

# Student Perceptions Of Communication: Undergraduate Engineers' Views Of Writing And Speaking In The Classroom And Workplace

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As engineering programs across North America respond to the most recent Accreditation Board for Engineering and Technology (ABET) criteria, programs must assess student competencies not only in technical skills, but also in professional skills such as effective oral and written communication. In response to this need, a growing body of literature exists where engineering and technical communication educators discuss assessment of communication within engineering curricula.

Included in this literature is Summer Smith's (2003) study comparing writing and engineering instructors' standards for writing, a study of communication competencies within engineering design courses (Brinkman and van der Geest, 2003), and Sibylle Gruber et al.'s (1999) study which asked whether or not engineering students improved communication skills after completing writing assignments in engineering classes. In addition, several articles discuss particular curricular techniques, such as multidisciplinary design projects (Miller and Olds, 1994); (Schwom and Hirsch, 1999); (Norman and Frederick, 2000); (Wojahn et al., 2001); (Dyke and Wojahn, 2000); student collaboration (Seat, Parsons, and Poppen, 2001); Ingram and Parker, 2002); genre theory (Artemeva et al. 1999); (Johnson-Sheehan and Flood, 1999); (Kryder, 1999); (Walker, 1999), and the use of portfolios (Scott and Plumb, 1999); (Williams, 2002). For a more extensive review of articles pertaining to engineering communication curricula, courses, and support systems see Ford and Riley's article in the October 2003 issue of the *Journal of Engineering Education*.

While our attempts to measure student learning of writing and speaking skills are certainly valuable, important too is our understanding of students' own perceptions of communication within the engineering discipline. Dorothy Winsor (1989, 1990, 1996, 1998, 1999, 2001) has done the most work in this area. As her studies have demonstrated, engineering students' reflection on their own communication instruc-

tion and skill level grants both engineering and communication fields a valuable sense of perspective. Viewing engineering communication through the students' eyes provides feedback that can enhance our future assessment efforts.

The small-scale study reported here contributes to our engineering communication awareness by providing information about engineering students' perceptions of communication in school and in the workplace. It was motivated by the following research questions: What writing tasks within engineering courses do students view as most important? What rhetorical strategies do students view as most important for completing writing assignments in an engineering course? What kind of professional writing experiences have students had outside of the classroom? What writing skills do students view as most important in the workplace? Does this view change after completing a writing-intensive engineering class? This article concludes with assumptions about engineering students' perceptions and communication behaviors followed by suggestions for accommodating these assumptions into the classroom.

## Methodology

This inquiry examined a single classroom to explore student perceptions of communication within engineering. My close examination of one site, as well as a variety of data collection methods, granted "specific knowledge about real people writing in significant...situations," knowledge that is necessary in a movement towards grounded theory (Flower, 1989a, p. 283). It is important to note that although the scope of this particular study was narrow, my prior experience studying and teaching engineering students is extensive. Over five years of experience working closely with engineering students from several different disciplines enabled me to contextualize the results from this study as part of a larger framework.

## Abstract

This article presents the results of a small-scale empirical study investigating engineering students' perceptions of writing in the classroom and workplace. It asks questions regarding the types and frequency of documents engineering students have written in school and internship settings, and it reveals both the strategies used to complete those documents and the sites where they were learned, information which is supported by related literature. This article concludes with suggestions for addressing student perceptions of communication in engineering classrooms.

The participants in this study were ten undergraduate students enrolled in a required senior-level industrial engineering course at a large state university. All of the participants had taken the university's required technical communication course. Participant grades for the technical writing course were above average; half of the students earned an A and the other half earned a B. The course studied was writing-intensive; the course professor valued communication highly and included several writing assignments.

## Questionnaires

During the first week of the semester, all students were asked to complete a prospective questionnaire (see Appendix A). The questionnaire, containing a mixture of open-ended questions and questions consisting of factors that students were asked to rate, was designed to understand the following:

- Students' academic writing instruction experiences (what courses they took, when they took them, how well they did, and what they thought they learned)
- Students' view of writing within engineering courses (what kinds of writing they thought were important)
- Students' predictions of what writing strategies they would rely on the most while completing writing assignments in the engineering course studied
- Students' nonacademic writing experiences (whether or not they had written in a professional engineering setting, what kinds of writing they had done)
- Students' views of writing within professional engineering settings (what kinds of writing they thought were important, what kind of writing in professional engineering contexts they had experience reading)
- Students' view of what experiences have prepared them to write in school and at work

The questionnaires were analyzed according to the rank order students assigned to each question. The information from open-ended questions was used to understand what their GPAs were, and if and where they had worked in a professional engineering setting on an internship.

During the last week of the semester, the participants were asked to complete a reflective questionnaire. The questionnaire (see Appendix B) contained similar content to the prospective questionnaire. It was designed to prompt par-

ticipants to reflect back on their writing experiences and view of writing within the engineering discipline. In addition, the reflective questionnaire served as a final reflection for students in which they could view the culmination of their learning within the course. As with the prospective questionnaire, the reflective questionnaires were analyzed according to rank order students assigned to each question. In addition, the students' responses to questions from the prospective questionnaire were compared to their reflective questionnaire responses.

## Survey of Technical Communication Instructors

Prior to the beginning of the semester, I surveyed all 16 of the technical communication instructors at the university studied. A majority of these instructors were graduate assistants, but adjunct faculty, lecturers and tenure-track faculty also taught this course. My survey asked the instructors to rate the importance of objectives being taught in the technical communication course required for engineering students. A list of 20 objectives common to technical communication textbooks and syllabi was presented, and instructors were asked to rate each of the objectives on a 5 point Likert scale according to how much they valued them when teaching technical communication (see Appendix C). The results from this survey were used to better understand the concepts technical communication instructors emphasized when teaching the course. These concepts were then compared with the students' perceptions of important concepts in the technical communication course.

## Interviews

At the end of the semester, once all writing assignments had been completed and students had finished the final exam for the course, I conducted individual interviews with the participants. I prepared a plan of inquiry to guide the interviews that included questions about 1) students' general perceptions of writing within the discipline of engineering, 2) their strategies for specific writing assignments, and 3) their reliance on rhetorical strategies learned previously.

My main goal in performing these interviews was to benefit from the students' hindsight by prompting reflection. This reflection included their perceptions of what previous experiences aided them in completing assignments, whether or not the writing they engaged in during the se-

mester was beneficial to their future as a professional engineer, and whether or not specific guidelines, such as a set audience, made a difference in their approach to assignments.

I treated these interviews as exploratory, and I relied on the transcripts of the audiotaped sessions with each student as valuable representations of individual experiences. From these interviews I gained a sense of perspective that helped me to better understand responses on the questionnaire.

## Results

The prospective and reflective questionnaires and the individual interviews provided information about my participants' academic and professional backgrounds and experience as well as their previous writing experience and expectations. The data afforded me insight regarding students' experience writing different kinds of texts in various settings. From their answers on the questionnaires and in the interviews, I was able to piece together my participants' previous writing experiences and realize the texts and contexts they valued as well as the texts and contexts they did not value. From the results of the survey of technical communication instructors I was able to understand the concepts of the technical communication course that were emphasized by the instructors and compare that with students' perception of the important elements from that class.

The GPA's reported on the questionnaires indicated participants were above average students; their average GPA was 3.38 on a 4.00 scale. As previously mentioned, the ten students who had taken a university technical communication course all received an above average grade for the course: five of them received an A as a final course grade and five of them received a B.

Included on the prospective questionnaire was an open-ended question that asked students to describe what they had learned in a university technical communication course. Eight out of ten participants answered this question with a "how-to" response:

- "I learned how to write technical papers"
- "How to write a memorandum"
- "The proper way to write memos, reports, and proposals"
- "How to write instructions, reports, and resumes"
- "Basic structure for preparing technical documents"
- "How to give a presentation"

**Table 1: Students' Reading, Writing, and Professional Experience**

	YES	NO
Have you worked in your profession in the form of an internship or full-time job?	8	2
Do you have experience writing within a professional engineering setting?	7	3
Do you have experience reading texts that professional engineers write?	9	1

- "How to perform an effective oral presentation"
- "How to refer to pictures shown within the text"

As indicated in Table 1, the reading and writing experience of students in settings outside of school varied. Eight of the ten students had worked in an engineering setting, and of those eight, seven claimed to have experience writing within a professional engineering setting. Nine students claimed to have experience reading texts that professional engineers write.

The data from the questionnaires also indicate the kinds of writing engineering students consider important in the workplace and in engineering courses. Tables 2-5 compare the top three rankings (out of a list of ten, see Appendices A and B) assigned by students on the prospective and reflective questionnaire for different kinds of documents in professional and academic settings. In these tables the total number of responses was counted for each document, regardless of the first, second, or third place ranking assigned by participants. It should be noted, however, that the three rows of data in Tables 2, 5, and 6 happen to reflect exactly the total number of first place rankings, followed by the total number of second place rankings, followed by the total number of third place rankings.

Featured in Table 2 are student perceptions of writing in school. At the beginning and end of the semester students viewed reports, research papers, and presentation planning as the most important kinds of writing within engineering courses. Memos, though not rated as important as these other kinds of documents, also received votes.

Following are data that capture students' perceptions of the writing strategies and experiences that were valuable to them as they completed writing assignments in the engineer-

ing course studied. This data, shown in Table 3, helps to suggest the actual rhetorical strategies students' relied upon as they engaged in different writing tasks during the semester.

*Writing clearly*, considered by students at the beginning of the semester to be the most important strategy upon which they would rely, was not seen as important at the end of the semester. *Thinking about audience* and *viewing writing as a process* received top rankings in both the prospective and reflective questionnaires. *Writing concisely*, a strategy ranked high at the beginning of the semester, received only one vote at the end of the semester. Though not ranked as important, *using proper formats* and *thinking about purpose*, also received votes by students.

Table 4 provides insight towards students' perceptions of the academic preparation that was useful to them as they completed the course writing assignments. *English 218G, Scientific and Technical Writing* and *English 111G/H* were ranked respectively as the most important courses in preparing students for writing assignments in the course studied. At the beginning of the semester, students predicted that their experience in *other engineering courses* and *Communication 265G, Public Speaking* would help prepare them for assignments in the course studied. While *Communication 265G, Public Speaking* was still considered important by students at the end of the semester, only one student voted for *other engineering courses*.

As the data in Table 5 indicates, memo writing, report writing, and presentation and speech planning were viewed at the beginning of the semester as the most important writing tasks for professional engineers. Instructions, an assignment included on most syllabi in technical and professional communication courses, were viewed as having no importance. Research papers received no votes, and business letters were voted for by only one student. Student perceptions did not change over the course of the semester; students viewed the same writing tasks: memo writing, report writing, and presentation/speech planning as the most important writing tasks for professional engineers. Also consistent with the results from the prospective questionnaire, instructions, case studies, and research papers received no votes.

Table 6 indicates the ranking students assigned to the kinds of writing they had done the most of outside of school. Consistent with their rankings in Table 5, Table 6 shows both speech/ presentations and memos were written in professional environments most frequently by

**Table 2: Student Perceptions of Writing in School**

What are the most important kinds of writing an industrial engineering student is required to do in engineering courses?	Prospective Questionnaire Number of Responses	Reflective Questionnaire Number of Responses
Reports	10	10
Research Paper	9	7
Presentation/speech planning	7	9

**Table 3: Student Perceptions of Important Writing Strategies for Assignments**

What are the most important writing strategies for completing writing assignments for this course?	Prospective Questionnaire Number of Responses	Reflective Questionnaire Number of Responses
Writing clearly	6	3
Thinking about audience	6	5
Viewing writing as a process (time for planning, drafting, and revising)	5	8
Writing concisely	4	1
Using proper format for memos, reports, proposals, research papers	3	4
Thinking about purpose	3	4

**Table 4: Student Perceptions of Academic Preparation for IE 424 Writing**

What courses were most important in preparing you for the writing assignments in IE 424?	Prospective Questionnaire Number of Responses	Reflective Questionnaire Number of Responses
English 218G, Scientific and Technical Writing	10	10
English 111G/H, Rhetoric and Composition	9	8
Other Industrial Engineering Courses	8	1
Communication 265G, Public Speaking	6	5

the participants. Students also had experience writing proposals, ranked 3rd highest. When asked during the interview how they learned to do the kinds of writing mentioned above, students most frequently cited their technical communication course and talking with a boss or manager as the ways in which they learned to write documents for professional contexts. Also cited were talking to other employees and looking at examples from other employees.

## Instructor Surveys

From the instructor surveys, I learned which objectives teachers of the technical communication course valued. The averaged results from the 16 surveys indicated that the top six objectives noted as most important to the technical communication course were as follows:

1. Define audience
2. Define purpose
3. Use organizational strategies
4. Consider concepts of visual design
5. Write in a professional style
6. Write in a user-friendly style

## Interviews

The participants' answers to my interview questions provided further insight regarding engineering students' perceptions of writing. I learned that the participants' views of writing were shaped as much by classroom instruction as they were by experiences outside the classroom.

Students' interview responses indicated that they are accustomed to thinking of writing tasks as long documents with several pages, rather than short memos. When I asked them to think about the writing assignments they had to do for the course studied, several students referred only to writing the eight-page research paper. Although many of their technical assignments for the course studied involved writing components, the students failed to make a connection between the required communication outcomes (written products or oral presentations) and the technical information they were required to present, develop, or synthesize.

The eight students who had worked in the engineering field as an intern tended to discount smaller pieces of writing when they spoke of their experiences. One student mentioned "No, I didn't do much writing, just a bunch of memos." Another student commented "I really didn't write anything on the job; I just did briefs and planned presentations." These answers

Table 5: Student Perceptions of Writing on the Job		
What are the most important kinds of writing a professional engineer is required to do on the job?	Prospective Questionnaire Number of Responses	Reflective Questionnaire Number of Responses
Memos	10	10
Reports	9	9
Presentation/ speech planning	8	8

Table 6: Student Writing Experience in the Workplace	
What kinds of writing have you done the most of outside of school, for an internship or full-time job?	Number of Responses
Speech/presentation writing	7
Memos	6
Proposals	5

coincide with what another student said about writing in the technical communication course: "We didn't write that much in the technical writing class. It was kind of just preparing technical papers -- it isn't too much writing."

Revealed in their interview responses were students' penchant for using templates. They mentioned that rather than make their own format decisions according to a document's audience and purpose, they relied on preset templates in Microsoft Word.

Although the participants ranked reliance upon conceptual rhetorical strategies high on the questionnaires, such as considering audience and purpose when writing documents, they did not speak readily about them in the interviews. When questioned about the concepts they learned in their technical communication course, the participants spoke readily about proper structure and formats.

## Discussion

While this study was localized to one particular classroom at one institution, the trends reflected in the data are useful in several different ways. By depicting students' academic and



nonacademic experiences, the data provide a snapshot of the contexts in which engineering students' rhetorical knowledge is shaped. By depicting the texts students have had experience writing, the data portray the kinds of documents that are prevalent in the engineering classroom as well as in entry-level or professional engineering settings.

This study's findings indicate that engineering students view writing tasks similarly to the ways in which they view other tasks; they see writing as a process that involves concrete rules. Similar to the mathematical problems they frequently solve in their engineering classes, the participants tended to view writing as containing right and wrong answers. The engineering students in this study approached writing assignments as though they were black and white problems, and in their interviews they preferred to discuss and cite model-based tactics as influential to their writing processes and products over conceptual problem-solving strategies.

The "how-to" answers to the open-ended question on the prospective questionnaire further suggest that engineering students may view content taught in a technical communication course as rule-based and procedural. The students' perceptions differed from the instructor survey results, which indicated that the objectives emphasized in the technical communication course at the university studied pertained to rhetorical concepts such as *consider audience* and *define purpose*.

It is possible, however, that the language the participants used to describe the strategies they learned in a technical communication course *does* account for audience and purpose. Although they speak in terms of "how-to," the engineering students might consider analyzing audience and purpose as part of the "proper way" of writing texts or as included in the "basic structure" of documents. As questionnaire results presented in Table 3 demonstrate, students did rank rhetorical strategies such as *thinking about audience* and *thinking about purpose* highly.

The change in student perceptions regarding the importance of other engineering courses in preparing for writing assignments in the course studied may reflect the opinion students stated in their interviews. In their interviews, several participants mentioned that the assignments in the course studied were not similar to writing assignments in other engineering courses.

Students' interview responses also indicated that they are accustomed to thinking of writing tasks as long documents with several pages,

rather than short memos. When I asked them to think about the writing assignments required for the engineering course, several students referred only to writing the eight-page research paper. The length of this assignment may have caused students' changed perceptions towards *Writing concisely* from the beginning to the end of the semester (as reflected in Table 3). Because the students completed the reflective questionnaire the week after they completed the research report, it is possible that they viewed a long report as going against the strategy of writing concisely.

It is interesting that the students who had written in internship settings included proposals as one of the texts most frequently written (as reflected in Table 6) but did not rank proposals as important texts on the job in Table 5. Perhaps their failure to consider proposals as very important demonstrates engineers' tendency to consider writing as a recording of the facts and an afterthought, rather than a crucial part of the design process (Miller, 1996).

Questionnaire results also indicate that students tend to separate writing tasks they perform in school from writing tasks required in professional settings. While students viewed reports and presentation/speech planning as two of the most important kinds of writing engineers write in work and in school, they cited the research paper as an important kind of writing engineers produce in engineering courses. Instructions and case studies, writing assignments that are in most cases essential components of technical communication courses, were not considered by students to be important in the workplace or the classroom.

This distinction between writing tasks is supported by Winsor (1999) and Deanna Dannels (2003), both of whom see the classroom and the workplace as competing activity systems. As Dannels notes in her study of design presentations in engineering, "contradictions emerge as teachers and students attempt to enact behaviors that legitimize both systems" (p. 141). If school and work are two different activity systems, where are internships, which have overlapping characteristics in both of these systems, classified? In this study, the students made distinctions between writing in the classroom, writing on the job, *and* writing in an internship; they appeared to treat an internship setting as a third activity system.

## Where Do We Go From Here?: Assumptions And Recommendations

While this study was small in scale, the results discussed previously line up with the trends I've observed in over five years of studying, teaching, and working with engineering students from several engineering disciplines. One overwhelming trait that the engineering students in this study as well as other engineering students I've worked with share is as follows: engineers are writers who want directions and think of writing in terms of concrete rules. This trait is not all that surprising. Because the discipline teaches them to work within boundaries and to follow specifications and meet guidelines, they tend to approach writing tasks this way as well.

To ensure their success, then, what can we as educators do to enable students to employ sound rhetorical practices? How can we help students to rely on the strategies and tactics they have learned in previous writing courses and apply them to engineering writing tasks?

Following are assumptions that I recommend both technical communication and engineering educators consider, as well as suggestions for incorporating these assumptions into the classroom.

### Students Tend to Remember Formats and Genres More Readily Than They Do Higher-Level Rhetorical Concepts

Perhaps the tendencies of engineering students to more readily remember and speak about formats and genres has to do with their rule-following nature I describe previously. After all, formats and genres include guidelines for the elements documents should include and the purposes they should encompass. They also offer students models for the ways documents should look. Thus, engineering students may view formats and genres that are taught within a technical communication course as concrete specifications for writing tasks.

While reliance upon formats and genres is not necessarily detrimental to students' future writing processes and products, it may have a negative effect if it overshadows the other rhetorical concepts taught to students. When we consider the complexities of some texts, the multiple purposes and audiences they serve as well as the contexts in which they are embedded, we should realize that genres offer the writer "only an abstract frame and limited information" (Flower, 1989b, p. 17). The writer

must be aware of the ways in which "genres are tailored to a specific community of writers and readers" (Beaufort, 1999, p. 70).

As Leeanne Kryder's (1999) study based on a three-quarter sequence of writing courses for engineers suggests, we should "avoid teaching genres as products" (p. 5). Linda Flower addresses this idea as well, arguing that if writing is "taught in terms of its specific discourse conventions rather than in terms of goals and strategies, the knowledge a student acquires doesn't appear (to the student) to apply in new genres" (1989b, p. 33). The notion of genre is further complicated by Ann Beaufort's distinction between genre knowledge of novices and genre knowledge of experts. The novice focuses on "surface features of genre," while the expert "focuses on deep structure and purpose of genre" (1999, p. 75).

#### *Recommendation: Teach Students that Templates are Starting Places, not Formulas*

With these arguments in mind, we should introduce genres and formats as "customs within the workplace that might change with the situation when practiced within a particular company or for a particular company" (Berkenkotter and Huckin, 1995, p. 5). This practice would require students to "rethink genre from a sociocognitive perspective" (Berkenkotter and Huckin, p. 5). Redirecting students so that they view genres and formats not as templates into which they can just plug the right words, but instead as starting places that they can adapt for different rhetorical situations, may prevent students from learning only formats and forgetting about the rest of the concepts we teach them.

### Students Are More Likely to Remember Rhetorical Strategies and Employ Them When They Are Cued

Researchers argue that in order for students to transfer writing instruction from one context to another, students must see relationships between the contexts they are traveling across (Flower, 1989a, 1989b); (Halford, 1995); (Mila and Sanmarti, 1999).

#### *Recommendation: Assign Writing Tasks that Require Reflection*

We need to create opportunities for students to engage in metacognitive activities. Asking students to write journal entries about their writing processes, turn in logs that identify the ways in which they approached parts of their

writing assignments, and turn in cover memos that address the strategies they relied on and the strategies they learned when completing assignments may all promote student reflection about writing processes.

Writing in reflective journals and reading those of peers may also help students to review their own learning experiences and connect them to current tasks (Kruger and May, 1986). A dialogic environment can enable students to understand similarities between writing for previous classes and writing for their current class (Artemeva, Logie, and St-Martin, 1999).

## Students Tend to Separate Writing Tasks from Engineering Tasks

Previous research has demonstrated that engineering students tend to separate writing tasks from tasks that call for more typical engineering skills, such as mathematical calculations or simulation activities (Winsor 1990, 1996); (Dyke and Wojahn, 2000); (Wojahn et al., 2001). There is a tendency for engineers, both students and professionals, to see writing as the “ex post facto expression of a scientific idea or a technical effort, not as part of that idea or that effort” (Miller, 1996, p. 115). By thinking of writing as a separate task, students may deny themselves the ability to use communication as a meaning-making activity. As a result, their deliverables may suffer from a lack of critical thinking and planning.

*Recommendation: Require Writing throughout the Lifespan of Engineering Projects, Not Only at the End*

Within engineering classrooms, professors can reinforce to students that writing is part of the development of scientific ideas and the accomplishment of technical efforts. Jason Swarts and Lee Odell state it well when they say “Rather than simply the manner in which engineering design is communicated, writing is the medium through which quality engineering design becomes possible” (2001, p. 1). Requiring students to present project plans, goals, questions, and constraints in writing instills in students the practice of negotiating each stage of a project through writing. Through creating memos, logs, or even oral presentations that address components of a project through different stages, students can realize the power communication has in clarifying their ideas, articulating possible problems, and establishing expectations.

## Students View Writing as a Process

The assumption that engineering students tend to view writing as a process may seem to clash with the assumption prior that suggests students separate writing from other tasks. My speculation is that students view writing as a process, not because they can naturally see how it fits in with other tasks they complete along the way, but instead because they are accustomed to viewing *all tasks* as process-oriented.

*Recommendation: Teach Students that Writing is Part of the Technical Process*

As educators we need to push students a step further by helping them see that yes, writing is a process, but it is part of the *same* process as the object or system it is describing. The two are not separate.

## Conclusion

Guided by these assumptions, teachers of engineering students can make efforts to first understand and then appeal to the ways in which engineers think. Through the classroom methods described in the previous section, we can direct students towards practices of effective written and oral communication. We can do so with curricula that is conscientious in its attempts to provide students with guidelines, language, and opportunities that cue awareness of the parallels existing between communication tasks in different contexts.



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## APPENDIX A: PROSPECTIVE QUESTIONNAIRE

Thank you for taking a few minutes to complete this questionnaire. The results will be used to help assess and suggest revisions for technical communication and engineering curricula.

My name is \_\_\_\_\_.

(Names will be used for tracking purposes only and will not be reported in research study).

My gender is \_\_\_\_\_.

M

F

*Circle One*

My G.P.A. is \_\_\_\_\_.

English is my first language.

Yes

No

*Circle One*

I have taken English 218G

(Scientific and Technical Writing)

Yes

No

*Circle One*

*If you answered yes to the above question, please complete the questions below.*

How many times have you taken English 218G? \_\_\_\_\_

When did you take English 218G? \_\_\_\_\_ (list semester and year)

Where did you take English 218G? \_\_\_\_\_

I received a \_\_\_\_\_ (list letter grade) for English 218G.

What did you learn in English 218G? \_\_\_\_\_

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Have you worked in your profession in the form of an internship or full-time job?

*Circle One*  
Yes No

If you answered yes to the above question, please indicate when and where:

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Do you have experience responding to and receiving feedback on writing from others through a peer review system?

*Circle One*  
Yes No

If you answered yes to the above question, please indicate when and where:

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Do you have experience writing within a professional engineering setting?

*Circle One*  
Yes No

Do you have experience reading texts that professional Industrial engineers write?

*Circle One*  
Yes No

On a scale of 1-5, 1 being the most prepared, how would you rate your preparation to write in a professional engineering setting?

*Circle One*  
1 2 3 4 5  
*Most prepared* *least prepared*

Please rank the top 3 choices.

1= most important

2 = 2nd most important

3 = 3rd most important

1. What are the most important kinds of writing a professional industrial engineer is required to do on the job? (identify top 3, with 1 being most important)

- \_\_\_ Memos
- \_\_\_ Business letters
- \_\_\_ Reports
- \_\_\_ Presentation/speech planning
- \_\_\_ Research paper
- \_\_\_ Instructions
- \_\_\_ Case Studies
- \_\_\_ Other (please explain \_\_\_\_\_)

2. What are the most important kinds of writing an industrial engineering student is required to do in engineering courses? (again, identify

top 3, with 1 being most important)

- \_\_\_ Memos
- \_\_\_ Business letters
- \_\_\_ Reports
- \_\_\_ Presentation/speech planning
- \_\_\_ Research paper
- \_\_\_ Instructions
- \_\_\_ Case Studies
- \_\_\_ Other (please explain \_\_\_\_\_)

3. On a scale of 1-5, 1 being most important, rate the importance of receiving feedback on your writing through a peer review system.

*Circle One*  
1 2 3 4 5  
*Most important*      *least important*

4. What courses were most important in preparing you for the writing you will do in this course? (rank top 3, 1 is most important)

- \_\_\_ English 111G/H, Rhetoric and Composition
- \_\_\_ English 218G, Scientific and Technical Writing
- \_\_\_ English 318G, Advanced Scientific and Technical Writing
- \_\_\_ Other industrial engineering courses (list \_\_\_\_\_)
- \_\_\_ Communication 265G, Public Speaking
- \_\_\_ Other (please explain \_\_\_\_\_)

5. What experiences outside of school were most important in preparing you for writing in this course? (rank top 3, 1 is most important)

- \_\_\_ Internship in Engineering field
- \_\_\_ Full-time job in Engineering field
- \_\_\_ Part-time job in Engineering field
- \_\_\_ Full-time job outside of Engineering field
- \_\_\_ Part-time job outside of Engineering field
- \_\_\_ Other (please explain \_\_\_\_\_)

6. What kinds of writing have you done the most of outside of school, for an internship, or full-time job? (rank top 3 by frequency, 1 is most frequent)

- \_\_\_ Memos
- \_\_\_ Business letters
- \_\_\_ Proposals
- \_\_\_ Research reports
- \_\_\_ Instruction writing
- \_\_\_ Website development/design
- \_\_\_ Speech writing
- \_\_\_ Lab reports
- \_\_\_ Grant writing
- \_\_\_ Progress reports
- \_\_\_ Other (please explain \_\_\_\_\_)

7. Explain how you learned how to do the writing you described for question #5.



- \_\_\_ Learned in English 111G/H
- \_\_\_ Learned in English 218G
- \_\_\_ Learned in English 318G
- \_\_\_ Learned in Engineering course (please name \_\_\_\_\_)
- \_\_\_ Learned through looking at example from another employee
- \_\_\_ Learned from talking to other employees
- \_\_\_ Learned from talking with boss/supervisor/manager
- \_\_\_ Learned from manual or guide at work
- \_\_\_ Learned by teaching self
- \_\_\_ Other (please explain \_\_\_\_\_)

8. What do you think will be the most important writing skills and strategies for completing writing assignments for this course?  
(rank top 3, 1 is most important)

- \_\_\_ Viewing writing as a process (time for planning, drafting, and revising)
- \_\_\_ Thinking about audience
- \_\_\_ Thinking about purpose
- \_\_\_ Using research strategies
- \_\_\_ Using technological tools
- \_\_\_ Writing clearly
- \_\_\_ Writing concisely
- \_\_\_ Defining unfamiliar terms
- \_\_\_ Using organizational techniques (bullets, headings, lists, indexes)
- \_\_\_ Arranging information in a logical order
- \_\_\_ Using proper format for memos, reports, proposals, research papers
- \_\_\_ Including visuals in documents
- \_\_\_ Other (please explain \_\_\_\_\_)

## APPENDIX B: REFLECTIVE QUESTIONNAIRE

Thank you for taking a few minutes to complete this questionnaire. The results will be used to help assess and suggest revisions for technical communication and engineering curricula.

My name is \_\_\_\_\_.

(Names will be used for tracking purposes only and will not be reported in research study).

On a scale of 1-5, 1 being the most prepared, how would you rate your preparation to write in a professional engineering setting?

*Circle One*  
1 2 3 4 5  
*Most prepared* *least prepared*

Please rank the top 3 choices.

- 1= most important
- 2 = 2<sup>nd</sup> most important
- 3 = 3<sup>rd</sup> most important

1. What are the most important kinds of writing a professional industrial engineer is required to do on the job? (identify top 3, with 1 being most important)

\_\_\_\_ Memos  
\_\_\_\_ Business letters  
\_\_\_\_ Reports  
\_\_\_\_ Presentation/speech planning  
\_\_\_\_ Research paper  
\_\_\_\_ Instructions  
\_\_\_\_ Case Studies  
\_\_\_\_ Other (please explain \_\_\_\_\_)

2. What are the most important kinds of writing an industrial engineering student is required to do in engineering courses? (again, identify top 3, with 1 being most important)

\_\_\_\_ Memos  
\_\_\_\_ Business letters  
\_\_\_\_ Reports  
\_\_\_\_ Presentation/speech planning  
\_\_\_\_ Research paper  
\_\_\_\_ Instructions  
\_\_\_\_ Case Studies  
\_\_\_\_ Other (please explain \_\_\_\_\_)

3. What courses were most important in preparing you for the writing you did in IE 424? (rank top 3, with 1 being most important)

\_\_\_\_ English 111G/H, Rhetoric and Composition  
\_\_\_\_ English 218GG, Scientific and Technical Writing  
\_\_\_\_ English 318G, Advanced Scientific and Technical Writing  
\_\_\_\_ Other Industrial Engineering Courses (list \_\_\_\_\_)  
\_\_\_\_ Communication 265G, Public Speaking  
\_\_\_\_ Other (please explain \_\_\_\_\_)

4. On a scale of 1-5, 1 being most important, rate the importance of receiving feedback on your writing through a peer review system.

*Circle One*  
1 2 3 4 5  
*Most important* *least important*

5. What experiences outside of school were most important in preparing you for writing in this course? (rank top 3, with 1 being most important)

- \_\_\_\_\_ Internship in Engineering field
- \_\_\_\_\_ Full-time job in Engineering field
- \_\_\_\_\_ Part-time job in Engineering field
- \_\_\_\_\_ Full-time job outside of Engineering field
- \_\_\_\_\_ Part-time job outside of Engineering field
- \_\_\_\_\_ Other (please explain) \_\_\_\_\_

6. What were the most important writing skills and strategies for completing writing assignments for this course? (rank top 3, with 1 being most important)

- \_\_\_\_\_ Viewing writing as a process (time for planning, drafting, and revising)
- \_\_\_\_\_ Thinking about audience
- \_\_\_\_\_ Thinking about purpose
- \_\_\_\_\_ Using research strategies
- \_\_\_\_\_ Using technological tools
- \_\_\_\_\_ Writing clearly
- \_\_\_\_\_ Writing concisely
- \_\_\_\_\_ Defining unfamiliar terms
- \_\_\_\_\_ Using organizational techniques (bullets, headings, lists, indexes)
- \_\_\_\_\_ Arranging information in a logical order
- \_\_\_\_\_ Using proper format for memos, reports, proposals, research papers
- \_\_\_\_\_ Including visuals in documents
- \_\_\_\_\_ Other (please explain) \_\_\_\_\_

## APPENDIX C: TECHNICAL COMMUNICATION INSTRUCTOR SURVEY

Please rate each of the 20 writing objectives listed below by selecting the ranking that appropriately corresponds to the learning objectives you emphasize in your technical writing classes.

When I teach English 218, I place emphasis on teaching students to

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neither Agree nor Disagree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
<b>Define audience</b>					
<b>Define purpose</b>					
<b>Plan written communication</b>					
<b>Draft written communication</b>					
<b>Revise written communication</b>					
<b>Work collaboratively on projects requiring oral communication</b>					
<b>Work collaboratively on projects requiring written communication</b>					
<b>Understand the role of ethics in professional communication</b>					
<b>Utilize technological tools</b>					
<b>Write in a professional style</b>					
<b>Write in a user- friendly style</b>					
<b>Learn to write lab reports</b>					
<b>Learn to write instructions</b>					
<b>Learn to write computer documentation</b>					
<b>Learn to write proposals</b>					
<b>Learn to write abstracts</b>					
<b>Consider concepts of visual design, including white space and graphics</b>					
<b>Utilize organizational techniques, such as headings, bullets, lists, indexes</b>					
<b>Utilize research strategies</b>					
<b>Improve oral presentation skills</b>					