A Community Addresses Communication

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Abstract

All changes in curriculum should begin with a study of current activities, needs, and resources. With the advent of EC 2000, the need to assess current engineering practices became clearly evident. A study focusing on communication needs, which began in the summer of 1997, suddenly took on a much greater importance when placed in juxtaposition with the ABET requirements. The issue of needed communication skill in engineering was addressed in the survey along with ways in which to provide this needed skill acquisition to mechanical engineering students. Basic information regarding the perceived inadequacies of students' communication skills from both the students and the faculty perspectives was collected. These results were tabulated and the concerns addressed. The survey was also extended to industry representatives to enlist their help in securing information on how they perceive the communication skills of graduates of engineering programs to be. By viewing the data gleaned from students, faculty, and employers; the comments made can help to set new and varied goals for students and faculty in the college of engineering.

Introduction

Departments of engineering have now had over three years to experience the new accreditation standards under EC 2000. The flexibility inherent in the way in which engineering departments address the needs of engineers can be both exciting and uncomfortable. Some departments may continue to see the above flexibility as too vague and therefore suspect. The area of communication may be one of the problem areas because a typical response from engineering faculty may still be, "I am not an English teacher!" The lack of specific requirements may make faculty feel that they will be forced into teaching topics or skills that may not be comfortable for them. This paper focuses on an ongoing study of attitudes and concerns toward communication skill acquisition in the Department of Mechanical Engineering at Michigan State University. Students and faculty are continually being asked to comment on areas of concern in communication, areas that have received little or no attention, or areas that seem to be purposely avoided. Specific activities will be explained in connection with skill acquisition. A look at the elements that will be refined for continued polling will also be included. It is hoped that by addressing the general problems experienced by both writers and speakers in the engineering curriculum, a foundation will be formed upon which a system for improved communication skill in engineering can be built and modified or copied by other engineering departments.

Initial Investigations

Instead of simply complaining about the lack of communication skill demonstrated by engineers, it is important that interested parties in engineering departments investigate the actual deficiencies and concerns of those affected. These parties are comprised of students, faculty, and employers. Faculty will provide the usual insights, "Engineers continue to be poor communicators! They can't write! They can't speak!" This may not be very helpful in trying to bring about change. Students are also fairly limited in their comments, "I can't write! I can't speak!" Certain employers will provide the same train of thought in their estimation of student output. These comments, though, do not provide much in the way of substantive help when it comes to correcting deficiencies. Therefore, access to actual concerns must be provided.

The initial investigation into communication issues began with a survey that was created to delve below the surface of " Can't write/Can't speak, " and discover what were the actual concerns of students and faculty. In this survey, faculty and students in the College of Engineering were asked to participate. Seventeen faculty members participated, distributing questionnaires to 28 classes. The two separate surveys produced a variety of interesting results, especially the similarity of concerns from both faculty and student alike. Since the surveys focused on the need for specifics and not the general attitude that "engineers can't communicate, it was important to gain insights about where the actual concerns lay.

The principal area of concern for both groups was the issue of grammar, punctuation, and spelling. This concern was followed closely by lack of organization skills, unclear expression of ideas, poor verbal skills, difficulty with writing introductions and conclusions, and weak logic. The rankings for each group were as follows:

Faculty	**Students**
Grammar	Grammar
Verbal skills	Expression of ideas
Organization	Organization
Expression of ideas	Support of ideas
Poor introductions and conclusions	Verbal skills
Logic	Poor introductions and conclusions
Support of ideas	Logic

The two groups also had similar responses to the questions that dealt with how to improve the communication skills of engineers. They both felt that more written assignments with increased feedback would help immensely. This applied equally to the verbal skills where more presentations were suggested with a more concerted effort toward providing constructive feedback. Class analysis of technical papers, providing equal grading for both technical and the way the material is presented, more practice, and the teaching of presentation tools like PowerPoint were all listed as helps to improving the communication skills of engineers. Future work will more clearly indicate concerns and the ways to address these concerns in an engineering department. Samples of the surveys are included in the Appendix.

The current focus of engineering faculty and corporate leaders over the lack of communication skill expressed by engineering undergraduates has merit when we look at many of the documents produced by young engineers in their early engineering courses.

These weak documents become the basis for much of the text production that is seen in the upper level engineering 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 engineering 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 investigate the typical problems shown in the text produced by the average engineer and devise methods to address these particular problems within the engineering classroom

The goal of any engineering course should be to produce technically competent engineers who can produce written text that is free of mistakes in both the technical content and the presentation of that material. If communication skills are to be scrutinized in the engineering classroom by the engineering faculty member, it is necessary to provide information on specific areas of concern along with ways to address these concerns. By focusing on problems that are generally encountered in engineering text, the faculty member does not have to assume the role of English teacher. There will only be a necessity of directing the attention of the students to a very specialized list and requiring that the student address the concerns.

Avenues for Improvement

After investigating almost ten years of text produced by junior and senior mechanical engineering students, five common areas of concern were found to be most prevalent: the problems involved in simply beginning the production of a text, specific grammatical mistakes, difficulty in creating text that flows, awkward wording, and a lack of direction in editing. If every engineering professor makes an effort to direct students to focus on these concerns, the text production in engineering courses will improve.

Engineering 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.

A common concern among faculty readers is the level of poor grammatical skills expressed by student writers. But where does one start in a fluid mechanics or in a vibrations course to address these concerns. The unfocused feeling expressed by faculty is probably the same as the

students who have no idea where to begin their reports when they have only the blank computer screen in front of them. There needs to be a basic list upon which to focus. After looking at a wide range of technical reports, a common set of errors came to light. These errors were in the use of tense: especially present and past. A simple request to look at the tense usage in text may be enough to correct some of these mistakes. Another area that seems to appear in many pieces of student text is incorrect documenting of sources both in the text and in the way bibliographies and reference lists are created. A great deal of complaint is raised, but if examples are given in the early days of a class, the problem might simply disappear. The last broad grammatical problem area concerns simple punctuation mistakes: punctuation with equations, both before and internally; where to place commas; the use of the semi-colon; punctuation with lists; and where does the punctuation go in figures and tables. A few grammar rules presented in the context of technical documentation to an engineering course at the beginning of each semester or quarter will, in most cases, eliminate many of these mistakes.

A third 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.

Another 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. Faculty who during the course of a semester or quarter give an overview of the kinds of text that do not convey concise meaning provide students with a clear indication of what their own text should avoid.

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.

Departmental Changes

As the information was collected and analyzed, required courses in the Department of Mechanical Engineering were viewed in respect to the communication skills that were being introduced or reinforced. With this investigation, the following was decided concerning

inclusion of communication activities in the courses.

Fresh. Year	ATL – American Thought and Language Remembered Events Paper, Proposed Solution Paper, Justified Evaluation Paper, Writing Profile Paper Tools: None	EGR 291– Freshmen Design **(Tentative)**
	EGR 291 – Residential Option for Science and Engineering Students Resumes, email, short engineering focused reports, engineering writing demands, problem solving, speaking, ethics, and orientation to the university/college/majors	
Soph. Year	ME 201 – Thermodynamics Student communication survey, refresher for past grammatical expertise Tools: MS Word, Email, WWW	
Junior Year	ME 302 – Fluid Mechanics Laboratory Reports: (Approx. 9 @ 4-6 pages each) Brief narrative of procedure, measured data, deduced and analyzed data, plotted results with discussion and conclusions.	ME 371 – Machine Design I Short Technical Reporting Design Analysis Reports (2 @ 4-6 pp. + App., Individual); Technical Analysis, Economic Analysis, Recommendation for Action Tools: EES.Powerpoint
	ME 391 – Mechanical Engineering Analysis Reading, thinking, and teamwork Tools: Matlab	ME 412 – Heat Transfer Design Project Documentation: Formal Repor (1 @ 10 pp. + App., Individual) Memo Report (X @ 2 - 5 pages App., Individual) Tools: MS Word, Excel
Senior Year	ME 451 – Controls Laboratory and Project Reports: Laboratory Experiment Written Reports (2 Formal Reports, Individual); Abstract, Nomenclature, Introduction, Analysis, Results, Discussion, and Conclusions – Teamwork (3-5 students/team), 9 short form reports, individual Tools: MS Word	ME 461 – Vibrations Laboratory and Project Reports: Laboratory Experiment Written Reports (2 Formal Reports, Individual); Abstract, Nomenclature, Introduction, Analysis, Results Discussion, and Conclusions – Teamwork (3-5 students/team), 9 short form reports, individua Tools: MS Word, Excel, Matlab

	ME – 471 Machine Design II Design Project Documentation: Formal Design Reports Tools: C Programming, Excel, Matlab, WWW	ME 481 – Senior Capstone Design Problem Definition, Progress report, Project Report (1 @ 35- 200 pages) Detailed description of design approach, results, and conclusions, with supporting documentation Teamwork 3-5 Students/Team Multiple industry interactions, small group presentations 1 Formal presentation to industry, faculty, and student audience Tools: MS Word, Excel, Matlab, WWW, PowerPoint

Means of Assessment

Since the inception of the Communication Program in the Department of Mechanical Engineering, there has always been a great concern with providing students with every opportunity to write and receive positive and critical comments on their text production. While we do not follow all students and chart their progress through the curriculum, we do monitor the overall improvement of their collective text production. We also provide them with a multitude of opportunities to practice their communication skill and receive feedback.

From the earliest forms of writing that take place in the ME 201 course, we begin to build the foundation for the competent engineering communicator. In the early days of the program, two individuals read first drafts, provided feedback, read final copy, and graded that copy. This provided a technical reading along side a reading for proper communication. As more and more courses were added to the list of classes that required written text that would be graded on the communication side, it became necessary to bring into the program readers. These readers were simply the 0n average 20 existing teaching assistants each semester. They obviously read for technical content, but they could easily tell an undergraduate additional areas of concern that included flow of the text, logical wording, level of vocabulary, and enjoyment of what they read.

In ME 332, 451, 461, 412, 371, and 481, I still read rough drafts offering suggestions on ways to improve the communication of the text. These rough drafts go back to the students for rewrites and are graded by the teaching assistants. The grades reflect both facets: the technical and the communication.

We also feel that it is important to empower students to make decisions on their own concerning their own writing. One way of doing this is to continually provide them with the means to check what they have done and use as much of their own talent to modify text before it is handed in rough draft and in final from. One of the ways of doing this is in using checklists. Two of these checklists follow: one that focuses on a particular course – ME 451 or 461 and the other a checklist that can be used for any written assignment. The last item is a grading sheet for each area that is used by the teaching assistants to evaluate

the final copy submitted by the student.

The following items make up the elements that will be evaluated in the formal reports for composition. Refer to Guidelines for Preparation of a Formal Technical Report (included in this lab pack) for writing style guidelines and additional information. Teaching assistants will comment on the inadequate elements, and you will have to address those comments.

Examples of all these items can be found in the lab and in the library under Craig Gunn's name in the reserved reading.

ONLY SUBMIT CLEAR AND CONCISE REPORT TO YOUR TEACHING ASSISTANT!

The requirements are as follows:

Title Page

1. Title of paper
2. Course
3. Date due
4. Section time
5. Name

Abstract

6. Why was the lab performed
7. How was the lab performed
8. What was discovered, achieved, or concluded
9. Past tense used
10. Reference to experiment not paper
11. No personal reference (I, We)

Nomenclature

12. In alphabetical order
13. Upper case then lower case (A a B b c G g_1 g_{1a})
14. Arabic and Greek separated
15. Only symbols appear

Table of Contents

16. All sections represented
17. Abstract and Table of Contents not listed
18. Lab Observations as a heading Analysis, Equipment, Procedure - sub headings
19. All columns lined up

Introduction

20. Ample motivation for the experiment stated

20A. Yours

20B. Whirlwind's

21. Sufficient information to orient reader to the substance of experiment
22. Sufficient information to excite reader
23. Sections to follow mentioned

General Lab Observations and Results guidelines (specifics follow)

Equations:

24. Equations are numbered
25. Punctuation with equations (: with follow/s/ing only)
26. Equations have space

Figures/Tables:

27. Figure/Table labels correct. (Figure 1. Title)
28. Figures oriented correctly, clearly labeled and referenced

Lab Observations

Analysis

29. Mathematical model used to predict system behavior presented with ample explanation and lead in.

Experimental Equipment and Procedure

30. Schematic of equipment used
31. Highlights of equipment used
32. Highlights of the procedure (not specific steps)

Results

33. Data presented with clear indication of what data applies to
34. Reader will understand what this data refers to
35. Trends in data stated (then to be discussed in the discussion section)
36. Clear indication of what reader should see in the data

Discussion

37. Complete discussion of the results appears
38. Connection of data and Whirlwind is clearly stated
39. Comparison to similar experiments is shown
40. Strong points of study given
41. Weak points of study given
42. Statements are specific

43. Logical progression to support conclusions that follow

Conclusions

44. "The following conclusions are supported by this study:"
45. Conclusions are numbered
46. Conclusions are concise and highly specific
47. Vague statements do not exist
48. Conclusions directly flow from discussion

References

(Reference Guidelines, which is included in the lab pack, has further guidelines)

49. Initials for first names
50. All information included
51. References numbered in text (i.e.: [author year, pages])

REVISION CHECKLIST: REACHING THE GOAL

Has the writer accomplished what he/she set out to do? If not, what still needs doing?

Has the paper said everything that you believe needs to be said?

Do you believe everything it says?

Do any of the interpretations or statements of opinion now need to be revised?

Has the writer tried to take in too much territory, with the result that the coverage of the topic seems too thin? How might the writer reduce the scope of the paper?

Could material be cut, perhaps by writing a new introduction to make clear exactly what the purpose is?

Does the writer know enough about the subject? Does more evidence seem called for?

If the writer has taken ideas and information from other writers, has credit been given where it is due?

Has the writer emphasized what matters most? Has he/she kept the essential idea or ideas from being obscured by a lot of useless details and distracting secondary thoughts?

REVISION CHECKLIST: TESTING STRUCTURE

Does the introduction set up the whole paper?

• Would any paragraphs make more sense or follow better if arranged in a different order? Try imagining how a paragraph might look and sound in a new location. Could the writer scissor it out and stick it into a different place or move it on your word processor. Reread it and see whether it works well there.

• Does the topic make itself clear early in the paper, or must the reader plow through much distracting material to come to it? Later in the draft, is there any passage that would make a better beginning?

• Is the thesis clear? Is it given a position of emphasis? Are all the ideas relevant to the thesis? Does everything follow clearly? Does one point lead to the next? Does the conclusion follow from what has gone before?

Do you suspect that the paper is somewhat confused? If you suspect it, you are probably right. Suggestion: Inform the writer to make an informal outline of the paper as it now stands. Then look over the outline and try to spot places to make improvements - to change the order, to add specific details, to make the ideas cohere better. Revise the outline; then revise the paper.

REVISION CHECKLIST: CONSIDERING THE AUDIENCE

Who will read this paper? What are the readers like? Does the paper tell them what they will want to know? Or does it tell them only what they probably know already?

Does the beginning of the paper promise your readers anything that the paper never delivers?

Has the writer anticipated questions the readers might ask?

Are there any places where readers might go to sleep? If so, can such passages be shortened or deleted?

Does the writer take ample time and space to unfold each idea in enough detail to make it both clear and interesting?

Would more detailed evidence help - perhaps an interesting brief story or a concrete example?

Can the writer cut any long-winded examples?

Are there places where readers might raise serious objections? How might the writer recognize these objections, maybe even answer them?

Has the writer used any specialized or technical language that your readers might not under ' stand? Has the writer used any familiar words in a technical sense? If so, can he/she work in brief definitions?

What attitude toward your readers does the writer seem to take? Is the writer overly chummy, needlessly angry, cockily superior, and apologetic? condescending? preachy?

From the conclusion, and from the paper as a whole, will readers be convinced that the writer has told them something worth knowing?

Technical Grading Guidelines

Abstract **10**
10

The main technical objective of the report is clearly stated
The method of an analysis or experimentation is briefly mentioned
The most important observation or finding is summarized
Statements are technically accurate
The specific conclusions drawn in the experiment are stated
The sentences contain appropriate information

Introduction **5**

Reader is provided with the motivation for performing the experiment
Sufficient information to orient reader to the substance of the experiment is provided

Concepts, Theory, and Method of Analysis **10**

Definitions and terminology are explained in detail
Governing equations are derived at an engineering level
Physical meaning of analytical solutions is explained
Equipment and experimental setup is explained in detail
Computer hardware and software are briefly defined
Alternate techniques or possible improvements are mentioned
Simulation or experimentation procedure is defined thoroughly

Results **10**

Presentation of results is of engineering quality
Unnecessary information has been removed
The reader is guided on every important detail of a graph or table
The results are matched with equations and physical explanations
All topics in the lab handout are covered

Discussion **10**

The performance of the analysis scheme and equipment is discussed
The methods, approach, or equipment are criticized
Alternatives and advantages are stated
Are the results conclusive?
Implications of findings are given
Discussion of how the results help achieve the stated objective is given
Other applications or examples where the results may apply are given
Suggestions on future work or further analysis are presented
Connection between physical and computer simulation is shown
Errors and shortcomings are pointed out, and reasons are given

Motivational topic is discussed in detail

Conclusions **5**

Conclusions are stated in a specific context, not in general
Sufficient number of conclusions is stated
The most important conclusions are emphasized
Conclusions are technically accurate

TOTAL: 50

Presentation Grading Guidelines

Abstract **5**

The length should be between 100-150 words
Very concise and technical
No personal (I, we, you...) references
Past tense used

Nomenclature **2**

Alphabetical listing
ALL Arabic symbols described first
ALL Greek symbols described last
Upper case listed first, then lower case
No simple abbreviations are listed

Introduction **5**

Sufficient information is given to excite the reader
The technical objective is introduced in detail
The reader is warmed up on concepts, methods, and terminology
What is accomplished in the report is stated briefly
Section reads easily
Sections to follow are mentioned

Concepts, Theory, and Method of Analysis **10**

Schematic of equipment is presented
Labeling is done correctly
Figures oriented correctly
Highlights of equipment used is presented
Highlights of the procedure is presented
Sketches and drawings comply with engineering standards
Section reads easily

Results **10**

Data is presented with complete explanation
Reader will understand what these data refer to
Section reads easily
In photocopy, paste marks are not present
Reasonable sizes for tables and graphs are used
No free-hand sketches or drawings are shown. (ruler, templates, or computer graphics only)
Table and figure captions are provided. (number and a brief explanation)

Discussion **10**

Connection of the data or motivational topic is clearly stated

Statements are specific
Section reads easily

Conclusions **5**

Conclusions listed in 1,2,3, fashion
No discussion
Conclusions are concise

Table of Contents, Appendix, and References **3**

TOTAL 50

Conclusions

The comments about student writing in the above text are quite simplistic, but therein lies the message. It does not require a great deal of effort to make students aware of the problems that commonly exist in their writing. Common mistakes seem to appear in most student text production. By looking at text that is produced in their own engineering courses, faculty can pinpoint the most common errors and address those concerns. Students will receive the message that errors in communication are important to their lives as engineers and improvements will begin.

It does not require a great deal of effort to survey the attitudes of faculty and students alike to gain insight into where problems are perceived. Organizing the department into groups that can address elements of concern will do much in both changing attitudes and creating better technical communicators.

Appendix

Communication Surveys

To: All professors in the College of Engineering
From: Craig Gunn
Re: Student technical communication skills

There is concern about the engineering student's ability to effectively communicate via either the spoken or written word. As a result, the following survey is being distributed to determine, from the professor's perspective, what needs to be improved upon and how this might be accomplished. Your participation is greatly appreciated and will go a long way to solving this critical problem.

Once finished with the survey, either e-mail back via the reply to sender command to Jill Juliano at juliano@egr.msu.edu with a carbon copy to me (gunn@egr.msu.edu) or place a hard copy of the survey in my mailbox in the Mechanical Engineering office.

In addition, there is a survey for the students to complete on this same subject. As I realize, it is close to the end of the semester; it might be preferable to distribute them at the same time as the

SIRS forms or the last class period or during the final exam period. Please note below how many surveys are needed for your classes.

I need_____surveys to distribute to my class(es),

_____

For each of the classes you are teaching this semester please respond to the following questions.

	# 1	# 2	# 3
Course Number	____	____	_____

Types of students in your class, please specify only those groups that account for a significant portion of the class population.

Grad Student	_____	____	_____
Senior	_____	____	_____
Junior	_____	____	_____
Sophomore	_____	____	_____
Freshmen	_____	____	_____

Types of communication performed by the students in your course

Formal presentations		_____		____		_____
Short oral presentations		_____		____		_____
Demonstrations	_____		____		_____	
Essays		_____		____		_____
Projects		_____		____		_____
Formal Reports		_____		____		_____
Lab Reports		_____		____		_____
Other (memos, progress reports, feasibility studies, correspondence)	_____		____		_____	

please specify_____

Communication problem areas for students (please use 1 for major problem area and 2 for minor problem area.)

Grammatical, spelling, and punctuation		_____		_____		____
Organization of paper or presentation		_____		_____		____
Expression of ideas		_____		_____		____
Logic		_____		_____		____
Support of ideas		_____		_____		____
Lack of technical comprehension	_____		_____		____	
Introduction or conclusion		_____		_____		____
Transitions		_____		_____		____
Proper use of visual aids	_____		_____		____	
Not focused on who the audience is		_____		_____		____
Use of ummm in oral communication		_____		_____		____
Verbal skills		_____		_____		____
Stilted or rambling style of presentation		_____		_____		____
Other, please specify_____						

Please list below any suggestions as to what you think should be included in a technical communications course to improve these skills in our student population.

_____
_____
_____

Please list below any ideas on how to educate the students on the various, areas of concern.

_____
_____
_____

Other comments or concerns

_____
_____
_____

Thank you for your time and cooperation

TECHNICAL COMMUNICATION SURVEY

An area that is of great importance to an engineer but in which there is little formal training or attention paid is technical communication. To help correct this problem, more emphasis is being placed on determining deficiencies for both the student and the system. Ibis survey hopes to identify those areas of concern and possible solutions to this situation. Your participation is greatly appreciated.

You are:
___Grad Student ___Senior ___Junior ___Sophomore ___Freshman

You have worked at (please mark all that apply):
___an internship ___a co-op ___a job within the engineering field

Please list any classes that have dealt specifically with the subject of developing communication skills through any means that you feel have been valuable.

_____
_____

What types of communication have been discussed or examined in your courses (please mark all that apply),

___Formal presentations
___ Short oral presentations
___ Demonstrations
___ Essays
___ Projects
___ Formal Reports
___ Lab Reports
___ Other (memos, progress reports, feasibility studies, correspondence)
Please specify_____
_____

Please list below communication problem areas for yourself and possibly other students as well (please use 1 for major problem area and 2 for minor problem area).

___Grammatical, spelling, and punctuation
___Organization of paper or presentation
___Expression of ideas
___Logic
___Support of ideas
___Lack of technical comprehension
___Introduction or conclusion
___Transitions
___Proper use of visual aids
___Not focused on who the audience is
___Use of ummm, you know in oral communication
___Verbal skills
___Stilted or rambling style of presentation
___Other, please specify_____
_____
_____

Please list below any suggestions as to what you think should be included in a technical communications course to improve these skills.

Please list below any issues that never seem to be raised in this kind of course that should be raised.

If you have worked at a co-op, internship or within the engineering field, please indicate, what if anything, the industry has taught you about the needs of communication that would be valuable in a communications course.

Please list below any ideas on how to educate students on the various areas of concern.

Other comments or concerns

Thank you for your time and cooperation

TECHNICAL COMMUNICATION SURVEY

An area that is of great importance to an engineer is technical communications. Emphasis is being placed on determining what, if any, technical communication deficiencies there are for both the student and the system. This survey hopes to identify those areas of concern and possible solutions. Your participation is greatly appreciated.

Have you already responded to this survey already THIS SEMESTER?
___Yes ___No If yes, please go no further.

You are:
___Grad Student ____Senior ____Junior ____Sophomore ___Freshman

What is your present major?_____

You have worked at (please mark all that apply):
___an internship ___a co-op ___a job within the engineering field

Do you believe engineering students have deficiencies in their technical communication skills?
___Yes ___No

What types of communication have been assigned in your courses (please mark all that apply).

this semester	college career	
___	___	Formal presentations
___	___	Short oral presentations
___	___	Demonstrations
___	___	Essays
___	___	Projects
___	___	Formal Reports
___	___	Lab Reports
___	___	Other (memos, progress reports, feasibility studies, correspondence)

please specify _____

For each of the various areas of communication listed below, please circle whether it is a major problem, minor problem, or no problem at all for yourself and/or possibly other students as well.

PROBLEM			
Major	Minor	No	Grammatical, spelling, and punctuation
Major	Minor	No	Organization of paper or presentation
Major	Minor	No	Expression of ideas
Major	Minor	No	Logic
Major	Minor	No	Support of ideas
Major	Minor	No	Lack of technical comprehension
Major	Minor	No	Introduction or conclusion
Major	Minor	No	Transitions
Major	Minor	No	Proper use of visual aids
Major	Minor	No	Not focused on who the audience is
Major	Minor	No	Use of ummm, you know in oral communication
Major	Minor	No	Verbal skills

Major Minor	No	Stilted or rambling style of presentation
Major Minor	No	Other, please specify_____

Please list any classes that have dealt specifically with the subject of developing communication skills through any means that you feel have been valuable. For each class, please briefly explain why they have been valuable.

_____
_____
_____
_____
_____

Please list below any suggestions as to what you think should be included in a technical communications course to improve these skills.

_____
_____
_____
_____
_____

Please list below any issues that never seem to be raised in a technical communications course that should be raised.

_____
_____
_____
_____
_____

If you have worked at a co-op, internship or within' the engineering field, please indicate, what if anything, the industry has taught you about the needs of communication that would be valuable in a communications course.

_____
_____
_____
_____
_____

Please list below any ideas on how to educate students on the various areas of concern.

_____
_____
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Other comments or concerns

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Thank you for your time and cooperation.

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