Assessment of Supplemental Instruction Programming on First Year Academic Success

Jenell Wilmot, University of Texas, Austin

Jenell Wilmot is a learning specialist at the University of Texas at Austin, specializing in Supplemental Instruction programs for STEM fields and the professional development of teaching assistants.

Dr. Nina Kamath Telang, University of Texas, Austin

Nina Telang is a senior lecturer in the Department of Electrical and Computer Engineering at the University of Texas at Austin. She received the B.Tech degree in Engineering Physics from the Indian Institute of Technology, Mumbai in 1989, and the M.S. and Ph.D. degrees in Electrical Engineering from the University of Notre Dame in 1992 and 1995 respectively. Her teaching interests are in the area of circuits and devices, computing, and logic design. Dr. Telang works closely with success programs for freshman engineering students.
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Abstract

During the 2015-2016 academic year, the Electrical and Computer Engineering (ECE) Department and the Sanger Learning Center at the University of Texas at Austin collaborated to bring academic support to a freshman level introductory course by establishing a pilot Supplemental Instruction (SI) program. Intending to aid students in adjusting to the university experience and be successful in their first year, the SI program provides non-remedial review and study skill development in the form of optional weekly discussion sessions. Analysis of quantitative and qualitative data aid in understanding the efficacy of the newly implemented SI program in the ECE department. Comparisons of course grades and passing rates reveal that fall 2015 course grades did not vary much between the SI-attending and non-attending groups, though students who attended SI had slightly improved passing rates compared to the non-attending group and the prior fall. Comparisons for the spring 2016 semester reveal that the course grades for the SI-attending group were improved yet not statistically significant; while the overall passing rate was not affected for the spring semester, a considerably larger proportion of SI attendees successfully passed the course than non-attendees. The differences in performance outcomes observed between the fall and spring semesters are potentially explained by the differences in the student populations. The spring enrollment is roughly ten percent of the fall enrollment and has a larger proportion of transfer students, those retaking the course, and first generation students. Studying the demographics and performance outcomes of the student population choosing to attend SI allows program administrators to better understand the potential of the SI program to help students find success in the ECE department.

Introduction

This complete research paper will examine the effects of a Supplemental Instruction (SI) program on the academic success of first-year Electrical and Computer Engineering (ECE) students at the university. The SI program offers optional, non-remedial discussion sessions to students enrolled in a required freshman-level course with historically high percentages of D’s, F’s, drops, and withdraws (DFQW percentage). The current degree plan advises incoming freshmen to enroll in EE 302 Introduction to Electrical Engineering during their first full semester; the majority of the course enrollment is in the fall. The spring semester enrollment is smaller and mainly populated by transfer students or those who did not successfully complete the course in the fall. This paper will investigate the differences in academic performance between those attending SI or not, and explore the differences in SI usage and academic performance between students enrolled in fall and spring semesters.

I. Review of Literature

Current studies of SI in engineering courses show that students attending SI sessions perform
better on exams and SI attendance was positively correlated with final course grades [1]-[8]. SI attendance improves persistence in the degree program with fewer leaving the degree [3] and students attending SI complete more credits in their first year [8]. The benefits gained in SI have been shown to be transferrable to non-SI courses [9] and affect both attendees and the SI session leaders themselves [10]. The SI program provides learning opportunities that are otherwise unavailable to students [5], and reaches greater proportions of underrepresented student populations (females and ethnic minorities) [2]-[5].

II. Motivation for Study

This study investigates the efficacy of the SI model in EE 302. The SI model is well established in other departments at UT Austin, implemented in economics, history, math, and other departments since the 1980s. Over time each program has identified the academic skills students need most to be successful in the given supported course. For instance SI in history courses stresses skills to improve literature analysis and essay writing while SI in calculus courses stresses heuristic problem solving skills. As administrators developing this program, we encountered limited literature pertaining to the implementation and resulting effects of SI in engineering courses at other universities. To adapt this pilot SI model to fit the needs of students in engineering coursework, we designed this study to gain understanding of the student population, their motivations for attending SI, and whether or not SI attendance was linked to increased academic performance.

Another objective was to provide feedback to the instructors of this course (and other freshmen courses) regarding the level of student participation in this optional support program, student perceptions of the value of this support program, and finer details of their experiences in their first semester in the ECE department.

This study on the SI program’s first year will provide a frame of reference for further development of SI for this course and other engineering courses at UT Austin. This documentation of this SI program and the resulting effects on student performance will serve as a comparison for other institutions adopting similar academic supports for their core engineering courses.

III. Limitations of Study

Given that student participation in the SI program was voluntary, this study’s findings face limitations in comparing student attendance and academic performance. The self-selection bias and other influences such as student’s prior experiences leading to variations in level of student preparation, proclivity for help-seeking behaviors, and overall motivation, are factors that make the analysis of student performance and SI attendance difficult. We have therefore also considered the students standardized test scores (SAT and ACT) and predicted GPA as measures of student preparation for college level coursework. Future studies would benefit from exploring ways to account for these factors.
Differences in the student populations and attendance rates between fall and spring semesters affect the ability to draw statistically significant comparisons between similar subpopulations. Demographic-based subpopulations found in the study’s data set, such as first generation or low SES students, have too few students to be compared in a statistically significant manner. Similar studies of SI identify subpopulations of students by sorting students by SI usage, typically into groups of those using the program with no-, low-, medium-, and high-levels of use. Review of literature has not revealed a standard for these definitions; these levels are defined differently by each author [5,9]. Considering the data set found in this study and its lack of a consistent n-value for groups of students based on SI usage between the fall and spring semesters, we defined SI usage as students with repeat attendance (i.e. those attending 2 or more sessions). While this definition of SI usage simplifies the analysis featured in this paper, future studies including a finer breakdown of SI usage into varied levels of use or timing of use (separating students attending only the week before exams) will provide added depth to the understanding of the benefits of the SI program and the student populations involved. This study is based on only one year of data; as the program continues additional years of data will allow for more granularity in analysis. Longevity data will provide larger n-values for subpopulations, allowing for more comparisons of student groups to be made in a significant manner.

IV. Research Questions

To examine the efficacy of the SI program in EE 302, this study addresses the following research questions:

1) How is SI attendance related to academic performance in EE 302 during the fall and spring semesters?
2) How does SI attendance relate to the DFQW percentage during the fall and spring semesters?
3) Is SI utilized by different populations to different extents?
4) What is the perceived benefit of SI by participating students for the fall and spring semesters?

V. Definitions Used in Study

The following terms utilized in this study are defined according to the authors’ and the university’s use:

- Drop: students may leave a course without it being noted on their transcript up to the 12th class day.
- Fail: a student earning below a D- has failed a course.
- Q-Drop: students may leave a course after the 12th class day with a “Q” noted on their transcript [11].
- Low Socioeconomic Status (SES): parental income reported as below $40,000.
- First Generation: neither parent of the student has completed a bachelor’s degree or
higher.

- Underrepresented Minority (URM): federal ethnicity reported as Latino/Hispanic, Black, Multi-Racial, Hawaiian/Pacific Islander, or Native American [12].

Design and Implementation

SI is an international model of academic support targeting large and historically difficult classes. Developed at the University of Missouri-Kansas City in 1973, SI’s peer-assisted study sessions employ active and collaborative learning strategies to review class material and develop transferable study skills [13]. For over 30 years, the Sanger Learning Center has coordinated SI programming at UT Austin and has supported departments within the College of Liberal Arts and the College of Natural Sciences.

I. The SI Program and EE 302

In the fall of 2015, a partnership between the Sanger Learning Center and the ECE department was established to provide SI programming to support students enrolled in EE 302 Introduction to Electrical Engineering. The SI program employed undergraduate ECE students as SI leaders to host weekly study sessions. SI leaders were required to hold two sessions per week and participate in weekly professional development meetings with other SI leaders. The SI leader was responsible for collecting attendance at each session and administering programmatic assessment tools throughout the semester. A graduate student was employed as a supervisor, responsible for leading the weekly professional development meetings and providing direction and feedback to the SI leaders. SI leaders were observed by the supervisor and the learning center’s SI coordinator [14].

II. Course objective, differences between fall and spring semesters

The objective of the Introduction to Electrical Engineering course, EE 302, is to introduce incoming freshman students to the basics of electrical engineering through the study of DC electric circuits. While the focus is on DC circuit analysis techniques, there is a substantial emphasis on the application of these basic principles on difficult engineering problems. Exam problems were designed to engage higher levels of thinking, more than the usual textbook or homework problems.

In the fall 2015 semester, 401 students enrolled in 6 lecture sections with about 65 students in each section. Four SI sessions were offered weekly; efforts were made to ensure that the sessions did not conflict with lecture or lab times and feedback from students was taken into consideration to identify suitable session times. Although the students were divided among the 6 lecture sections, the exams were common to all lecture sections, ensuring a fair comparison of exam scores between different student populations based on SI attendance. In the spring 2016 semester, 44 students enrolled in 1 lecture section, and two SI sessions were offered weekly.
Methods

This study used a mixed methods approach to investigate the research questions. By collecting both quantitative and qualitative data we gained a better understanding of the student population choosing to attend the SI sessions, their motivations for attending, and the perceived value of the sessions. Considering a combination of quantitative and qualitative measures, we took an interpretative approach to examine the relationship between SI attendance and student’s academic performance, and applied these findings to further adapt the program to best meet the needs of the enrolled student populations.

I. Quantitative Data Collection

Three forms of quantitative data were collected:

- **SI Program Usage**: at the beginning of each session, students signed in with both their name and university unique identification number.
- **Grade Data**: course letter grades and pre-semester and post-semester cumulative GPAs for all students enrolled in the course were gathered.
- **Student Demographics**: information on gender, race, citizenship, first-generation student status, family income, parent’s education levels, probationary status, declared major, and classification was collected.

Attendance data was documented by the SI leader at the start of each session and reported to the learning center, where the SI coordinator maintained a database that connected with the university’s registrar. The SI coordinator exported additional data regarding student grades, enrollment, and limited demographics. Additional demographics were provided by the School of Engineering’s office of academic affairs.

Students attending zero or one session were categorized as the no-SI group, whereas repeat attendees (those attending two or more sessions) were categorized as the SI group. This definition of the SI group as those who returned, the study focused on the outcomes students who showed investment in using this resource. To examine the effects of SI on student academic performance, course grades were converted from nominal to ordinal data as per the university’s numerical grade point equivalencies [15]. The statistical methods used in this study are described in Table 1 below.
Table 1
Statistical Analysis Methods

<table>
<thead>
<tr>
<th>Test</th>
<th>Data</th>
<th>Purpose</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures of central tendency and variance</td>
<td>Course grades, semester GPA, predicted GPA, SAT Scores</td>
<td>Compare anticipated and actual academic performance of SI and non-SI groups</td>
<td>Median and interquartile ranges are used for grade and GPA data as this data is not normally distributed</td>
</tr>
<tr>
<td>Spearman's correlation</td>
<td>Attendance values (continuous) and course grades</td>
<td>Correlate SI attendance and course grade</td>
<td>Spearman's correlation is used because grade data is ordinal</td>
</tr>
<tr>
<td>Pearson's chi-square test</td>
<td>Attendance groups and DFQW percentages</td>
<td>Identify differences between DFQW percentages and SI attendance groups within the spring and fall semesters</td>
<td>Students with 0, 1 sessions are labeled as no-SI group, students attending 2 or more times are labeled as SI group</td>
</tr>
<tr>
<td>Pearson's chi-square test</td>
<td>Student demographic information (first generation, low SES status, URM) and attendance group</td>
<td>Determine significant differences in student populations between SI attendance groups</td>
<td>Students with 0, 1 sessions are labeled as no-SI group, students attending 2 or more times are labeled as SI group</td>
</tr>
</tbody>
</table>

II. Qualitative Data Collection

SI Leaders administered a student perception survey monthly, three times during the fall 2015 semester from September through November. This survey collected information about the attendees and their use of SI, including:

- **Student Demographics**: adding to the demographic information provided by the registrar and the engineering school, students provided information about their length of time at the university, previous enrollment in the course, expected grade for the course, and how many SI sessions were attended that semester for the ECE course.
- **Student Understanding of SI**: students defined the practice of SI, rated the helpfulness of the components of SI, and articulated their reasons for attending SI.
- **Use of Additional Academic Support**: students identified their levels of use of faculty and TA office hours for the course, enrollment in the GE supplement to the course, and any SI for their additional courses.

The data for each set of surveys was entered into a spreadsheet. Demographic information was analyzed to determine the common backgrounds and their use of other academic support resources. To examine participant perceptions of SI, an initial open coding process was used to
determine general themes. Then an axial coding process was used to distill and aggregate those themes. The axial codes were further analyzed to identify trends for students’ perceptions of SI.

Qualitative data was used to answer research questions regarding trends in student attendance and grade performance, DFQW percentages, and background for the fall 2015 and spring 2016. This information provided course and SI administrators with a better understanding of which student populations were attending the study sessions, qualitative data helped to identify specific factors that may have influenced both their choice to attend and their grade performance. The next sections will answer our research questions by further outlining the impact of SI on student performance, what specific aspects of the SI program may have facilitated change, and recommendations for future practice and study of SI for this course.

Findings and discussion

This study uses a mixed-methodology to determine how SI attendance relates to student performance and what aspects of SI students find most beneficial.

I. SI Attendance and Student Academic Performance

Of the 401 students enrolled in EE 302 in fall 2015, 387 students completed the course. SI sessions were held on 14 weeks during the semester and 39% of the enrolled students attended at least two sessions. In contrast, the enrollment in the spring was 47, with 40 students completing the course. Of the enrolled students, 66% attended two or more sessions in spring 2016.

In Figure 1 we provide a comparison of the median course grades for the SI and no-SI groups. The course grades increased for the SI group in the spring, but decreased in the fall. In the fall semester, the median course grades for the SI group were 0.33 points lower than the no-SI group, but in the spring semester the median course grades were 0.67 points higher.

![Figure 1](image)

**Figure 1**
Median Course GPA Based on SI Attendance

<table>
<thead>
<tr>
<th>Session Type</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or 1 session</td>
<td>3</td>
<td>2.33</td>
</tr>
<tr>
<td>2+ sessions</td>
<td>2.67</td>
<td>3</td>
</tr>
</tbody>
</table>
Predictors of the students' success and their actual performance is summarized in Table 2 below. For both the fall and spring student populations, the mean SAT scores and predicted GPAs were higher for the no-SI group than the SI group. It is conceivable that the no-SI group consisted of students who believed that they did not need the extra help that SI provided, at least to the extent that the SI group did. Despite the higher previous academic achievement indicated by the SAT scores and predicted GPAs, the spring 2016 SI group outperformed the no-SI group in terms of course grades and overall end of semester GPA.

<table>
<thead>
<tr>
<th>Semester</th>
<th>SI Attendance</th>
<th>N</th>
<th>Median Course GPA (IQR)</th>
<th>Median Semester GPA (IQR)</th>
<th>Median Predicted GPA (IQR)</th>
<th>Mean SAT Score (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>0, 1 Sessions</td>
<td>251</td>
<td>3.00 (1.34)</td>
<td>3.21 (1.04)</td>
<td>3.61 (0.39)</td>
<td>2046.49 (184.63)</td>
</tr>
<tr>
<td></td>
<td>2+ Sessions</td>
<td>150</td>
<td>2.67 (1.00)</td>
<td>3.25 (0.93)</td>
<td>3.53 (0.39)</td>
<td>1996.72 (193.08)</td>
</tr>
<tr>
<td>Spring</td>
<td>0, 1 Sessions</td>
<td>16</td>
<td>2.33 (1.83)</td>
<td>2.72 (1.04)</td>
<td>3.68 (0.41)</td>
<td>1994.6 (166.50)</td>
</tr>
<tr>
<td></td>
<td>2+ Sessions</td>
<td>31</td>
<td>3.00 (1.34)</td>
<td>3.08 (0.92)</td>
<td>3.46 (0.41)</td>
<td>1970.5 (162.80)</td>
</tr>
</tbody>
</table>

Spearman correlation analyses do not show significant relationships between SI attendance and the grade outcomes. Weak correlations were found between attendance and final course grades for the fall population, $r(387) = 0.08$, $p = 0.12$, and spring population, $r(47) = 0.11$, $p = 0.45$. Examining the grades of the SI attending group show weak correlations for the fall semester, $r(146) = 0.10$, $p = 0.23$, and spring semester, $r(30) = -0.01$, $p = 0.97$.

Further investigation into the demographics of the spring student population may assist in interpreting the differences seen between SI attendance and course grades from the fall to spring semester. These differences are explored in section four of our findings.

II. Course DFQW Percentages

One of the major goals of implementing new forms of academic support for an introductory engineering course is to reduce DFQW percentages in an effort to improve four-year graduation rates. In Figure 2 below we provide the percentage of students earning a D, F, Q or W for EE 302 for the past five academic years. The DFQW percentage (including both fall and spring semesters) for the academic year that SI was implemented, 2015-2016, showed a 0.8% drop from the previous academic year. A closer look at the DFQW percentages reveals a greater relationship between DFQW percentages and SI attendance for the spring semester than the fall.
In Figure 3, both the fall and spring semesters show a downward trend in the DFQW percentages, suggesting that there is a relationship between attending SI and passing the course. The drop in the DFQW percentage with SI attendance is more steep (44% to 16%) in the spring semester partially explaining the increase in the median GPA from 2.33 to 3.00 (refer to Figure 1).
A chi-square test on the distribution of DFQW percentages amongst the different attendance groups showed no significant relationship for the fall semester, $\chi^2 (1, N = 401) = 0.33$, $p = 0.56$, but a significant relationship for the spring, $\chi^2 (1, N = 47) = 5.32$, $p = 0.02$. There may be some relationship between SI attendance rates and DFQW percentages to be investigated further with additional demographic and longitudinal data.

### III. Differences in Student Populations and SI Usage

The student populations for the two semesters are summarized in Table 3 below. Chi square tests indicate a significant difference between the spring and fall student populations in terms of percentage of low SES students $\chi^2 (1, N = 448) = 5.97$, $p = 0.02$, first generation students, $\chi^2 (1, N = 448) = 12.83$, $p = 0.0003$, and students previously enrolled in the course, $\chi^2 (1, N = 448) = 134.28$, $p < 0.0001$. For each of these populations, the spring semester student body had a higher percentage than the fall student body.

<table>
<thead>
<tr>
<th>Semester</th>
<th>N</th>
<th>% URM</th>
<th>% Low SES</th>
<th>% Transfer</th>
<th>% First Gen</th>
<th>% Prior enrollment</th>
<th>Mean SAT (SD)</th>
<th>Mean ACT (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2015</td>
<td>401</td>
<td>24.80%</td>
<td>17.33%</td>
<td>11.47%</td>
<td>7.58%</td>
<td>1.00%</td>
<td>2027.69 (184.14)</td>
<td>31.18 (3.44)</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>47</td>
<td>14.89%</td>
<td>31.91%</td>
<td>20.45%</td>
<td>23.40%</td>
<td>40.82%</td>
<td>1979.33 (161.71)</td>
<td>30.80 (3.27)</td>
</tr>
</tbody>
</table>

Table 4 provides a comparison of student outcomes and demographics for the fall and spring semesters, based on the number of SI sessions attended. Noting the differences between the SI and no-SI groups for each of these semesters better informs us of who is choosing to attend SI in the different semesters.

<table>
<thead>
<tr>
<th>Semester</th>
<th>SI Attendance</th>
<th>N</th>
<th>% URM</th>
<th>% First Gen</th>
<th>% Low SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2015</td>
<td>0, 1 Sessions</td>
<td>251</td>
<td>13.15%</td>
<td>33.47%</td>
<td>9.96%</td>
</tr>
<tr>
<td></td>
<td>2+ Sessions</td>
<td>150</td>
<td>21.19%</td>
<td>33.77%</td>
<td>12.58%</td>
</tr>
<tr>
<td>Spring 2016</td>
<td>0, 1 Sessions</td>
<td>16</td>
<td>6.25%</td>
<td>25.00%</td>
<td>18.75%</td>
</tr>
<tr>
<td></td>
<td>2+ Sessions</td>
<td>31</td>
<td>19.35%</td>
<td>22.58%</td>
<td>38.71%</td>
</tr>
</tbody>
</table>
IV. Perceived Benefit to Students

Student participants’ definition for SI centered on three themes: improving conceptual understanding, reinforcing class work, and providing help or support. Participant understanding of SI was generally accurate in that it is a practice designed to aid students with their understanding of course content. Table 5 summarizes students’ definitions of SI and the change observed between fall and spring semesters. In the spring semester, students attending SI described the program as a source for help, support, and community, while the perspective of fall attendees was largely focused on SI as reinforcement for topics addressed in lecture.

<table>
<thead>
<tr>
<th>Student SI definition</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice that should improve their conceptual understanding</td>
<td>24.74%</td>
<td>21.43%</td>
</tr>
<tr>
<td>Practice that should reinforce what is taught in class.</td>
<td>51.55%</td>
<td>35.71%</td>
</tr>
<tr>
<td>Practice that provides some form of help, support, or community</td>
<td>22.68%</td>
<td>42.86%</td>
</tr>
</tbody>
</table>

Student participants were asked to set goals for the semester. Overall themes for goals included improving knowledge of the course material, grade improvement, practicing problems, and improving critical/analytical thinking. Table 6 lists students’ goals and the change observed between fall and spring semesters. In the spring a large majority identified a goal based on gaining a better understanding of content knowledge, while in the fall the students identified this goal to a lesser extent and instead indicated goals relating to improving their grade.

<table>
<thead>
<tr>
<th>Student goals</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving content knowledge</td>
<td>51.92%</td>
<td>92.86%</td>
</tr>
<tr>
<td>Improving grades</td>
<td>61.54%</td>
<td>28.57%</td>
</tr>
<tr>
<td>Practicing problems/concepts</td>
<td>22.12%</td>
<td>21.43%</td>
</tr>
<tr>
<td>Improving critical or analytical thinking</td>
<td>38.46%</td>
<td>28.57%</td>
</tr>
</tbody>
</table>

The survey also asked participants to rate the helpfulness of each major aspect of the SI practice: small-group activities, large-group discussion, practice problems, concept/lecture review.
Consistently, students rated practice problems the highest, with concept/lecture review just under that. Small and large group activities were considered the least helpful. Table 7 summarizes students’ ratings given for each aspect of SI on a scale of 1 to 5 with 1 being least helpful and 5 being most helpful.

<table>
<thead>
<tr>
<th>SI Helpfulness</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Group Activities</td>
<td>3.27</td>
<td>3.62</td>
</tr>
<tr>
<td>Large Group Activities</td>
<td>3.38</td>
<td>3.38</td>
</tr>
<tr>
<td>Practice Problems</td>
<td>4.65</td>
<td>4.77</td>
</tr>
<tr>
<td>Concept/Lecture Review</td>
<td>4.43</td>
<td>4.15</td>
</tr>
</tbody>
</table>

**Conclusions**

Due to the self-selecting nature of program participation and potential covariances between the variables, reporting the benefits of SI is troublesome. The relationships observed in the analyses identify the potential for a relationship between the academic support provided by SI and benefits to those choosing to attend.

Although the academic differences between the SI and no-SI groups were not statistically significant in either semester, they were more articulated in the spring semester. This can be seen in the improvement of semester grades and the lowering of DFQW percentages. We conclude that the SI program had a greater positive effect in the spring semester than the fall. Identifying the differences between the spring and fall semester student populations and their motivations for attending SI explains the source of these differences.

The SI program in EE 302 has varied findings for different student populations during the fall and spring semesters. Relating the study body demographics from fall to spring semester, the spring semester student population was more heavily comprised of students either repeating the course or transferring from another institution. Those attending SI were also more likely to be first generation students or of low socioeconomic status than the fall student population. The program attracted a greater percentage of the enrolled student population, and attendees were more interested in understanding the material and working with others than the fall population, who identified more interest in securing a passing grade. The spring SI attendees also reported a more favorable view of engaging in small group work, which is an integral component to pedagogical foundation of SI.

The notable difference in motivation may be reflective of the differences in class environment between the fall and spring semesters. With the spring semester’s smaller student population, there may be a different sense of community and accessibility to resources than is experienced in
the larger lectures during the fall. No longer in their first semester, spring students are potentially more adjusted to the rigors of university-level work than their first-semester freshman counterparts. The spring SI program benefited from the experience gained by the SI leaders from the fall, improvements to the advertising, and changes in the implementation of the sessions. For instance, video promotions were created and leaders increased their efforts to incorporate hands-on activities.

This growth in the SI program and leaders from the fall to spring semester paired with the different student population yielded a more favorable result.

Future Work

To stay true to the mission of SI and increase the perceived value of attending the sessions we will look for new ways to nurture small group relationships. To achieve this, we will work with SI leaders to develop small group activities that expose students to real life applications of the content studied. SI leaders could bring in physical materials from their upper division courses that demonstrate fundamental principles.

To build community within the freshman student body, the SI program is well situated to be a medium for fostering connections and networks. We will invite engineering student organization to have a presence in the SI sessions, allowing students to learn of opportunities to become involved in extracurricular group and find support and belonging in the major. A relationship with student organizations would also allow us to better recruit SI leaders and create awareness of the SI program.

To improve attendance of the SI program, we need to first ensure that students are well informed of the benefits of participating. We will create advertising materials that incorporate the findings of this study, which can be used in communications with students or posted on the course website. The best advertisers of the program are students themselves who have used the program and can speak to the benefits of attending the SI sessions. Increasing the attendance of the SI sessions will result in a larger set of data for analysis.

To improve the depth of the feedback that we receive from students attending the SI program, we plan to administer a more detailed survey that will include new items to identify their academic needs and struggles and revise current survey items to better understand their reasoning behind their goals and perceptions of the SI program.

To address our ultimate goal, which is to support student’s understanding of foundational course content as well as develop transferable skills for their continued success in the ECE major, we will track student performance as they progress through related coursework. We will use this information to direct the continued growth of the SI program.
Acknowledgements

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References


