A Process to Begin Integrating First-Year Composition and Engineering: Or How to Talk to an English Department

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Abstract *- Arizona State University's Foundation Coalition Program for first-year-engineering students is one of the few programs that integrates English (first-year composition courses) with engineering courses. So successful has this integration been that we now offer a separate section of English for engineers in addition to the large Foundation Coalition class of 80 students. While we encourage other institutions to consider integrating English with engineering, we are aware that there are a number of barriers that make such integration difficult. These barriers include basic problems such as not understanding what is typically taught in first-year composition classes and who does the teaching. In most English departments, first-year English classes are composition classes, and are under the auspices of the Rhetoric and Composition faculty. Some of these faculty members feel strongly that composition classes should deal with issues of rhetoric, and they believe that integration with another subject will weaken their own subject area. Another problem is that Teaching Assistants teach most composition classes. Therefore, the possibility of involving tenured faculty in the teaching of integrated classes may be remote, and engineering departments who approach English departments with this goal in mind may be quickly disappointed. However, in a number of institutions, composition classes are also taught by instructors and lecturers who may, for reasons we will discuss in the paper, be more willing to undertake such courses. In this paper, we will discuss ways to approach an English department to begin the process of integration, staffing such courses, persuasive benefits engineering can offer English departments, and some areas of integration that can occur in composition classes.*

Introduction

At Arizona State University, the Foundation Coalition Program for first-year engineering students is now in its sixth year of funding and fifth year of teaching. At this point, the program integrates engineering, physics, calculus, and English composition and delivers those courses to a first-year class of 80 students who are taught in an 80 person mediated classroom [1]. For calculus, physics, and English, this is a much larger class than a regular first-year class, and the teachers involved have dealt with this larger class size in several ways including the extensive use of teaching assistants. English has proved to be more interesting in that the ratio of teacher to student in regular sections of composition is 1 teacher to 25 students. Thus, for 80 students, the department assigns three teachers. Rather than split the groups into three smaller classes, the English teachers have elected to keep the whole group together and team-teach the whole class. This solution appears to be working well; however, creating this integrated class, developing an integrated curriculum, solving the student-teacher ratio, and staffing the English class has presented problems. In this paper, we will discuss what problems an integrated program should anticipate, how we solved those problems, and what kind of integration can occur when those problems are solved.

Lessons to be Learned from our History

Engineering departments should prepare for negative responses when they first propose an integrated composition course to an English department because some departments may feel that composition should not become a service course controlled by departments outside the English department. For example, when Dr. D. L. Evans (Director of the Foundation Program at Arizona State University and Director of the Center of Innovation for Engineering Education) approached the English department at Arizona State University, he was not met with great enthusiasm. He asked whether it would be possible to develop a composition course for first-year engineering students that would integrate with engineering, physics, and calculus. The response was negative. The then temporary director did not see how such a course could be developed without *compromising* the first-year composition courses, nor could he see how to staff such a course. He felt that few tenured faculty would be interested in teaching in a program that would clearly demand additional work; moreover, at that time, the numbers of tenured faculty who taught composition was very low. English composition was largely taught by teaching assistants (graduate students in the MA and Ph. D programs in literature, Rhetoric and Composition, and graduate students in the MFA program). Additional sections were taught by instructors (teachers who teach four courses per semester and are hired on a one-year non-renewable contract), lecturers (teachers who teach three courses per semester and are hired on a three-year renewable contract), and faculty associates (part-timers who are hired from semester to semester).

0-7803-5643-8/99/$10.00 © 1999 IEEE **November 10 - 13, 1999 San Juan, Puerto Rico**

Other institutions will probably face the same negative responses, but they should be persistent. For example, unlike our composition director, our director of the Writing Across the Curriculum Program felt that such a course was indeed possible and suggested not tenured faculty but instructors or lecturers who might be more willing to develop a new course if they themselves would benefit. As the director explained, those people working on a one-year contract might be willing to work in a program that would help them in the rehiring process the next year. Thus, as a result of this, instructors on a one-year contract staffed the English composition courses at ASU.

Staffing Issues for an Integrated Program

Therefore, any engineering department wishing to begin an integrated program with an English department must first determine who does the first-year teaching. In most state universities, graduate students, part-timers, and instructors teach these courses [2]. Therefore, the engineering faculty should consider what kind of instructors they want to involve. While graduate students are often highly qualified, and many would welcome the opportunity to work in a program that might give them the edge over another candidate when they apply for full-time teaching positions, the engineering department should remember that these teachers are students first. They are working on degrees, and the time that they can give to additional projects is limited. Most will probably not be able to attend meetings during vacations, workshops during vacations, and additional meetings and workshops during the semester—all things that are necessary if an integrated program is to succeed. In addition, these graduate students will be involved in job searching which means attending either the MLA conference and or the CCCC conference. Both will involve preparing conference papers and extensive interviewing at the conferences and at campuses. As a result, this is not a stable population on which to build a program. Likewise, part-timers who are hired from one semester to the next are equally unstable. At Arizona State University, these teachers are often hired only weeks or days before a semester begins. Again, they will not provide the stability needed for an integrated program. Moreover, many part-timers teach at more than one institution, and so their ability to attend additional meetings and workshops would be severely curtailed.

Given these problems, the most desirable group might be instructors. As full-time employees, these teachers have a full teaching load at one institution. They are hired each year, and at Arizona State University, they can be rehired each year although they must go through the rehiring process. Because they must go through the rehiring process, many are looking for involvement in programs that will make them either necessary to the university or will make them more attractive when compared to other candidates. Therefore, as a group, they are willing to be involved in programs that may demand extra work if they can see a benefit. That is certainly true of the authors of this paper.

To attract this group of teachers, engineering departments can also offer incentives and rewards to instructors who are often overlooked by their own department. In many English departments, "composition is the economic and ideological handmaiden to English" [3]. That support can involve the following: support to attend professional conferences, computer equipment, professional development workshops, and even office space. Many English departments offer only limited financial support to full professors and of course, much less to those lower on the hierarchy; Arizona State University is generous in its support of $300 per year to instructors to help them attend conferences, but clearly that is a small amount of money. Therefore, if the engineering department can offer additional support, to attend conferences related to teaching the integrated program, this is a huge incentive. Likewise, many English departments are not able to provide instructors with their own computers at the institution. Again, this is a small expense that an engineering department may be able to provide—especially if engineering can recycle slightly older machines that meet the English teachers' needs. Surprisingly, office space may also be an incentive. At Arizona State University, instructors, some lecturers, and graduate students all share large offices. Part-timers may also share desks. Office space is at a premium, and so giving attractive space to the English teachers may also be an overlooked incentive.

Subject Matter of Composition Classes

Another problem that engineering departments will face is understanding what is and what can be taught in composition classrooms. From attending a number of conferences with engineering faculty, we have found that many teachers outside composition are not really familiar with current first-year composition courses. Clearly, any engineering department that wishes to integrate with composition needs to understand exactly what is taught in these classes. Arizona State University, like many state universities, requires that all first-year students take some writing classes—no student can avoid this. Those with a high SAT ACT score may take a one semester course, and those with a low SAT ACT score are required to take the equivalent of three semesters of composition; however, the majority of students take two semesters of composition, English 101 and English 102. These courses are composition courses. They are not, as some believe, literature courses. In fact, the students do not read literature during this first year. Instead, in the first semester, the composition course deals with learning to write essays that employ primary research and observation and secondary research, and in the second semester, students learn to write argumentative researched essays. The focus of these classes is writing [4].

However, at conferences, we have met a number of professors who imagine first-year English to match their own experiences. It is true that at one time, such classes were often classes in "great books." Students would read literary texts and write about them. This is not the case today in many universities. These courses fall under the auspices of Rhetoric and Composition, and what is taught in these classes is writing. Typically, students learn to write "genres" or types of papers that may include profiling, evaluating, explaining, and autobiography. In the second semester, they learn to write a variety of arguments including causal arguments and problem solution arguments. If an engineering professor approaches composition teachers expecting them to assign literature such *as Brave New World*, he or she may sorely disappointed with the response.

Moreover, at Arizona State University, one goal has been to provide students with a *standard* experience in these classes so that there has been a standardized syllabus, uniform textbook, and uniform paper requirements. Such standardization may act as a barrier to integration. Certainly at Arizona State University, the director of composition felt that there should be a degree of uniformity in all composition classes, and to him, the integrated class appeared to threaten that uniformity. Therefore, the English instructors had to work hard to integrate with the other classes and yet ensure that students in the integrated section could take only the first semester with the integrated class and then return to a regular section in the second semester.

Tact, Compromise, and Diplomacy

Even after the problem of staffing the integrated course has been solved, and engineering understand some of the limitations of what can be integrated, there are still barriers that must be overcome. The most significant, and often the most overlooked, is how instructors from the various disciplines regard each other. Although we have had very positive interaction with the engineering departments at Arizona State University, this is not always the case for other instructors. We have met many professors outside of English who regard the subject as one that can be taught by anyone. However, if the students write badly, the English teachers are to blame. As Anne Ruggles Gere explains, English teachers are often told, "I wish you people would teach students how to write. You should see what some of my employees produce. They can't even spell" [5]. Such views are damaging. They overlook the fact that those of us who teach composition have studied our subject area of Rhetoric and Composition. We do not just walk into a classroom and ask students to write papers. In addition, most English teachers feel that student writing is *a shared responsibility*. We are not responsible for how well students write their lab reports. That is the responsibility of the teacher who assigned the report. In the composition class, we do not teach students how to write a lab report, and indeed, when we tried to gain consensus for one common format for the Foundation Coalition students, the physics professor and the engineering professor wanted quite different things. In some ways, every teacher is a teacher of English, and if engineering departments assume that all things to do with writing are the responsibility of the English teachers, then the integration is not likely to succeed.

Another problem that arises from integration, although this was never a problem at Arizona State University, is the notions that the English instructors will grade writing that other teachers assign. This is impossible for a number of reasons. Most English teachers find it difficult to grade English assignments set by other English teachers because they are unfamiliar with what was taught, what invention activities were completed, and unless stated, what goals the teacher had for the assignment. Certainly this would be true if the physics professor asked us to review his or her students' lab reports. Moreover, we are unfamiliar with the conventions and genres that are discipline specific. Different disciplines have different discursive practices. Finally, as instructors, we have the equivalent of 100 students per semester who each write a minimum of 4 papers, a portfolio, and a final reflection. That is 600 pieces of polished work we grade, and this does not account for rough drafts we read and comment on. To ask us to read additional work is hardly tactful, not theoretically sound, and can make us feel like "graders" as opposed to equally qualified teachers.

A Process that Works

Once these barriers are overcome, then planning for integration can begin. Engineering departments wishing to begin integrated course with English will need to devote significant time to planning. We developed a very successful process, and one that we would recommend others consider. The physics, calculus, and engineering professors met regularly at least one year prior to teaching the class to work on integration. They began by listing goals, outcomes, and topics for their existing courses. Once they had established key areas for integration, the English teachers joined the meetings and met regularly with the faculty throughout the summer prior to teaching [6]. We began by listing the goals for composition courses, the outcomes, and the "genres" or types of papers that were taught in the regular sections [7]. We also listed things that we could not do if we were to ensure that students in this program receive an experience that was similar (but not identical) to those in regular sections. Thus we could not teach the students "technical writing." We would not ask students to write memo reports, informal reports, formal proposals, and reviews of literature. Our reasoning was twofold: first, our own department offers course on upper levels that do this (as does engineering in a required intermediate design course), and secondly, this would differ too much from the regular English 101 and 102 sequence so that if students dropped the integrated program after the first

semester, they might be unable to succeed in a regular section.

Having listed our goals for English 101 and 102, we then asked the other faculty to write down what they would like students to be able to do in terms of writing. Their goals were very similar to our own. They wanted students to be able to organize their ideas clearly, to write coherently, to support their ideas with evidence, and to understand how audience affects what they write, all rhetorical issues that had to be addressed. We then discussed ideas for various papers that would integrate specifically with the various subjects to produce a reasonable integrated course.

We also realized that a key component for an integrated composition course was to explore the notion of audience or readers. For engineering students, the concept of audience is especially important. They must understand for whom they are writing if they are to deliver their message. Many of us are all too familiar with the poorly written memorandums produced by engineers working on the Challenger. Too often those engineers wrote for non-specialists as if they were specialists in engineering, and not surprisingly, their readers did understand the message. In an integrated course, we would have the perfect opportunity for asking students to write about technical matter in a way that non-specialists (English teachers) could understand. In this way, we could teach them rhetorical concepts more commonly taught in technical writing courses, and we could enhance our integration.

Why Not Writing Across the Curriculum?

Some engineering departments may feel that integration with composition is unnecessary given the development of Writing Across the Curriculum (WAC) and their own efforts to integrate writing vertically in the curriculum through Writing in the Disciplines. It is true that these programs did develop rapidly so that in 1993, Beall and Trimbur noted that there were "over four hundred Writing Across the Curriculum Programs, many of which require students to take writing-intensive courses outside the English department and beyond the freshman year" [8]. Unfortunately, some of these programs have not been able to sustain their initial enthusiasm and support. Of those programs of particular interest to engineering departments is the program developed at Michigan Technological University where they believe that "all disciplines have the responsibility to participate in the effort to improve student writing and to the idea that writing is a heuristic that facilitates learning" [9]. Similarly, a search in the engineering and composition databases yields over fifty articles that detail assignments engineering professors are employing to bring writing into the engineering curriculum and meet the ABET 2000 goals [10]. However, we should remember that although many WAC programs continue to flourish, "proponents of WAC did not succeed in dislodging the universal requirement" of freshman English [11]. Thus, while the authors of this paper agree WAC is a viable alternative to integration, and note that a number of engineering professors are integrating writing into their courses on a variety of levels, it would seem foolish to overlook the opportunities for integrating writing and engineering that the required freshman English class affords. If students are required to take one or more courses on writing in their first year at the university, why not create a course that allows them to understand more of discursive practices that their profession involves? Why not develop a first-year English program that prepares them for writing in their college career and beyond rather than delivering a generic course in "academic writing" which most composition specialists agree does little to help with the discipline-specific practices of their field?

Areas of Integration

We believe that the ideal integration of engineering and English occurs on multiple levels so that students do more than simply write about engineering topics. Our beliefs are based on the fundamental premise that "engineering design and the composing of an essay are problem-solving processes that have much in common"[12]. Of course, we begin on a subject level in the first semester when we ask students to write about topics from engineering and physics. In their first paper, students show the English teachers how the design process they have learned about and are employing in engineering is similar to the writing processes they employ in English and how the heuristics they learn in engineering might prove useful in composing papers in English. Next, we ask the students to profile an engineer to show and audience of high school students what skills an engineer uses and how an engineer typically works based on a presentation given by a professional engineer and their own interviews with working engineers (often relatives). This is a particularly important assignment because it asks students to research and investigate the profession they are studying. And, because the professional engineer and their interviewees discuss how they typically work, the assignment also shows the students why they are learning to work in teams, and why the faculty place so much emphasis on teamwork and active discovery learning. To help students learn concepts from their other classes, we also ask them to explain a physics concept such as gravity in a way that non-science majors can understand and appreciate its importance [13].

We also integrate on a methodological level. We ask students to take a decision-making tool from engineering, explain it, and then apply it to evaluate a decision outside of engineering such as where to live in the second semester or which computer to buy or which part-time job would be better.

Finally, we integrate on an instructional level. Since the students work in teams on team projects in the other classes,

we also assign them team papers and teach them collaborative tasks. In the first semester, students collaborate in teams on a paper that examines the causes of an engineering disaster. Of course, this paper also integrates engineering and often physics since they must understand how we deal with engineering failures and what physics concepts were involved in those failures.

In the second semester, we integrate on a more thematic level, asking students to develop critical thinking skills and to apply those skills to engineering, ethics, and technology. Our assignments ask students to consider what causes low retention (of all students or of a minority group) or high dropout rates in engineering, math, and science. This paper also helps the students develop a greater awareness of the problems some of their class members' experience. In another assignment, we ask students to consider whether the press exaggerates technology's promise or technology's failure when journalists write about new technology. Finally, we ask students to work collaboratively on evaluating whether a technological or a social fix is the better solution to a social problem of their choice.

Each paper allows us to integrate with the other subjects so that the students are thinking critically about the technology they employ. For example, when the students write about he exaggerations of the press, the calculus professor can also ask them to apply that notion of evaluation to their own decisions of when to use technology to solve equations and when not to. When we ask students to consider technological versus social fixes, the engineering professor can ask the students to consider how much they should revise their design for their projects. Is there a point at which they should stop optimizing and why?

Lessons for Other Schools

Despite our positive experiences with integration, there are issues and problems that other schools should consider. First, if a school has a universal first-year writing class requirement, is the English department willing to allow different kinds of sections for specific groups of students? Some departments will see such a request as an invasion of their territory and an attempt to control their curriculum [14]. Second, who should teach such a course? Not only should these teachers understand technical writing in order to teach students the underlying rhetorical practices, but they need to be a stable population so that retraining is not necessary from semester to semester. Few tenured professors have the time or the desire to teach sections of composition and graduate students and adjunct staff are often temporary. Next, what incentives can the engineering department offer that will attract good teachers to a course that is more demanding? What kind of time can be given to the development of such a course? Merely asking composition teachers to develop a course without interaction from the other faculty may not yield the desired results. And finally, what value-added results from such course? We believe that this kind of integration with English has a number of benefits for the students and the faculty involved. The students see that writing is important to the entire faculty, and they also see that writing enables us to share ideas, build knowledge, and so co-construct our world [15]. Faculty also benefit. The English teachers benefit from working with faculty who stress daily the value of writing. The other faculty benefit from having students who are thinking about issues and topics that arise in their classes and writing about them. We urge engineering departments to join with English departments and consider integrating. However, before they do, each should take the time to discover who constitutes the department and what they teach.

References

[1] For more information about the first-year engineering Foundation Coalition courses at Arizona State University, please visit:
http://www.eas.asu.edu/~asufc/fipe/

[2] For a comprehensive overview into who teachers Composition see: Trainor, J.S., & Godley, A., "After Wyoming: Labor Practices in Two University Writing Programs," *CCC*, 50, 2, December 1998, pp. 153-181; Crowley, S., *Composition in the University*, Pittsburgh: University of Pittsburgh Press, 1998; Schell, E., *Gypsy Academics & Mother-Teachers*, Portsmouth: Boynton, 1998; Enos, T., *Gender Roles & Faculty Lives in Rhetoric & Composition*, Carbondale: Southern Illinois UP, 1996.

[3] Trainor, J.S., & Godley, A. "After Wyoming: Labor Practices in Two University Writing Programs," *CCC*, 50, 2, December 1998, p. 159.

[4] For information on the Composition program at Arizona State University, please visit the following website: http://www.asu.edu/clas/english/composition/index.html

[5] Gere, A. R. "Public Opinion and Teaching Writing," *The Politics of Writing Instruction: Postsecondary*, R. Bullock, & J. Trimbur, Portsmouth: Boynton, 1991, pp. 263-275.

[6] For a similar model of collaborative planning between English & engineering see Kuriloff, P. C., "The Writing Consultant: Collaboration and Team Teaching," in McLeod, S. H., & Soven, M., *Writing Across the Curriculum: A Guide to Developing Programs*, Newbury Park: Sage, 1992, pp. 134-153.

[7] For a complete goals/objectives/performance matrix, please visit the following website:
http://www.public.asu.edu/~atsjd. Also, for an explanation of this matrix, see Duerden, S., & J. Garland, "Goals, Objectives, & Performance Criteria: A Useful Assessment Tool for Students and Teachers," Published in the proceedings for Frontiers in Education 28th Annual Conference, Nov. 1998.

[8] Beall, H., & Trimbur, J., "Writing in Chemistry," *College Teaching*, 41:2, spring 93, p. 50.

[9] Fulwiler, T., & Young, A., Programs That Work: Models and Methods for Writing Across the Curriculum, Portsmouth: Boynton, 1990, p. 178.
[10] For other references to integrated programs in English and engineering see Anson, C. M., & Schwiebert, J. E., *Writing Across the Curriculum: An Annotated Bibliography*, Westport: Greenwood Press, 1993, pp. 111-132.
[11]Crowley, S., *Composition in the University*, Pittsburgh: University of Pittsburgh Press, 1998, p. 15.
[12] Fulwiler, T., & Young, A., Programs That Work: Models and Methods for Writing Across the Curriculum, Portsmouth: Boynton, 1990, p. 169.
[13] For complete assignment sheets for the English assignments mentioned in this paper, please visit the following website:
http://www.public.asu.edu/~atsjd
[14] See Crowley, S., *Composition in the University*, Pittsburgh: University of Pittsburgh Press, 1998, pp. 1-29.
[15] For information on how we measure student understanding of the value of English, please see:
Rhoads, T.R., & S. Duerden. "Views About Writing Survey: A New Writing Attitudinal Survey Applied to Engineering Students," Published in the proceedings for Frontiers in Education 28th Annual Conference, Nov. 1998.
For other WAC program assessments see Yancy, K., & Huot, B., *Assessing Writing Across the Curriculum: Diverse Approaches and Practices*, Greenwich: Ablex, 1997.