INTRODUCING UPPER-LEVEL ENGINEERING STUDENTS TO THE TECHNICAL LITERATURE IN A SPECIAL TOPICS COURSE BY WRITING REVIEW PAPERS ACCORDING TO ARCHIVAL SPECIFICATIONS

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Abstract - Many Technical Elective and Graduate courses use a textbook as the sole source of information. While this is convenient and efficient for engineering fundamentals it prevents students from developing skill sets that will enable young practitioners to interact with emerging research issues. A culminating paper assignment provides an excellent opportunity to strengthen both self-directed learning and technical communication skills. This paper overviews the scaffolding used to improve learning through the use of writing. Through the project, students gained confidence searching and interpreting the technical literature.

Index Terms – Literature review, Technical report, Textbook supplement

WORK IN PROGRESS

Technical report writing is a part of most engineering positions. Most programs rely on courses from the English department to teach technical writing skills, which can leave students inexperienced with writing on an engineering topic. By integrating writing in to the curriculum it is possible to provide this experience while enhancing learning.

Goals

Initially there were three goals for this project. First, most courses depend on a textbook as the primary source of information, with lectures following the text. To expand the source of information in the classroom, research paper was assigned. The paper is to be a review literature covering the state of the art in a topic area of the students’ choice, but must be aligned with the subject of the course.

As part of any research, a literature review should be conducted to see if the answer to the research questions already exists. Many students will never experience literature reviews if they do not continue through graduate school. Working on this project provided this opportunity at an undergraduate level.

In preparation for professional work or further education, students should learn to write a technical paper in a specified format. Since this was a course on internal combustion engines, the Society of Automotive Engineering (SAE) paper format was chosen.

Method

The research project was assigned and introduced with the syllabus. The assignment was worth 25% of the total grade in the class, and was not due until nearly the end of the semester. At first just a basic description of the project was disseminated. As the course continued, more details were released at appropriate times.

Mid-way through the course the students were introduced to literature reviews. They were given access to a current database of SAE papers as one possibility of sources, but were encouraged to expand their selection of resources. Also, the students were made aware of a service the library provided about literature searches.

To help achieve the objectives, individual interaction between the instructor and students was done at critical stages in the process. As part of a homework assignment each student was to propose a topic for research. Just after reviewing the submissions the instructor met with each student to help scope the topic to a reasonable level. About 75% through the course a first draft of the research paper was due. This was not to be a rough draft, but a complete, fairly polished version. The first draft was worth more points than the final draft. Students are given detailed feedback about their paper – what aspects were well done, and what items could use more attention. This would set the criteria for grading the final submission.

Results

Results are still being compiled, and the project will be run again in the Fall 2003 semester. Student feedback has and will be collected. Students were queued about how the project influenced their education, the usefulness of a literature review, and their comfortableness in searching and reading technical papers.

The quality of students’ papers is also a good indication of project success. By providing individual feedback at critical times in the process there is a notable improvement in quality and learning. The paper also serves as a great means to assess the student. As a culminating work, it is clear to see the depth of learning the student attained through the course lectures and work. Underlying concepts from the course can be easily evaluated though reading the papers.

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