

## **Professional Writing Seminar for Engineering Students: A Pilot Project and Evaluation**

**Rebecca Pinkus, Craig Simmons  
University of Toronto**

### 1. Background and Introduction

The ABET EC 2000 goals and the Canadian Engineering Accreditation Board both identify the ability to communicate effectively as an essential skill required of graduates of engineering programs. Apparently, a large number of engineering students agree. In response to numerous student requests for additional writing courses, we have designed a pilot program for a non-credit writing seminar that we hope may be used as a foundation for a mandatory (or at least credited) course for senior-level undergraduates.

While many American universities have at least two writing requirements in their engineering curricula, such as freshman composition and technical writing, Canadian universities typically require only one technical writing course, often given in the first year of the engineering curriculum<sup>1</sup>. The Canadian engineering curriculum tends to be based on the more traditional, technical-based style of teaching. This is partly due to the traditional emphasis on science and engineering in this field, and partly due to the fact that few English Departments in Canadian universities include Rhetoric and Composition in their curriculum.<sup>2</sup> As a result, writing is not widely recognized as a discipline, so few courses are available. Canadian universities such as the University of Toronto (U of T), tend to graduate highly skilled technical students who may not be as well prepared for written and oral communication in the professional world as some of their American counterparts. In light of this issue, we explored one option for providing additional writing instruction in a technology-heavy curriculum.

In an attempt to help improve the writing skills in the Faculty of Engineering, the University of Toronto's Language Across the Curriculum (LAC) program provides the Engineering Writing Centre (EWC) and numerous short workshops aimed at targeting specific concerns. (E.g., lab report workshops, oral presentation skills, etc.). These workshops are often what one might call "triage" or SWAT team style: they aim at immediate "fixes" for student writing, but do not provide students with much in the way of learning to help themselves. While the one-to-one conferences offer more possibility of changing writing behavior, we typically see only 15-20% of students in the EWC. As an alternative to the one-on-one writing centre work, and to the one or two-session workshops, we proposed a several-week intensive writing seminar aimed specifically at the needs of 3<sup>rd</sup> and 4<sup>th</sup> year engineering students. Our seminar was inspired by a short Science Writing course offered at U of T the previous spring, but we designed our seminar to meet the specific needs of engineering students.

### 2. Seminar design and objectives

One of the primary influences on the seminar design was our decision to team-teach the course with two instructors: one a writing specialist with an interest in engineering (RP), and the other an engineer with an interest in writing (CS). This pairing of instructors allowed for both a unique class design as well as instruction. By bringing the engineer into a writing course, we hoped to take away some of the initial hurdles often faced by writing instructors working in an engineering environment. Where the writing instructor might be perceived as an initial “outsider” in the engineering classroom, the “engineer as writing instructor” may be seen in a different light. Moreover, the interaction between the two instructors, and their differing perspectives on written text, helped us show students the importance of the different communication issues engineers face in both the academic and professional worlds. One of the ways we began to implement these views was by co-designing the course, taking into account both key writing and engineering issues.

We experienced several challenges while designing the seminar, particularly the scheduling and content of the course. The two main scheduling considerations were the length of the classes and the best time to offer them. These are issues because U of T’s students have little flexibility in their schedules, and elective courses are few and far between. Given this, we ran class for 2 ½ hours a week in the evening to allow us to provide both lecture and in-class writing time, while not keeping the students in class for an unreasonable length of time. We initially chose five weeks, but early in the first session we decided to add a mandatory sixth class so that students could fill out their evaluations. During this extra session, we also offered an optional resume and cover letter seminar, which was run by a technical consultant from Manpower Professional (a staffing agency for engineering firms); well over half of the students stayed for the resume seminar. With the first meeting as a general introduction to the course and technical writing, and the sixth meeting as a wrap-up session, we were left with four sessions of instruction. Given these ten hours, we were faced with deciding what we thought would be the most useful information to teach in this class. This was not an easy task.

We ultimately decided that the seminar should emphasize the writing process itself and how students can apply this process to their own writing, rather than teaching different document styles or the common “quick fixes” the students are often exposed to in writing centers and short workshops. We focused our classes on 1) audience and aims, 2) organization and drafting, 3) revising for organization and style, and 4) graphics, referencing, and the “polished product.” The organization of these topics was based loosely on portions of *The MIT Guide to Science and Engineering Communication* by Paradis and Zimmerman<sup>3</sup>, although we ultimately used several texts as reference material. Our hope was that the four seminars would build upon each other, and the students would at the very least improve their understanding of the writing process and begin to get a sense of how to improve their own writing.

Since we designed this seminar over the summer, we were limited to advertising the course in only the first week of classes. Because of this short “advertising period” and the general lack of free time most students have, we anticipated a low enrollment of the course. The course received much attention, however, and we quickly filled the original class and added a second session that began as the first one ended. This second session enabled us to better judge the success of the

course (it gave us a larger “sample” of students), and it helped us as instructors to iron out some wrinkles from the first session.

### 3. Seminar format

The six classes that composed each seminar session were offered once a week from 6:00 – 8:30 p.m., with one 15-minute break in the middle. Our original aim was to provide feedback from assignments at the beginning of each class, followed by a brief lecture. After the break, we usually had students get into groups and do in-class writing exercises, grammar exercises, or peer-review. After the students had time to work, we would then reassemble the class and have the students discuss the exercises. When this discussion was finished, and all questions addressed, we would discuss the homework assignments for the next class.

The homework assignments initially revolved only around each class topic, but were different in content week by week, and the final three assignments concerned short proposal memos. We modified the homework assignments between the first and second session so that the students were working on their own proposal topic throughout the seminar.

### 4. Seminar evaluation

The students were asked to evaluate the seminar through an anonymous survey at the end of the six-week course. The survey included questions on general issues, specific course content, the instructors, and the issue of whether the seminar should be expanded to a full course.

#### 4a. Evaluation of the seminar in general

Generally, the seminar was well received by the students, with an overall rating of good to excellent. The students commented that the seminar was a valuable learning experience and wise investment of their time; the very low attrition rate for a voluntary course (less than 5%) confirmed that the students felt the seminar was worthwhile. However, about half the students felt that the seminar series was too short. Many students commented that by the end of six weeks they had an understanding of their writing problems, but would have liked more time to fix their problems under the supervision of the instructors. Most students acknowledged, however, that had the seminar series extended further into the term, their commitment to the seminar would have faded, as other academic commitments, such as examinations and final projects, took precedent. The burden of adding a voluntary seminar to a course schedule that is already formidable was particularly evident in the session we ran in the second half of the term, when the requirements from other courses were more demanding. Ultimately, we had fewer students enroll in the second session and, compared with the first session, the energy and effort of the students were lower. Furthermore, although we structured the weekly homework assignments such that they could be completed within one to two hours, the students remarked they had difficulty balancing this minimal commitment with their other course requirements. This was particularly true for the students in the second session. Nonetheless, one to two hours of homework per week was judged to be appropriate and allowed them to put into practice what we had worked on in class. Based on the suggestions of the students and our observations as instructors, holding the seminar during the first half of the term is preferable.

Although the class only met six times, the majority of students saw improvements in their writing. Frequently, students commented that they were more aware of the deficiencies in their writing and had a new appreciation for the importance of "big picture" issues, such as identifying the audience, and organizing and revising a document. Almost all students commented that even if they did not see improvements in their writing during the short seminar, they were much more familiar with the process of writing, and therefore expected to see improvements in the future. Many students also stated that because they learned how to recognize many of the problems in their writing and were able to correct those problems, they were more confident of their writing abilities. Due to time constraints, we were unable to evaluate the students' progress quantitatively, through standardized tests for instance. However, as instructors we were able to make a qualitative assessment of the students' progress, due in large part to the small class size, which allowed us track the performance of individual students. In most cases, we observed that the students became more conscientious and critical of their writing during the seminar series. Therefore, although we worked with the students for only six weeks, this appeared to be enough time to instill in them an appreciation for and an understanding of the fundamental aspects of the writing process, thus meeting the main objective of the seminar. And although we were unable to demonstrate quantitatively that the students' writing improved, based on their comments and our observations, it seems likely that the majority will continue to be critical, conscientious writers, and will implement the techniques and lessons learned in the seminar.

#### 4b. Evaluation of the seminar content

The students were generally satisfied with the topics covered in the seminar. Some commented that they had never considered seriously the issues of audience, brainstorming, or organization, and therefore appreciated the classes that covered these topics. Also, many students felt the sessions that provided techniques for editing and revising a document were particularly beneficial. The session that covered the use of graphics was rated the lowest. Many students felt that they "already know this stuff", and the material could have been covered in a portion of a class, rather than a full class. Certainly, senior engineering students are familiar with various graphics, charts, and tables, and use them frequently in their coursework. However, based on class discussions and our experience as writing tutors for engineering students, certain issues regarding the use of graphics are not clear to students, even by the fourth year of their studies. For instance, many students in the seminar were uncertain about how to reference figures in the text, where to position figures in a document, and how to write captions for figures and tables. This suggests that the session on graphics should be retained, but rather than discussing different types of charts, the focus of a session on graphics should be on the issues related to producing clear figures and incorporating them into a document.

The main deficiency cited by the students in the seminar content was the lack of material on specific document types. The homework assignments required the students to write memos and proposals, so we covered briefly the key points for these documents. The session on resumes and cover letters was very popular since many of the students were searching for employment after graduation or for their work experience term. We did not explicitly discuss other documents that were of immediate interest for the students, including theses and progress reports. A couple of students suggested that these topics could be covered in additional sessions or in separate "focus" workshops that are offered separate from the seminar series.

In an effort to make the seminar interactive, we incorporated various activities that required the students to participate actively. Not surprisingly, there was universal agreement that these interactive exercises were necessary to supplement the lectures. The students felt the discussions as a class and in small groups were particularly valuable because of the variety of opinions that came out of these discussions. The students were generally less satisfied with the exercises that involved peer review and in-class writing. Some students felt that because these exercises were performed in class under time constraints, they were unrealistic. Others felt that their peers' comments were not very useful. The poor return from these exercises may stem from the students' unfamiliarity with in-class writing and peer review exercises. The majority of engineering classes at U of T are delivered as traditional lectures, with opportunities for small group work in tutorials and laboratories, but little exposure to in-class exercises or peer review. Certainly, the students do not receive formal training on how to review a peer's paper, despite the importance of this activity to engineering practice. Because of time constraints, we were unable to incorporate peer review techniques into the seminar. In retrospect, doing so would be valuable not only to make the in-class exercises more beneficial, but also for the students' future activities as practicing engineers.

#### 4c. Evaluation of the instructors

A rather unique aspect of our seminar was that we had two instructors with very different backgrounds. There was unanimous agreement from the students that this arrangement added significantly to the seminar. Based on the students' comments and our observations, we think there are a few reasons for why having two instructors with different backgrounds worked so well. The most obvious reason is that the ratio of students to instructors was very low (less than 10:1). As a result, we were able to provide individual assistance and detailed feedback to the students. The feedback we provided was regarded unanimously as useful. The students remarked that the comments on their writing were more detailed than any they had previously received; consequently, the comments identified problems in their writing that they had previously been unaware of. Furthermore, many students commented that the personal attention and encouragement provided in the comments motivated them to improve their writing. Another benefit of having two instructors related to classroom dynamics: the students commented that they appreciated hearing two opinions expressed, and the discussion and debates that resulted from those opinions made the class more interesting.

From a more personal point of view, we felt that a related benefit stemmed from our differences in training and backgrounds, which ultimately influenced our individual approach to engineering writing. Our differences worked well together, and we were able to complement each other both in teaching style and student feedback. The students were very cognizant of this, and commented that our approaches were complementary and synergistic. And while collaborative teaching is a common pedagogical model, bringing an engineer into the classroom *to teach writing* is not. From our experience, the benefits of having an engineer as an instructor are significant. Certainly, we were able to provide broader insight than, for instance, would a single instructor with a background in rhetoric, as is the common model for many engineering writing courses. Furthermore, an engineer instructor can eliminate many of the hurdles that confront instructors with a non-engineering background, including lack of credibility with the students and lack of

practical or technical engineering experience. Frequently in our seminar, CS (the engineer instructor) supported the concepts being discussed with practical, concrete examples based on his experience as an engineer and his familiarity with conventions in engineering writing and practice. For instance, in our introductory class, we had the students critique an abstract from a grant application for a study in which CS was involved. The abstract was poorly written and the grant application was initially rejected in part because the writing was unclear. Once the students had discussed the abstract, and in all cases recognized that it was poorly written, we were able to demonstrate the practical consequences of poor communication by telling the students about the fate of the application. Real-world examples such as this one, based on the instructors' personal experiences, were particularly effective at demonstrating the importance of writing clearly and more importantly, the consequences of not doing so.

While our model is by no means meant to diminish the role of the rhetoric and composition instructor in engineering writing, we do suggest that the collaboration between the "traditional" writing instructor and engineer writing instructor can work quite well. Moreover, both instructors noted that they learned something from the other, and that they quite enjoyed the experience of team-teaching in a writing workshop environment.

#### 4d. Evaluation of the seminar structure

The final aspect of the seminar that the students commented on was whether the engineering writing seminar should be expanded to a full-time, full-credit, graded elective (or requirement) for senior undergraduate students. The students' opinion was divided on this issue. Approximately 60% of the students felt that more communication courses are needed in their curriculum, and therefore the seminar should be expanded into a full course elective. As one student wrote, "The current curriculum expects students to have good writing skills, [but] the faculty does not provide these skills." Although engineering students at U of T take a communication course in their first year, many of our students commented that they did not see the value of technical writing at that time, and it was only in their later years, once they had been exposed to work terms, summer jobs, and course assignments, that they recognized the importance of being able to communicate clearly. These comments suggest that the students feel more benefit would be realized from additional training in technical writing later in the undergraduate program. Some students also felt that if the course was graded and for full credit, they would put more effort into it, and therefore receive more benefit from it. However, several students argued that if the course were graded, the focus would change from improving one's writing in a non-competitive environment to obtaining the highest possible grade. A related comment that came out of the survey was that because the homework assignments were not assigned a grade, the students were more willing to focus on the specific feedback and comments we provided. Another common argument against expanding the seminar into a full course was that there is insufficient room in the current curriculum to add another course and the students would not want to replace a technical elective with a communication course. Some students suggested that a remedy for this would be to replace one of the current social science electives with a communication course. The difference in opinions of the students on this issue reflects fundamental differences in their perceived needs: about half of the students felt that a full-credit, graded course would provide the time and motivation necessary to achieve the level of communication ability demanded by their curriculum, whereas the other half of the students were

satisfied with a short “refresher” course that allowed them to hone their writing skills in a low pressure environment.

## 5. Conclusions

The demand for our engineering writing seminar and the positive feedback provided by the participants confirms our belief that additional instruction in engineering communications is both highly beneficial for and desired by many upper-level engineering students. While this model of teaching is becoming more common at many American schools, Canadian engineering schools do not traditionally provide the instruction in written and oral communications that most students require to excel academically and professionally. To meet this need, we implemented a six-week voluntary seminar as a pilot project with the objective of providing intensive instruction on the process of technical writing. Our goal was that the students would become more self-reliant, and as a result, more confident in their writing. Based on the students’ feedback and our observations as instructors, the seminar was successful at meeting this goal, despite the short, six-week schedule. Our experience with this pilot project has also provided us with insights into the logistics of mounting a short seminar in a crowded course schedule so as to achieve the most benefit for the students.

The question of whether engineering writing needs to be taught as a full-time, full-credit, graded course is still open, however. Our experience suggests that some, but certainly not all, of the aims of a full-time course can be met with a short seminar. It is important to note, however, that we were only able to reach a very small portion of engineering students with our seminar, and because the course was voluntary, it self-selected for students who already have an appreciation for the importance of clear communication. If a goal of an engineering curriculum is to produce graduates who have adequate written and oral communication skills, then there needs to be a mechanism in the curriculum to ensure *all* students receive appropriate training at the appropriate stage of their program. Currently, the curriculum at most Canadian schools does not do so, and serious consideration should be given to implementing a mandatory course in engineering communication for upper-level students.

Perhaps the most interesting finding from our pilot project was the significant benefit we achieved from having two instructors, one a writing specialist and the other an engineer. Our experience suggests that *engineers* should make more of an effort to contribute to the education of engineering students when it comes to writing. Not only are there pedagogical benefits to this arrangement, but an engineer who teaches communications has the opportunity to act as a role model for his or her students, and by emphasizing the importance of clear communication, may help to remove the stigma many engineering students currently associate with non-technical electives.

## Acknowledgements

We gratefully acknowledge Dr. Rob Irish for his support and encouragement with the planning, implementation, and evaluation of the seminar, and for his contributions to this paper. We would also like to thank the students who participated in the seminar and who provided valuable feedback.

## Bibliography

1. Irish, R. "Internal Report to the Dean: Survey of Technical Writing Courses." Faculty of Applied Science and Engineering, University of Toronto, June, 1998.
2. Graves, R. *Writing Instruction in Canadian Universities*. Winnipeg: Inkshed, 1994.
3. Paradis, JG & Zimmerman, ML. *The MIT Guide to Science and Engineering Communication*. Cambridge, MA: The MIT Press, 1997.

## REBECCA PINKUS

Rebecca Pinkus is currently completing her M.A. in the History of Technology at the Institute for the History and Philosophy of Science and Technology at the University of Toronto. She received her B.A. (English Literature) from Allegheny College, and her M.A. in Technical Writing from Northeastern University, where she also taught several undergraduate writing courses. In between her graduate degrees, Rebecca worked as a volume editor for the Surgeon General's *Textbook of Military Medicine* series.

## CRAIG SIMMONS

Craig Simmons is currently a post-doctoral research fellow at the University of Michigan. He recently completed his Ph.D. in Mechanical and Biomedical Engineering at the University of Toronto, and has a B.Sc. (Eng.) in Biological Engineering from the University of Guelph and a S.M. in Mechanical Engineering from M.I.T. In addition to his research activities, Craig has taught several undergraduate engineering courses and was a writing tutor in the Engineering Writing Centre at the University of Toronto.



**University of Toronto**  
**Language Across the Curriculum Program**  
**Professional Writing Seminar for Engineers**  
**Fall 1999**

<b>Instructors</b>	Rebecca Pinkus E-mail: rpinkus@chass.utoronto.ca Phone: 978-7432	Craig Simmons E-mail: simmons@mie.utoronto.ca Phone: 978-1467
<b>Seminar Description</b>	This non-credit writing seminar is for third and fourth year engineering students who are interested in improving their writing skills for both academic and professional purposes. The seminar will focus on issues such as defining audience and aims, document organization and style, basic editing techniques, as well as the proper integration of graphics and visual information into text documents. The ultimate goal of this seminar is to better prepare students for academic and professional writing situations that they are likely to face in their near futures.	
<b>Seminar Objectives</b>	By the end of the seminar, the student will: <ol style="list-style-type: none"><li>1. Be aware of and appreciate the issues related to effective professional engineering writing.</li><li>2. Have a thorough understanding of how to create a well researched, well organized, and polished final document.</li><li>3. Have a collection of reference material and writing samples that can be used as a resource for future writing assignments.</li><li>4. Be better prepared for thesis writing, PEY, graduate school and job applications, and other professional endeavours.</li></ol>	
<b>Expectations</b>	The student is expected to: <ol style="list-style-type: none"><li>1. Attend all five seminars plus one short final meeting.</li><li>2. Complete all in-class and homework assignments. Students can expect to have approximately one hour of homework per week outside of the 2½ hour seminar.</li><li>3. Participate in classroom discussions and exercises.</li></ol>	
<b>Schedules</b>	Classes take place on Mondays from 6-8:30 p.m. in GB404. Please refer to the attached sheets for the seminar schedule. This schedule may be modified if required.	
<b>Reference Material</b>	Reference material will be provided in class.	

**Professional Writing Seminar for Engineers  
Fall 1999 Schedule**

**Classes will take place on Mondays from 6-8:30pm in room GB404**

---

<b>Date</b>	<b>Topic</b>
<b>Oct 25</b>	<b>Introductory Seminar</b> <i>How and where does written communication fit into the engineering profession? Is it possible for an engineering student to become a good writer and communicator?</i> To answer the last question first – YES, engineering students can become excellent writers. Like engineering, writing is comprised of structural elements, and critical components; there are methods for creating a strong structure, and for avoiding design flaws. This introductory seminar provides an intense examination of several writing samples, and allows the students to learn how much they already know – and more importantly, how to apply that knowledge to their own writing. The aim of this first seminar is to provide the students with an opportunity to begin exploring the value of good writing versus the consequences of bad writing, and to provide a springboard for the rest of the course.
<b>Nov 1</b>	<b>Audience and Aims</b> <i>Who am I writing for? What is the purpose of this document? How can I be sure that what I write is appropriate for my intended audience? What are the consequences of writing something that is inappropriate for my audience?</i> These are all very real questions faced by most engineers at some point in their career, if not on a daily basis. This seminar will focus on the importance of properly identifying the audience and writing for their needs, as well as for the intended purpose of the document. Main aspects of the seminar will include determining the readers' interests, and revising one document for several different audiences and purposes by means of style modification.
<b>Nov 8</b>	<b>Organization and Document Drafting</b> <i>Where do I start?! Does it matter how my document is organized?</i> This seminar takes the audience and aims discussed in the previous seminar and adds to it issues of organization and drafting often faced by engineering students and engineers. Students will learn solid techniques for presenting their data or material in a logical, solid structure appropriate to their audience and purpose. Issues such as outlining, early-stage-editing, and initial drafting will provide the foundation for this session.
<b>Nov 15</b>	<b>Revising for Organization and Style</b> <i>How can I be sure my writing is clear and accurate? Can I learn to edit my own writing?</i> Contrary to what many writers practice, revision requires a great deal of time. A good method of revision helps provide a solid organization for a document, and ultimately allows for both clarity and concision in the final product. The difference between a document that has been thoroughly revised and one that has not can mean the difference between passing or failing marks on papers or success or failure in the professional world. This seminar will be devoted to the many aspects of document revision, including basic editing skills and some helpful stylistic issues. The student should expect to learn the difference between an unpolished piece of work and one that has been given both time and thought.

---

---

<b>Date</b>	<b>Topic</b>
<b>Nov 22</b>	<b>Graphics and the Polished Product</b> <i>Now that the writing is done, how can I make sure my graphics work with the text? How do I properly document tables and graphs? Can good use of graphics really help polish the final document?</i> The first part of this seminar will cover the proper integration of data and information in visual (graphic) form. Issues such as when to use what kind of visual, how to avoid “chart junk,” and how not to lie with graphics will be covered, along with some basic information about how to avoid some common pitfalls with popular graphics software. The second portion of this seminar will serve as a review of the entire course, focusing on the finished product. By the end of this course, the student should have a thorough understanding of how to create a well researched, well organized, and brilliantly polished final document.
<b>Nov 29</b>	<b>Final Meeting</b> The seminar series will end with a brief meeting to wrap up any loose ends.

---