Evaluation Plan and Preliminary Report

The evaluation of the Affinity Group Project is a multi-method approach designed to document and examine the processes, outcomes, and impact of the Affinity Group Project. In particular, the evaluation is designed (1) to provide information to program developers to improve the conceptualization and implementation of the project and (2) to document and examine potential essential organizational structures that define a model for undergraduate/graduate research groups. The evaluation is guided by two questions (1) what are the important student experiences (ie. activities designed by program developers or informal everyday activities with others) that enable and encourage student success in computing and (2) what are the minimal organizational structures that support student success in computing.

Briefly, the evaluation plan includes:

- The administering of a critical incidents technique instrument that is designed to systematically gather and categorize behaviors which have previously been critical to success or failure in a specific performance context or situations. This method capitalizes on the use of impressionistic data to provide a diverse sample of behaviors that are potentially critical to performance of a specific set of tasks in a specific context or situation. In the case of the Affinity Group Project evaluation, students were asked to describe two situations: one in which the Affinity Group or subgroup worked well and one situation in which the Affinity Group or subgroup did not work well. Analysis of both situations should highlight those essential organizational structures that are needed for conducting research/developing projects and supporting student success in computing.

- The development and administering of a student questionnaire that is designed to systematically gather student self-ratings of their skill and knowledge level in a field of interest and knowledge and skills needed to work in teams, as well as, their attitudes toward research and team-building. For example, on the questionnaire there are sets of items that ask students to rate their satisfaction with their current skills. Students are asked to respond "extremely satisfied," "satisfied," "dissatisfied," "extremely dissatisfied," and "unsure" to such items as: "I can contribute to team discussions," "I can cooperate with other group members," or "I can work in a group or work individually when needed."

Based on the analysis of the responses to the critical incidents technique and the responses to the items on the questionnaire, two other instruments will be developed and implemented: an observation system to be used to systematically gather and examine group behaviors and an interview protocol to be used to systematically explore and examine the student experiences around the Affinity Group Project.

Data collection using the critical incidents technique and student self-ratings have been conducted and are in the process of being analyzed and interpreted. The development and implementation of the observation system and interviews will commence once the data from the critical incidents technique and questionnaire have been analyzed. Preliminary results of sections of the
Preliminary Report.

The following results are preliminary and descriptive in nature. Only those items that deal with a student's satisfaction with their current skills are reported in this section. Students were asked to rate their satisfaction with their current skills: "Extremely satisfied," "Satisfied," "Dissatisfied," "Extremely dissatisfied," and "Unsure." Seventeen items were designed to tap into a student's perceptions of her/his group, communication and research skills. The three items judged by the students as the most valuable skills they have learned from their participation in the Affinity Group Project are listed below. Each item is presented with the percentage of students responding to the item in a particular way. The percentage of students will be shown in the appropriate cell.

<table>
<thead>
<tr>
<th>Item</th>
<th>Extremely Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Extremely Dissatisfied</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can contribute to team discussions.</td>
<td>25%</td>
<td>63%</td>
<td>8%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>I can cooperate with other group members.</td>
<td>20%</td>
<td>76%</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can work in a group or work individually when needed.</td>
<td>48%</td>
<td>48%</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For items specifically asking students to rate themselves on their skills to conduct research, they responded in the following ways. On the item, "I can conduct research without much supervision" 16% of the students responded that they were extremely satisfied, 52% of the students responded that they were satisfied with their current skills to conduct research without much supervision. 16% responded that they were "dissatisfied," 4% responded that they were "extremely dissatisfied" while 12% responded that they were "Unsure." On the item, "I can design a research project with minimal help from a faculty member," 16% responded that they were "extremely satisfied," with their current skills, 28% responded that they were "satisfied." 28% responded that they were "dissatisfied" while another 12% responded that they "extremely dissatisfied." 16% of the students responded that they were "unsure."

Students were asked to rate how important certain activities were in contributing to the success of a team. At least 84% of the students agreed that the following activities were important to the success of a team.

- Communicating information about meetings
- Building a supportive climate
Keeping communication open
Assuring that all members are heard
Managing conflict
Managing time
Orienting team to its task
Encouraging critical analysis
Creating a feeling of unity
Being individually accountable
Identifying with the group
Implementing the plan
Provide feedback
Having fun

Students were also asked to rate the performance of their groups on each of the activities listed above. The results are presented below. The table will included the item and the percentage of students who felt that their group "did well," "did okay" or "did poorly" on each activity.

<table>
<thead>
<tr>
<th>Activity &amp; Importance</th>
<th>Did well</th>
<th>Did okay</th>
<th>Did poorly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicating information about meetings</td>
<td>60%</td>
<td>32%</td>
<td>8%</td>
</tr>
<tr>
<td>Building a supportive climate</td>
<td>52%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Keeping communication open</td>
<td>56%</td>
<td>20%</td>
<td>16%</td>
</tr>
<tr>
<td>Assuring that all members are heard</td>
<td>44%</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>Managing conflict</td>
<td>28%</td>
<td>56%</td>
<td>4%</td>
</tr>
<tr>
<td>Managing time</td>
<td>8%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Orienting team to its task</td>
<td>20%</td>
<td>60%</td>
<td>12%</td>
</tr>
<tr>
<td>Encouraging critical analysis</td>
<td>44%</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td>Creating a feeling of unity</td>
<td>44%</td>
<td>36%</td>
<td>4%</td>
</tr>
</tbody>
</table>
In general, when asked why they were participating in the Affinity Group Project, students answered in one of the following ways:

- To gain knowledge of the field and/or research.
- To improve their research skills or their teamwork teams.
- To collaborate with other students and professors.

For example, students wrote:

- It has enhanced my view of computer science and allowed me the opportunity to collaborate more closely with the students and professors in the department.

- Of a senior project related to Communications and DSP. Strong interest in DSP and digital communications. Willingness to do research in these areas during my masters.

- To learn more about computer science than what is taught at the course level. And to have experience with research and get to know more people.

In response to the item: "The one thing I accomplished...," students wrote about three areas: increased knowledge of the field and research, the completion of a specific project, and increased knowledge and ability to work in teams and communicate with others. For example, in response to the item, students wrote:

- I am more confident in my ability to ask questions and seek justification for answers rather than blindly accepting what others say. I have learned so much more about my field and improved my group and communication skills through the affinity group.

- To be more active with students and professors who are knowledgeable in the field of computer science.

- A QAM system (transmitter & receiver) on a DSP Chip.

In describing their thoughts or impressions about graduate school, students wrote that

- Graduate school increases your knowledge in the major chosen and provides the opportunity to specialized. It is a lot of hard work.

- I think as a female, a graduate degree is necessary to be taken seriously. I think a graduate degree in any area multiplies your marketability & opportunities that are beyond
the scope of an undergraduate degree.

I think graduate school will be fun and make me a leader instead of a follower in the professional world.

When asked to list the factors that one would take into account when deciding to go to graduate school, students mention: Tuition, programs of study, marketability, learning more about a subject area, and continuing to work with a professor. Students wrote,

I looked hard to advance and to be distinguished among the people with their bachelors. I have a chance to specialize in the signal processing/communication area.

Research for my thesis and possible papers with a professor. Money to sustain my education. Right professors.

Some of the students felt that graduate school was not for them. For example, one student wrote that

I am not willing to devote any time towards graduate school at this moment.

Most of the students give themselves a 25% or greater chance of attending graduate school. Many of the students are first or second year graduate students. When asked why it is important to get a degree in computer science or electrical engineering, students wrote that

I think that when one really puts his/her feet firmly on the ground and says I am hungry for knowledge one accomplished big successes. To be successful is the important reasons here.

I decided to pursue this degree, because I like this area, and it is interesting to study.

A few verbatim responses to a request for students to describe situations in which the members of their Affinity group worked well and did not work well gives an idea of how one can examine the descriptions and come up with potential essential organizational structures.

Some potential essential organizational structures are the following:

- Clearly stated goals or frameworks in which the student understands and experiences the complexity of research and project work. That is, things are not set in stone, but can adapt to the changing situation.

- Clearly established responsibilities and mechanisms to support individual accountability, such as regularly scheduled meetings for faculty coordinators and students, and students with their team members.

- Clearly defined timelines and due dates, interim reports and project meetings to discuss progress.
Watch for signs of "clique-formation". Develop ice-breaking activities that are related both to the task and to the social dimension.

Establish a culture of innovation and collegiality. Students socialize each other.
Reinforce appropriate behavior.

Verbatim Reports

#1 In our Systems Affinity Group, there are 3 students that will be presenting papers in Washington. One of the students had his papers almost ready to present. Our goal was to read his paper and correct it. We were divided in groups of 2, and we were given 2 paragraphs to correct. We read and correct each paragraph for about 20 mins. I think that in this activity we worked well as a group because we were helping a team member and at the same time we were learning to give positive and feedback. We all had to do our part of the job because this was a very important paper. After we corrected it, we discussed our corrections with this student and with the rest of the group.

My contribution was to help one of my team members and give him feedback.

The Affinity group has helped me a lot to work in groups. It helped me with my Software Engineering class because we had to work in groups of five. I think that I had the team skills that I needed for this class thanks to the Affinity Group. I didn't like to work in groups before, but now I even enjoy it.

I also have learned a lot about the research process and how to do research together with my team members. For me, this is the first time I've done research and everything I know about it is thanks to the job I've done for this group. I learned how to find reliable sources and even how to write a technical paper.

#2 The group was the entire affinity group, and we were working on an outreach program called the Engineering and Science Expo. It was held in the Spring semester of 1996. The task was to develop a program that would introduce a new concept in computer science to people in the community.

Our particular concept involved Fractals. The goal was to make the program fun and interesting, while providing a learning experience. The group members where the entire Software Engineering Affinity