university-level general chemistry course. These advice books are passed on to future peer instructors, creating a community of practice between new and more experienced peer leaders. From the analysis, we discovered that peer leaders focus on developing robust student–student discussion during complex

problem solving by 1) creating a community-oriented social and intellectual environment, 2) adapting their tactics and the collaborative-learning strategies to balance different personalities and promote equal participation among all students, and 3) modifying collaborative group approaches when facilitating their sessions. Also, in their correspondence across cohorts, peer leaders provided near-peer support to one another. These annual books disseminate practiced advice between peer-leader generations and are used during new peer-leader training.

Thompkins, C. D. (2001). Learning to facilitate construction of understanding: A case study of Supplemental Instruction leaders [Dissertation, North Carolina State University, 2001]. *Dissertation Abstracts International, 62*(01), 70.

The purpose of this study was to investigate the verbal interactions between Supplemental Instruction leaders and students within the context of Supplemental Instructions sessions to acquire an understanding of how dialogue exchanges were established and maintained over the course of a semester. Three novice Supplemental Instruction leaders were selected for this study. Their classes were observed and recorded throughout the semester through the use of audio and video recordings and observer field notes. Their beliefs about teaching and learning, their rationale for making instructional decisions and their perceptions about their students' learning were identified through the use of interviews. A socio-constructivist perspective was used to frame and interpret the findings of the study. This perspective embraces the idea that students not only construct knowledge individually, they construct knowledge socially through interactions with others by establishing a sociocultural system. This system establishes the norm for how classroom interactions will occur. Analysis of verbal interchanges that took place over the semester in each of the SI leaders' classrooms indicated that the type of talk that occurred in two SI leaders' sessions changed, resulting in an increase in student involvement. No differences in exchanges over the semester were found for the third SI leader. The factors that seemed to most strongly influence how SI leaders led sessions were their initial beliefs about teaching and learning and their perceptions of students' needs. The factors found to affect implementation of instructional strategies were the numbers of students attending the session, the immediate stated and observed needs of the students and the pedagogical inexperience of the SI leaders. The findings of this study indicated that the three SI leaders respective belief systems ultimately determined what went on in SI sessions. Although all three had the same SI training and initially indicated that they would actively involve students, only two SI leaders were eventually able to do this.

Van Der Karr, C. A. (2001). Becoming a cooperative learner: Supplemental Instruction experiences at a community college [Dissertation, Syracuse University, 2000]. *Dissertation Abstracts International, 62*(04), 1347.

This study is an exploration of the Supplemental Instruction experience at a community college. The study was designed to gain a better understanding of these peer lead study groups grounded in the perspectives of students. The community college was located in the northeast and served 8000 full time, part time, and continuing education students. The qualitative design included data collection via participant observation, individual interviews, group interviews, and review of related materials over the course of a semester. The students described a cooperative environment built upon shared values, goals, and expectations. This environment included norms around appropriate behavior, creating a safe environment, and protecting the group culture. Within this group environment and culture, students described perceptions and patterns of shares authority framed through the role of the leader. Authority was a fluid point on a continuum between high leader authority and high shared authority in group. Authority was presented through three domains of leadership: social leadership, administrative leadership, and content leadership and students and group leaders both resisted and promoted shared authority. The students engaged in this negotiated authority in different ways related to their personal perspectives and experiences. They described critical perspectives that relate to their patterns of participation in the groups. As students described higher levels of participation in group, they also described shifts in their perceptions of themselves as learner, peers, relationship to content, and locus of control. The participants of this study explained how Supplemental Instruction served as an opportunity to engage in content within a social context. The social engagement not related to higher content understanding; it provided a form of involvement for students whose involvement was often limited by other life roles and responsibilities. The findings support the critical role peers and cooperative learning have in student learning, satisfaction, integration, and persistence. The findings also suggest dimensions to cooperation that may yield design that is more effective, implementation, and assessment of group learning.

Vanmali, B. H. (2012). *Assessing assessment: How use of the concept inventory of natural selection influences the instructional practices of an experienced biology professor and Supplemental Instruction leader.* (Ph.D. dissertation), University of Missouri-Columbia, Columbia, MO. www.mospace.umsystem.edu/xmlui/bitstream/handle/10355/33113/research.pdf?sequence=2

Assessment has garnered increased interest in recent years. It is seen as critical to enhancing student learning and understanding. Formative assessment tools such as concept inventories could be valuable in moving toward

such goals. Concept inventories, a recent addition to biology education, hold much promise for helping faculty to understand the preconceptions their students hold and therefore, how to design lessons to better support students' conceptual change processes. While these are the hopes of the developers of concept inventories, no one has examined what professors and other academic professionals actually do with results of the concept inventories. Likewise, academic support programs such as Supplemental Instruction have gained attention as mechanisms by which to help students improve understanding and increase achievement. Much research has touted the efficacy of Supplemental Instruction programs. However, little research has examined the mechanisms by which those learning gains are attained. Do innovations such as concept inventories help improve teaching and learning? How are they used and what can we learn from the experiences of faculty and academic support professionals who use them? Would learning improve if concept inventories were utilized in an academic support environment such as Supplemental Instruction? This study used interviews with an experienced biology professor and an experienced Supplemental Instruction Leader to examine how they used the collective results of the Concept Inventory of Natural Selection (CUB, used as a pre- and post test) to design and implement lessons in a large lecture introductory biology course and in Supplemental Instruction sessions. Using observations and document analysis as supporting data, themes were identified that describe these educators' views of learning, knowledge of assessment principles, and knowledge of assessment interpretation and action taking. This study provides the first data for how concept inventories are interpreted by faculty and Supplemental Instruction Leaders and used to guide instructional planning and implementation. Data analysis revealed that an experienced biology professor did not rely on the diagnostic pre-assessment tool (the CINS) to understand and act upon students' prior knowledge and misconceptions. Rather, she was already aware of common student misconceptions and prepared to help students modify their knowledge. Instead, she preferred to rely on such instruments as a tool to help students self-assess the status of their knowledge. Likewise, this experienced Supplemental Instruction Leader was also aware of students' misconceptions and prepared to work with students to revise their understandings prior to receiving the results of the CINS pre-assessment. She relied on a variety of formative assessment tasks to help students build their knowledge and periodically check their understandings in a collaborative, small group environment. This study sheds light on areas of strength as well as needed professional development and education for faculty members and Supplemental Instruction Leaders. It provides the first data on how concept invent ories may be used in the biology classroom and in Supplemental Instruction sessions. It also identifies areas of educator knowledge where more understanding and research is greatly needed by the teacher educator community.

Wang, J., Wang, Y., Winfli, K., Thacker, B., & Hart, S. (2023). Investigating Learnign Assistants' use of qustioning in online courses about introductory physics. *Physical Review Physics Education Research, 19*. doi: https://doi.org/10.1103/PhysRevPhysEducRes.19.010113. https://journals.aps.org/prper/pdf/10.1103/PhysRevPhysEducRes.19.010113.

Learning assistants (LAs) play an important role in inquiry-oriented physics instruction in large classrooms. LAs increase the teacher-student ratio and provide timely support to student exploration. Questioning is believed to be an advantageous strategy for LAs to scaffold student learning and maintain students as the agent of knowledge construction. Unfortunately, there are few instruments for the measurement and preparation of LAs' competency of questioning. It remains obscure how LAs use questioning in their interaction with students and how their questioning contributes to students' conceptual understanding. In this study, we developed two instruments that included a coding scheme to assess LAs' practice of questioning from class videos and written questions to assess LAs' knowledge of analyzing various situations that they may encounter while teaching introductory physics. We used the two instruments to measure performed and narrated pedagogical content knowledge of questioning (PCK-Q) of four LAs in two inquiry-based physics courses taught online. We examined the validity and reliability of both instruments, gauged LA-student interaction in online settings, delineated the LAs' PCK-Q, and suggested how the LAs' questioning contributed to students' physics learning. We also discussed the use of the two instruments for the purposes of both LA assessment and preparation.

Winterton, C. (2018). *Peer-led Team Learning: The effects of peer leader and student interactions on studdent learning gains and course achievement in introductory biology.* (Ph.D. dissertation, unpublished manuscript), Syracuse, NY, Syracuse, NY. www.surface.syr.edu/etd/901/

This study sought to connect the literature on Peer-Led Team Learning (PLTL) to the work on student-teacher interactions as well as STEM role models. Student and peer leader interactions were explored to determine the effect of these interactions on student learning outcomes. Students and their peer leaders were both asked to determine the student's learning gains from the PLTL course. Perceived learning gains were measured using a modified version of the Student Assessment of their Learning Gains (SALG) instrument. Peer leader responses were paired with their student's responses to determine differences in peer leader

ability to discern learning gains, learning gains from students in different groups, and to identify the pairings that were most closely aligned. Qualitative data from open-ended questionnaires collected from the peer leaders were used to establish contributing factors of these findings. The ability to relate to the student was found to be an important factor in peer leader's ability to assess learning gains and establishing a positive relationship between student and peer leader. Relatability was further shown to positively and significantly influence student's final grade in the course, as well as increase student perceived learning gains. When students considered their peer leaders to be a role model, perceived learning gains significantly increased but there was no measurable effect on final course grade. Positive interactions with the peer leader were shown to benefit all students, regardless of their chosen major. Qualitative responses from peer leaders and students were analyzed to identify the factors contributing to role model status.