

Web Based Project Reports

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Abstract - Most freshman engineering classes have some form of a presentation and /or a report associated with projects. One of the challenges with a large class is providing efficient, but meaningful feedback and grading. It is also important to provide a good framework of instruction to students for their first projects in engineering. We have experimented with a web based form for the project report. The students fill in boxes for such things as title, description, process, conclusions, feedback, other information, and references. Students also upload a device picture, a team picture, a video of the project in operation, and a short video in which the team describes their project. One advantage of the web form is that it enables easy grading; a web form is developed with side-by-side windows of the grading rubric in a web entry form and the team project report in the other window. Another advantage is that a summary of all the projects can be easily developed to showcase what the class has done. Potential disadvantages are that the web form does too much for the student (spoon feeds the required parts of the report), and can constrain creativity in presenting results. Overall, the web form has been positive. The concept has been extended so that students submit a planning report and a status report via a web form. The planning report requires students to list any assigned team members that they have not been able to contact, a brief description of their project (with the understanding that this could change as the project progresses), and how the team plans on dividing the work. The status report requires teams to report any team member who is not contributing, the progress the team has made, and any changes the team has made to their original plan.

Index Terms – Online reports, physics, first year engineering, rubrics, engineering design process.

INTRODUCTION

The freshman engineering program at the University of Tennessee consists of two main courses - Physics for Engineers I and II. The content of these courses is primarily physics, covering approximately the first 25 chapters of an introductory engineering physics textbook. The courses are taught by engineering faculty and, along with the primary physics content, integrate an introduction to engineering and elements of successful engineering practice: teamwork, engineering design, and communication. Serving approximately 700 students in an academic year, each four credit hour class consists of three 50 minute lectures and

two 75 minute recitations per week. The lectures are common - all students attend a large team-taught lecture, and the recitations are divided into groups of 24 students each and are directed by a graduate teaching assistant (GTA). The recitation activities are developed by the faculty and the GTAs lead the recitations following the prescribed plan. Activities include demonstrations, hands-on experiments, homework help, and team design projects. A custom web site for course management has evolved over the years and has been invaluable in allowing the effective and efficient coordination of the large, multi-section courses. The custom web site also allows for the development and implementation of new online tools. This paper will describe how students submit results from their engineering design assignments, and how their submissions are evaluated via the custom web site. While the implementation is a custom one, the philosophy, methods, and goals of the system are applicable to any class.

WHAT IS A WEB BASED PROJECT REPORT?

As a deliverable in the objective of introducing students to the teamwork and communication involved in the engineering design process, students are required to participate in a design project near the end of each semester and document the process with a project report. In the past, project reports are not started until the project is finished, often done by a single team member, and turned in at the end of the project as a single printed or electronic document. These reports were difficult to grade objectively and the timing and logistics made it difficult to provide feedback to all team members. To address some of these issues, we have experimented with a set of web based forms for the project report.

Approximately a week after the project is assigned, students must complete a web based “preliminary plan” form. The form is designed to initiate the planning process and to force the students to get an early start on the project. In addition, the planning report requires students to list any assigned team members that they have not been able to contact, a brief description of their project (with the understanding that this could change as the project progresses), and how the team plans on dividing the work. A few weeks into the project the students complete a status report form. The status report requires teams to report any team member who is not contributing, the progress the team has made, and any changes the team has made to their original plan.

For the final report, students complete a form which, in essence, is an outline of all of the components required for a complete report. Separate fields are provided for such things

as title, description, process, conclusions, feedback, other information, and references. Students also upload images and videos as required by the specific project. All of this information is stored in a secure web based database. Finally, all of information submitted by the students over the course of the project comes together to form a completed set of documentation of the project.

ADVANTAGES

There are many advantages of using a web based reporting system as compared to a document based system. The forms and information are accessible by any team member at any time. The nature of a form based system enforces a consistent and standard format for report components. Storing the data in a database allows for searching, reformatting and summarization of the data. Integration of the web based reports with an online rubric based evaluation system allows for more consistent grading feedback. For team projects, it also allows access to the feedback for all team members. Having results online means that students can view the reports of other students and teams, and even view project results from previous semesters. Requiring reporting during all phases of the project allows for earlier identification of potential problems and encourages work to be more evenly distributed.

DISADVANTAGES

Due to the nature of the forms in general, one can argue that a form based report does too much for the student, i.e. it spoon feeds the required parts of the report. However, many classes provide example reports which in essence do the same thing by allowing the student to mimic a specific format. Web forms also can constrain creativity in presenting results. We address this concern by allowing students to submit supporting information in the form of text, images, and video. Making project report information available on the web, even in summary form, increases the possibility of students using prior work as their own. Our best defense against this is proactive education – we make it clear to students at the beginning of the assignment that this information is available for their reference and that our web based system makes it easy to check their work against previous work.

RUBRIC INTEGRATION

As mentioned earlier, the integration of an online rubric system with the web based reports is a very powerful combination. Using a custom online rubric provides a method of providing timely, consistent, and meaningful feedback to all team members. The online rubric system used allows criteria to be defined that either add to or subtract from a project’s score. Simple web checkboxes and radio buttons are the grader’s interface, with text comments also supported. Links to all components of the web report allow for ease of use. All results are stored in a central

database to allow for controlled access. Any combination of statistics and summary information is readily available.

FUTURE PLANS

With the successful implementation of web reports for the final projects in our large classes, we are considering expanding the use of the system for more projects in these classes, and also using the system for other classes. Much more can be done with the information gathered during the reporting process, especially in the areas of early intervention to prevent potential problems. Peer reviews (students evaluating other students’ work) is also being considered.

CONCLUSIONS

A web based project reporting system for an introductory engineering design project in a large class provides many benefits such as more and more consistent documentation, better and timelier feedback, and enhanced summary and statistical capabilities. Care must be taken in how this functionality is used to avoid providing too much structure and thus limiting creativity. Examples of the project reports as implemented in several different classes is available at <http://ef.engr.utk.edu/efd/publications/web-reports>.



FIGURE 1
EXAMPLE OF A PROJECT REPORT GALLERY

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