Abstract - Teaching of technical writing in an engineering program is usually a difficult task because of the wide range of technical subjects in the engineering field and the inherently different writing styles adopted by the various engineering disciplines. This is compounded by the different background of engineering faculty, the dichotomy of the background of students in a typical engineering class, and different author requirements by different technical journals. These, sometimes mutually exclusive issues, tend to impede student's learning of technical writing. In the course of their training at Grand Valley State University (GVSU), beginning with the freshman semester and continuing until the senior year, engineering students are required to complete numerous writing assignments. These assignments are usually in a variety of different engineering courses with different topical emphasis. To help engineering students master the fundamental aspects of technical writing, the faculty in the School of Engineering at GVSU have developed unified technical writing guidelines for engineering students. In this paper we discuss some of the features of the unified guidelines and preliminary results obtained from using these guidelines in some of the sophomore level courses.

Index Terms – Technical writing, Writing guidelines

INTRODUCTION

One of the components of Grand Valley State University’s liberal arts education is the Supplemental Writing Skills (SWS) program. It was developed based on a national "Writing Across the Curriculum" movement [1]. Two of its core principles are that writing instruction must be continuous during all four years of undergraduate education, and that only by practicing the conventions of an academic discipline will students begin to communicate effectively within that discipline. The Writing in the Disciplines (WID) approach is based on the understanding that each discipline has its own conventions of language use and style. These conventions must be taught to students so that they can successfully participate in academic discourse.

The School of Engineering at GVSU has taken the WID approach and integrated numerous writing assignments throughout the curriculum, beginning with the freshman semester and continuing until the senior year. These assignments vary in report type, format, and topical emphasis between courses. As a result of the wide range of technical subjects and the inherently different writing styles, the teaching of technical writing in an engineering program can be a challenging task. The task becomes more difficult when the different background of the faculty and students are taken into account.

To assist in the instruction of technical writing to our engineering students, unified technical writing guidelines have been developed for students and faculty in the School of Engineering at GVSU [2]. Some of the features of the unified technical writing guidelines and preliminary results obtained this past winter semester in several sophomore level courses are discussed.

UNIFIED TECHNICAL WRITING GUIDELINES

The unified technical writing instruction document was created to provide students with a short set of general guidelines that are applicable to various types of technical reports and papers in different Engineering disciplines. The document was not intended as a substitute for the excellent books on technical writing and presentation [3]-[6] but to provide a broad framework that people have used successfully to write many published scientific papers and a variety of internal technical reports in different corporations. The goals of the document were two-fold. The first was to develop a set of guidelines that will meet the requirements across different engineering disciplines and that allow flexibility between instructors, courses, and reports. The second goal was to develop technical writing guidelines that were succinct and can be read, understood, and applied by students.

The guidelines include brief descriptions of the different types of technical reports that the students may encounter in both academia and industry. These include technical highlights, technical memorandum, letter reports, progress reports, full technical reports (i.e., technical laboratory, project, and review papers for publication in technical journals), and proposals. The purpose, potential audience, length, content of and when to write these different types of reports are described. The guidelines also contain a description of the layout of a typical scientific paper or technical report. In this part of the document, the purpose for and content of the typical sections in a technical report are described. The sections discussed include: Title Page, Abstract (Synopsis), Introduction, Relevant Theory (Scientific Background), Analysis (Design), Simulation (Design Verification).
Experimental Procedure, Experimental Results, Discussion, Conclusion, Recommendations, Future Work, Acknowledgements, References, and Appendices. In the last section of the guidelines, concise advice and help for the writing process are given. Some of the issues addressed include appropriate grammar usage (spelling, punctuation, voice, tense), style (accuracy, brevity, conciseness), and formatting (tables, figures, equations).

PRELIMINARY RESULTS

During the Winter 2005 semester, the unified technical writing guidelines were incorporated into three sophomore level courses: EGR 214 (Circuit Analysis I), EGR 226 (Introduction to Digital Systems), and EGR 250 (Material Science and Engineering). Seven different instructors involved in teaching the courses used the guidelines. The classes included students pursuing computer, electrical, mechanical, and product design and manufacturing engineering degrees.

The EGR 214 course is a university SWS designate course. This means that a specified amount of time must be spent teaching writing skills, and at least 25% of the grade must be based upon writing assignments. In EGR 214, several laboratory periods were devoted to teaching writing skills. The unified technical writing guidelines document was used as a basis for the instruction. The official writing assignments consisted of two full technical reports, each with one allowed revision.

The EGR 226 course includes three laboratory design projects throughout the semester. For each project, the students were required to submit a project report detailing their design. Part of one laboratory period was spent covering the report requirements. Again, the unified technical writing guidelines document was used as the basis for the instruction.

Technical writing is a critical component of the EGR 250 course. In the laboratory portion of the course, students were required to acquire, analyze, and present data in a full technical report. Using the unified technical writing guidelines as the instruction manual, students were instructed on how to present data in a logical, ethical, and professional manner. In a typical semester, each student is required to write more than six full technical reports and a technical memorandum. In addition, the students taking the EGR 250 course are also required to conduct a literature search and write a 10-15 page technical review on an engineering component or product. Students’ responses in course evaluations the last four years suggest that they have benefited from the emphasis on technical writing. Most of them commented that the writing of the reports compelled them to think more critically about the technical and practical implications of the results of their research and laboratory tests.

Technical writing improves the students’ ability to think more clearly and enhances their understanding of technical concepts. The unified guidelines provided a consistent basis for the instruction of technical writing in all three courses. In addition, the students appreciated the brevity of the unified technical writing guidelines document.

SUMMARY

Preliminary results suggest that the introduction of unified technical writing guidelines in the sophomore level engineering courses has enhanced the teaching of technical writing skills to engineering students. It has also helped the engineering students acquire and master the fundamental aspects of technical writing. These guidelines will be modified as necessary and their use extended to other engineering courses throughout the curriculum in the upcoming year.

REFERENCES