ASSESSING STUDENT PREPAREDNESS FOR PROFESSIONAL ENGINEERING PRACTICE: A PROFESSIONAL ADVICE TASK

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Abstract- *One goal of engineering education is to prepare students for professional engineering practice. Assessing such preparedness can be difficult. At the Center for Engineering Learning and Teaching, we have been exploring the development of an authentic assessment task in Civil and Environmental Engineering – the professional advice task. We have been using this task to gain insight into students' preparedness relative to ABET outcomes B (data analysis) and D (teamwork), as well as their preparedness more broadly (i.e., when they generate the list of issues, how broad are these issues). However, the format of the task is sufficiently generic that it could be used for almost any ABET outcome.*

ASSESSING PREPAREDNESS FOR ENGINEERING

One goal of engineering education is to prepare students for professional engineering practice. Assessing such preparedness can be difficult. At the Center for Engineering Learning and Teaching, we have been exploring the development of a variety of tasks for use in assessing preparedness. These tasks include word association and concept mapping for exploring students' overarching conceptions of their engineering discipline, concept sorting for exploring students' understanding of the relationships among major discipline specific concepts, and a professional advice task. In the professional advice task, the student is asked to comment on various dimensions of a project in their discipline. Because the student could be asked to provide advice on a number of different issues (including any or all of the ABET outcomes), this type of task is quite flexible.

PROFESSIONAL ADVICE IN "CEE"

In our case, we worked with Civil and Environment Engineering (CEE) students, and asked them to give professional advice concerning the construction of a new bridge. Specifically, we told the students that they would be participating in a public forum and asked them to prepare comments in three areas: the types of issues that would arise, the types of data to be collected and analyzed, and the team that would be needed.

With this task, we have been able to explore student preparation relative to ABET outcomes D (teamwork) and B (data analysis) as well as their preparedness more broadly (i.e., when they generate the list of issues, how broad are these issues). In our analysis, we have focused on student performance on each of these dimensions as well as the consistency of the students' responses between these three dimensions.

To analyze the data, we created a rubric for each problem dimension (i.e., issues, data, and teamwork). These rubrics represent a master list of ideas that could have been mentioned. These ideas are represented at two levels of detail. For example, the broader first-level "issue" category of "soil" included the following second-level items: composition, shear strength, and boring capacity. Furthermore, these individual rubrics were created so that they could be compared, in order to determine the consistency of the responses. Ultimately, two coders independently coded all data, compared the responses to determine reliability at the first level, and negotiated all differences to consensus.

PRELIMINARY RESULTS

Our dataset includes responses from 31 graduating civil engineering students. From the results, we are learning that the students are able to broadly identify project-related issues and data, but less able to broadly identify team members. Furthermore, we are seeing that students' responses to the "data" and "issues" prompts are quite consistent, while their responses to the "teamwork" prompt are somewhat inconsistent with their responses to the first two prompts. For example, many students identified public opinion issues as important, but few included anyone on the team who would be responsible for those issues.

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