About the International Center for Supplemental Instruction

Supplemental Instruction (SI) is an academic assistance program utilizing peer-assisted study sessions. SI sessions are regularly-scheduled, informal review sessions in which students compare notes, discuss readings, develop organizational tools, and predict test items. Students learn how to integrate course content and study skills while working together. The sessions are facilitated by SI Leaders, students who have previously done well in the course and who attend all class lectures and act as model students.

The International Center for Supplemental Instruction at the University of Missouri-Kansas City serves as the hub for Supplemental Instruction programs across the globe. In the United States of America, the International Center provides training, guidance, support, and resources for institutions of all types through training workshops in Kansas City and on site.

The International Center also has memoranda of understanding with five institutions around the world: University of Wollongong (Australia); University of Guelph (Canada); Nelson Mandela University (South Africa); Lund University (Sweden); and North-West University (South Africa—regional center). These institutions serve as national or regional centers and support institutions in their countries and regions in implementing Supplemental Instruction.

About the Supplemental Instruction Journal

*Supplemental Instruction Journal* (SIJ) seeks to publish the latest research in the field and to be the foremost resource for advancements and discoveries related to Supplemental Instruction. SIJ submissions are peer reviewed by national and international education professionals who work with or have worked in some capacity with Supplemental Instruction programs. SIJ is intended for a wide audience.

This issue marks the second publication of the Supplemental Instruction Journal. While the first issue, published in November 2014, included refereed papers from our 2014 International Conference on Supplemental Instruction, this issue is comprised of articles submitted, evaluated, and accepted for publication by SIJ’s Peer Review Board.

The articles in this issue explore the quantitative and qualitative benefits of being an SI Leader, as well as the impact of SI on first-year students with low high school GPAs. We at the International Center for SI hope that these articles will broaden readers’ understanding of the benefits of SI programs and offer ideas for broadening SI’s application to affect change in new arenas.

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Call for Submissions

The Supplemental Instruction Journal is currently accepting submissions for its fourth issue.

Submissions must be submitted in APA format to SIJ@umkc.edu.

Submissions are accepted on a rolling basis.

For more information, please visit info.umkc.edu/si/journal or email questions to SIJ@umkc.edu.
Building Leadership Skills: A Small Cohort Study of the Associated Benefits of Being and SI Leader
Tim Podolsky, University of Manitoba

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Moving In, Through, and Out of the Supplemental Instruction (SI) Leader Experience
James L. Eller, Case Western Reserve University
Fred A. Milacci, Liberty University

The Benefits of Supplemental Instruction (SI) for the SI Leader
Neva Lozada, Monmouth University

Quantifying the Soft Power of SI for the SI Leader
Arthur Holmer, Lund University
Building Leadership Skills: A Small Cohort Study of the Associated Benefits of Being an SI Leader

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Abstract

Since the inception of Supplemental Instruction study groups in 1973, the benefits for student participants have been thoroughly studied and reported. There have also been reports about the associated benefits that SI Leaders can acquire from being involved with the program as peer mentors; however, these claims remain primarily anecdotal, and there has been a minimal amount of research conducted on the actual nature of the benefits for SI facilitators (Couchman, 2009). This research project aims to discover the specific nature of the benefits to SI Leaders who have moved on to other academic programs or professional careers. The research was conducted by surveying 24 former SI Leaders and through two focus groups consisting of 5 former Leaders in total. The results indicate that the SI Leaders benefitted by improving their own study skills in a variety of ways, improving their communication skills, increasing their self-confidence when public speaking, developing both their appreciation of and their ability to work in group situations, increasing their capacity to be flexible and adaptable, and improving their teaching abilities. Although these skills are not necessarily taught or learned through typical course work, they are highly valuable in graduate and professional programs, and workplaces often covet employees who already have many of these “leadership”
skills. By placing a greater focus on the leadership development aspects of SI programming, this research study provides concrete evidence that there are tangible benefits for SI Leaders themselves, which confirms the value of SI programming beyond the more established benefits for student participants.

Building Leadership Skills: The Associated Benefits of Being an SI Leader

Since the inception of the Supplemental Instruction program at the University of Manitoba in the winter of 2011, the Academic Learning Centre has been evaluating and assessing the performance of students in these sessions without exploring how being an SI Leader specifically benefits the peer mentors who are involved with facilitating this program. The purpose of this study, therefore, is to explore the impact of being an SI Leader on future studies or employment experiences. In particular, this research project explores how SI might benefit peer facilitators in the following areas: study habits and metacognitive awareness; oral presentation and communication skills; the ability to work effectively in groups; the development of self-confidence; and personal goal-setting and self-evaluation. The research questions that inform this project include:

1. What specific skills do students gain by being SI Leaders?
2. How do SI leadership experiences benefit students in their future studies?
3. How do SI leadership experiences benefit students in their professional work lives?

Literature Review

The Supplemental Instruction program is designed primarily to help students in historically difficult courses and improve overall retention rates, so it is not surprising that most of the SI research has been focused on how it benefits the students who participate in the program. However, for SI coordinators and administrators involved with the program, it is often apparent that an additional benefit of Supplemental Instruction relates to the skill set that students develop by being put in leadership positions as SI facilitators. The limited research that has been conducted on the benefits for SI Leaders reveals that they develop a number of important skills through their experience as peer mentors that can be used in both their future studies and professional careers. These skills typically fall into the categories of improved interpersonal relations, better communication skills, increased self-confidence, a deeper understanding of course content, and other general organizational and work related abilities.
A number of studies concluded that students develop better interpersonal relation skills by being SI Leaders (Capstick, 2004; Congos & Stout, 2003; Malm, Bryngfors, & Morner, 2012; Couchman, 2009; Skalicky & Caney, 2010; Stone, Jacobs, & Hayes, 2006; Stout & McDaniel, 2006; Lockie & Van Lanen, 2008). Using open-ended surveys of former SI Leaders, Congos & Stout (2003) found that the development of these skills was the most frequently cited benefit by SI Leaders. Capstick (2004) described it as an ability to foster cooperation and collaboration among members of a group. Malm, Bryngfors, and Morner (2012) described interpersonal relation skills as the ability to listen to others, create trust, inspire others, and generate enthusiasm. And, Couchman (2009) used text reflections from SI Leaders to describe it as the ability to create “communities of practice” that were characterized by empathy, collaboration, and inclusiveness (p. 94). For Skalicky and Caney (2010), it was classified as a leadership skill that meant being able to create a “familiar and comfortable atmosphere” for students (p. 31).

One seemingly related skill that is also frequently cited by studies of SI leadership benefits is improved communication (Malm, Bryngfors, & Morner, 2012; Couchman, 2009; Capstick 2004, Congos & Stout, 2003; Skalicky & Caney, 2010; Stone, Jacobs, & Hayes, 2006; Stout & McDaniel, 2006; Lockie & Van Lanen, 2008). SI Leaders reported that the experience made them better at giving specific instructions and more conscious of communicating things simply and effectively (Couchman, 2009). They also reported an increased ability to explain things in different ways as well as a greater awareness of whether students had understood the messages that were being communicated (Malm, Bryngfors, & Morner, 2012).

Many former SI Leaders have also reported an increased sense of confidence when speaking in front of groups of people (Zaritsky & Toce, 2006; Capstick, 2004; Couchman, 2009; Malm, Bryngfors, & Morner, 2012; Skalicky & Caney, 2010; Stone, Jacobs, & Hayes, 2006; Lockie & Van Lanen, 2008). Zaritsky and Toce (2006) surveyed 184 former SI Leaders and found that most of the respondents reported a variation of the following comment: “I was very reluctant to speak in public or express my ideas in front of an audience. Through SI, I was able to break that barrier and open up more” (p. 28). Improved confidence in terms of public speaking has been reported, but it has also been reported more generally in terms of the ability to handle new problems and unfamiliar situations (Malm, Bryngfors, & Morner, 2012).
Another consistent finding is that SI Leaders deepen their understanding of course content by participating in classes more than once (Congos & Stout, 2003; Malm, Bryngfors, & Morner, 2012; Couchman, 2009; Zaritsky & Toce, 2006; Capstick, 2004; Stone, Jacobs, & Hayes, 2006; Lockie & Van Lanen, 2008). According to Zaritsky and Toce (2006), 95% of their survey respondents indicated that “SI was very helpful in giving them a better understanding of the course material” (p. 28). Capstick (2004) also noted that facilitators of their Peer Assisted Learning sessions made frequent reference to the fact that it was useful for them to go over the subject again, and Stone, Jacobs, and Hayes (2006) found that SI Leaders reported finding it helpful to “refresh and relearn the material” (p. 136).

SI Leaders are trained to deepen metacognitive awareness and introduce new study habits to other students during their review sessions; however, research indicates that SI Leaders benefit equally by improving their own learning skills (Congos & Stout, 2003; Zaritsky & Toce, 2006; Couchman, 2009; Capstck, 2004; Skalicky & Caney, 2010; Stone, Jacobs, & Hayes, 2006; Stout & McDaniel, 2006; Lockie & Van Lanen, 2008). Although the development of learning skills is often broadly reported, the most clearly articulated specific improvement is in the area of organization and time management (Congos & Stout, 2003). Lockie and Van Lanen (2008) noted that many Leaders improved their own study habits, which often involved the recognition of “the importance of studying hard and working each day” (p. 5).

At the same time, the position of SI facilitator emphasizes the importance of planning for SI sessions while also being able to incorporate a variety of student needs into the planning. SI Leaders are often encouraged to evaluate themselves as well as the overall effectiveness of their sessions in order to improve and ameliorate their planning process while also being able to deal with a variety of unexpected situations. Lockie and Van Lanen (2008) reported an increase in “problem-solving” abilities among SI Leaders (p. 5); Skalicky and Caney (2010) referred to an increased capacity for “decision making;” and Couchman (2009) described the development of “reflective practice” among SI Leaders, which can be characterized as a deeper awareness of the importance of planning, improved flexibility and improvisation skills, a deeper awareness of the importance of self-evaluation practices, and an increased ability to deal with unforeseen circumstances (Couchman, 2009).
Method

Participants

The participants for this research study were students who, at one time, worked as SI Leaders at the University of Manitoba’s Academic Learning Centre. A total of 37 former SI Leaders were invited to participate in the survey, and a total of 24 (65%) responded to the survey. The respondents consisted of 13 females and 11 males. The majority of the students (96%) were between the ages of 20-26; however, one student was over 30 years old. A total of 13 students were studying in undergraduate professional programs, five students were studying in graduate programs, and six students were employed full-time or no longer studying at the time of the survey. Three students (two females and one male) between the ages of 20-26 participated in an initial focus group. All three of these students were enrolled in undergraduate professional programs (Nursing, Pharmacy, and Engineering) at the time. Two additional male students between the ages of 20-26 participated in a subsequent focus group. Both students in the focus group were employed and no longer studying at the time.

Procedure

The survey instrument used for this research project included an anonymous questionnaire that was distributed via e-mail. The survey consisted of 20 questions that included both Likert scale questions and open-ended questions. The Likert scale questions consisted of a statement followed by five options that invited the students to express their agreement or disagreement on a continuum (strongly agree, moderately agree, neutral, moderately disagree, or strongly disagree). Once the survey was completed, students were also invited to participate in focus groups that were designed to obtain more specific and detailed responses. Both the open-ended survey responses and the focus group comments were categorized based on recurring themes related to study practices, communication abilities, self-confidence, the ability to work in groups, planning and organizational skills, interpersonal relations, and professional development (see Appendix E).
Results

Study Skills

The results of the survey indicated that most of the participants (96%) agreed that they developed new study techniques through their experiences as SI Leaders. When asked to identify how they developed those study techniques (via training, SI Leaders, or other students), most of the respondents indicated some of this came from SI training (92%) and some came through their contact with other SI Leaders (88%) (see Appendix A).

The participants were asked to indicate in a multiple response format which study skills were developed through their experiences as SI Leaders. The choices included “time-management,” “note-taking,” “test preparation,” “new approaches to solving problems,” “strategies for identifying important concepts,” “techniques for applying concepts to new situations,” “none of the above,” and an option for “other” study habits, which allowed respondents to make additional comments.

A total of 79% of the respondents chose “new approaches to problem solving” as an option on the questionnaire. When prompted for more detail about this during the focus groups, the respondents acknowledged that SI increased their awareness that there is “more than one way of looking at a problem.” One specific example that was given included learning “more efficient” techniques for finding a “limiting reagent” in a Chemistry course. In other words, the experience allowed them to reach the understanding that their own methods and techniques were not definitive, which opened them up to the possibility of learning from others.

In addition, 75% of respondents chose “strategies for identifying important concepts” as a study skill that was gained from their SI leadership experience. The focus group participants described how the act of sitting through a lecture for a second time allowed them to practice and pinpoint “the things that were stressed the most.” As the SI Leaders put it, reattending lectures “makes you pay attention to the classes that you are taking in a different way,” and it “helps you to summarize your own notes in the future.” More specifically, as one SI Leader explained, it provided an opportunity to “observe other traits of a lecture” and develop skill in
identifying “cues,” which was helpful for other courses. In general, there was an overall recognition that their ability to identify key points had improved through their experiences as SI Leaders.

The other important study skill recognized by 71% of the survey respondents was “test preparation.” The focus group participants described some broad habits related to test preparation that included studying more regularly throughout the semester and “connecting concepts over a longer period of time.” One student talked about becoming more thorough with test preparation by studying until being able to “understand enough to teach somebody else,” and two other students talked about becoming better at “predicting test questions” when it came to preparing for their own tests. Finally, others described how leading SI sessions influenced them to adopt more specific active review techniques for their own courses such as “using flashcards” “drawing diagrams,” or creating “concept maps.” All of these responses imply that their experiences as SI Leaders led to more thorough study approaches and a greater understanding of how to adequately prepare for tests and exams.

**Communication Skills**

The survey contained a series of questions related to communication skills, and all (100%) of the survey respondents agreed that being an SI Leader helped them to develop their overall communication skills as well as their confidence when communicating with others. Most participants (96%) agreed that it helped them to develop their presentation skills and to become more attentive when listening to others (see Appendix B).

The focus group participants stressed that the SI program gave them opportunities to strengthen their communication skills, including an increased awareness of how they communicate with others and whether they have communicated their ideas effectively. Specifically, they mentioned being conscious of the need to explain things in different ways, talking more slowly, using visuals, writing more clearly, and generally being more aware of “blank stares” or body language that communicates confusion. They also described how their own active listening skills benefitted from their SI experiences by helping them to be more patient when listening to others and by developing their ability to “prompt” others when something is unclear. These
listening skills in particular were talked about as being important in various workplace settings that involved advising or training others.

Additionally, the focus group participants stressed that their self-confidence when public speaking was greatly increased from their experience as SI Leaders. In particular, they described how the opportunity to advertise the SI program and speak in front of large groups of students (200+) was initially very frightening; however, that experience has now made speaking in front of others much “less intimidating.” One student also described how communicating in front of peers was a good opportunity to practice communication skills regularly, which has made it easier to communicate with “supervisors” and while “working in an office” with new co-workers. As she put it, “it helps you to be more confident in a situation where you would otherwise be less confident.” Another student described being more confident in new situations and when meeting new people in the workplace.

**Collaborative Learning Skills**

The survey results indicated the SI Leaders felt more prepared to work in a group as a result of their SI experiences. In total, 96% of the participants felt more confident when working as part of a group, 92% felt more confident when leading a group, and 87% felt more confident when engaging a group of individuals on a task. A total of 83% reported being more self-assured in group situations, 79% reported being more respectful and appreciative of different viewpoints, 75% reported being better at achieving consensus from a group, and 67% reported being better at eliciting a variety of responses from a group (see Appendix C).

During the focus group, the participants pointed out that doing group work is a skill that is highly important in their current professional programs. They felt that being an SI facilitator gave them opportunities to work in groups, which made them more prepared for their current programs. Specifically, one student described the importance of “working in teams and team-building” as an Engineering student. Another student from Pharmacy talked about how “having group discussions and bouncing ideas off of each other is very important.” There was a greater appreciation for the importance of collaborative learning and an increased value for peer learning that made these students more likely to ask questions of their peers. They also
expressed an increased appreciation for diversity through an awareness of the overall importance of being able to understand and communicate with a “diverse population.”

With regards to collaboration in the workplace, one student talked about being “really comfortable working in a team atmosphere” and attributed this to his experiences as an SI Leader. He specifically mentioned that he is now more adept at transitioning between a leadership role and a listening role: “in the work setting, there are times when you need to be the Leader of a group, and there are times when you need to let other people lead.” As he described it, being able to function in this way allows for the successful “merging of ideas” to take place in group settings. There was also a recognition that interactions with various work colleagues are all unique, and that being flexible will “lead to better engagements.” This was, again, a skill that was attributed to past experiences interacting with a diverse population of students in SI sessions.

**Planning and Flexibility**

The survey participants were also asked a series of questions related to their general skill development as individuals. In particular, they were asked about their overall confidence, their ability to plan and articulate goals, and their ability to evaluate and assess their own work. A total of 83% agreed that being an SI Leader made them better at setting and articulating personal goals, 80% agreed that being an SI Leader made them better at assessing and critiquing the quality of their own work, and 79% agreed that being an SI Leader helped to improve their overall self-confidence (see Appendix D).

The focus group revealed a variety of ways in which the position has helped them to develop their planning and organizational abilities, most notably by increasing their skills at prioritizing and by making them more flexible and adaptable with their plans. With regards to planning, one SI Leader commented on how the position allowed him to be better at organizing himself. He said specifically that he learned “to plan ahead and prioritize,” which was something that he recognized as being important “for the rest of [his] life.” Another focus group participant acknowledged that being an SI Leader gave her experience at dealing with “curve balls,” which has made her better at being flexible with her planning: “it’s really about adaptability and thinking on your feet … and really changing and tailoring things as you go, and that’s again another life skill and work force skill.” The experience of facilitating an SI session and “being able to identify what is working
and what isn’t working” is a transferrable skill that has made these former SI Leaders better at adjusting “in stride” to various situations.

**Improved Teaching Skills**

One additional finding from this research project was that SI Leaders noted that their teaching skills had improved through their experiences with the program. The survey did not ask about teaching skills, yet 25% of the respondents commented specifically on the open-ended questions that their teaching abilities had improved as a result of being SI Leaders. It was the most commonly mentioned unsolicited response from the survey respondents.

Teaching skills were also mentioned by the focus group participants when they were given an unprompted opportunity to discuss additional benefits. They spoke specifically about how their training and experience as SI Leaders has provided them with useful skills for working as teaching assistants and tutors in other capacities at the University of Manitoba. One SI Leader spoke about her use of scaffolding techniques to promote more independent learning: “I try to avoid giving answers and I try to prompt people to come up with them on their own.” This particular SI Leader further described how using probing or socratic questioning was a better way to help students to “learn how to learn” as opposed to just simply “giving answers.”

Another student emphasized that SI has provided him with teaching skills that are used daily when training new lab employees where he works. He stated that SI taught him to assess comprehension levels when trying to clarify student understanding. By “asking more questions at the beginning,” he is able to ascertain a new employee’s “base level” and respond to her needs in a more gradual fashion so that he can ensure that the training is successful and that new lab applications are understood correctly.

**Discussion/Conclusion**

The results indicate that SI Leaders developed a number of valuable “leadership” skills through their experiences with the program. They benefitted by improving their study skills, improving their communication skills, increasing their self-confidence while public speaking, developing their appreciation and ability to work in group situations, improving their organizational and planning abilities, increasing their capacity to be flexible and adaptable, and improving their teaching abilities.
The development of their own study habits has obviously been important to the SI Leaders who have entered professional programs. Aside from learning new course specific techniques and developing an appreciation for the benefits of a regular study routine, the most obvious gain appears to be a greater proficiency at identifying important concepts and being able to isolate key points. For SI Leaders who have more coursework ahead of them, this is a very important outcome that can be used in their future studies. The acquisition of better study habits through SI, therefore, is useful not only for retaining new students in first or second year courses, but also has the potential to act as a retention initiative for SI Leaders studying in challenging upper-level courses, as well as graduate or professional programs.

In this study as well as others (Lockie & Van Lanen, 2008), the SI Leaders benefitted by developing a new appreciation for the importance of establishing study groups. The focus group participants talked specifically about how the SI experience was essentially the only preparation that they had for the abundance of group work activities in their current professional programs. An increased competence when working with others is clearly advantageous in collaborative learning environments, but being able to work collaboratively is also a highly valued workplace skill that SI Leaders will undoubtedly use when they enter the workforce.

There was overwhelming agreement that the SI leadership experience strengthened both their capacity to communicate clearly and effectively, which is consistent with the findings from Couchman’s study (2009), and there was also overwhelming agreement that their self-confidence when public speaking improved as a result of the experience, which again has been previously reported in a number of studies (Zaritsky & Toce, 2006; Capstick, 2004; Couchman, 2009; Malm, Bryngfors, & Morner, 2012; Skalicky & Caney, 2010; Stone, Jacobs, & Hayes, 2006; Lockie & Van Lanen, 2008). The significant new finding in this case is that the participants agreed that it increased their confidence while communicating in unfamiliar work situations where they might otherwise be less confident.

The participants also identified improved planning and organizational abilities as skills that were developed through their experience as SI facilitators. Specifically, they talked about becoming more flexible, adaptable, and resourceful when faced with a variety of competing student needs. Couchman (2009) referred to this flexibility as the ability to improvise, and Stout & McDaniel (2006) described it as the ability to create
“contingency plans” that consider all possibilities, “not just the likely, best case scenario” (p.60). As they put it, these are important skills that carry over as SI Leaders become members of the “educated workforce” (Stout & McDaniel, 2006). The SI Leaders in this particular study similarly expressed a recognition that these were skills that they have used and needed in their professional lives when faced with competing priorities from work supervisors.

Finally, perhaps the most significant finding is that the SI Leaders developed their teaching abilities through their experiences with the program. The participants expressed an increased ability to coax students towards the correct answers and an appreciation for encouraging students to learn independently, which was also listed by Skalicky and Chaney (2010) as one of twelve key SI leadership skills. Although this finding should not be surprising, it has been relatively under-reported in the literature to date. It is also somewhat significant given the increased likelihood that SI Leaders will be involved in other mentoring or teaching roles such as tutoring, working as teaching assistants, training new students in laboratory settings, or mentoring peers in other programs that may or may not involve training. The development of one’s teaching abilities is particularly important in a university environment that values the sharing of knowledge and information, and these skills will also be of use once the SI Leaders become more experienced members of the workforce who are expected to pass on their expertise to others.

The Conference Board of Canada (2016) outlined a number of fundamental skills (ex: communication, information management, and problem solving), personal management skills (ex: responsibility and adaptability), and teamwork skills (ex: respect for diversity and self-monitoring) that are required to be successful in the Canadian labour force. Overall, the findings of this study suggest that the SI Leaders gained many of these same skills through their participation in the SI program. These “soft skills” are valuable for them as students, future members of the workforce, and citizens in general. They are also skills that are not usually acquired by participating in conventional undergraduate classrooms; they are learned through experience and participation.

Universities have traditionally been supportive of practice-based learning opportunities for particular professions, but there is a growing demand for these types of experiences “across a broader range of
programs” (Kennedy, 2015, p. 3). Unfortunately, many universities avoid embracing these opportunities because work-based learning experiences are “resource intensive” and unsustainable (Kennedy, 2015, p. 3). Programs like Supplemental Instruction add value to the institution for student participants, while also providing SI Leaders with these types of experiences within the campus community, which is one way to provide feasible practice-based learning opportunities that can be easily monitored and assessed.

Research in this area is important because it provides additional support in favour of SI programming beyond the more immediate benefits for the students who participate in the program. The use of focus groups in this study has been particularly fruitful because it has provided a more detailed and thorough understanding of how the SI Leaders benefitted from participation in the SI program given the limited research and often unspecified findings in this area. Learning outcomes that focus on the development of SI leadership skills could be used to argue in favour of increased support for SI programming because it also benefits the SI Leaders who are students themselves, and it provides valuable training and expertise that can be useful in various teaching and leadership roles across the institution and beyond. As universities prioritize programming while budgets diminish, assessment practices that focus on all aspects of SI programming can be used to provide further support and justification for Supplemental Instruction.

References


Couchman, J.A. (2009). An exploration of the “lived experience” of one cohort of academic peer mentors at a


Appendix A

Figure 1. New Study Techniques. This figure illustrates the survey responses to questions regarding new study techniques developed by being SI leaders. Percentages may not total 100 due to rounding.

Appendix B

Figure 2. Communication Skills. This figure illustrates the survey responses to questions regarding how communication skills were developed by being SI leaders. Percentages may not total 100 due to rounding.
Appendix C

Figure 3. Group Work. This figure illustrates the survey responses to questions regarding the ability to work as part of a group after participating as an SI leader. Percentages may not total 100 due to rounding.

Appendix D

Figure 4. Planning Skills. This figure illustrates the survey responses to questions regarding planning and organizational skills. Percentages may not total 100 due to rounding.
Appendix E
SI Leader Survey

1. Being an SI Leader has helped me to develop my oral communication skills.
   1 2 3 4 5
   Disagree Agree

2. Being an SI Leader has helped me to develop my presentation skills.
   1 2 3 4 5
   Disagree Agree

3. Being an SI Leader has helped me to develop my ability to listen attentively to others.
   1 2 3 4 5
   Disagree Agree

4. Being an SI Leader has made me more respectful and appreciative of differing opinions and viewpoints.
   1 2 3 4 5
   Disagree Agree

5. Being an SI Leader has made me more secure in leading a group discussion.
   1 2 3 4 5
   Disagree Agree

6. Being an SI Leader has made me more secure in being in charge of a group of people.
   1 2 3 4 5
   Disagree Agree

7. Being an SI Leader has made me better at exhibiting democratic principles when working within a group.
   1 2 3 4 5
   Disagree Agree

8. Being an SI Leader has made me better at getting a group of individuals excited about performing a task.
   1 2 3 4 5
   Disagree Agree

9. Being an SI Leader has made me more assertive in group situations.
   1 2 3 4 5
   Disagree Agree
10. Being an SI Leader has helped to improve my overall self-confidence.

1 2 3 4 5
Disagree Agree

11. Being an SI Leader has made me better at setting and articulating goals.

1 2 3 4 5
Disagree Agree

12. Being an SI Leader has made me better at making plans to achieve specific goals.

1 2 3 4 5
Disagree Agree

13. Being an SI Leader has made me better at assessing and critiquing the quality of my work.

1 2 3 4 5
Disagree Agree

14. Describe your employment, work, or study program since you stopped being an SI Leader?
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

15. Briefly name and explain three skills that you improved upon by being an SI Leader?
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

16. Which skills developed during your SI leadership have you had use for in your future studies or work? Please explain in what way you have used them.
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

17. Give an example of, and describe a situation, where you used the experiences of your SI leadership in your own future studies, other employment opportunities, or professional life?
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

18. Please comment generally about how being an SI Leader was a benefit to you in your development as an individual.
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
Low High School GPA:

Another Reason to Try SI

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Abstract

The purpose of this project was to investigate the effect of participation in Supplemental Instruction (SI) on first-year students’ academic performance after controlling for relevant non-programmatic factors. Student academic performance was compared in quartiles determined by high school core grade point average (HS Core GPA). A total of 2,436 student SI participants and non-participants were matched based on six academic readiness and demographic covariates. The results revealed that SI participants had significantly higher course grade averages and passing rates compared to non-participants. Participants in the lowest HS Core GPA quartile had the largest gains in course grade with the largest effect size when compared to matched non-participants. The results of this study suggest that first-year students with low HS Core GPA may experience the greatest benefit of SI participation.

Keywords: High school GPA, first-year students, Supplemental Instruction

Low high school GPA: Another reason to try SI

High school grade point average (GPA) is a strong predictor of college academic performance (Geiser & Santelices, 2007). Students with a high school grade point average below 2.0 (on a scale of 0.0-4.0) had the lowest probabilities of retention at a large public university, and only approximately one third of students with high school GPAs of 2.0-2.7 were retained after four years (Murtaugh, Burns, & Schuster, 1999). While high
school grade point average is an important predictor of first-year college academic performance (Geiser & Santelices, 2007; Zwink & Sklar, 2005), it is an even stronger predictor of academic performance after four years (Geiser & Santelices, 2007). Students entering college with a low high school grade point average may be at risk for failing courses, being placed on academic probation, and/or leaving higher education without a degree. Consequently, academic interventions to benefit first-year students with low high school grade point averages could be a valuable tool in increasing student retention in higher education.

Supplemental Instruction (SI) is a non-remedial, academic intervention program that supports all students enrolled in historically challenging courses. Historically challenging courses are defined as having high rates of D, F, and Withdrawal grades. In 1997, SI was implemented at Northern Arizona University (NAU) as part of a National Institutes of Health grant. The grant initially supported seven introductory courses in biology and chemistry. In 2006, the NAU SI program expanded to include additional biology and chemistry courses as well as accounting, engineering, and physics courses. Since 2006, additional courses in business and social and behavioral sciences have been supported. Many of the SI-supported courses at NAU have high enrollments (>100 students/class) and are required for progression in a major. At NAU, the SI approach is to hire and train a student who has been previously successful in the course as an SI Leader. The SI Leader is responsible for serving as a peer role model, attending the course again, taking notes, and advertising SI sessions. The SI Leader holds four, one-hour long study sessions each week focusing on reviewing the course content and introducing students to effective study and review strategies. SI Leaders are supervised by professional staff, observed regularly for formative assessment, and paid a stipend for their work during a semester. Student participation in SI is voluntary.

The earliest data on the effectiveness of SI program participation date back to the 1970s and 1980s and demonstrate academic improvement through a variety of dependent measures, primarily final course grades and course completion rates (Arendale, 2002; Dawson, van der Meer, Skalicky, & Cowley, 2014; Summers, Acee, & Ryser, 2015). For example, a growing body of research supports claims that SI participants earn higher final course grades, pass courses at higher rates and are retained at their institutions at higher rates when controlling for ethnicity and previous academic performance (Dawson et al., 2014). Beyond examining general
improved grades or retention among participants, recent research on the effectiveness of SI has expanded to focus on the benefits of online SI programs (Hizer & Schultz, 2017), the challenges serving transfer students (Musah & Ford, 2016), and the factors important in voluntary SI participation (Goldstein, Sauer & O’Donnell, 2014). Some research also suggests that SI can help close the academic achievement gap between Hispanic and Caucasian students (Summers et al., 2015). The overall results of annual assessment of the NAU SI program are consistent with the literature and demonstrate increased rates of passing courses among participants (Chen & Neff, 2015; Hedegard, 2013; Merica, 2012). A pilot investigation suggested positive benefits of SI participation among first-year students with lower by high school core grade point average (HS Core GPA) (Cruickshank & Merica, 2013). As students with low HS Core GPAs are often considered at-risk for course failure, the potential impact of SI participation on increased grade and pass rate is of particular interest to those involved in retention efforts with first-year students in higher education.

Based on previous pilot data (Cruickshank & Merica, 2013), we anticipated that voluntary SI participation among NAU students with the lowest HS Core GPAs would result in increased course GPA and pass rates. In order to test the hypothesis that first-year SI participants will have higher course grades and higher rates of passing SI-supported courses, we used a quasi-experimental, matched, two-group design to investigate the academic performance of SI participants compared to non-participants.

**Method**

**Participants and Courses**

In Academic Year 2014-2015 (AY14-15), Northern Arizona University, a public, regional institution, had approximately 20,000 undergraduate students on its main residential campus. The SI program at NAU adheres closely to the model developed at the University of Missouri Kansas City and described by Stone and Jacobs (2008). Table 1 lists the courses with SI support at NAU in AY14-15. This study focused on the 3,643 first-time, full-time, first-year NAU students who enrolled in SI-supported courses during AY14-15. The SI program served 42.8% ($Nn=1,560$) of the individual students who participated in at least one SI-supported course. Consequently, this study examined 6,402 cases of students who enrolled in SI-supported courses. Table 1
Courses with Supplemental Instruction (SI) support in academic year 2014-2015.

<table>
<thead>
<tr>
<th>Course Prefix</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC205</td>
<td>Legal, Ethical, Global, And Regulatory Environment Of Business</td>
</tr>
<tr>
<td>ACC255</td>
<td>Principles Of Accounting: Financial</td>
</tr>
<tr>
<td>ACC256</td>
<td>Principles Of Accounting: Managerial</td>
</tr>
<tr>
<td>BIO100</td>
<td>Principles Of Biology</td>
</tr>
<tr>
<td>BIO181</td>
<td>Unity Of Life I: Life Of The Cell</td>
</tr>
<tr>
<td>BIO182</td>
<td>Unity Of Life II: Lives Of Multicellular Organisms</td>
</tr>
<tr>
<td>BIO192</td>
<td>Introduction To Exercise Science</td>
</tr>
<tr>
<td>BIO201</td>
<td>Human Anatomy/Physiology I</td>
</tr>
<tr>
<td>BIO202</td>
<td>Human Anatomy/Physiology II</td>
</tr>
<tr>
<td>BIO205</td>
<td>Microbiology</td>
</tr>
<tr>
<td>BIO320</td>
<td>General Pathology</td>
</tr>
<tr>
<td>CENE251</td>
<td>Applied Mechanics Static</td>
</tr>
<tr>
<td>CENE253</td>
<td>Mechanics Of Materials</td>
</tr>
<tr>
<td>CHM130</td>
<td>Fundamental Chemistry</td>
</tr>
<tr>
<td>CHM151</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHM152</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHM235</td>
<td>General Organic Chemistry I</td>
</tr>
<tr>
<td>CHM360</td>
<td>Fundamental Biochemistry</td>
</tr>
<tr>
<td>CS122</td>
<td>Programming For Engineering And Science</td>
</tr>
<tr>
<td>ECO201</td>
<td>Introduction To Business Statistics</td>
</tr>
<tr>
<td>ECO280</td>
<td>Introduction To Economics</td>
</tr>
<tr>
<td>ECO284</td>
<td>Principles Of Economics: Micro</td>
</tr>
<tr>
<td>ECO285</td>
<td>Principles Of Economics: Macro</td>
</tr>
<tr>
<td>EE110</td>
<td>Introduction To Digital Logic</td>
</tr>
<tr>
<td>EE188</td>
<td>Electrical Engineering I</td>
</tr>
<tr>
<td>FIN311</td>
<td>Principles Of Finance</td>
</tr>
<tr>
<td>FIN340</td>
<td>Financial Analysis And Working Capital Management</td>
</tr>
<tr>
<td>ME252</td>
<td>Applied Mechanics Dynamics</td>
</tr>
<tr>
<td>PHY111</td>
<td>General Physics I</td>
</tr>
<tr>
<td>PHY112</td>
<td>General Physics II</td>
</tr>
<tr>
<td>PHY161</td>
<td>University Physics I</td>
</tr>
<tr>
<td>PHY262</td>
<td>University Physics II</td>
</tr>
<tr>
<td>PHY262</td>
<td>University Physics II</td>
</tr>
</tbody>
</table>
**Procedure**

Using a non-experimental design, a HS Core GPA quartile distribution representing student cases in multiple courses that were supported by SI during AY14-15 ($N=6,402$ cases) was created to define the first-year student quartile groups. Students who did not have a HS Core GPA were excluded from the study. The median HS Core GPA was used to divide the ordered set into two halves and was not included in either half. The lower quartile value was the median of the lower half of the data and the upper quartile value was the median of the upper half. The lower quartile and upper quartile values were not included in either quartile. The lowest quartile (Q1) included students with HS Core GPA ranging from the minimum value of 2.03-2.98; Q2 from 2.99-3.33; Q3 from 3.34-3.67; and Q4 from 3.68-4.00. All measures of GPA are based on the following scale: 0.0=F, 1.0=D, 2.0=C, 3.0=B, 4.0=A.

Within each quartile group, students were matched on the following demographic and academic preparedness covariates: HS Core GPA, gender, ethnicity, in-state residency, Pell grant eligibility, and first generation student status. All participants/non-participant pairs that were not included in the match up were discarded. By matching the groups, the design excluded several possible alternative explanations (gender, ethnicity, in-state residency, Pell grant eligibility, and first generation student status based on the covariates) for differences in academic performance between participants and non-participants.

Combined course grade average representing 32 SI-supported courses included in the study (see Table 1) and passing rate (defined as earning an A, B or C final grade in the course) were used as dependent variables measuring the effect of SI participation in each quartile. Several additional courses received SI support during AY14-15; however, they did not include first-year students, so they were not included in this analysis.

**Data Analysis**

As with many types of educational research, in this study it was not possible to randomly assign students to an intervention and control group in an educational context. To address limitations of non-experimental designs, many education researchers use a variety of methods to match an intervention group with a control group on variables where previous research has demonstrated that these variables affect
outcomes such as retention and GPA. Here a quasi-experimental, matched, two-group design was used to investigate the course grade average and passing rate of SI participants compared to non-participants by HS Core GPA quartile. Course grade was converted to a four-point scale with the following values: A=4.0, B=3.0, C=2.0, D=1.0, F=0.0.

Propensity score matching is used to control for differences in academic readiness and demographic measures. In this study, the covariates included HS Core GPA, first generation status, Pell grant eligibility, state residency, ethnicity, and gender. All of these variables have been shown to affect student success outcomes at Northern Arizona University (Saltonstall, Dickson, Hopkins, & Chen, 2013; Saltonstall, Dickson, Hopkins, Chen, & Neff, 2014; Saltonstall, Dickson, Hopkins, Chen, & Neff, 2015). Using logistic regression, these variables serve as the predictors of intervention participation. The propensity score measures the probability of treatment and helps to balance the intervention and control groups. As a result, impacts of the program on the dependent variables are better isolated.

Statistical analyses were conducted using SPSS Statistics 22.0. Groups were matched with the R-Essentials SPSS extension bundle PSMatching 3.0 (Thoemmes, F., 2012). A logistic regression method was used to create the propensity scores (i.e., the probability of treatment given the set of covariates). To create a balance between the two groups, the nearest neighbor with caliper adjustment, 1:1 matching algorithm was employed with none of the units discarded after the matching. The caliper adjustment was .05 for the 3rd and 4th quartiles and 0.00 for the 1st and 2nd quartile matched groups. Match quality was evaluated using t-tests and Chi-Square goodness of fit tests. Notable differences in all of the covariates were reduced to a small degree or completely eliminated.

One-way analyses of variance (ANOVAs) were used to assess mean difference in course grade average between matched participants and non-participants within each quartile. The frequency distribution for categorical data in individual course grades (counting the number of students earning an A, B or C in the course) between participants and matched non-participants was determined with the frequency analysis χ² option. The alpha for this study was constrained at .05.
The data were collected during AY14-15 from NAU’s internal student databases as part of an ongoing annual program evaluation. This research was submitted for review by the Institutional Review Board of Northern Arizona University. Upon review, this research was determined to not meet criteria for research with human subjects and therefore not subject to oversight by the Board.

Results

Table 2 summarizes the demographic characteristics of the matched participants and non-participants in this study.

Table 2

Matched participant and non-participant characteristics

<table>
<thead>
<tr>
<th></th>
<th>Non-Participants</th>
<th>Participants</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Number of Students ($n$)</td>
<td>471</td>
<td>557</td>
<td>676</td>
<td>732</td>
<td>471</td>
<td>557</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female (%)</td>
<td>48.4</td>
<td>53.9</td>
<td>65.8</td>
<td>75.8</td>
<td>48.0</td>
<td>55.5</td>
</tr>
<tr>
<td>Male (%)</td>
<td>51.6</td>
<td>46.1</td>
<td>34.2</td>
<td>24.2</td>
<td>52.0</td>
<td>44.5</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska Native (%)</td>
<td>1.2</td>
<td>1.3</td>
<td>1.8</td>
<td>1.8</td>
<td>2.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Asian (%)</td>
<td>0.8</td>
<td>2.9</td>
<td>2.2</td>
<td>2.0</td>
<td>0.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Black/African American (%)</td>
<td>6.2</td>
<td>3.2</td>
<td>3.0</td>
<td>2.9</td>
<td>7.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Hispanic/Latino (%)</td>
<td>34.0</td>
<td>29.3</td>
<td>26.2</td>
<td>24.7</td>
<td>32.7</td>
<td>27.8</td>
</tr>
<tr>
<td>International (%)</td>
<td>0.2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Island (%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Not Specified (%)</td>
<td>0.4</td>
<td>0.4</td>
<td>0.7</td>
<td>0.1</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td>Two or More (%)</td>
<td>7.6</td>
<td>7.9</td>
<td>3.7</td>
<td>6.0</td>
<td>6.8</td>
<td>7.7</td>
</tr>
<tr>
<td>White (%)</td>
<td>48.4</td>
<td>54.9</td>
<td>61.7</td>
<td>62.4</td>
<td>49.5</td>
<td>56.2</td>
</tr>
<tr>
<td>In-state Resident (%)</td>
<td>48.2</td>
<td>52.2</td>
<td>70.9</td>
<td>86.1</td>
<td>47.1</td>
<td>51.0</td>
</tr>
<tr>
<td>First Generation Student (%)</td>
<td>43.7</td>
<td>49.2</td>
<td>47.0</td>
<td>43.7</td>
<td>44.4</td>
<td>46.0</td>
</tr>
</tbody>
</table>

Table 3 displays differences in outcomes between the four matched quartile groups. Participants in all four quartiles earned significantly higher course grades compared to non-participants. The effect size of group differences ranged from 0.36 (Q4) to 0.65 (Q1), suggesting a moderate to large effect of SI participation on
course grade. Participants in Q1 had the largest significant increase in course grade (+0.74, Effect Size=0.65) compared to non-participants.

Table 3

Course grade average of participants and non-participants by quartile groups

<table>
<thead>
<tr>
<th>HS Core GPA</th>
<th>Non-Participants</th>
<th>Participants</th>
<th>Mean Difference in Course GPA</th>
<th>Mean ± SD</th>
<th>95% CI</th>
<th>p [Effect Size]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>471</td>
<td>1.30 ± 1.15</td>
<td>[1.19, 1.40]</td>
<td>471</td>
<td>2.04 ± 1.14</td>
<td>[1.93, 2.14]</td>
</tr>
<tr>
<td>Q2</td>
<td>557</td>
<td>1.77 ± 1.25</td>
<td>[1.66, 1.87]</td>
<td>557</td>
<td>2.36 ± 1.04</td>
<td>[2.27, 2.44]</td>
</tr>
<tr>
<td>Q3</td>
<td>676</td>
<td>2.49 ± 1.17</td>
<td>[2.41, 2.58]</td>
<td>676</td>
<td>2.91 ± 0.92</td>
<td>[2.84, 2.98]</td>
</tr>
<tr>
<td>Q4</td>
<td>732</td>
<td>3.10 ± 1.02</td>
<td>[3.02, 3.17]</td>
<td>732</td>
<td>3.43 ± 0.79</td>
<td>[3.37, 3.49]</td>
</tr>
</tbody>
</table>

*Effect size based on Cohen’s distance (Cohen’s d).

Participants had significantly higher rates of passing the SI-supported course compared to non-participants. The differences in pass rates were significant in all quartiles. Odds ratios were calculated to demonstrate the odds of passing the course for students in each quartile. The results of comparisons of passing rates within each quartile are summarized in Table 4. The odds of passing are 2.94 times greater for Q1 participants, 2.65 times greater for Q2 participants, 3.00 times greater for Q3 participants, and 2.69 times greater for Q4 participants – all compared to non-participants in each quartile.

Table 4

Passing rates of participants and non-participants by quartile groups

<table>
<thead>
<tr>
<th>HS Core GPA</th>
<th>Non-Participants</th>
<th>Participants</th>
<th>Mean Difference in Passing Rate</th>
<th>p [Effect Size]</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartiles</td>
<td>n</td>
<td>Passing Rate</td>
<td>n</td>
<td>Passing Rate</td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>220</td>
<td>46.7%</td>
<td>339</td>
<td>72.0%</td>
<td>+25.3% &lt;.001 [.26] 2.94</td>
</tr>
<tr>
<td>Q2</td>
<td>565</td>
<td>64.1%</td>
<td>460</td>
<td>82.6%</td>
<td>+18.5% &lt;.001 [1.19] 2.65</td>
</tr>
<tr>
<td>Q3</td>
<td>559</td>
<td>82.7%</td>
<td>632</td>
<td>93.5%</td>
<td>+10.8% &lt;.001 [1.17] 3.00</td>
</tr>
<tr>
<td>Q4</td>
<td>691</td>
<td>94.4%</td>
<td>716</td>
<td>97.9%</td>
<td>+3.5% 0.001 [.09] 2.69</td>
</tr>
</tbody>
</table>
Note: Passing rate was determined by the percent of students in the quartile earning an A, B or C final grade in the SI-supported course. The odds-ratio characterizes the intervention effect as the odds of passing for the participant group, or the ratio of the number who pass to the number who fail.

Discussion

The results of this research demonstrate that first time, full-time, first-year students who participate in SI earn significantly higher course grades compared to non-participants when controlling for HS Core GPA, gender, ethnicity, in-state residency, Pell grant eligibility and first generation student status. While participants in all four quartiles earned significantly higher grades, participants with the lowest HS Core GPA (Q1) demonstrated the largest increases in grades (with the largest effect size) when compared to non-participants. It is important to note that the effect sizes of SI participation on course grade average were 0.65 in Q1, 0.57 in Q2 and 0.40 in Q3, meeting or surpassing the 0.4 benchmark often used to determine practical usefulness of an education intervention (Hattie, 2009). This suggests that SI participation was most effective for students with a HS Core GPA <3.68.

Looking more closely at Q1, on average, participants (M±SD=2.04±1.14; C final grade average) earned one letter grade higher than non-participants (M±SD=1.30±1.15; D final grade average), which resulted in a mean passing grade when students attended at least two SI sessions in a semester. Participating in SI may be particularly beneficial to students in this group, whose retention in AY15-16 was 14.6% lower than the overall (full and part-time) first-year student retention rate for on-campus students at NAU (J. Hopkins, personal communication, October 18, 2016).

In a separate analysis, we further demonstrated that participants had significantly increased rates of passing SI-supported courses compared to non-participants. Passing rates were lowest among students with the lowest HS Core GPAs; however, participating in SI increased rates of passing by over 25% in this group (Q1), with an odds ratio for passing the course of 2.94. The impact of SI participation on passing rates was largest among students with the lowest HS Core GPAs (Q1).

While the largest gains in grades and pass rates by participants were made in Q1, it should also be noted that this quartile contained the smallest number of participants (n=471). A small number of students in Q1 may be due to several factors such as lower admission rates for students with low high school Core GPAs.
or inability to attend SI sessions held outside of regular class meeting times. The students in Q1 included a larger number of individuals identifying as male, Hispanic or Black/African American compared to the other quartiles. This result complements the finding that SI participation benefitted Hispanic students and helped reduce an academic achievement gap between Hispanic and Caucasian students in a History course with a low passing rate overall (Summers, Acee, & Ryser, 2015). Harper (2013) identified reduced help-seeking behavior by men and students of color (p. 6). This may be one factor related to reduced use of SI among Q1 students in the present research (see also Summer et al., 2015). Additional research is needed to more clearly identify the factors related to lower numbers of participants in this quartile; however, additional outreach or coordination to meet the needs of potential participants in this quartile may be of interest to SI programs seeking to increase the effects of their intervention among students with low HS Core GPAs. Murtaugh, Burns and Schuster (1999) found that students with a HS Core GPA below 2.0 had the lowest rates of retention at a large public university, suggesting that students entering college with low GPAs are an important demographic group for academic intervention. In their review of a decade of recent research on SI effectiveness, Dawson and colleagues (2014) note prior research did not find a difference in HS Core GPA between SI participants and non-participants. While the present study took a different approach by controlling for HS GPA in quartiles for the analysis, our data suggest that students with the lowest HS GPAs receive the greatest benefit from SI participation.

There are several limitations of this research, including some of those identified by Dawson, van der Meer, Skalick, & Cowley (2014). Like many observational studies that attempt to understand cause-and-effect relationships, the present research is not experimental as students were not randomly assigned to groups, and the results may not generalize to groups other than first-year students at Northern Arizona University. Moreover, propensity score matching can only attempt to control some of the confounding bias inherent in this type of educational intervention. Other factors like instructional delivery, course design, content difficulty, course and section variability, and teaching quality all play a role in contributing to the outcomes described in this study. To further improve understanding of the effects of SI participation, future research should seek to
include measures of historical data by course, instructor and/or SI section leader to better understand class-level effects.

With regard to measures of student success, the use of course grade and pass rate as a dependent variable may not accurately reflect learning. That said, it is important to note that the present research meets the four recommendations for SI research set forth by Dawson and colleagues (2014). First, the number of students involved in the study was identified. Second, SI attendance requirements were described. Third, mean course grades included a range (95% confidence interval), standard deviation, and significance levels ($p$ values) for the data. In addition, we have calculated effect sizes to aid in interpretation of the results of the study. By meeting these criteria set forth by Dawson and colleagues (2014), this study raises the standard of research for this type of investigation.

One additional caveat of interpreting the results of this research is the limitation of calculating course grade. These calculations were based on a restricted range scale of 0.0-4.0. This may contribute to a ceiling effect in course GPA whereby additional academic gains or learning due to SI participation cannot be captured by the dependent variable. Using a course grade based on a percentage of total points earned (numerical: 1-100%) may be one way to address this limitation in future research.

The present research replicates the statistical effect of SI participation on course grade and passing rate. It extends this general finding to show that SI is beneficial for participants with low HS Core GPA who may be at risk for adverse academic outcomes. Future research should seek to examine the effects of SI participation in a more diverse (e.g., second, third or fourth year students) sample or with respect to specific disciplines or courses. Alternative variables and assessments to represent learning (e.g., pre/post testing, standardized exams etc.) may also help evaluate the effects of SI participation. In addition, the effects of factors such as the number of SI sessions attended, students’ perceptions of the sessions, session participant size, and long-term impacts such as second-year retention remain to be investigated in this sample. It would also be beneficial to determine the effects of other covariates such as concurrent or sequential participation in other student success programs. Finally, future research examining the effects of SI participation amongst part-time and transfer students would address an existing gap in the literature. Altogether, an accumulating body of
research indicates that participation in SI yields important benefits for college students. It serves as an important tool for retention and student success by providing strategies for students to improve their understanding of the course content, strengthen critical thinking, engage in collaborative learning, and promote positive study habits in historically difficult gateway courses.

References


Cruickshank, B. & Merica, M. (2013, April). The impact of SI attendance on course grade average for first-year college students based on incoming high school GPA. Poster presented at the Northern Arizona University Assessment Fair, Flagstaff, AZ.


Acknowledgements: The results of this study were presented at the 2016 Northern Arizona University 14th Annual Assessment Fair.
Moving In, Through, and Out of the Supplemental Instruction (SI) Leader Experience

James L. Eller, Case Western Reserve University
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Abstract
Using a phenomenological research method and Schlossberg’s transition theory as a theoretical framework, this study addressed the central research question: How do students move in, through, and out of the Supplemental Instruction (SI) Leader experience at a mid-sized, private research university located in the Midwestern United States? Through questionnaires, interviews, archival records, and focus groups, data analyses revealed themes that were used to describe the participants’ perceptions of their SI Leader experience in the context of their transition from students to peer educators and the lasting impact of their experience beyond their SI Leader tenure. Themes are organized within Schlossberg’s stages of transition and the factors of situation, self, supports and strategies that influence how a person copes with transition. Study limitations and recommendations for future research are discussed. Appendices including data collection instruments are included.

Keywords: accreditation, learning outcomes, peer-education, student engagement, Supplemental Instruction (SI), transition theory

Moving In, Through, and Out of the SI Leader Experience

Educators and employers in the United States continue to question the quality of learning and acquired competencies of some of today’s college graduates (Arum, 2013). Similarly, as college tuition continues to increase and the nation’s job market remains stagnated, more parents and students are questioning the benefits of pursuing a college education (Doyle, 2011; Willie, 2012; Wood, 2011). As institutions of higher learning strive to maintain accreditation, enhance the quality of the educational outcomes of their students, and improve
their institutional appeal to future students and the employers who may hire them as college graduates, there is a growing necessity in higher education to demonstrate learning outcomes beyond earned grades and diplomas. Qualitative research utilized to identify learning experiences through student engagement activities can contribute to meeting this important need (Henning, 2012; Wawrzynski, LoConte, & Straker, 2011). One such student engagement activity is Supplemental Instruction (SI)—an academic intervention in which students serve as peer facilitators and engage with other students, staff, and faculty with the goal of helping improve student GPA and retention outcomes. The purpose of this study was to address a growing concern about the value of a college degree in view of increasing costs to students and their families (Arum, 2013) and to demonstrate that quality learning and competencies can be attained outside of the classroom through participation in student engagement activities, specifically through the SI Leader experience.

Developed in 1973 by Deanna Martin at the University of Missouri-Kansas City (UMKC), SI is an academic support program intended to target historically challenging courses for the purposes of increasing student retention (Blanc, DeBuhr, & Martin, 1983). Initially created to support courses in the health sciences, the SI program has been adapted and expanded to other courses, and, in 1981, SI was awarded designation as an Exemplary Educational Program by the United States Department of Education (DOE) (Arendale, 1997; Blanc et al., 1983; Stone & Jacobs, 2008). SI relies on students to serve as peer educators, or SI Leaders, responsible for facilitating group learning activities to reinforce content presented in traditionally challenging courses (Arendale, 1997; Hurley & Gilbert, 2008). Although numerous quantitative studies conducted over recent decades have shown the impact of participating in SI on student grades (Blanc, DeBuhr, & Martin, 1983), persistence (Bronstein, 2008), and retention (Grillo & Leist, 2013), there is limited research focused on the students who serve as the major contributors to the successes of the program—SI Leaders. This study utilized a phenomenological study method (Moustakas, 1994) and the theoretical lens of Schlossberg’s (2011, 1981) transition theory to more broadly investigate the SI Leader experience and to identify the lasting outcomes associated with the experiences of SI Leaders as they transition from students to peer educators in particular.
**Introduction**

SI Leaders have the unique challenge of planning and leading both small and large groups of students in specific, planned, and strategic learning activities intended to facilitate the learning process (Arendale, 1997; Blanc et al., 1983; McDaniel, 2008). Therefore, these students must learn how to nurture and maintain professional relationships with faculty and staff, and foster peer relationships with diverse groups of students. Additionally, they must develop and employ basic facilitation skills to help them plan and execute learning activities necessary to facilitate student understanding of challenging course material (McDaniel, 2008). Inevitably, students who serve as SI Leaders must transition from their roles as students to the more complex roles of students who are also peer facilitators expected to impact the academic performance of other students.

This study took place at a mid-sized, private research university in an urban setting in the Midwestern United States. Student enrollment is approximately 10,500 with a split of 60% graduate and professional students and 40% undergraduate students. The majority of undergraduate students major in engineering or the natural sciences, and a significant portion initially enroll in pre-professional health programs.

The SI program has been in place at the institution since 1985 and initially targeted first- and second-year courses in chemistry, biology, engineering, and physics. In recent years, the program has been expanded to include select upper-level courses in chemistry and physics. On average, 75% of undergraduate students enroll in one or more SI-supported courses during their undergraduate experience, with approximately 1,800 students participating annually. The SI program currently supports courses in biochemistry, biology, chemistry, cognitive science, engineering, nursing, and physics, and SI session attendance at a single session ranges between one student and 200 students, although the mean attendance ranges from 20 to 30 students and 80 to 100 students for sessions just before exams.

Each semester, the SI program employs between 22 and 32 SI Leaders responsible for facilitating the SI sessions. SI Leaders are expected to dedicate eight to 10 hours each week to their SI Leader responsibilities. This includes three hours per week attending the course for which they are serving as an SI Leader, three hours facilitating SI sessions (Most SI Leaders hold two 90-minute SI sessions each week), and two to four hours for planning and preparing for their SI sessions and for meetings with their SI course faculty and program.
supervisor. Although the UMKC model outlined in Hurley and Gilbert (2008) does not specify the time commitment for students who serve as SI Leaders or the duration or number of SI sessions that should be held each week, the SI model in place at the study site conforms fully to the UMKC (2006) model in that (1) SI is applied to targeted courses and supported by the respective faculty members (2); the program employs students to serve as SI Leaders supervised by an SI supervisor in the targeted courses; (3) SI Leaders receive training prior to the start of the semester (and peer and supervisor observations throughout the semester); (4) SI sessions run throughout the entire semester; and (5) SI Leaders utilize effective learning strategies to facilitate SI sessions including collaborative learning and critical thinking techniques. Adhering to the UMKC model for SI, students who serve as SI Leaders at the institution have a documented history of having a positive impact on the academic performance of a significant number of their peers.

**Schlossberg’s Transition Theory**

Schlossberg’s transition theory served as the theoretical framework for this study. Its stages of transition—in, through, and out—provided an excellent structure to inform and guide the development of the research questions and the data collection and analysis processes.

Schlossberg (1981) defines transition as “an event or non-event that results in a change in assumptions about oneself and the world and thus requires a corresponding change in one’s behavior and relationships” (p. 5). Transition can impact an individual’s roles, relationships, routines, and assumptions. As students who serve as SI Leaders accept the additional responsibilities of their new roles as peer facilitators, it is expected that they experience a form of transition. This transition takes time and resources and can elicit various feelings and reactions for the individual engaged in the process (Schlossberg, Lynch, & Chickering, 1989).

Schlossberg’s transition theory identifies four sets of factors, referred to as the 4 S’s, that influence how a person copes with transition—situation, self, supports, and strategies (Evans et al., 2010; Schlossberg, 2011; Schlossberg et al., 1989).

_Situation_ refers to the person's situation at the time of transition and encompasses the factors that led to the transition, a person’s perceived level of control in the transition, and whether or not the transition is viewed as positive or negative. _Self_ refers to one’s abilities to cope with the transition. _Supports_ include the
resources available to a person at the time of the transition. Strategies are those responses to transition that modify the situation, control the meaning of the immediate problem, or manage the stresses derived as a result of the transition.

In addition to the 4 S’s that influence how a person copes with transition, Schlossberg (1989) and Anderson, Goodman, and Schlossberg (2012) identify transition as taking place in three steps—moving in, moving through, and moving out. Moving in is the first stage of the transition process and is the point when a person moves in to a new transition situation (Anderson et al., 2012). For the purposes of this study, moving in was the point at which a student first determines to become an SI Leader. Moving through is when a person arrives at the stage of the transition process when they “know the ropes” (p. 57). It is not realistic to expect a student to master the role of SI Leader. However, SI Leaders at the research site underwent extensive training during their first semester in the position and did not have the opportunity to transition fully into their roles. Therefore, for the purposes of this study, an SI Leader was considered to be established in the position after two semesters, at which time they can be expected to “know the ropes” (Anderson, et al., 2012, p. 57). Moving out marks the end of one period of transition and the “moving in” to the next transition, whether it be a new role in the organization, graduation, or the start of a new job (Anderson et al., 2012). As students are likely to require resources and help as they transition to their role as peer facilitators, Schlossberg’s transition theory is an appropriate lens through which to view the SI Leader experience.

Method

Phenomenology is a philosophical approach to describing and interpreting a lived phenomenon from the perspective of one who has experienced it (Creswell 2013; Moustakas, 1994, van Manen, 1990, 2014). Although founded by Edmond Husserl in the early 20th century to describe phenomena (transcendental phenomenology), phenomenology has been expanded upon by others, including Heidegger (1962, 1972) and van Manen (1990, 2014) to interpret the phenomena being studied (hermeneutic phenomenology). This qualitative study utilized a transcendental phenomenological research method to describe students’ experiences in their roles as SI Leaders. Because this study focused on the perspectives of SI Leaders and the meaning of their experiences, a qualitative research approach was appropriate for this work (Creswell, 2013; Patton,
And, because the intended outcome of this research was a holistic description of the SI Leader experience derived from the textual and structural descriptions produced through data analysis, this was best achieved utilizing a transcendental phenomenological research design as outlined in Moustakas (1994). This research method is commonly used by qualitative researchers interested in describing a lived experience, “in which everything is perceived freshly, as if for the first time” (Moustakas, 1994, p. 34). Moustakas (1994) advised that a disciplined transcendental phenomenologist will begin the data analysis process taking “systematic efforts to set aside prejudgments regarding the phenomenon being investigated” (Moustakas, 1994, p. 22). As researchers, we made every effort to remain “completely open, receptive, and naïve in listening to and hearing” participants as they described their SI Leader experience (p. 22).

**Data Collection and Analysis**

Using a combination of purposeful criterion, intensity, and maximum variation sampling, 12 students who served as SI Leaders for a minimum of two semesters were selected as study participants. Participants included eight males and four females from largely STEM/pre-medicine fields of study with between two and 10 semesters of SI Leader experience.

Data collection methods and sources included questionnaires (Appendix A), open-ended interviews (Appendix B), focus groups conducted in-person or via the online communication program Skype (Appendix C), and archival records (Appendices D, E, and F). Questionnaires (Appendix A) captured demographic information about participants and confirmed details of their SI Leader experience and their perceived level of ability to discuss their SI Leader experiences. Semi-structured interviews (Appendix B) focused on participants’ prior experiences with SI and motivations for becoming an SI Leader; the expectations of what the SI Leader experience would be; the realities during the SI Leader experience; and how they perceive the value of the experience beyond their SI Leader tenure. Archival records (Appendices D, E, and F) in the form of SI Leader applications and journals completed during each SI Leader’s experience provided information that added to, amplified, or corroborated participants’ interview responses. Finally, focus groups (Appendix C) captured information related to participants’ SI Leader experience that may have been missed or not communicated during individual interviews and served as a means of member-checking descriptions and data.
derived from interviews and archival records to increase credibility (Lincoln & Guba, 1985). This triangulation of data sources served as an effective method of corroborating themes revealed through this study and provided validity to our findings (Creswell, 2013; Patton, 2015).

Data was analyzed using a phenomenological model process outlined by Moustakas (1994). This process began with what Moustakas referred to as Epoche, a bracketing of all presuppositions of the SI Leader experience. This was accomplished through reflexive journaling. Phenomenological reduction of the data started with seeing all of the collected data (or horizons in Moustakas’ terms) as equally significant, and moved to clustering the horizons into themes. The themes (see Table 1) that emerged from the clustering were then used to create the textural description, or the what, of the SI Leader experience. From the phenomenological reduction process, the data analysis process continued to imaginative variations whereby descriptions were analyzed for varying possible meanings and structural qualities. The structural qualities were then developed into structural themes, or the how, of the SI Leader experience.

Results

Data analyses revealed 12 themes organized within the theoretical framework of Schlossberg’s transition theory. Table 1 shows the 12 themes organized within the framework of Schlossberg’s (1981) four factors of how a person copes with transition (situation, self, supports, and strategies) and the quantity of enumerations of the themes that emerged during the data analysis process. Themes are discussed in the larger context of moving in, through, and out of the transition from student to the role of peer facilitator.
Overall, the findings of this study show that students who serve as SI Leaders do necessarily experience a form of transition as a result of the anticipated event of moving from students to peer facilitators. Themes related to each stage of the transition process, and participant statements that appropriately reflect the stage and factors of transition, are provided in the paragraphs that follow. Participant names are replaced with pseudonyms.

**Moving In (Situation and Self)**

Previous academic success and experience with peer facilitation. Each participant cited their high school and early college academic success, their previous peer assistance experience, and their participation in the University’s SI program as first-year students as motivations for seeking a position as an SI Leader. For example, Kaiser indicated on his initial SI Leader application: “I have a strong understanding of chemistry and excel in my current [chemistry] class.” Similarly, Whitney attested to her previous academic experience on her application, “I took an introductory course in high school, and then [biology] at [the

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<th>Stage of Transition and Factors</th>
<th>Themes (Enumerations during Data Analysis)</th>
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<tr>
<td>Moving In</td>
<td>Experience with Peer Facilitation (44)</td>
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<td>(situation, self)</td>
<td>Academic Success (24)</td>
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<td>Personality Traits (35)</td>
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<td>Personal Interests (45)</td>
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<td>Moving Through (supports)</td>
<td>Support from SI Team Members (196)</td>
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<td>Time Commitment/ Management (31)</td>
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<td>Moving Out</td>
<td>Interpersonal Benefits (86)</td>
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<td>Appreciation of Teaching and Learning (29)</td>
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<td>Campus Connectedness (15)</td>
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University] and I feel that I know the content well.” However, speaking of his previous experience with the SI program as a regular SI session attendee, Lucas articulated well what several other participants indicated as a key contributor to their desire to become an SI Leader:

I had a really great experience with my SI Leaders in [physics] and I want to be able to pass that on to the next classes. There were definitely some concepts that I initially struggled through in [physics], but it was thanks to my SI Leaders that I was able to nail it in the exams and prove I understood it 100%.

**Personality Traits and interests.** Participants were also motivated to pursue positions as SI Leaders based on perceived individual characteristics and skillsets. Among these included experience in public speaking and effective communication skills, strong organizational and Leadership skills, self-confidence in their ability to perform the tasks of an SI Leader, and having a personality that would make them approachable and personable to other students. Kaiser explained, “I also feel that my public speaking ability is more than adequate to allow me to communicate clearly with other students.” Similarly, in outlining his motivations for wanting to become an SI Leader, Peter described, “Most of all, I'd like to become an SI because I'm a people person. I like working with and helping out my friends and students who share the same interests as I do.”

Each participant also expressed personal interests for wanting to become an SI Leader. Some of these interests were pragmatic while others were more altruistic in nature. Several participants had considered academia as a future career option and sought an experience that would provide them a glimpse into what it might be like to be a teacher or instructor, while others envisioned a position in which they could draw on their previous leadership experience or further enhance their leadership skills. Timothy explained about his thoughts as a first-year college student, “You know coming into college, ‘Do I want to be a Professor or not?’ I don’t know. I should probably learn if I want to be a teacher or not . . . .” But, Matthew noted, “I wanted to get involved in something. I knew I wanted to have a job, didn’t want to work at fast food . . . I’ve just always had that sort of leadership drive, just want to like, I don’t know, be a leader.”
A prevailing theme among all of the participants was a desire to help others in a way they felt was the most significant to their peers—helping them achieve academic success. Describing her motivations for applying for an SI Leader position, Wendy attested, “I liked the idea of, I guess, how I saw the SI Leaders as role models and I wanted to do that for new, incoming freshmen and really get the chance to encourage them in their classes.” Similarly, Whitney described, “I like working with students, and helping my peers this past semester really solidified this [desire to help others].”

**Moving Through (Supports)**

Themes related to the challenges of moving through the SI Leader experience include support from the SI team, preparedness, experience, and time commitment/management. These themes provide an outline of the supports available to the former SI Leaders at the time of the transition from student to peer facilitator.

**Support from SI Team.** The basic SI model is comprised of students, SI Leaders, faculty, and an SI Supervisor (Hurley & Gilbert, 2008). Each has responsibilities that must be fulfilled if an SI program is to be effective. When asked about the resources that contributed to his success as an SI Leader, Kaiser explained, “[My professor] and are I are like a married couple at this point. [He] has been my professor before . . . . He is very active in helping and it helps immensely.” Lucy described the importance of her course professor to her role as an SI Leader and in her responsibility for planning her SI sessions; “[My professor] has been wonderful. He really cares about the students and recognizes our role in assisting him with the class. He’s been extremely helpful in [my session] planning.” Of her SI supervisor, Whitney shared that,

> [The SI supervisor] has helped in our classes when we go over the different [collaborative learning] techniques and discuss in groups because it reminds me of all the different techniques I have at my disposal as well as inspiring me with some of the creative ideas other SI Leaders implemented.

A more recurring theme revealed in the data was how much the participants appreciated learning from one another. Peter explained, “Observing a fellow SI Leader, I always learn new ways of presenting material. I always have gotten great feedback from SI Leaders. They notice things that I don’t know I’m doing wrong.” Similarly, Lucy attributed her success to her fellow SI Leaders, “I think having great partners was a big reason I succeeded.”
**Preparedness and experience.** Two of the most predominant items revealed in the theme of preparation is an appreciation for session planning and SI Leader training. When asked how he overcame the challenge of managing SI sessions, Matthew simply responded, “Prepare. Like. Crazy.” Asked the same question, Lucas immediately exclaimed, “Prepare! You’re about a billion times more effective if you have some sort of plan of attack going in.” Similarly, Haley found a basic session planning format to be essential to the effectiveness of her sessions, “I think the session planning has been most helpful, in terms of having a beginning, middle, and end.”

Although session planning and training were among the most mentioned resources in helping participants in their transition from students to peer facilitators, equally significant was the benefit of experience. For example, when asked about resources in addition to formal training, Peter explained, “There is no training like actually doing the thing you’re being trained to do.” Others echoed this same sentiment. Wendy stated, “As I’ve said in the past though, the best training is experience, and that’s something I continue to see as my sessions improve with time.”

**Time commitment/management.** Similar to the transition from high school to college, the SI Leader position comes with responsibilities that are time sensitive and time intensive. Describing his early experience as an SI Leader, Liam attested, “Having to balance this new job as an SI Leader, as well as taking second semester Organic Chemistry with my other classes, [the] time commitment was the most difficult sort of thing for me to handle.” Although the time commitment required to be an SI Leader limited opportunities to participate in other activities, Haley still found the experience to be enjoyable. “I think the time commitments are always hindering on your personal life, but I enjoyed that I got to use my time at work to help others and to further my personal development.” Similarly, Ketan explained that during his experience, “time management was necessary as an SI Leader; holding a part-time job on top of other extracurriculars/employment was not easy to manage, and 10 hours per week sounds like much less on paper.”
Moving Out (Strategies)

Themes related to the residual benefits beyond their tenure as an SI Leader (i.e. moving out of the SI experience) include interpersonal benefits, intrapersonal benefits, appreciation of teaching and learning, and campus connectedness.

**Interpersonal and intrapersonal benefits.** The most prominent themes related to how participants moved on from the SI Leader experience are the development of intrapersonal and interpersonal skills. Describing feedback about his communication skills from one of his medical school professors, Heath reflected, “That was one of the feedback things I got, was that I could take very difficult information and make it where the patient could actually digest it, and that was something I definitely learned from SI.” In the same context, Haley explained, “I also am better at one-on-one interactions, especially listening to a problem and trying to explain it in an understandable way.” Speaking about how he developed as an individual, Heath added that one result of his SI Leader experience was, “really getting to know myself on a million different levels.” Peter articulated both how his SI experienced helped him inwardly and outwardly, “[I improved] my study skills, [and] it helped me be a better student. It helped me communicate better, deal with different personalities.”

**Connectedness and an appreciation of teaching and learning.** The SI Leader role shares similarities to that of a teacher or a professor in that it is the responsibility of the SI Leader to engage students in activities that facilitate the learning process. Understanding these similarities, SI Leaders often use the terms “teaching” and “facilitating” interchangeably; this reality was a theme generated by each participant. Furthermore, because they saw themselves in this similar capacity, participants described that as SI Leaders, they felt a stronger connectedness to the University, to the faculty and staff, and to their fellow students. Heath described that his SI Leader experience “made me really get down to what kind of learner I am, something that has been invaluable in medical school.” Similarly, Peter attested that he, “learned a lot about the learning process and how to teach someone something.” When asked about the value of her SI Leader experience, Haley said, “Being an SI Leader has given me a sense of purpose on this campus.” In the same
way, Wendy said, “Being an SI Leader has helped keep me connected with the overall [University] community.”

As shown above, this study addressed the research question: How do students move in, through, and on from the SI Leader experience? The data revealed 12 themes that provide a unique glimpse into each stage of transition and the factors of situation, self, supports and strategies that helped participants cope with the transition from student to peer facilitator.

**Moving In**

Moving in to the SI Leader experience was an anticipated event for this study’s participants. Prompted to apply for an SI Leader position either by their previous experience as peer educators, their previous academic success, or their experience with SI as students in an SI supported course, these students made a conscious decision to take on a role that would require them to develop and apply skills above and beyond those needed to succeed solely as a student. They believed themselves to be in an appropriate situation or circumstance to be an effective resource to help their fellow students. Furthermore, each participant felt they had at least some of the necessary skills and qualities that would serve as the foundation for success in the position including public speaking and communication skills, personality traits that make them amiable to other students, organizational skills to ensure efficiency, and confidence in their ability to be effective in the position. Finally, each participant expressed personal interests for wanting to become an SI Leader. These interests ranged from aspirations to enter the teaching or professorial professions and enhancing their leadership ability, to more altruistic reasons such as helping others and contributing to the campus community.

**Moving Through**

As expected, participants had to learn new skills and develop sources of support to help them transition to their roles as peer educators. Among the most significant challenges experienced by participants were adjusting to the rigors of planning, preparing, and facilitating SI sessions and effectively managing their time to meet both their own academic responsibilities in addition to their SI duties. Although experience and developing effective time management practices helped them overcome these challenges, participants also cited formal and informal SI Leader training that focused on session planning, nurturing interpersonal
relationships, and the importance of maintaining a positive attitude as key sources of support in helping them navigate the transition process. However, each participant attributed the support they received from their fellow SI Leaders, faculty members, and their SI supervisor as the most important sources of support in helping them meet the demands of the SI Leader position. These interactions included regular peer observations, peer group discussions, regularly scheduled meetings with course professors and the SI supervisor, and observations conducted by the SI supervisor or other professional staff members.

Moving Out

College is certainly a time of growth and development. Exactly how and in which ways students develop during their college experience undoubtedly varies from student to student. However, study participants revealed that the transition from student to peer facilitator changed them in meaningful ways that has impacted them in their academic and professional situations. Themes related to how the SI Leader experience impacted participants beyond their tenure as peer facilitators include interpersonal and intrapersonal benefits; greater sense of appreciation for teaching and new insights into learning and the learning process; and a greater sense of connectedness to their university, faculty, professional staff members, colleagues, fellow peer facilitators, and peers.

Conclusion

The purpose of this study was to address a growing concern about the value of a college degree in view of increasing costs to students and their families (Arum, 2013) and to demonstrate that quality learning and competencies can be attained outside of the classroom through participation in student engagement activities, specifically through the SI Leader experience. For parents and future students, the results of this study demonstrate the value of a college experience despite rising costs of attendance (Doyle, 2011; Willie, 2012; Wood, 2011). For higher education professionals, these findings add to the growing literature used to help justify continued dedication of resources to SI and similar programs that can also contribute positively to institutional image and help institutions meet or maintain accreditation criteria (Henning, 2012; Wawrzynski et al., 2011). For potential employers of college graduates, the results of this study clearly demonstrate ways to identify quality learning and acquired competencies beyond a college diploma or grade transcript (Arum,
Finally, for researchers, the results of this study add to the body of literature on the nature of transition, specifically among college students, and further reveals how Schlossberg’s transition theory can serve as a lens through which to view college student development through participation in student engagement activities.

**Limitations**

Wiersma (2000) suggests that, “Because qualitative research occurs in the natural setting it is extremely difficult to replicate studies” (p. 211). Therefore, this study has limitations related to its sampling that impacted its results (Patton, 2015). This study lacks generalizability outside of similar study sites because it is limited to the experiences of participants from a single site. In the same way, the results of this study are limited to similar sites that prepare SI Leaders in accordance with criteria and guidelines prescribed by the UMKC’s International Center for Supplemental Instruction.

**Recommendations for Future Research**

This study focused on the experiences of students who served as SI Leaders at a mid-sized private research institution in the Midwestern United States. Based on the findings of this study, future research encompassing participants from multiple study sites could add generalizability to similar studies. Additionally, incorporating participants who experienced other models of SI Leader training and preparation could reveal information on the immediate and long-term outcomes of various SI Leader preparation and development programs. Finally, this study revealed that SI Leaders do learn and develop skills throughout their SI Leader tenure that they take with them into their endeavors beyond their undergraduate experience. Future research focused on this aspect of the SI Leader experience could reveal more specific competencies that can be learned or developed through this unique peer facilitator experience.

**References**


Arendale, D. (1997). Supplemental instruction (SI): Review of research concerning the effectiveness of si from the University of Missouri-Kansas City and other institutions from across the United States. In S.


APPENDIX A: QUESTIONNAIRE

This questionnaire is intended to capture demographic information, confirm your completion of SI Leader training, assess your perceived level of ability to reflect on and discuss your SI Leader experience, and to record your overall reflections and perceptions of your SI experience.

1. Name:

2. Gender:

2. Current age:

3. Age or age range during your SI Leader experience (e.g. 20-22, or 20):

4. Race/Ethnicity:

5. Highest degree earned or expected to earn (if still a student):

6. Major(s):

7. Current profession/Employment position:

8. Prior to beginning your SI Leader experience, did you attend and complete a structured SI Leader training? (yes/no)

9. Did you attend follow-on training during your first SI semester either through a credit-bearing course or as part of a regularly scheduled follow-on training meetings? If so, please indicate which one you attended.

Use the following scale to respond to questions 10-11.

1 = strongly disagree  2 = disagree  3 = undecided  4 = agree  5 = strongly agree

10. I am confident that I can recall details about my SI Leader experience including the events that led to my interest in being an SI Leader and events that occurred during my SI Leader experience.

11. I am confident in my ability to reflect on and discuss my SI Leader experiences.

12. Reflect on your undergraduate career and describe your experience with SI before, during, and after your tenure as an SI Leader. How, if at all, did it influence you as a person, as a student, and as a learner? How, if at all, has your SI Leader experience contributed to or hindered your learning or your personal/professional life? Please describe how your SI experiences were positive or negative.
APPENDIX B: STANDARDIZED INTERVIEW QUESTIONS

Standardized Open-Ended Interview Questions

Opening Questions

1. Please tell me a little about yourself – where you grew up, your family, and your pursuits since completing your undergraduate experience.

2. Tell me about your high school experience. Academics, extracurricular activities, memorable moments in school.

3. During your college search, what were you looking for in a college experience?

4. Why did you choose to attend your particular institution?

5. What excited you or concerned you about attending college?

6. How would you summarize your college experience?

Questions Related to Pre-SI Leader Experiences

7. What was your immediate thought or feeling when you were invited to participate in this study?

8. Please describe your SI experience prior to applying for a position as an SI Leader. What was your initial attitude about the program in general?

9. What were your thoughts about your SI Leaders? How did you see them and their roles as SI Leaders?

10. Describe the circumstance surrounding your decision to apply for a position as an SI Leader. Were the influences positive? Negative?

   a. (i. a.) What were your initial thoughts or feelings when you were approached or encouraged to apply to be an SI Leader?

11. Please describe how you imagined yourself as an SI Leader. What expectations did you have for the experience? What qualities or skills did you feel you had to be successful in the role?

Questions Related to SI Leader Experience

1.

2.

3.
12. Please describe how you felt when you were offered a position as an SI Leader.
   a. Did you have any immediate concerns or fears about serving in this position? If so, how did you overcome or address these concerns or fears?

13. Did you experience any challenges during your SI Leader experience? If so, describe them.

14. What helped you succeed in your position as an SI Leader? (Or to what do you attribute your lack of success as an SI Leader if you believe you were not successful in the position?)

15. How do you feel OTHERS benefitted (or did not benefit) from your time as an SI Leader? Faculty? Staff? Students? Other SI Leaders? Friends?

16. How do you feel YOU benefitted from your time as an SI Leader working with faculty, staff, students, and other SI Leaders?

Questions Related to Post SI Leader Experience

17. Please describe how you view your SI Leader experience. Was it positive? In what ways? Was it negative? In what ways?

18. What skills, if any, do you feel you developed or enhanced as a result of your SI experience? How do these skills influence you in your current situation, if at all?

19. Would you recommend other students to pursue a position as an SI Leader? Why?
   a. What advice or suggestions would you give to students considering an SI Leader position?

20. What was your most memorable moment as an SI Leader?
21. Is there anything else related to your SI experience that you would like to add that we have not already discussed?

22. If needed, would it be okay if we did a follow up or clarifying interview in-person, or via e-mail or telephone?
APPENDIX C: STANDARDIZED FOCUS GROUP QUESTIONS

Standardized Open-Ended Focus Group Questions

1. What were the factors or your primary motivations for becoming an SI Leader?

2. What were the challenging aspects of your SI Leader experience?

3. What do you consider to be the most rewarding aspects of your SI Leader experience?

4. How has what you learned through your SI Leader experience influenced you as a student or in your current work/life situation?

5. Based on your SI experience, what advice or suggestions would you give a student about SI? (These suggestions can be aimed at students who attend or do not attend SI, or students who desire to become SI Leaders. Suggestions can also be specific to pre or post SI experience or during SI experience.)
APPENDIX D: SI LEADER APPLICATION

Name:
Network ID:
Major:
Class Standing:
GPA:
Are you eligible to earn work-study?
Phone:
Email:
Current Address:

Position of Interest: SI Leader

Essay Questions

For which course(s) would you like to apply to be an SI Leader? (You must have earned a grade of “A” in the course.)

What do you expect to obtain, learn, or achieve as an SI Leader?

What resources, skills, or support do you expect to need as an SI Leader?

What challenges do you expect to encounter as an SI Leader?

Beyond your courses, what other commitments do you anticipate having during the semester you would SI? (e.g., jobs, research, campus organizations, etc.)
APPENDIX E: SI LEADER FORMATIVE ASSESSMENT

SI Formative Assessment #1
Please e-mail a copy of this assessment to the course professor

Name ______________________________________    Course ____________________

1. How did your first session(s) go? What went well? What didn’t? What did you do differently in your subsequent sessions?

2. Summarize the communication you have had with your course professor so far. Has it been helpful in planning and executing your SI sessions?

3. What is the general pulse of the students in your course? How are they feeling about the course? What is their attitude toward your sessions?

4. Have you given students an opportunity to provide feedback by completing a session evaluation? If so, how many times? If not, why? (SI Leaders will be asked to provide specific student comments on SI Formative Assessment #2)

5. What portion of SI Leader training has been the most useful in planning and conducting your sessions? What topic(s) should have been included in training that were not?

6. Thinking about mid-term exams, what are your (or your team’s) plans for your mid-term exam review session? What challenges do you expect and how do you plan to overcome them?

7. During your sessions, what course material has been the most challenging for students?

8. What can the SI supervisor or course professor do to assist you in your role as an SI Leader or in your sessions?
SI SUMMATIVE ASSESSMENT
Supplemental Instruction (SI)

Instructions: For this assessment to be effective, you must be as candid as possible. Be sure to submit this report prior to your end-of-semester meeting. Thank you.

SI Leader Name: _______________________________ Date Completed: ____________

1. Course name and number: ________________________________. Do you feel we should continue to support this course with Supplemental Instruction?

2. Training to be an SI Leader consisted of pre-semester training, EDUC 200 for new SI Leaders, Leader meetings throughout the semester, and individual observations and conversations with the SI Supervisor. Do you feel you have been adequately trained to be an SI Leader? If yes, what were the most beneficial aspects of training? If no, please explain your answer and include changes you would like to see for future training.

3. Did the SI supervisor provide you with adequate feedback regarding your performance? Please explain.

4. Do you feel you received too much or too little supervision (spot checks, observations, etc.)?

5. What additional support would have been helpful for you in your role as an SI Leader?

6. If you were the SI supervisor, what changes, if any, would you make to the program?

7. Did you find observing your peers beneficial? Did you find their observations of you helpful? Why or why not?

8. What was the average attendance at your weekly sessions? Did you have higher attendance for special reviews and/or after making an SI announcement?
9. Relay some of the comments your students have made regarding their attendance. Why do you think some students attend SI and others do not? What ways, if any, could you increase attendance at your sessions?

10. Did you meet with the course professor on a weekly basis? On average, how long were these meetings? Briefly note what you and the professor discussed at these meetings:

11. What could the SI supervisor or course professor have done to assist you in your role as an SI Leader or in your sessions?

12. What is the *most* rewarding aspect of being an SI Leader?

13. What is the *least* rewarding aspect of being an SI Leader?

14. What three (3) suggestions would you give to future SI Leaders?
   a.
   b.
   c.

15. What has being an SI Leader meant to you? How has it contributed to your experience at the institution and with the department? How do you think it will benefit you in the future? How has SI helped you develop as a student, if at all?

16. How have you developed as an SI Leader? If you would like to return next term, describe two goals you have for yourself and for your SI sessions? Please be very specific.

17. If you completed EDUC 200 this semester, revisit the course syllabus and briefly discuss how you have successfully achieved at least three of the course objectives.
The Benefits of Supplemental Instruction (SI) for the SI Leader

Neva Lozada, Monmouth University

Abstract

The majority of research on peer assistance programs explores benefits for student participants, such as increased retention and course grades; however, benefits gained by the programs’ student leaders are often overlooked. This qualitative research study describes how undergraduate students benefit from their experience serving as leaders in a Supplemental Instruction (SI) program at a four-year, private university.

The Benefits of Supplemental Instruction (SI) for the SI Leader

While the majority of research on Supplemental Instruction (SI) examines increases in participants’ course grades and the positive effects that the program has on students who attend sessions, few studies set out to examine the additional benefits of the program for the student leaders who are responsible for facilitating the sessions, which may result in increased levels of institutional engagement (Lockie & Van Lanen, 2008; Malm, Bryngfors, & Morner, 2012; Skalicky & Caney, 2010; Stout & McDaniel, 2006). While working as SI Leaders, students learn to help peers construct knowledge through social interaction, exploration, and application, which can lead to connecting with other students individually and the campus community as a whole. This perceived benefit of SI is not widely explored, which is why this study seeks to uncover more about the SI Leader’s holistic experience of working in the program.

This qualitative research study explores how undergraduate students benefit from their experience serving as SI Leaders and how these perceived benefits may correlate with increased communication skills, improved leadership ability, and higher levels of institutional engagement. The following research questions guide the study’s inquiry:
1. What are the benefits of serving as an SI Leader?

2. How does serving as an SI Leader impact institutional engagement?

3. How does serving as an SI Leader affect leadership and communication skills?

**Literature Review**

Examination of the current literature on peer assistance programs in regard to the benefits for student leaders yielded limited results. Several researchers uncovered the mutual academic benefits for both SI Leaders and program participants in terms of increasing understanding of course concepts (Stone, Jacobs, & Hayes, 2006). In regard to gaining greater knowledge of effective study techniques, Donelan (1999) discussed SI Leader benefits as a result of learning a variety of cognitive activities, note-taking skills, and organization and planning strategies that accompany the facilitation role of the SI Leader. The influence of the SI program on increasing SI Leaders’ opportunities to build professional relationships through personal interactions with faculty and students, as well as the self-confidence and teamwork experience that come along with the leadership role, have also been noted as key benefits (Donelan, 1999; Wallace, 1992).

A study conducted by Lockie and Van Lanen (2008) uncovered additional benefits through the delivery of an open-ended survey that was distributed to all SI Leaders at the conclusion of each semester over a nine-semester period. Results of the data analysis revealed the following themes: the diversity of student learning needs, enriching academic experiences, enriching intrapersonal experiences, and relationships with faculty. The first theme described benefits related to an appreciation of the unique ways in which individual students learn, which is a benefit that had not been discussed in previous research in the field. The second theme yielded results similar to the academic benefits presented by Stone, Jacobs, and Hayes (2006) and Donelan (1999), such as increased content knowledge and good study habits, while the third theme presents experiences of SI Leaders that enriched their own sense of leadership, communication, and self-confidence, a variation on the benefits outlined by Donelan (1999).

While previous research (Donelan, 1999; Wallace, 1992) cited all relationship-building opportunities as benefits for SI Leaders, Lockie and Van Lanen’s (2008) study focused particularly on the improvement of faculty-student relationships as a result of the SI experience, which allowed the student leader the unique oppor-
Lockie and Van Lanen (2008) also concluded that the long-range benefits of serving as an SI Leader are assets to the future academic and professional success of these students.

A similar study was conducted by Skalicky and Caney (2010) at the University of Tasmania that collected data from 23 leaders and mentors working in a peer assistance program known as PASS in the form of an open-ended survey. The purpose of the study was to reveal the most important learning experiences of the PASS Mentor/Leader as well as what specific aspects of the role can be related to leadership. The following ten aspects of leadership were produced from the results of the study: organization, support, facilitation, role model, attitude, responsibility, relationships, communication, collaboration, and decision-making. Of these ten leadership aspects, seven can be directly correlated with results from the aforementioned studies.

More recently, a study facilitated by Malm, Bryngfors, and Morner (2012) focused on SI Leader benefits in an engineering program at a Swedish university, drawing upon previous research conducted by Congos and Stout (2003), which found the main benefits for SI Leaders to be communication and interpersonal relations skills, learning skills, and leadership skills. However, Malm, Bryngfors, and Morner (2012) extend the purpose to also explore if serving as an SI Leader has had any merit in terms of applying for future employment and if any skills learned as a result of the SI program are applicable in a professional setting upon the graduation of SI Leaders. The study included two sample populations, who were given questionnaires regarding their experiences: 1) students who recently finished their SI Leader tenure and 2) students who had previously graduated and are currently working.

Results of the study found that a majority of SI Leaders agreed that they had developed the following skills as a result of their SI experience: improved communication skills, the ability to organize collaborative learning groups, a deeper understanding of course content, improved self-confidence, and increased security in a leadership role (Malm, Bryngfors, & Morner, 2012). These findings confirmed those yielded in earlier studies by Congo and Stout (2003) and Lockie and Van Lanen (2008). However, in contrast to similar studies, participants did not note any benefits related to study skills or organizational strategies as a result of their SI Leader roles.
Context

The scope of this research focuses on the perceptions of SI Leaders who were employed at the time of the study within an SI program at a four-year, private institution of higher education. The university that serves as the context for this study is a comprehensive, coeducational institution that offers 57 undergraduate and graduate degree programs to approximately 6,300 students. The SI program began as a pilot in fall 2010 to fill a void in academic support services provided by the university to better support historically difficult courses. The initial pilot supported seven sections of General Chemistry and employed seven SI Leaders. The program grew both due to its effectiveness and by faculty demand, and, as of fall 2017, supported 55 course sections across multiple disciplines, including biology, chemistry, physics, and accounting, with a staff of 30 SI Leaders.

Methods

The primary researcher for the current study also serves as the SI program administrator and is responsible for supervising 30 SI Leaders. For the purpose of this study, the researcher emailed all SI Leaders asking for volunteers. Per a pre-determined protocol, the first four who responded were chosen to participate. Of these four participants, two SI Leaders were sophomores with one year of work experience (SI Leader 1 and SI Leader 4); one SI Leader was a senior with one year of work experience (SI Leader 3); and one SI Leader was a graduate student with three years of work experience (SI Leader 2). Three of the participants led SI review sessions for General Chemistry, and one led review sessions for Biology. All four participants completed the same two-day, mandatory new SI Leader training.

The researcher conducted individual interviews with each study participant. The interview consisted of ten open-ended questions and subsequent follow-up questions focused on the central research question, which seeks to determine what benefits the SI Leader derives from his or her participation within the SI program. The researcher informed the participants that their responses would remain confidential within the study. Each interview lasted approximately 30 minutes. After the data collection phase, the researcher transcribed and manually coded the interview responses. At the conclusion of the interview, participants were asked to depict, through words or a graphic elicitation (participatory diagram), how they conceptualized specific characteristics
Supplemental Instruction Journal, Volume 3, Issue 1

that they felt were positively impacted as a result of serving as an SI Leader. Participants were also asked via a written prompt to draw their visual interpretation of the role of the SI Leader as part of the graphic elicitation activity. The researcher further analyzed participants’ diagrams for triangulation purposes to determine if any consistent themes were present across the multiple forms of data retrieved within the study.

This study employed a mixture of deductive and inductive analysis. It was deductive in that it was a replication of earlier studies that investigated perceived benefits for SI Leaders; however, it was also inductive because it analyzed results concerning the central research question: “What are the benefits of serving as an SI Leader?” Inductive data analysis was implemented with responses to the open-ended interview. During the first step of data analysis, the researcher transcribed all four participant interviews and used process coding as a first-cycle technique to categorize the data. During this first cycle, the researcher used broad terms, including the following 11 codes, which were derived from the central research questions and sub-questions: [ACADEMIC BENEFITS]; [LEADERSHIP BENEFITS]; [COMMUNICATION BENEFITS]; [ENGAGEMENT BENEFITS]; [“HELPING OTHER PEOPLE”]; [STUDENT BENEFITS]; [SI LEADER ROLE]; [TIME MANAGEMENT]; [GOOD EXPERIENCE]; [BAD EXPERIENCE]; and [ACADEMIC ABILITY]. The researcher also used In Vivo coding throughout the first cycle, as two of the preliminary codes were developed in reference to particular phrases that came up repeatedly throughout the participants’ responses: “helping other people” and “time management” (Saldaña, 2016).

Through a second cycle of coding, the researcher implemented focused coding and extracted all passages within the participants’ responses that corresponded to a particular code and rearranged them together in a separate file for further analysis in an effort to develop the most relevant categories for the study (Saldaña, 2016). Each preliminary code was clustered together with similar codes in an outline form, which resulted in a list of tentative category names. During the second coding cycle, the researcher also recoded the data based on a twelfth emergent theme, which included all other benefits that the SI Leaders disclosed that did not fit into the aforementioned categories: [OTHER SI LEADER BENEFITS]. The researcher independently applied the codes to the data. Several initial minor themes were discarded due to having an insufficient number of respons-
es associated with them, which is why the final category, [OTHER SI LEADER BENEFITS], was ultimately created. After the data analysis was concluded, six final themes remained.

Findings

The SI Leaders who participated in the study expressed throughout their interview responses and within their graphic elicitations various ways in which they benefit personally by serving as an SI Leader. These benefits were categorized into the following six emergent themes: academic improvement, increased leadership attributes, more effective communication skills, fulfillment in helping others, effective time management, and relationship-building opportunities, all of which translate into higher levels of overall institutional engagement.

Academic Improvement

Benefits related to academic improvement are the most likely in terms of what an SI Leader could potentially gain as a result of working in an SI program. This is because SI Leaders, as part of their job responsibilities, are required to sit in on lectures and labs to re-familiarize themselves with the content material so they are aware of what their students are learning as they are learning it. Having to sit in on a class that they have already taken, according to SI Leader 2, allows the SI Leader “to stay in contact with some of the lower-level content that is sort of a summation of all four years of the degree.” In addition, engaging with peers on a regular basis to review content material as well as exchange ideas about study habits further benefits the SI Leaders, as it allows them to view subject matter through a variety of perspectives.

Three of the four SI Leaders who participated in the study directly noted the influences that the role has had on enhancing their own study skills, specifically in terms of organization and practice techniques. In the following anecdote, SI Leader 1 described how preparing for his job as an SI Leader is a skill that has transferred to preparing for his own courses, whether by being more organized in terms of studying or preparing study materials. SI Leader 4 noted how she has expanded her toolbox of study skills by learning from her student participants and gaining a greater sense of how other people study differently than she does: “I’ve also learned different study habits from the students … like one student folds her notebook paper, and she writes the words on one side and definitions on the inside, so that helps with … concepts.” This example presents an
unanticipated benefit for SI Leaders; not only do SI Leaders help student participants learn effective study techniques, but SI Leaders themselves also benefit by learning from their students. In this way, the SI session becomes a reciprocal, two-way learning experience.

While sitting in an additional class or two each week can be time-consuming for the SI Leaders, three out of four respondents admitted that this job requirement is beneficial in terms of reconnecting with the content material. SI Leader 1 stated, “Sitting in helps me refresh my memory ‘cause it’s hard when you take so many science classes to keep everything in order,” whereas SI Leader 4 mentioned that, “… you’re seeing it from different angles, from different perspectives, so now you know more than you did before.” For some SI Leaders, they are facilitating sessions for courses that they may not have had since freshman year. SI Leader 3 noted that refreshing the material is not only beneficial for the SI Leaders’ sessions to be effective but also for their own knowledge of their content area that is built upon the foundation of the introductory course: “If you have a strong foundation, everything that comes after that is going to be that much easier.”

In addition to the content material being reinforced through repeated lectures, the SI Leaders also gained increased content knowledge by facilitating their sessions. In essence, by fulfilling the responsibilities of the job, they were gaining a greater understanding of their respective courses. SI Leader 3 said, “I feel more confident in how much I know about biology and how well I’m able to present it because they always say if you can teach something that means you know it really, really well.” This not only gives credence to the fact that the SI Leader is simultaneously teaching and learning, thus performing the role of the facilitator and the student at the same time, but it also exemplifies the increased levels of confidence that the SI Leader develops as a result.

Another unanticipated academic benefit for SI Leaders that was uncovered in the interview is their likelihood of utilizing additional academic resources at the university since working as an SI Leader. While marketing their own sessions to students, they see the value in seeking academic assistance to maintain high course grades for themselves. For example, SI Leader 2 stated, “SI has definitely taught me to take advantage of every resource available to me at the university.” One of the resources that SI Leaders utilized was SI. SI Leaders are further motivated to do well in their own courses as a result of watching the motivation of the stu-
dent participants who attend their sessions, as is evidenced in SI Leader 1’s response: “When I’m trying to help people get A’s, like, I know that I wanna try my hardest, too, to get an A, so when I see people working hard and coming to SI, it makes me want to work harder and get good grades.” By serving as SI Leaders, these upper-level undergraduate students not only see the benefit of academic assistance but also observe on a daily basis the positive influences that such programs can have on students despite the remedial stigma that is often attached to them.

**Increased Leadership Attributes**

Findings from the current study revealed numerous benefits related to increased leadership attributes for SI Leaders. The notion of the SI Leader serving as a role model was a prominent theme across all four interview responses and was defined as both a role model for student participants and a role model/mentor for novice SI Leaders. In addition, respondents mentioned how gaining leadership attributes as a result of the SI experience will help them in their future academic and professional aspirations.

SI Leader 1 mentioned how in serving as a role model for others he became the student that he ultimately wanted to become:

I think we get as much out of it as the students do; as we’re teaching them study skills, those are always things that we can remember and use in our own lives, in our own courses. You’re also convincing yourself, I should be putting in more effort, I should be a better student than I already am.

In terms of defining the experienced SI Leader’s mentorship role, he or she is not just a mentor to his or her student participants but also serves a mentor for novice SI Leaders, a characteristic of the position that is not immediately considered when discussing the leadership qualities required of the role. In SI Leader 3’s own words, “Once you, kind of, get into the higher levels, you are a role model for the new, incoming [leaders], so that’s definitely something [working as an SI Leader] will help with.” This type of mentoring is organic and occurring naturally within the SI environment and among the SI staff, as there are no formal “mentor” or “head leader” roles within this program.

Two SI Leaders noted how the specific leadership skills gained as a result of their SI experience can transfer to their future academic and career aspirations. For example, SI Leader 1 has already seen how this
benefit directly correlates with his career preparation: “Now I’m taking initiative, finding job opportunities, volunteering in a hospital, volunteering at Ronald McDonald House, volunteering all different places. It’s helping me become more of a leader and not a follower.” SI Leader 2 can already foresee the benefit that the SI leadership experience will have on the journey toward obtaining his future career:

I think that any potential employer likes to see that kind of initiative in a prospective employee, at least I know I would if I was the employer, because it sets the individual apart from other students who didn’t get that sort of leadership experience while in undergrad.

More Effective Communication Skills

In terms of communication skills, findings of the study showed that serving as an SI Leader made the Leaders more confident communicators. As SI Leader 1 stated: “When I got the job, like, I knew that I had to come out of my shell a little bit more because I’m a really quiet person.” SI Leader 4 stated: “I was definitely shyer before I started.” Three of the SI Leaders discussed the positive impact that the role had on their public speaking skills. One noted: “I feel a lot more confident in talking in front of a group of people. … presenting is definitely not as challenging as it used to be.” In addition, SI Leader 1 credited the position as having improved his communication skills while talking with peers: “Through the job, I communicate better with everyone. I’ve always been more comfortable talking to people who are older than me than people like my peers, so it’s helped me become more open to talking to people my own age.”

While the majority of SI Leaders described improved communication skills in terms of their level of comfort in speaking in front of groups and relating to their peers, SI Leader 2 interpreted this benefit as more effectively analyzing communication exchanges; he saw his increased effectiveness in regard to communication to lie in his ability, as the SI Leader, to decode student participants’ body language as a tool for session management and to increase engagement and participation. This alternate take on how to interpret “communication skills” was an unanticipated finding.

In addition, two participants thought of this benefit in regard to their future successes in medical school and subsequent career paths. For example, SI Leader 4 anticipated that her interviewing process for medical school would be easier because of her experience in the role: “You have to come up with something pretty
quick, but with the right answer of course, so I’ve had a lot of practice with that. I feel like during an interview I’ll just be able to think more quickly on my feet.” SI Leader 3 finds a similar benefit in her acquired ability to break down complex information, one that she will continue to use in her role as a future doctor: “I think that’s important because as a doctor, a lot of times you’ll have to break down information, present it in a way that whoever you’re talking to can understand it and that is something I have some experience with.”

**Fulfillment in Helping Others**

All four participants noted the importance of the intrinsic desire to help others within their interview responses. This recurrent theme of “helping other people” revealed an unanticipated benefit for SI Leaders; the SI program provides them with both an outlet and a medium through which they are connected to others who need their help, thus satisfying a personal, inherent need and fostering a passion for altruism. For SI Leaders 1, 2, and 4, the need to help others was one of the main reasons for applying for the SI Leader position in the first place, as exemplified by the following responses: “I applied to be an SI really to just help other students that need the help;” “I first chose to apply to become an SI leader because of the value I saw in helping others;” “I wanted to help other students understand [chemistry].”

Once in the role, the SI Leaders found their desire to help others being met, which resulted in a positive experience, as evidenced by the following: “I just feel, it’s a good opportunity to help other people, and that’s, like, what my goal really is. I love helping other people;” “[It’s] a great way to help others achieve their goals, whatever they were, like some students want to go on to grad school and do research and others want to go on to med school, or even helping them with higher level courses.” Within their graphic elicitations, SI Leaders 1 and 2 visually depicted this positive experience of helping others through a graphic representation of an SI session in which the SI Leaders were smiling while assisting students with challenging content material. In these drawings, the SI Leaders created an environment in which students were responsible for their own learning through collaborative learning activities facilitated by the SI Leader.

Further, two of the SI Leader respondents discussed how helping other students perform better academically consequently improves their own academic success. For SI Leader 3, helping others required her to commit to a greater understanding of the content: “If you’re willing to help other people, you really need to know
that information.” For SI Leader 1, his personal aspirations to succeed were augmented as a result of helping his peers: “You’re trying to help people do better and to succeed, so, like, it’s giving you more drive to succeed and do better.”

SI Leader 4 expressed the value of wanting to help others as a desirable characteristic for future SI Leader candidates: “You have to want to help people. That has to be something that you’re really passionate about.” Similarly, SI Leader 3 described the position as “a great opportunity for any student who wants to help other people do well in their courses.”

**Effective Time Management**

Another benefit that all four SI Leader respondents addressed was the increased effectiveness of their time management skills as a result of serving in the role of SI Leader. While general academic benefits have been addressed by similar studies, the specific mention of “time management” has not been as consistently present in the research as it was throughout the data analyzed by the current study. Findings of the study revealed that, for a majority of SI Leaders, becoming more organized through improved time management skills is a natural part of the process of developing into an SI Leader: “Time management has definitely been a major part of me becoming an SI Leader;” “I feel like I’ve become more organized, my time management is better;” “I have learned to manage my time.” SI Leader 1 also included the words “time management” in his graphic representation of an SI session that was drawn in response to a prompt within the graphic elicitation exercise.

Time management was primarily discussed by participants in terms of preparing for sessions, which was within the realm of the SI Leader’s responsibilities, as supported by the following:

I feel like I’m more organized. I’ve gotten a lot better at managing my time and realizing, how much I need to be prepared before I go into the lecture or go an facilitate a session, and that’s definitely translated into me just being a better planner in general.

I know that if I don’t manage my time in the right way, things will start building up.

Further, an improvement in time management skills was explored by the SI Leader respondents in terms of juggling and managing personal academic tasks along with those required for the position: “You can sort of create your own schedule, which makes it manageable; even though it’s a big responsibility, it’s man-
ageable even when you have a full load of courses yourself;” “It’s definitely helped with time management skills … because obviously I have to help them when their exams come up and it’s the same time my exams come up.” SI Leaders must prioritize their own academic needs as undergraduate students yet still respond to the needs of their session participants.

**Relationship-Building Opportunities**

In analyzing the interview data, the delineation of the relationship-building aspects of the SI Leader’s role became apparent in three contexts: with faculty, with students, and with peer SI Leaders. These three levels of relationship-building all fall under benefits associated with the SI Leaders’ level of campus engagement and institutional involvement. In regard to additional outlets for campus engagement through the SI program, all four SI Leader participants cited relationship-building opportunities. SI Leaders 3 and 4 found a great benefit in having the unique role of serving as a liaison between faculty and students, thus forging bonds and networking with faculty members with whom they may not have otherwise had the chance. SI Leader 3 stated:

I definitely met a lot of new professors, ones that I never took, so I got to know more people in the department, these are faculty who I may have never taken a class with, or who I might not have really gotten to know them in this setting where we’re not really student-professor, but we’re a little bit more on that same level.

SI Leader 4 said:

I’ve gotten closer to certain professors because of the program because I’m always in their classrooms, and we’re just talking about stuff, and most of the time our conversations go away from chemistry, so it’s just getting to know them, which is cool.

SI Leaders 1, 3, and 4 found value in forging new relationships with students who attended SI sessions, which deepened their connection to other students on campus who they may not have met in any other capacity: “Having the job, I meet more people and more people that aren’t in my classes, not in my, maybe not in my grade, so I like know more people around campus;” “I’ve also met a lot more students, a lot more freshmen, which has been nice, so I like that;” “I also get to know the students on another level, so I know more people.”
Most interesting, however, is the bond that is naturally forming among SI Leaders due to their common involvement with helping others through an on-campus program that fosters a greater campus connection and student experience:

It’s been great meeting other SI Leaders. Especially for other classes that I didn’t really take, like meeting some of the SI Leaders for chem, I might not have otherwise gotten to know them, most of them are chem majors, and I’m a bio major so we don’t take that many classes together that we have in common, so I definitely got to meet new people.

We always talk to each other about the students we have, so SI Leaders definitely have an interesting relationship between all of us, because we have something we can all relate to.

All of these types of relationship-building opportunities that have developed as a result of working in the SI program are beneficial in SI Leaders’ overall feelings of institutional engagement in terms of knowing more people on campus and belonging to part of something larger than themselves.

**Discussion**

The participants in the study expressed many ways they benefited from their role as an SI Leader. A majority of the findings confirmed what previous research on the benefits gained by SI Leaders has found in terms of academic benefits, increased leadership attributes, more effective communication skills, and relationship-building opportunities. Numerous benefits related to academics, such as increased content knowledge, study techniques, and self-confidence, coincide with what Stone, Jacobs, and Hayes (2006) and Donelan (1999) found in studying the SI leadership experience. However, the current study had one additional finding regarding academic benefits for SI Leaders, which came in the form of their increased utilization of academic support services on campus as a result of serving in the SI Leader role.

Benefits concerning increased leadership attributes, including serving as a role model to students and peers and perceived leadership benefits for future academic and professional aspirations, all support previous findings in the studies of Skalicky and Caney (2010) and Malm, Bryngfors, and Morner (2012). Similarly, the current study confirms what Malm, Bryngfors, and Morner (2012) found regarding the impact that serving as an SI Leader has on the individual’s development of effective communication skills. In addition, the findings
of the current study correlate with earlier research in regard to the relationship-building opportunities between SI Leaders and students, peers, and faculty that are available as a result of working in the program (Lockie & Van Lanen, 2008; Donelan, 1999; Wallace, 1992).

The current study also yielded two categories of findings related to SI Leader benefits that had not been noted within the literature previously reviewed. Surprisingly, both of these categories—the SI Leaders’ fulfillment in helping others and their use of effective time management skills—were derived from an analysis of interview responses and were not part of the original, anticipated themes as outlined by the study’s research questions. While the latter is sometimes referred to within studies as a subset of study habits, it was recognized as a prominent theme throughout the findings of the current study, which is in contrast to other research in the field. Further, the former category, which concerns the SI program’s position as serving as both an outlet and a medium through which SI Leaders are able to fulfill their passion for helping others, is one that has yet to be revealed in similar studies on SI Leader benefits. Future research exploring the benefits for SI Leaders should specifically seek to uncover similar themes related to the connection between SI Leaders and altruism, focusing on how the intrinsic design of the SI program may serve as a vehicle for SI Leaders to reach their goals of helping others.

As with all studies, the current research is not without its limitations. First, this study focused on SI Leaders’ self-reported perceptions, which could have been impacted by intrinsic errors associated with recall, bias, interpretation, and judgment, as are the limitations with any self-reported data. Second, all four study participants served as SI Leaders in science courses; a wider sample, including SI Leaders who partner with business or humanities courses, may have yielded different results. Third, all four study participants served undergraduate students at the introductory course level; it is possible that different responses may have resulted from including SI Leaders who facilitate sessions for upper-division courses in which upper-level undergraduate students are enrolled. Finally, the fact that the researcher conducted the interviews and also serves as the participants’ supervisor may have influenced their responses, thereby skewing results.
Conclusion

Results from this study attempt to fill the void in research on benefits for SI Leaders. By further exploring this area, program administrators will gain a better sense of how SI Leaders are benefitting from this peer leadership role, which can be generalized to further explore how student leaders at all levels may benefit by working in peer assistance programs. In addition, this study provides an alternative for program assessment; rather than just determining that a peer assistance program is, in fact, effective solely based on a quantitative analysis of grade calculations for program participants, program effectiveness can be further assessed in regard to student success from both angles by uncovering additional program benefits for the SI Leaders. Further, this study also serves as a stepping stone for future research on peer-facilitated academic assistance programs, including how serving as an SI Leader benefits future career aspirations. A subsequent study measuring this variable would include following this particular cohort of participants through the framework of a longitudinal study throughout their pre-professional studies and careers to determine if serving in a student leadership role has benefitted their professional aspirations.

References


Quantifying the Soft Power of SI

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Abstract

Supplemental Instruction is one of the most successful programmes of peer-assisted study in existence. Numerous studies show that SI attendance correlates with student achievement, regardless of the level of knowledge of the student prior to commencing their studies. The present study, from Humanities at Lund University, Sweden, outlines a method for gauging the effect of SI on soft values such as study attitudes, confidence, and self-reported study skills. To eliminate the effect of different backgrounds, the study is based on 388 pairs of two questionnaires (before and after the semester) and SI attendance is correlated with the change in the self-reported values, rather than with the final absolute value. It is shown that issues dealing with study skills and strategies correlate more closely with SI-attendance than do psychological issues such as ambition and confidence.

Quantifying the Soft Power of SI

Supplemental Instruction, designed by Dr. Deanna Martin of the University of Missouri, Kansas City, in 1973, is one of the most successful programmes of peer-assisted study today, and is now represented in almost 30 countries (Martin 2008). Numerous studies show that SI attendance correlates with student
achievement, regardless of the level of knowledge of the student prior to commencing their studies (cf. Dawson et al. 2014 and numerous references cited therein). The present study, building on data from the Faculty of Humanities and Theology at Lund University, in Sweden, attempts to use a method with dual questionnaires to gauge, not only the academic results of the SI-attendees, but also their self-reported motivation, diligence, self-confidence and study strategies. It will be shown that SI attendance correlates positively with each of these measures, regardless of the values reported in the questionnaire before the beginning of the semester. This suggests that SI may be the crucial factor in improving study strategies and the study experience of students.

**SI at Lund**

Supplemental Instruction was first tentatively introduced at Lund University in Sweden in 1993 by Leif Bryngfors and Marita Bruzell-Nilsson. It was then established in 1996 across the Faculty of Engineering, and subsequently in the Faculty of Humanities and Theology in 2001. It spread to the Faculty of Science in 2014. Today, it is found to a greater or lesser degree across all faculties of Lund University, as well as in several senior high schools in the general area around Lund (corresponding to the province of Scania / Skåne).

In the Faculty of Humanities and Theology, SI is offered in most subjects (exceptions being subjects where the student cohorts are too small for SI to be viable, such as Icelandic, Yiddish and Romanian). It is primarily offered during the first semester level, but in response to student requests has been extended to the second semester, as well as to the BA thesis level (“Essay SI”), which specifically targets the challenges of writing a thesis (cf. Gillis & Wallette, 2010).

SI Leaders are paid rather than volunteers and are generally recruited among students who have studied an average of two semesters more than the students in the SI groups they will be working with. Thus, the prototypical SI Leader is a third semester BA student, whereas the prototypical Essay SI Leader is a Master’s student. Although group size varies considerably, SI meetings at the Faculty of Humanities and Theology typically have around 10 participants, although as many as 20-30 may attend the introductory SI meeting. These groups are largely self-regulating, so students are generally not assigned to a specific SI group, except in sub-
jects with particularly large cohorts (such as English). For more details about the implementation of SI at Lund University, cf. Gillis & Holmer (2012).

Evaluating SI

Effects of SI and the causality problem

The beneficial effects of SI regarding grades and retention are concerned have been reported in a wide variety of studies (Malm et al. 2011, 2014; Miller et al. 2004; cf. also Dawson et al. 2014 for an excellent listing of other surveys). In one ongoing survey at the Faculty of Humanities, which correlates SI attendance and study results of 1928 students in History, Linguistics, Swedish and Philosophy, the following results are found (Table 1):

| Table 1. Correlation of achievement with SI attendance |
|---------------------------------|-------|-------|-------|
|                                  | no SI | low SI | high SI |
| % pass                          | 49.44 | 68.63  | 76.49  |
| % pass with distinction (of whole cohort) | 17.43 | 31.37  | 34.52  |
| % pass with distinction pass (as % of pass) | 35.25 | 45.71  | 45.14  |

The results show that students who attended SI sessions tended to get better results than those who did not attend, and the higher the rate of attendance, the greater the effect. However, investigations which correlate academic achievement with SI attendance often face the potential problem that SI participation creates self-selecting groups, or that SI tends to attract high performers.

One method to address this problem is to correlate SI attendance with academic achievement separately for different groups which have been pre-selected on the basis of previous grades from senior high school (Malm et al. 2011, 2014). These studies show that for each sub-group, SI has a measurable effect. In fact, it can even be shown that students with low high school grades but high SI participation perform on average as well as, and often better than, students with high high school grades who do not participate in SI. Another method is that applied by Blanc et al. (1983).

---

1 Low SI implies attendance at less than 80% of the SI meetings offered, while High SI implies attendance at 80% or more of SI-meetings offered. No SI implies either that the student did not take part at all in SI, or only attended once, but did not return.
Through this study, it is shown longitudinally for an example course in economics that as SI attendance increased over the space of five years, the D/F/W rate decreased correspondingly. If SI had simply targeted high performers within comparable cohorts, there would not have been an overall decrease in the D/F/W rate.

The present study outlines yet another approach, to correlate SI attendance, not with the final results or profile of the student, but rather with changes in the profile of the student between the beginning of the semester and the end of the semester. Further, it specifically targets study attitudes and study strategies rather than actual achievement.

**Student results and student attitudes.** Student attrition is a particularly serious problem for the Humanities (Mastan 2016). Reasons for attrition vary, but student withdrawal is more often based on personal and social issues than on problems with academic performance (Tinto 1987, Kalsner 1991).

One relevant factor is the career value of the study program. Astin, Green, Korn & Schalit (1987) show that values traditionally associated with the humanities (e.g. “developing a meaningful philosophy of life”) have been slowly and surely supplanted by more practical considerations such as financial and career success. This is reflected in a steady decrease in interest for humanities subjects (cf. also Astin et al. 2002). Student persistence is also higher for students who aspire to professional careers (Kalsner 1991). Taken together, this suggests that addressing psychological issues such as self-confidence and self-efficacy may be more crucial for the humanities than for other areas of study. It follows that one important goal of SI must be to increase the motivation of students.

Further, quantitative studies of how well a student performs give us information about the grade of the student, or the percentage of a cohort which passes the course or earns a degree at the end of the study program. They tell us next to nothing about what a student actually does, i.e. what processes the student undergoes during the semester, and what effects can be attributed to, or at least correlated with, SI attendance. It is these questions that the present study intends to address.

**Method**

Over the span of three semesters in 2012 and 2013, students at Lund University across courses in humanities and theology where SI is offered were presented with two questionnaires, one at the beginning of the se-
mester and one at the end of the semester. These will henceforth be referred to as the BEFORE questionnaire and the AFTER questionnaire. Each student was asked to fill in certain digits from her or his civic registration number on both questionnaires. The resulting digit sequence was detailed enough to make it possible to uniquely identify which questionnaires came from the same individual, while being vague enough to guarantee the anonymity of the participant. In many cases it proved impossible to pair questionnaires, since students had joined the course after the first meeting or were absent at the final occasion. Nevertheless, 388 pairs of matched questionnaires were collected.

Most of the questions in the questionnaire were in the form of statements where the participant was asked to rate on a Likert scale whether they agreed entirely (5) or disagreed entirely (0). In the BEFORE questionnaire, the questions referred to intentions concerning the course (e.g., “In this course, I will be aiming for the highest possible grades”) or general study strategies (e.g. “I usually take it easy during the beginning of the course and work all out during the last week before the exam”). In the AFTER questionnaire, the questions referred specifically to the course which had just finished (e.g. “In this course, I have taken it easy in the beginning and then worked all out during the last week before the exam”). Otherwise, the questions were largely the same for both questionnaires, except that the AFTER questionnaire also contained specific questions dealing with SI attendance.

It is important to note that all the answers reflect self-reported subjective judgments. For example, the reported number of hours of study do not necessarily correspond to the actual hours studied, but rather to the student's perceptions of how diligent they have been. Here, the important point is that this study compares the same students BEFORE and AFTER and maps the change, rather than attempting to compare two entirely different cohorts of students.

The issues investigated were: a) perceived difficulty of the course; b) ambition; c) quantitative diligence, i.e. hours studied and lecture attendance; d) self-confidence; e) forward planning; and f) qualitative diligence.

Some of the issues to be tested were addressed in more than one statement. Thus, the self-reported level of ambition was tested by the following two statements: “In this course, I will aim for the highest possible grade” and “In this course, I will be content if I get a Pass grade.” For the vast majority of participants, these
two statements are in a clear inverse relationship. Each statement had the possible values 0–5, so the range of all logically possible combinations spans between 0 and 10. However, only 25 students gave answers which were outside the range 3-7. The choice to include more than one statement was intended to make the differences between students clearer and the pattern more robust.

To get the total value for a given feature, the value for the negative feature was subtracted from the value for the positive feature. Thus, the value for *I will be content if I get a Pass grade* was subtracted from the value for *I will aim for the highest possible grade*, and the result can be seen as a measure of the self-reported level of ambition as far as grades are concerned. For each issue we discuss, the relevant statements will be presented.

Given that the values compared are the averages of subjective judgments on a Likert scale with only 388 participants, the usual tests for statistical significance would not be applicable, and have not been applied in this study. When correlations are mentioned, this should be understood as impressionistic patterns of covariation, which can be illustrative, in particular when they represent a trend which spans across more than two data points, but which should be corroborated with larger studies for statistical significance.

**Results**

**Perceived difficulty of course**

The first pattern we will look at concerns two factors which cannot be compared directly between BEFORE and AFTER, but should be looked at separately. These are the self-reported high school grades of the student (ranging from 1=LOW to 4=VERY HIGH)\(^2\) and the perceived difficulty of the course compared with expectations (ranging from 1=MUCH EASIER to 5=MUCH HARDER, where 3= AS EXPECTED).

*Table 2. SI and the perceived difficulty of the course*

<table>
<thead>
<tr>
<th></th>
<th>High SI</th>
<th>Mid SI</th>
<th>Low SI</th>
<th>no SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school grades (self-reported)</td>
<td>2.83</td>
<td>2.91</td>
<td>2.90</td>
<td>2.92</td>
</tr>
<tr>
<td>Perceived difficulty of course</td>
<td>3.11</td>
<td>3.18</td>
<td>3.27</td>
<td>3.09</td>
</tr>
</tbody>
</table>

\(^2\) The relation of self-reported grades to objective grades depends to a great extent on one's level of ambition (e.g., a B may be considered a low grade by an ambitious student and a high grade by a less ambitious student). Thus, high SI students might also have higher aims, rather than simply lower grades.
There was no notable difference between the self-reported grades of the groups of students who subsequently took part in SI. If anything, students who attended SI were those who had slightly lower self-reported grades. When it comes to the perceived difficulty of the course, an interesting pattern emerges. The two groups that reported the lowest degree of difficulty were those with high SI attendance and those with no SI attendance. For students who actually took part in SI, the degree of attendance correlated with their perception of the course: the higher the attendance, the lower the perceived difficulty.

The interrupted gradient that we see here, and which will recur in other cases in this study, can be interpreted to reflect the fact that some students are very individualistic high performers that feel no need to attend SI and are perfectly capable of completing their studies satisfactorily without taking part in SI. The existence of this group makes it important that SI be a voluntary activity where students who prefer to work in groups can meet and work together, without forcing their study strategies on other learner types. Students who subsequently had high SI attendance tended also to be those who expressed a preference for studying together (cf. Table 3). However, they were not more confident, did not have higher grades, and were not in any other way higher achievers, except in the potential sense that their higher willingness to work together made them more open to taking part in SI. With this in mind, let us proceed to the actual investigation.

Table 3. SI and self-reported willingness to study in groups

<table>
<thead>
<tr>
<th></th>
<th>High SI</th>
<th>Mid SI</th>
<th>Low SI</th>
<th>no SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>4.11</td>
<td>3.94</td>
<td>3.86</td>
<td>3.51</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ambition

The statements targeting ambition level, in the BEFORE questionnaire, were, “In this course, I will aim for the highest possible grade,” and “In this course, I will be content if I get a Pass grade.” The same statements were used in the AFTER questionnaire, mutatis mutandis. The results are given in Table 4.

Table 4. SI and self-reported ambition

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>High SI</td>
<td>1.14</td>
<td>2.97</td>
<td>1.83</td>
</tr>
<tr>
<td>Mid SI</td>
<td>1.44</td>
<td>3.06</td>
<td>1.63</td>
</tr>
<tr>
<td>Low SI</td>
<td>1.33</td>
<td>2.92</td>
<td>1.59</td>
</tr>
<tr>
<td>no SI</td>
<td>1.14</td>
<td>2.84</td>
<td>1.69</td>
</tr>
</tbody>
</table>
As can be seen, the general level of ambition rose during the course of the semester. Interestingly, it rose most for students with a high SI attendance, and subsequently less for students with a lower SI attendance, except for those students who did not attend SI at all. This is a repeat of the interrupted gradient we saw in the previous section, which indicates that there are (broadly) two types of students: individualist learners and collaborative learners.3

Quantitative diligence

This is basically a factor of the self-reported number of hours per day that the student intended to study (BEFORE) or reported actually having studied (AFTER). Neither of these measure necessarily reflects how many hours the students actually studied, but the results more closely reflect what could be described as the attitude of the student toward studying. The results are given in Table 5.

Table 5. Average self-reported hours studied

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>High SI</td>
<td>3.42</td>
<td>3.27</td>
<td>-0.15</td>
</tr>
<tr>
<td>Mid SI</td>
<td>3.48</td>
<td>3.13</td>
<td>-0.35</td>
</tr>
<tr>
<td>Low SI</td>
<td>3.52</td>
<td>2.93</td>
<td>-0.59</td>
</tr>
<tr>
<td>no SI</td>
<td>3.42</td>
<td>2.76</td>
<td>-0.66</td>
</tr>
</tbody>
</table>

As can be seen, the number of self-reported study hours decreased for all student groups, but it decreased least for students with high SI attendance, and most for students who did not attend SI. This suggests that students did not view SI as a replacement for studying on their own, but rather as a supplement, which in fact inspired them to study more.

The same pattern also holds for attendance at lectures. While this question cannot be compared between BEFORE and AFTER, since the BEFORE questionnaire did not include the question of how many lectures the student intended to attend,4 the correlation between SI attendance and self-reported attendance at lectures is also interesting. On a scale of 5=ALWAYS and 3=60% of lectures, SI students were more likely to report a higher attendance at lectures as well (cf. Table 6).

3 The fact that SI appears to correlate positively with study achievements across cohorts suggests that the (successful) individualistic learners are fewer in number than those who work better collaboratively. This issue is deferred to future research.

4 Including such a question at the beginning of the semester could have conveyed the message to the students at the beginning of the semester that skipping lectures is an acceptable option, and this was not something that we wished to convey.
Again, this suggests that students did not view SI attendance as an alternative to attending lectures, but rather as a source of inspiration either leading them to attend lectures to a higher degree, or possibly to exaggerate their lecture attendance, both of which reflect a positive study attitude.

Table 6. SI and lecture attendance

<table>
<thead>
<tr>
<th></th>
<th>no SI</th>
<th>Low SI</th>
<th>Mid SI</th>
<th>High SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>4.16</td>
<td>4.38</td>
<td>4.47</td>
<td>4.65</td>
</tr>
</tbody>
</table>

Self-confidence

The statements which were the basis of this sub-investigation were “I am nervous that this course is going to be difficult” (BEFORE; where 0=NOT AT ALL and 3=VERY NERVOUS) and “During the course, I have felt confident that I was going to pass the exam” (AFTER; ranging from 0=TOTALLY DISAGREE to 5=TOTALLY AGREE). Since the BEFORE question is negative (a high value corresponds to low confidence) and since the range of values for the BEFORE question is 0–3 while the range for the AFTER question is 0–5, the two sets of data were equalized by subtracting the BEFORE value from 4. Thus, the BEFORE value given in Table 7 is a measure of confidence, rather than nervousness, and is comparable in scale to the AFTER value. Notice, however, that we cannot actually say anything about a change in confidence, since the BEFORE and AFTER figures are not commensurable. The comparison we can make is between different student groups at each stage.

Table 7. SI and reported self-confidence

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>After – before</th>
</tr>
</thead>
<tbody>
<tr>
<td>High SI</td>
<td>2.95</td>
<td>3.43</td>
<td>0.48</td>
</tr>
<tr>
<td>Mid SI</td>
<td>3.03</td>
<td>3.18</td>
<td>0.15</td>
</tr>
<tr>
<td>Low SI</td>
<td>2.87</td>
<td>2.85</td>
<td>-0.02</td>
</tr>
<tr>
<td>no SI</td>
<td>3.12</td>
<td>3.17</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Here we see that the students who had the highest degree of self-confidence BEFORE were those that subsequently decided not to participate in SI. However, those who had the highest degree of self-confidence AFTER were those who had had a high SI attendance. While we cannot speak meaningfully of “change” in this case where the BEFORE and AFTER measures are not comparable, subtracting the value for BEFORE from AFTER shows clearly that students with a high SI attendance fared much better when it came to self-confidence.
during the course than students with low SI attendance. A small maximum for students not attending SI at all shows again the individualistic high achiever group.

**Forward planning**

This issue concerns the self-reported preference on the part of the students as to whether they work systematically throughout the whole period of the course or concentrate their efforts towards the end of the course. The statements used here were: a) “I prefer to take it easy and then work very hard just before the exam” and b) “I prefer to plan my time so as to avoid stress just before the exam.” Since these two statements are in an inverse relation, the value for a) was subtracted from the value for b), and the result was a positive value for the degree of forward planning. The same statements were presented at the end of the semester, and the sum of self-reported forward planning was calculated in the same way, by subtracting a) from b). The results are shown in Table 8.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>High SI</td>
<td>1.24</td>
<td>0.35</td>
<td>-0.88</td>
</tr>
<tr>
<td>Mid SI</td>
<td>1.36</td>
<td>0.05</td>
<td>-1.31</td>
</tr>
<tr>
<td>Low SI</td>
<td>1.31</td>
<td>-0.08</td>
<td>-1.39</td>
</tr>
<tr>
<td>no SI</td>
<td>1.10</td>
<td>-0.38</td>
<td>-1.49</td>
</tr>
</tbody>
</table>

There does not appear to be any systematic difference in attitude to forward planning between SI attendees and non-attendees BEFORE the semester. AFTER the semester, the measure of forward planning has decreased considerably (possibly the result of initial good intentions being confronted by the harsh realities of actual study), but it has decreased less for regular SI attendees, in particular for students with a high SI attendance. Here we see no interrupted gradient, which suggests that regardless of the ambition and self-confidence felt by the individualistic high achievers, they were no better than their peers when it came to forward planning. It appears to be SI which is making all the difference here, regardless of the background of the students.
Qualitative diligence

As opposed to the question of lecture attendance and hours of individual study, another question concerns the qualitative diligence of the work, in terms of “working hard.” This measure is extremely subjective, in that it does not only represent a self-reported estimation of something which could have been measured objectively, but rather an estimation of something which of itself is fully subjective. The statements that the students were asked to judge were, “I will do my utmost to get good results in this course” (BEFORE), and “I have done my utmost to get good results in this course” (AFTER). The results are given in Table 9. As usual, the potential range of answers was from 0 to 5.

Table 9. SI and self-reported diligence

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>High SI</td>
<td>3.48</td>
<td>3.85</td>
<td>0.37</td>
</tr>
<tr>
<td>Mid SI</td>
<td>3.58</td>
<td>3.72</td>
<td>0.13</td>
</tr>
<tr>
<td>Low SI</td>
<td>3.72</td>
<td>3.67</td>
<td>-0.05</td>
</tr>
<tr>
<td>no SI</td>
<td>3.26</td>
<td>3.57</td>
<td>0.31</td>
</tr>
</tbody>
</table>

As we can see, there is no striking pattern BEFORE, except perhaps that students who subsequently did not attend SI were less likely to describe themselves as being willing to work hard. (This is perhaps connected with self-confidence.) A possible trend might also be that (of those students who actually attended SI) students who subsequently became high SI attendees reported a slightly lower self-estimate of diligence than those who subsequently became low SI attendees. In the results AFTER the semester, however, the pattern is reversed: The higher the attendance at SI, the harder the student self-reported having worked.

Discussion

We have seen various cases where different social, pedagogical and psychological factors for study success covary with SI attendance. In some cases, this became more obvious when comparing the development across the semester rather than when just looking at the self-reported attitude/state of the student at the end of the semester. Across the board, we found that, for students who took part in SI at all, the positive effects covaried with attendance: the higher the SI attendance, the greater the effect.
However, another interesting pattern surfaced as well. For several of the features investigated, students who did not take part in SI reported answers which were largely almost as positive as the high SI attendees. This pattern can be schematized as an interrupted gradient, where one maximum represents the high SI attendees, and the other maximum represents the non-attendees. In contrast, there were other features resulting in a straight gradient, with SI non-attendees reporting values which were consistently lower than those reported by SI low attendees. The difference is shown schematically below:

![Interrupted Gradient vs. Straight Gradient](image)

If we look at which features display an interrupted gradient and which features display a straight gradient, we see an interesting difference. The interrupted gradient is found for questions concerning the perceived difficulty of the course, the ambition with respect to high grades, and self-confidence (i.e. values which are to a large extent psychological and deal with motivation and ambition); the straight gradient is found for questions concerning the number of hours studied, lecture attendance, forward planning, and to what extent the student reported exerting their utmost (i.e. values which more closely reflect the process of studying efficiently).

I have suggested that the interrupted gradient may be a reflection of a set of students who are individualistic high performers, who do not appear to feel any need for SI and who are equally successful in their studies. It is interesting to note that such lone wolf students may well achieve good results, and are characterized by high levels of psychological motivation, but seem to pattern differently when it comes to how they go about their studies, being more enthusiastic, but less systematic, than SI attendees.
Another observation worth noting is the following: it is sometimes mentioned anecdotally that one hour of SI corresponds to two or more hours of individual study. Lecturers sometimes (and in particular when SI is newly introduced into a study programme) express nervousness at competing activities which could reduce students’ interest in attending lectures. What the results of this study show is rather the opposite: SI is an activity that contributes to higher participation outside SI as well. Regarding the idea that SI could replace individual study, students do not appear to act upon this idea; rather, SI appears to inspire them to more individual study, just as it appears to inspire them to higher lecture attendance.

There does not seem to be any correlation between study attitudes at the beginning of the semester and SI attendance. However, after the semester, there seems to be systematic covariation between SI attendance and a set of values crucial to study success, both psychological and study skill related (in particular the latter). Thus, the study shows SI students are in certain ways “better” students.

**Conclusion and Future Research**

The present study has outlined a method which can be used to test how SI attendees differ from SI non-attendees in other respects than simply correlating SI attendance with academic achievements. The questions which have been tested have dealt with the processes of study, as well as with psychological factors such as motivation and confidence. The study has shown that certain patterns are easier to see when comparing values before the semester with values after the semester, and observing the development across the semester. For psychological issues, there seemed to be a pattern where SI non-attendees had higher values than SI low-attendees, but for issues dealing with study skills and processes this pattern did not appear. In these areas, SI students appear to outperform non-SI students, regardless of the level of ambition reported and regardless of their background or perceived attitudes at the beginning at the beginning of the semester.

For future studies, more detailed questions dealing with different aspects of study processes (e.g. attitude to exercises etc.) would be interesting to examine. Most importantly, however, future studies should be improved methodologically in various ways.

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5 Typical examples include the SI information websites of California State University, Fullerton (http://www.fullerton.edu/si/students/) and University of Idaho (http://www.uidaho.edu/current-students/academic-support/asp/ics/si/si-for-students).
First, given that participants tended to select fairly central values on the Likert scale, preferably this should be expanded from a 6-point scale to a 10-point scale to get more accurate judgments. Further, future studies should endeavor to greatly increase the number of participants, either by involving other universities or by involving other faculties within the same university. (The latter option would of course also raise the issue of subject-specific patterns, e.g. it is not inconceivable that students of medicine, engineering and humanities may pattern differently with respect to the effects of SI on various psychological factors for academic success.) However, increasing the size of the investigation and the accuracy of the judgements on a Likert scale is crucial to be able to test the statistical significance of patterns which at present can only be seen as impressionistic trends. One way to simplify the data collection process is of course to replace paper questionnaires with online questionnaires.

Finally, while gender was not included in the present study (as a means of preserving student anonymity in a fairly small population of participants), an interesting study would also be to include gender as a separate parameter. This would be possible to combine with preserving student anonymity if a sufficiently large number of participants were included in the next study.

References


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