Abstract— In previous studies on Supplemental Instruction (SI) relatively little attention has been paid to the “senior” students who lead the sessions. The focus in this study is on the benefits that the SI leaders gain from their SI experience. Data, from one questionnaire directed at 35 students who recently completed their assignment as SI leaders, and another questionnaire directed at 20 former SI leaders who have graduated and are currently employed, was analysed. The results indicate that the SI leaders improved their communication and interpersonal skills, several types of leadership skills, and self-confidence as well as acquiring a “deeper” understanding of course content. A majority of former SI leaders regard their SI leader experience as an important asset in attaining employment after graduation. A clear majority of former SI leaders have had some use, or good use in their later professional life, for skills acquired and developed during their SI leadership.

Index Terms— Supplemental Instruction, leadership skills

I. INTRODUCTION

Supplemental Instruction (SI) is an academic support program that aims at increasing student success in “difficult” courses ([1]). SI was developed at the University of Missouri in Kansas City in the early seventies and has since spread to over 1500 universities and university colleges in nearly 30 countries ([2]).

The main component of SI is an informal collaborative learning environment under the guidance of a “senior” student. This SI leader is a student who has previously completed the course successfully and can therefore act as a model student. The role of the SI-leader is not that of a teacher – they do not impart new knowledge. Instead the SI leader facilitates the process of understanding difficult course material.

Research on Supplemental Instruction has so far been limited, and mostly focused on its potential to increase grades and retention among students who attend Supplemental Instruction sessions ([3],[4]). Focus on the senior students who lead the sessions has been little documented, and then mostly in the context of how the session participants develop, and how SI sessions are planned and run ([5],[6]). If we restrict ourselves to the actual benefits SI leaders may gain – such as improved study techniques, leadership experience, group and individual management, practice in planning meetings and a general pedagogic insight - there have been relatively few research studies conducted. Ashwin [7] concluded that peer facilitators changed their view on what was important in learning, with more focus on student to student interaction. Congos & Stout [8] surveyed former SI leaders after graduation on the benefits of the SI leadership experience. They found that the main benefit categories were communication and interpersonal relations skills, learning skills, leadership skills (in a very general sense) and improved course content knowledge. [9] and [10] studied self-reflections from SI leaders and found that the they developed empathy with their students, practice in using collaborative techniques, and an improved self-confidence. Reflection on how to improve their sessions, and communicating and learning course material were other competencies acquired.

Thus, insight into the potential benefits for senior students who guide SI sessions is a relatively unexplored area, research wise, and would benefit from more information on the range and depth of the SI leaders experiences and development. In this study we look into the following potential benefits of the SI leadership in engineering education:

- What specific competencies do they develop as a result of being an SI leader?
- Is the merit of being an SI leader an advantage when applying for a job?
- Do former SI leaders, in their professional life after graduation, have use of the skills they gained and developed when running SI sessions?

II. SI AT THE FACULTY OF ENGINEERING AT LUND UNIVERSITY, SWEDEN

What does a typical SI session at the Faculty of Engineering at Lund University look like? First of all it is a scheduled weekly 2-hour session during normal school-hours when the students are free from other educational activities. Normally it is attached to an introductory course in mathematics (most common), physics or chemistry. It generally commences in a relatively easy-going fashion with some 5-10 minutes of talk, guided by the SI leader (the SI-leader is usually a 2nd or 3rd year student) about occurrences in the course during the previous week. Thereafter the participants decide which areas they want to focus on during the SI session – these may be terminology, theorems/proofs or concepts that need clarification, or problems that have been difficult to understand and solve. In addition – time allowing, which is generally the case - the participants work with more difficult tasks at exam level, which the SI leader has prepared. The SI leader usually divides the group into smaller sub-groups to ensure that all participants may be active and able to contribute to the work with the material. The SI leader’s main task is thereafter to act as a facilitator to ensure that the work and discussions in the groups progresses smoothly. This is
done for instance by asking or redirecting questions within the group, helping to break down problems, and encouraging participants to help each other towards understanding, by posing critical or probing questions. It is essential that the SI leader works to obtain an open climate in the group whereby all participants are free to ask the questions they would like to have answered. The SI sessions are generally concluded with the participants presenting for each other, the solutions and answers they have arrived at, using the blackboard.

III. METHODOLOGY USED IN STUDY

In order to answer the questions raised above in the introduction we used two questionnaires – one for students who have just concluded their term as SI leaders (see tables I and III), and one for former SI leaders who have graduated and who are currently working (see tables II and IV). Both questionnaires consisted of a few statements to which respondents expressed agreement using a 5-level Likert-type scale, as well as a number of open-ended questions. The first questionnaire was handed out to 36 students who had completed their SI leadership at the end of the autumn semester. The second questionnaire was posted to 40 SI leader alumni who are currently employed.

TABLE I

Open-ended questions to students who have just finished their term as SI leaders
- What has been most rewarding in your job as an SI leader?
- What has been least rewarding in your job as an SI leader?
- Name three qualities that you believe characterize a good SI leader
- Describe how your role as an SI leader changed during the semester
- Have you, by being an SI leader, changed your view on your own studies?
- Briefly name and explain three skills you improved upon by being an SI leader
- Describe what you did to try to create a trust between you and your participants at the SI sessions. Do you feel that you succeeded in creating this trust?
- Describe what you did to create an easy-going, positive and supportive atmosphere at your SI sessions. Do you feel that the atmosphere at your sessions can be described in that way?
- Other remarks

TABLE II

Open-ended questions to former SI leaders who have graduated and who are currently working
- Describe briefly your employment and work tasks since graduating from the School of Engineering at Lund University
- In hindsight – What skills did you develop during your SI leadership?
- Which skills developed during your SI leadership have you used for in your work, and in what way?
- Give an example of, and describe a situation where you used the experiences of your SI leadership in your professional life.
- Other remarks

IV. RESULTS

35 students (97 %) completed and handed in the first questionnaire. The results regarding agreements with statements are shown in table III. A clear majority of the students agree, or agree to a large extent, that they have got a deeper understanding of the course as well as improved self-confidence. Many of these results confirm earlier findings by [8], [9], and [10] from other universities and in other subject areas.

The results in table III are supported by the answers to the open-ended question “Name and explain briefly three skills you improved upon by being an SI leader”. One example:

- To study and inspire large groups and to talk in front of others. To plan and take responsibility. To reflect on my own studies.

TABLE III

<table>
<thead>
<tr>
<th>Statements (all beginning with – By being an SI leader …….)</th>
<th>Disagree</th>
<th>Agree to a minor extent</th>
<th>50 % agreement</th>
<th>Agree to a large extent</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have developed my ability to communicate with others</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>29</td>
<td>66</td>
</tr>
<tr>
<td>I feel more secure in being a leader of a group</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>31</td>
<td>63</td>
</tr>
<tr>
<td>I improved in organizing the work for a group</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>34</td>
<td>54</td>
</tr>
<tr>
<td>I have developed my ability to listen to other people’s thoughts and reasoning</td>
<td>0</td>
<td>3</td>
<td>11</td>
<td>31</td>
<td>54</td>
</tr>
<tr>
<td>I feel more secure in leading a discussion</td>
<td>3</td>
<td>0</td>
<td>17</td>
<td>34</td>
<td>46</td>
</tr>
<tr>
<td>I have developed my ability to make a group of individuals enthusiastic about performing a task</td>
<td>0</td>
<td>3</td>
<td>17</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>I got a considerably deeper understanding of the course content</td>
<td>3</td>
<td>3</td>
<td>17</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>I have developed my ability to get students to help each other</td>
<td>0</td>
<td>6</td>
<td>9</td>
<td>49</td>
<td>37</td>
</tr>
<tr>
<td>I have improved my self-confidence</td>
<td>0</td>
<td>6</td>
<td>26</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>I improved my ability to talk in front of others</td>
<td>0</td>
<td>6</td>
<td>17</td>
<td>46</td>
<td>31</td>
</tr>
<tr>
<td>I improved my ability to meet and inspire different individuals</td>
<td>0</td>
<td>3</td>
<td>23</td>
<td>46</td>
<td>29</td>
</tr>
<tr>
<td>I improved the planning of my own work</td>
<td>6</td>
<td>23</td>
<td>29</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>I improved my own way of studying</td>
<td>14</td>
<td>34</td>
<td>26</td>
<td>26</td>
<td>0</td>
</tr>
</tbody>
</table>

Support for some of the results in table III can also be found in the answers to the open-ended question put to former SI leaders who have graduated and are currently working, “Seen in hindsight – What skills did you develop during your SI leadership?”. One of the answers that illustrates this:

- I have improved my leadership abilities, seen the value of involving and engaging those who participate in projects by promoting active participation and own initiatives

Two items in table III that did not change much for the majority of the students during the SI leadership, were the
planning of their work and their way of studying. This observation is confirmed by the answers to the open-ended question “Have you, by being an SI leader, changed your view on your own studies?”. More than half answered negatively to the question. However, some of the SI leaders who answered negatively mention that they had preferred to work in groups prior to SI leadership, or state that they changed their view on their own studies through SI sessions, when they themselves were participants. The students who felt that they did change their way of studying by being an SI leader, mention the benefits of working in a group, to look at a problem in different ways and to learn in a more meaningful way – not just for the exam.

Two other competencies that are essential for SI leaders were addressed in the open-ended questions regarding trust between SI leader and participants and creating an easy-going, positive and supportive atmosphere in the SI sessions. The answers reflect that all SI leaders had strategies to create both trust and a fruitful atmosphere and they appear to have succeeded well in both respects. One example:

- By being friendly and helpful but also firm regarding helping each other. To encourage the students and give plenty of praise for good questions etc. No questions are bad! They have trust in the SI leader if they feel free to ask him/her questions.

In the last open-ended question “Other remarks” it is impressive how many students - actually a majority of them - express how much fun it is to be an SI leader (some of them being quite surprised at this conclusion!).

20 of the 40 SI leader alumni sent in a completed questionnaire (questionnaire No. 2). The types of jobs they represent vary quite a lot – from being a researcher at a university to purchase manager at a communication company, and a development engineer at a packaging company are a few examples. The results regarding agreement with statements are shown in table IV. It is encouraging to see that a clear majority of the respondents judge the merit of having been an SI leader, as an important merit in attaining employment after graduating from the Faculty of Engineering at Lund University.

Several of these benefits are confirmed in the answers to the question “Other remarks”:

- To have been an SI leader was seen as very positive at job interviews, since so many positive experiences are linked to this, like leadership, pedagogy, coaching, responsibility etc.

It is also encouraging that most former SI leaders feel that they had some use or good use of their SI leadership experience in their current employment, agreeing well with the findings of [8]. This is also illustrated in the answers to the open-ended question “Which competencies developed through your SI leadership have you had use for in your work and in which way?”. One example:

- Very good use since I am often in charge of different jobs. It is about communication, patience to explain in different ways etc. It has also made me feel comfortable when I am in charge of meetings.

### TABLE IV

Agreement (% of former SI leaders) with statements in questionnaire by former SI leaders who have graduated and are presently working

<table>
<thead>
<tr>
<th>Questions</th>
<th>Not at all</th>
<th>Of very limited importance</th>
<th>Of some importance</th>
<th>Of high importance</th>
<th>Of very high importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>How important was the merit of being an SI leader in attaining employment after graduating from the Faculty of Engineering at Lund University?</td>
<td>6</td>
<td>28</td>
<td>17</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>In your job, how much use have you had of your SI leadership after graduating from the Faculty of Engineering at Lund University?</td>
<td>5</td>
<td>15</td>
<td>35</td>
<td>45</td>
<td>0</td>
</tr>
</tbody>
</table>

V. CONCLUSIONS

The study indicates that students who work as SI leaders gain several benefits from their SI experience. The benefits can be divided into the following main themes:

- Improved communication skills
- Improved interpersonal skills
- Improved leadership skills
- Improved self confidence
- Deeper understanding of course content

Several of these benefits are confirmed in the few other studies made on the subject mentioned in the introduction. In the present study it does not seem that SI leaders in general feel that they improve their study skills or become better in planning their own work as a consequence of their leadership. These results are contrasted by the findings of [8] and [10] that indicate the opposite. The reasons for these differences between the studies are hard to say.

SI alumni and to what extent their SI leadership have benefited them in their working life after graduation have received little attention previously. In the present study a majority of former SI leaders regard their SI leader experience as an important merit in attaining employment after graduation. A clear majority of former SI leaders have had some use, or good use in their later professional life, of the skills acquired and developed during their SI leadership.

REFERENCES


