Utilizing Co-op to Further Liberal Education within Engineering

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Abstract

No matter what the subject area studied by students in institutes of higher learning, there is always the need to prepare written documents or create oral presentations. This communication skill preparation is critical for success in the working world. It is an activity that does not stop when a student enters the workforce. Since communication is a tool that finds its way into every area of employment, cooperative education can provide students with not only knowledge of the workplace but concrete experience in the need for good communication skill in the working environment. Classroom instruction can provide a certain amount of practical knowledge, but the forty-hour a week job brings the entire textbook learning into a proper perspective. It is with this information in mind, that a systematic approach to provide a background for dealing with communication issues was begun in the Cooperative Education Division of the College of Engineering at Michigan State University.

1. Introduction

Within many colleges of engineering, students are admitted to their respective departments in their junior year. The contact that these students will have with those respective departments may be fairly sparse. Therefore the tools that these students bring with them can be an unknown quantity. It is always hoped that all the lower division courses provide an adequate basis for the knowledge needed in the areas other than engineering, but this may not always be the case. Areas such as writing, speaking, and a sense of the need for these kinds of skills may not find sufficient skill building practice before the students enter the junior year. It is suggested that schools with cooperative engineering education programs be viewed as vital links between engineering, ABET, and liberal education. ABET requires that certain facets be an integral part of every engineering program; engineering programs want their graduates to function in a real world; and liberal education proponents strive to help educate the rounded engineer who will not only prosper as an engineer but as a complete human being. Cooperative Engineering Education provides many tools that will help facilitate these desires. Ethics, teamwork, and communication are just some of the areas that are addressed within cooperative engineering education programs. Providing students with tools to function within the real world has always been a prime focus of these programs. Communication, one of the critical needs of all

engineers, will be addressed in this paper. The means to create technical and non-technical documents will be investigated along with the foundation that needs to be created in order to direct students on their path to a future in engineering, a future that is primarily one of communication. Workshops that disseminate information, activities to focus students' attention on communication, and a detailed look at work reports and reviewing techniques will be discussed.

The concerns of faculty and corporate leaders over the lack of communication skill expressed by undergraduates have merit when we look at many of the documents produced by these young students in their early courses. These weak documents become the basis for much of the text production that is seen in the upper level courses. Poor training in and attitudes toward the production of technical documents and a lack of concrete connections to the technical world in early writing classes have created a weakness in the communication system in many departments. It is necessary, therefore, to address and correct this problem in any manner that will bring about improved communication skill. Many avenues have been suggested to do just this: writing across the curriculum, writing intensive courses, tutors. The list is extensive. Another method may be to utilize the cooperative education experience to instill in students the need to communicate with the best tools that they can gather during their college or university years.

2. The Co-op Communication Seminar

It was with this idea in mind that seminar sessions as one-day activities and a series of weekly meetings became a required activity for students who participate in the cooperative engineering experience in the College of Engineering at Michigan State University. The seminar, which focuses on language, audience, structure, and flow, presents students with the aspects of communication that will improve their performance in the workplace. By providing students with adequate information on why communication is important to them, their written and oral production will improve. These seminar experiences will be presented in detail.

The three-part communication orientation for cooperative engineering education students focuses on aspects of communication that beginning students may fail to see as important. It creates a dialogue about the importance of communication; the formats that will be encountered in academia and the industrial world; and the need to be aware of language, audience, grammar, and revision techniques. It is hoped that this very quick review of the important elements of communication will influence students to make a greater effort in their writing and speaking responsibilities.

2.1 Preliminary Issues

The seminar begins with an overview of the communication area, its importance to workers in the global society, and the need for students to continually be aware of where communication fits in their careers. Students need to be told to let text flow from the knowledge that they possess. They need to sit down and brainstorm the information that may or may not be included in their writing. Telling students to make an effort to generate as much text without a concern for order or grammatical correctness produces a wealth of material that a student can then organize into a

coherent document. By producing copy with as much information as the student can generate, a clear indication of gaps in necessary material will also be evident. Suggesting that outlines should be produced from this early writing will allow the student to see the direction in which the text will move, a movement that will result in a much more competent production. These simple elements will help to give the student a chance to produce a greater amount of text.

2.2. The Co-op Report

The second section of the seminar revolves around the more practical matter of the required co-op report. Students will receive their grades from the presentation of their semester's work related in the final report. The report itself not only gives an indication of what the students have discovered and learned in the semester, but it also provides them with important information upon which to judge the work environment and its positive and negative effects upon them.

The report is more than a, "What I Did Last Summer Report." It delves into information that might not be regularly considered by the student. It requires the student to ask questions that will create more thought that just, "Here is what I did." The students are provided with specific directions in which to take their writing. In this way, they will not fail to address elements that will form the basis of their impressions of the working world. The LEVEL I REPORT is constructed as follows.

I. Nature of the Work Setting

a. The functions, products, or services of your employing organization.
b. The organizational structure of your employer.
c. The relationship of your unit or department to the overall structure.
d. The objectives of your position. The utilization of your technical background in the position.

II. Duties and Responsibilities

a. A detailed account of your major activities to date (emphasis on the specific technical functions of your position.)
b. Any additional responsibilities you anticipate before the completion of your co-op assignment.
c. Your assignments and their relationship to your field of study.
d. Your accomplishments that will make you a better engineer.

III. Relationship to Career Goals and College Study

a. Ways in which your career goals been reinforced or modified.
b. Changes in your plans for future coursework.
c. Value of experience on potential career options.

IV. Overall Evaluation

a. Has your employment experience met your expectations?
b. In what ways has it differed from your objectives?
c. In what ways could your assignment be improved by your employer?
d. Could it be improved by you?
e. Have your assignments provided a broad, developmental experience?
f. Has your co-op assignment given you a progressive, in-depth learning experience?
g. What would you want your professors to know about your assignment, your educational enrichment, your technical accomplishments, and your overall development as an engineer?

Also contained in this section are the many formats that may be encountered by students in the real world: formal reports, email, feasibility reports, progress reports, executive memos, etc. By giving an overview of these many styles, students are given an indication of what is expected of them in their written activities.

2.3 The Focus on Style

The third section of the seminar focuses on the elements of grammar, language flow, revision techniques, and the general principles for technical writing. Here students are provided with the connections to all the previous writing classes and communication activities that they may have forgotten. Audience is also addressed in this section as a vital element of communication. Students are given a variety of situations to help develop their perception of the need to always be aware of the audiences to whom they will communicate.

Another concern among readers of student text is the flat dull quality that comes from much of the text that is produced by students. This quality reflects a lack of flow in the wording, a condition similar to reading a list that indicates no apparent connection among the various parts of the list. This lack of connection makes a reader quickly begin to wander, sometimes becoming lost in personal thoughts far from the actual text. The three items that may help improve all student text are a focus on outlines, a review of simple paragraphing with topic sentences and supporting information, and an overview of the transitions that can be placed in a piece of writing to make the text flow. These relatively easy elements in writing can make a great difference in the quality of a student's text.

An additional problem that is seldom mentioned to an entire class of students (but appears at some time or another in the text that they write) is awkward wording. Students are never shown examples of text that absolutely makes no sense; sentences that are so long that the reader loses contact with the core meaning; and word choices that are either inappropriate, ambiguous, or redundant. By providing students with concrete examples of poor text, a dialogue can be generated to address proper and acceptable text.

Lastly, many papers look as though the writer made no effort to read the paper after it was completed. Students sometimes feel that the final click on the computer to print the document is

sufficient for a quality piece of text. But does anyone really spend time in giving students an indication of how they should approach their text to proofread and edit the copy. A simple process is to instill in students a need to first look at the content and make sure that they have supplied all the information required. They can then approach the issue of clarity. Is the wording clear and concise? In the third step they review the text for grammatical correctness. The last two steps require students to evaluate their own writing for its ability to present the text in the least number of words and to investigate their own particular style. These efforts will lead to a much better production and fewer concerns over the finished text.

3.Conclusions

No matter what discipline a student pursues in his or her quest for a university degree, the issue of adequate communication skill is paramount in the minds of academics and employers alike. It is important that every avenue be utilized to provide these students with as many advantages as possible to produce text, receive feedback, and continue to improve their skills. The cooperative education experience can help in this pursuit. By providing students with many of the tools needed to communicate at a competent level, they will begin the upward climb to communication skill awareness. The co-op communication seminar focuses on the issues of communication awareness, structures, grammar, and audience. It begins the process early in the career of the university student to make an effort to truly work toward communication competence.

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Craig James Gunn is Director of the Communication Program in the Department of Mechanical Engineering at Michigan State University. In this role he directs the integrated communication program in mechanical engineering while providing help to the cooperative engineering education division of the College of Engineering. He has spent thirteen years of teaching in the public school system and thirteen years at Michigan State University. He serves as editor for the CED Newsbriefs and MCCE Co-op Courier.