Understanding Behaviors of Attendance in Supplemental Instruction and Subsequent Academic Success in a First Year Engineering Course

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In this Presentation

I. Introduction to Program, Course, & Study
II. Study Design & Implementation
III. Methodology
IV. Findings and Discussion
V. Conclusion and Recommendations
Supplemental Instruction (SI): Peer-assisted study sessions using active and collaborative learning strategies to review course content and develop transferable skills.
Dependency Cycle

Tell them.

Professor

Students
Failed Processes

Tell them again.

Tutor/Professor → Students
Failed Processes

Tell them more slowly.

Tutor/Professor

Students
Break the Dependency Cycle

Tell them.

Professor

Students
Break the Dependency Cycle

Get them to tell each other.

SI Leader
Break the Dependency Cycle

Get them to tell you.
Introduction: About the Program

SI at UT:

- Humanities, Economics and STEM
- Managed by professional and graduate student staff
- SI Leaders selected for interest in teaching and learning
- Training and development delivered through orientation and weekly meetings
- Throughout the semester: weekly sessions, reporting, staff meetings, observations and feedback, and evaluations
Introduction: About the Study

Purpose
Identify and understand the attendance behaviors of students and assess SI’s impact on attendees’ academic achievement

Significance
Contribute to body of literature; identify ways to improve promotion and marketing; make programmatic changes to improve student outcomes
EE 302: Introduction to Electrical Engineering

- Incoming freshman class, often first semester at UT
- Historically high DFWQ rates (reduced from 23.7% in 2011 to 10% in 2015 which was the first year that SI was offered.)
- DC circuit analysis and application:
  - Circuit laws (Ohm’s, KVL, KCL)
  - Circuit analysis techniques (Node-voltage, mesh-current, course transformations, superposition)
  - Circuit equivalents (Thévenin’s, Norton’s)
  - Operational Amplifiers
Study Design & Implementation

Research Questions

☐ How does students’ initial awareness and perceptions of resources influence SI attendance?

☐ How does students’ perceptions of SI and it’s learning model (peer-led collaboration) influence intention to attend SI sessions?

☐ How does SI attendance affect academic performance in current coursework?

☐ What is the perceived benefit of SI by participating students?
Study Design & Implementation

- **Timeline:** Fall 2017
- **Demographic information and quantitative and qualitative data collected and analyzed by ECE and Sanger Learning Center professional staff.**
- **Limited formal literature shows attendees:**
  - Do better on exams
  - Have better final course grades
Methodology - Mixed Method

- Used **quantitative** data to assess effects of SI attendance on course performance.
  - Exam, final course grades and SAT scores
  - SI attendance numbers

- Used **qualitative** data to gain a better understanding of students’ behaviors of attendance to and perceived benefits of SI
  - Pre-survey - assessed awareness of resources and categorized resources according to expertise and instructional method to identify trends of planned resource use
  - Post-survey - assessed planned vs. actual use of SI as well as perceived benefits of SI
Methodology

- **Quantitative** Data Collection and Analysis:
  - Attendance, final course grades, and end-of-semester grades correlations
  - Grade correlations with attendance to SI for students with similar SAT scores

- **Qualitative** Data Collection and Analysis:
  - Pre- and post-survey collecting qualitative data
  - Open coding to determine general themes
  - Identifying trends
Findings: Behaviors of Attendance
Research Question 1

- Students’ awareness of selected academic support resources
Findings: Behaviors of Attendance
Research Question 2

- Students’ intention of use for selected academic support resources

![Bar chart showing the number of student choices for different academic support resources. The chart compares the number of students who are aware of and plan to use each resource. The resources include One on One Tutoring, Peer Study Groups, Supplemental Instruction, Office Hours with TA or Professor, and Other (please specify).]
Findings: Academic Performance
Research Question 3

- Median Course Grade and SI Attendance Correlation
- Total population: 333
- Attending 2 or more sessions: 134
- GPA difference is not significant

<table>
<thead>
<tr>
<th></th>
<th>Fall 2015</th>
<th>Fall 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>non SI</td>
<td>SI</td>
</tr>
<tr>
<td>GPA</td>
<td>2.79 (N = 242)</td>
<td>2.62 (N = 146)</td>
</tr>
<tr>
<td>DFWQ%</td>
<td>11.6</td>
<td>9.3</td>
</tr>
</tbody>
</table>
Findings: Academic Performance

- Median Course GPA based on SI attendance (2015 vs 2017)
## Findings: Academic Performance

<table>
<thead>
<tr>
<th>SAT score range</th>
<th>1000-1120</th>
<th>1130-1250</th>
<th>1260-1380</th>
<th>1390-1510</th>
<th>1520-1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean GPA (SI)</td>
<td>2.22</td>
<td>1.91</td>
<td>2.25</td>
<td>2.61</td>
<td>3.38</td>
</tr>
</tbody>
</table>
Findings: Academic Performance

Mean GPA for SI vs non-SI Attendees - SAT Score Comparison

- SI
- no SI

SAT score range

1000-1120
1130-1250
1260-1380
1390-1510
1520-1600

Course GPA

2.22
1.67
1.91
1.87
2.25
2.24
2.61
2.64
3.38
3.18

Graph showing comparison of mean GPA for SI and non-SI attendees across different SAT score ranges.
### Findings: Perceived Benefits

#### Research Question 4

- **SI Attendees Perceived Benefits**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Agree (%)</th>
<th>Neutral (%)</th>
<th>Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI sessions helped me to gain a better understanding of the subject matter</td>
<td>72%</td>
<td>20%</td>
<td>16%</td>
</tr>
<tr>
<td>SI sessions helped me gain good study habits and self-discipline</td>
<td>32%</td>
<td>52%</td>
<td>16%</td>
</tr>
<tr>
<td>SI sessions helped me get information about exam materials</td>
<td>72%</td>
<td>20%</td>
<td>16%</td>
</tr>
</tbody>
</table>
Students are highly aware of academic support services available but choice of academic support utilized appears related to level of content expertise of instructor (peer vs. professor) and learning model (individual vs. collaborative).

Majority of students attending SI sessions believed that they help with difficult course concepts and exam preparation.

Students highly prepared (indicated by their SAT scores) for college level coursework are less likely to attend SI sessions.

SI session attendance positively influenced course GPA for students with similar SAT scores.
Recommendations

- **Research and Assessment:**
  - Identify differences in peer study groups and SI sessions that create differences in attendance
  - Incorporating experiential learning in EE 302 SI sessions and subsequent impact to course grades

- **Programming:**
  - Promotion and marketing of SI program to improve attendance
  - Investigate more “best practices” of SI and learning theory to incorporate in future semesters
References


