

## **Knowledge Probe Report for ECE 435: Software Engineering**

### **Probe Overview**

This probe was designed to test and evaluate for Outcome D (the ability to function on multi-disciplinary teams). Since this course incorporates a large team-based software design project, the outcome probe was designed to be an end-of-term questionnaire on this particular activity. Specifically, the following questions were asked:

- Q1) What was the size of your project team?*
- Q2) What was the level of effort required to complete this project (versus other course projects)?*
- Q3) How were the project tasks assigned between group members?*
- Q4) What were some of the overall positives of the course project?*
- Q5) What were some of the overall negatives of the course project and what changes should be made?*

The objective of the above questionnaire was to gauge the students' assessment of the course project and its usefulness in improving their ability to work on a sizeable project in a team-based manner. All responses were collected in an anonymous manner after the final project presentations were completed.

### **Analysis**

A total of 13 responses were received for the survey questionnaire (from a total class size of 16 students). These responses were carefully reviewed to analyze key details regarding the outcome under consideration. The responses are summarized as follows:

- Q1) All respondents stated a group size of 4 (i.e., 4 project groups with 4 students each).
- Q2) More than half the respondents stated that the team-based project involved the same or notably higher level of effort versus other course projects (i.e., 4 stating considerably more and 5 stating approximately the same). The remaining respondents stated that the level of effort was moderate or lower than other courses (total of 5).
- Q3) A variety of different approaches were used by the groups to delineate work between team members. Namely, roughly half of the respondents stated that the project tasks and activities were assigned according to the strengths (or likes) and weaknesses (or dislikes) of the team members. Hence, in these instances, team members tended to only gain exposure with one/two types of design activities, e.g., documentation, coding, testing. Meanwhile, the other half of respondents stated that tasks were "equally" assigned at each stage of the project. Hence, in these cases, all members worked on the different types of activities, thereby providing them with a broader exposure to the software development process.
- Q4) The respondents cited a variety of positive experiences with the team-based project. These included increased exposure to teamwork environments (reflective of real-world design activities), learning from each other, and improving their technical skills (e.g., coding, testing, documentation, etc). Several also stated that the project helped them better

understand and appreciate the formal software design process and experience firsthand how this process can help simplify subsequent coding and development efforts.

Q5) The respondents cited a variety of negative experiences with the team-based project. For example, nearly half stated that there was too little time given to complete the project and that it should be assigned earlier on in the course. A lesser fraction also stated that the lack of sample reports and documentation (e.g., requirements, design, testing, evaluation) was problematic as they were not clear about what exactly was expected. A few respondents (two) also stated that the project involved too much documentation and that they preferred to have more of a focus on coding.

### **Suggested Actions and Follow-up Actions**

The overall performance of the students on the various portions/aspects of the course project was quite good, i.e., in terms of challenge of the project selected, quality of design requirements, detailed design, code development, testing, and final presentation and analysis. As a result it was concluded that the desired outcome D was met, i.e., students did exhibit the ability to function in multi-disciplinary teams.

Based upon the feedback received in the questionnaire, some follow-up suggestions are also noted to better improve the overall team-based project experience for future classes. Namely, all groups will be required to formalize their project within the first 3 weeks of class, thereby allowing more time to work on the detailed aspects of the design process. Sample documentation will also be provided to better detail the desired level of effort and outcomes of the course project. Finally, it will now be required for each student to work on all key aspects of the project (design, documentation, coding, testing) in order to gain increased exposure to the multi-disciplinary software design process.