

“Nerds Write!”: First-Year Writing Course for Engineering Students at the University of Hartford

Beth Richards and Karen Walsh
University of Hartford
brichards@hartford.edu

Abstract

To meet the engineering and technology challenges of the 21st century, engineers and technologists of the future, in addition to technical skills, need to master the significant interpretive, rhetorical, and analytical skills required to communicate effectively. But how can that happen, in a university's first-year, general-education, required writing course, particularly when many first-year engineering students would rather be somewhere else—*anywhere* else?

In this paper, we describe a recent approach to teaching writing to first-year engineering students at the University of Hartford, in which we crafted a course based the concept of the nerd, a topic that engineering students find engaging, and then developing their writing skills from those materials in an integrated way that is interesting to students and (most important) develops key communication skills. We developed two tracks, one using a gender approach and the other using historical reactions to innovations in technology; these are described, along with texts used and writing assignments that grew from the readings. This rhetorical foundation becomes the basis for the oral and written communication skills required by ABET as well as essential for students' future success in the workplace.

Background

The University of Hartford has significant history of collaboration between the first-year required engineering curriculum and the first-year required writing curriculum. Since 2000, these courses have been paired in First Year Interest Groups (FIGS) in which instructors plan and implement shared objectives and course activities, to emphasize the essential relationship between engineers and written and spoken literacy.¹ Although writing instructors and engineering instructors must give first priority to departmental objectives, critical thinking and analytical skills cut across both disciplines, and shared or linked assignments (called “integrated learning blocks”) are readily developed that emphasize those connections.

In the FIGS program, writing instructors strive to use course materials that pique the interest of science and technology oriented students and that also provide excellent models of literacy. Instructors have thus developed a wide range of materials, ranging from historical perspectives to digital literacy² as well as biomechanics, the science behind science fiction, and technology-based controversies. These courses have developed a reputation for success, for breaking down some of the barriers between the humanists and the engineers, and—most important—preparing engineering students for the demanding levels of literacy required both for university coursework and the workplace.

During the summer 2009, we began discussing our approach to the first-semester writing course that would begin in September 2009. Both of us were interested in the concept of “nerd” and had read Benjamin Nugent’s *American Nerd: The Story of My People*, a cultural and historical exploration of the concept of nerd from the nineteenth century until the present. Using this book as a foundation we developed a course plan that explored the cultural paradigm of nerd in a variety of ways.

Meeting Students in the First-Year Space

Although on the surface the nerd theme might seem rather lightweight, it in fact allows students to explore cultural and historical issues within a larger context, including history of education and history of racism, and how these issues apply to the current engineering and technology milieu, and the people who inhabit it. In addition, we were convinced that this approach would be particularly useful for first-year students, who had just transitioned from high school, which, they freely admit, is strongly hierarchical and “clique driven.” The fresh and immediate contrast of the social structures of high school and the first-year university experience would allow students not only to self-identify but also to thoroughly analyze how stereotypes (such as nerds and jocks) both succeed and fail. In addition, this analysis, based on Nugent’s analysis of nerd “types,” had the potential to be particularly fruitful for the majority of first-year engineering students, who typically identify themselves as a complex mix of types rather than “pure nerd.” The nerd theme also would provide the engineering students with a touchstone, allowing them a level of comfort not always found in English classes, from which they could explore these complex subjects in depth and with sustained interest and thus effort.

Our conceptualizing of this course was based partly on our experience as professional writers (a lawyer and a technical writer) and our experience working with engineering students. We were also informed by various rhetorical theories and research. For example, we drew on the Burkeian concept of identification³ as well as his concept of communication as a form of drama.⁴ Despite the nerd theme being familiar, as the class progressed, students recognized that the definition of nerd was not as unidimensional as it might appear. In complicating this seemingly easy definition of nerd, we, like Downs and Wardle, tried to avoid framing the reading and writing tasks as a “universal academic discourse” but instead focused on writing as inseparably paired with content. To accomplish this goal, we used, as Downs and Wardle describe, reading material that “centers on issues with which students have first-hand experience,” data-driven reading, as well as reflective and research assignments, to lead to increased awareness about writing as well as improved reading abilities and confidence—including recognition of texts not just as information but “as the words of real people.”⁵

So, What Is a Nerd?

At the outset of *American Nerd*, Nugent defines nerd in two different ways. First, he describes what he calls the “machine nerd” as:

- “Passionate about some technically sophisticated activity that doesn’t revolve around emotional confrontation, physical confrontation, sex, food, or beauty
- Speaking in language unusually similar to written standard English

- Seeking to avoid physical and emotional confrontation
- Favoring logic and rational communication
- Working with, playing with, and enjoying machines more than most people do.”⁶

Many students view this type of nerd (whose characteristics are discussed throughout the book) as someone with whom the media relates but with whom they themselves do not identify. Using Nugent’s categories and arguments, students found themselves analyzing their own interests and methods of social interaction. Through this discourse, they disassembled the ideas and argued against them. This created a sense of passion that gave students the impetus to want to engage in both discussions and writing. While they may have determined that they were not nerds, based on this definition, and may have found themselves angered by Nugent’s simplified definition, they used critical thinking to integrate the information with their own identities and life experience.

Nugent’s second definition of nerd further caused students to pause and reflect on how their own identities fit within an idealized and potentially simplified world view. As Nugent writes, “The second type of nerd probably consists equally of males and females. This is a nerd who is a nerd by sheer force of social exclusion.”⁷ This nerd is one whom many students saw in their high schools, and this paradigm gave students a connection to that cliquish world. However, many dissected their high school experience, indicating that although group cohesion may be formed around interests, their own individual experiences differed from Nugent’s more simplified, generalized examples. Again, this gave students an opportunity to integrate information using personal experience. Once they had become comfortable discussing these larger ideas, they began to expand upon them through the reading and integration of additional texts.

The activities described in this paper cover three sections of the paired classes; sections are capped at 20 students each. Students are placed in a paired FIG section when they register for fall classes. The assignment is random, based on section availability and students’ other courses to be scheduled.

In one section of the course, which we’ll call Track 1, the additional texts explored gender-related issues especially those concerning math/science vs. the humanities. In the other two sections, which we’ll call Track 2, the additional texts explored some of the great “nerds” in the history of science and technology, including Galileo, Charles Darwin, Ray Kurzweil, and contemporary science writers, as well current practices in technical writing. The two different approaches evolved out of each instructor’s response to Nugent’s text, as well as each instructor’s background and preferred teaching method and style. This material could be adapted in yet other ways by other instructors.

Each track’s approach is discussed below.

Track 1: Gendering Math and Delineating Masculinities

This track used the texts “A Beautiful Myth: The Gendering of Being/Doing Good at Maths” by Heather Mendick and “Living the Image: A Quantitative Approach to Delineating Masculinities” by Andrew P. Smiler. These texts allowed students to engage in a discussion about the gendering

of math and science education, which impacts both males and females in these courses. By exploring the manner through which math and science have been considered “masculine” as opposed to “feminine,” students began to move their analysis outward from themselves and connect it to larger societal ideas. This critical analysis gave them an opportunity to ease into the analysis of more difficult and technical texts.

Using Boy-Teaching Principles

Although engineering courses increasingly include women, engineering remains a male-dominated field (of a total sixty students in three sections, only seven were female). In fact, in “Delineating Masculinities,” Smiler notes, “Subtypes that had very low endorsement rates (...women [for example, did not identify with the following masculinities]: country, criminal, jock, nerd...) are not discussed in the text.”⁸ In other words, women who fall within certain categories of “feminine” do not traditionally identify with the nerd stereotype. In this manner, looking at how young men learn and connect to their education becomes important since even those women within these courses may find that a different learning style helps them. According to Peg Tyre’s *The Trouble with Boys*, classroom suggestions that particularly helped boys included:

- a coherent structure that is clearly explained
- vibrant and fast teacher-pupil interaction
- high levels of teacher input
- constant reinforcement of high expectations
- well-established baseline rules with known and enforced sanctions when rules are broken
- short-term targets, public praise, the use of humor, informality and topics that students can relate to
- an environment in which sexist comments and stereotypical behavior are challenged and not condoned.⁹

Using this pedagogical guide for a writing class for engineering students, both the primary text (*American Nerd*) and the adjunct subject matter fit all of the categories, especially since the nerd stereotype allows educators to address the typical male stereotypical behaviors. Incorporating a book and topic on nerds provides both a pedagogical background to the usage as well as bringing a sense of humor into the classroom. It creates a lighthearted base from which heavier topics can springboard. This use of humor and informality does not work just with boys, but to the extent that it reaches a demographic within the particular classroom in a way that other course material may not, it creates an opening for a classroom in which all students can succeed.

Oppositional Beliefs in Writing/Math

One of the innate struggles with teaching scientifically or mathematically oriented students is the societal opposition between writing and math. Many students have heard over the course of their lives that they are either left-brained “science people” or right-brained “humanities people.” The problem with this division is it creates a distinction for engineering students and makes writing something that is difficult in theory before they even attempt it. To conquer this societally created mental block, the class discussed links between writing and math/science. For example,

in “A Beautiful Myth,” Heather Mendick notes, “Even when mathematicians ‘find a creative solution...they’re still looking at all different things that have happened in the past and following the rules still. When in English it’s not like that at all. It’s really working with things, there’s rules, but they aren’t real and proper, none of them are rigid’...Peter [the subject who discusses the distinction about English not having rules] is drawing on the oppositions: maths people/non-maths people; ordered and rule-based/creative and emotional; mathematics/English and art.”¹⁰ Making a link between the math/science and the English/humanities, rather than settling for the math/English divide, was extremely important in this course. Since students have been taught that the two are oppositional, they need to be guided to find common ground between them in order to have them become engaged in the work.

Giving students a common language shared by writing and science makes them more able to connect to the skills, be it through the material or through this “common language.” One example of this common language would be to explain composition in terms of a mathematical proof. First-year engineering students clearly remember high school courses in geometry, trigonometry, and calculus. If the class discusses composition in terms of the inherent logic needed as like walking through the steps of a proof, engineering students begin to see that the two are similar. This similarity creates a common language between the courses. For example, one explanation of transferred logic referred to an essay’s argumentative structure in terms of the transitive law of mathematics. In math, if $A=B$, and $B=C$, then $A=C$. In writing, if dogs bark, and barking is loud, then dogs are loud. This showed students the inherent similarities between a logical argument and a mathematical principle.

As another example, in the discussion of archetypical nerd, the students connect to humanities through the sciences in that they begin to analyze the way that society, the humanities, views people in their field, the sciences. This wedding of the ideas and information creates a launching pad for engagement in ideas and topics that they heretofore have perceived as out of reach, having identified themselves within one realm and thus outside of the other realm. For example, an initial writing assignment asked students to probe the following questions, “What is a ‘nerd’? In other words, does Nugent give a single definition that appropriately identifies ‘nerd’ in society or are his definitions oversimplified? Are they missing something? If so, what? In the process of discussing this topic, determine whether ‘nerd’ is a societal construct or an individual construct. Do individuals who self-identify as ‘good at math or science’ create this image of the nerd, or does society create this image by creating a stereotype to which individuals relate?”

Supplemental Readings, Track 1

To further discussions and add academic context to the issues discussed in *American Nerd*, supplemental readings from journals, news magazines, and the Internet were included. During the first segment regarding identity, several journal articles were included to help further define both the nerd and jock paradigms. Heather Mendick’s “A Beautiful Myth” and Andrew Smiler’s “Living the Image” were two of the most compelling additional readings for this section.

Mendick’s article focused on interviews with several students who identified themselves as being strong at math and science. This article served two purposes. First, it allowed an exploration of the gendering of math/science. Second, it created a context within which the writing/math

oppositional positioning in society could be discussed. Mendick also included an introduction to some later issues such as how the media and movies portray math as being something that requires individuals to choose between being “normal” and being “good at math.” This article became, throughout the course, a touchstone for many of the discussions.

In addition to Mendick, Smiler was used to discuss different types of “masculinities,” including both the jock and the nerd. The research in this article allowed for several different rhetorical analyses. First, it included definitions for terms such as “stereotype” and “social identity,” giving students a better understanding of how to position themselves within the different societal groupings. Second, Smiler’s research allowed students to see how self-identity and stereotypes interact, showing them that how people view themselves is related to how society views certain social traits and how these interactions can self-perpetuate. Third, Smiler’s research contained a segment discussing his statistical analyses, giving students and the instructor the opportunity to compare scientific findings between Smiler and Mendick. While Mendick’s sample was small, Smiler’s was large. Smiler included detailed mathematical discussions regarding how he came to view his findings as significant. This allowed students to look beyond the ideas generally associated with the humanities and relate them more clearly to their science classes, giving them a connection between the two and further establishing a common language.

Writing Assignments: Responding to Readings

For each of the three modules of the course, students were required to write two to three response papers and complete a final culminating essay assignment. The small papers were approximately 2-3 pages. The culminating assignments gradually increased in length with a requirement of 5-7 pages for the first assignment and 7-9 pages for the final paper, which also included limited independent research.

Starting with Nugent, Smiler and Mendick, students were encouraged to relate their own experiences to those of Nugent and the individuals discussed in the sociological articles. Many found that their own personal experience suggested that Nugent’s definitions were narrow and simplistic. Beginning with a focus on the individual experience, students were able to transition from high school writing to more formal academic writing.

The first writing assignment required that students look at their own personal experiences and use them as additional evidence to support the texts. Looking at their lives from the viewpoint created by the adjunct texts forced students to incorporate an objective analysis of themselves. Seeing their own experiences as similar to textual evidence created a bridge between high school and college without requiring them to step too far outside their comfort zone by writing a completely personal narrative or by writing a solely formal academic essay.

Additionally, incorporating an analysis of scientific research into the discussions of the readings gave students a chance to integrate the skills of writing and scientific analysis. Argumentative writing relies on the same process of explanation as scientific writing does. However, in most writing classes, the similarities between explaining the steps of an experiment and its outcomes and explaining the logic of an argument and connection to its thesis are ignored. Since the

students view themselves as scientists, this common language between the two not only gave them additional confidence in writing but also added value to their engineering courses.

Once the initial discussions regarding self-identity had been completed, students were given readings to position the nerd paradigm within larger socio-historical contexts. Readings regarding education and prejudice were included and paired with *American Nerd* to show students where Nugent's discussions intersected with broader issues. Deborah Tannen's "The Roots of Debate" allowed students to connect the linguistic aspects of social interactions and education with the previous module's gender discussions. In addition, Jean Anyon's "Social Class and the Hidden Curriculum of Work" was included to move students' focus away from just themselves to help them analyze and determine whether certain "nerdy" skills are taught within different socio-economic classes. Nugent, for example, devotes a chapter to students and debate club, explaining how nerds use debate to interact and meet one another while engaging in intellectual activities. Pairing Anyon's social hierarchical argument¹¹ with Tannen's linguistic and gender analysis¹² created a supplement to the Nugent reading that focused less on the nerd paradigm as a stereotype and more on how society views intellectual nerd skills as powerful or not powerful within society.

Although this segment of the course focused on historical discussions, connections between historical documents and historical scientific research were included. The Anyon piece, for example, relies on the author's research. Students discussed Anyon's small sample of five schools to prove an overarching argument. In reviewing the scientific flaws in an otherwise humanities centered piece, students learned how to critically analyze other scientific documents, such as in engineering journals. By formally analyzing these flaws, students are better prepared to write arguments that utilize the readings since they know where the potential pitfalls of the argument lie. Within this category of assignment, students were asked to write a paper exploring whether the culture of American education—what is taught, how it is taught, and to whom it is taught—helps redefine nerd as "intellectual" or "powerful." In doing this, the concept of nerd helps students see the greater implications of socio-economic and societal interests on the previously discussed self-identity.

Nugent discussed different ethnicities and races and placed them within a "nerd scale," so *American Nerd* also created a springboard for discussions of prejudice in U.S. society. After reading *American Nerd* chapters that discussed how different races/ethnicities are viewed as nerdy or not, historical reviews of American prejudice were included to tie together how society can create negative stereotypes based on race/ethnicity. Nugent describes, for example, the nerd paradigm in terms of Asian and Jewish heritages. This discussion created a logical opening for students to read and discuss George M. Frederickson's "Models of Ethnic Relations" and Vincent M. Parillo's "Causes of Prejudice." Frederickson outlines how changing immigration in the United States impacted how people viewed race/ethnicity. He outlines different paradigms of prejudice, such as Ethnic Hierarchy, Assimilation, Cultural Pluralism, and Group Separatism.¹³ This historical perspective was connected to Nugent in two ways. First, historical treatment of ethnic and racial groups was connected to the nerd identity to place these larger socio-historic issues within the previously established nerd discussions. By discussing how prejudice impacts not just ethnic/racial identity but also intellectual identity, students were able to discuss the idea of nerd in a larger context.

Parillo's work gives different definitions of the psychological and sociological causes of prejudice, including self-justification and economic competition.¹⁴ Nugent discusses societal demeaning of intelligence among minority groups as a way to keep majority groups from feelings displaced. Parillo's work thus creates a context through which these seemingly innocuous statements can be viewed as tangible expressions of larger societal issues. Again, as a culminating assignment for this module, students were required to write an essay incorporating the historical and cultural perspectives of race and prejudice within the more limited confines of Nugent's discussion. The assignment asked students to determine if racial and ethnic biases, whether based on historical, psychological, or sociological causes, inform or create the nerd identity in a way that creates a prejudice against intelligence in American society. The goal of this assignment was to have students look at a small example, the nerd, and expand it to the larger societal perspectives.

These supplemental readings provided larger contexts for what might otherwise be considered simplistic course material. While students were engaging in discussions of what creates the foundation of nerd identity—intelligence or social awkwardness—they were also being forced to look at whether there is a socio-economic leaning to the idea of nerd and whether nerds are powerful. Many students argued that nerds are indeed powerful in the present society ("laugh at Bill Gates' haircut all you want" one student declared. "*He's* laughing all the way to the bank."). Students identified that this societal power in an economy evolving from one based on labor to one based on intelligence is tied to both the educational, socio-economic, and racial/ethnic tensions in America. The supplemental readings took Nugent's less academic writing and provided a greater sense of intellectuality that allowed students to engage in greater rhetorical analysis of the overall ideas.

In moving the discussion outward from the self, students began to take a more humanitarian view of the scientific ideas. Within this assignment, although no specific scientific research articles were incorporated, students were asked to view supporting quotations from the readings as evidence. In the course of discussing argumentative essay writing, textual evidence was linked to the idea of scientific evidence, such as that found in an episode of *CSI*. For example, a jury looks for scientific evidence, such as DNA evidence to help support a criminal prosecution. By linking these ideas of science and argumentative writing, students again saw the commonalities between their two courses. In the same way that they are required to outline the different steps of an engineering project while explaining why it was successful, they were also required to use textual evidence from the readings and explain how they proved the overall thesis. This commonality between the two types of writings were useful in giving engineering students both value in other non-engineering courses as well as showing them how a composition course can be useful for their major.

Throughout the course, students were asked to write response papers linking ideas from the various readings. Although prompt questions were included, students were also given the option of exploring any ideas in the readings about which they wanted to write. These assignments were intended to help students engage the ideas throughout the course to prepare them for the larger assignments. In addition, the response papers were a tool for students to begin to engage in intellectual curiosity by giving them an opening to bring in outside examples. Many students

used these papers to explore topics such as video games, music, or movies within the larger contexts of the ideas presented. In doing so, they were able to take their own interests and apply them to more academic works. Thus they engaged in critical thinking and effective application of ideas that were less formal academically but appropriate rhetorically. For example, when reading about Major League Gaming in Nugent, one student made the link between major league sports and video game conventions. This link between mainstream- and counter-culture events was one example of students transferring ideas from one genre to another, similar to the transference of skills between the humanities and the sciences.

These smaller writing assignments, which asked students to focus on a single idea from a reading in order to prepare for class discussions, gave students an opportunity to focus on the written exploration of ideas. Although not as formal as a unit-culminating essay, these papers required that students include quotes from or references to the readings. While a clear argument did not need to be present, students found that in order to obtain a good grade, they had to explain how ideas were connected. Students commented that they enjoyed the papers since they found that writing their ideas down helped them to solidify their thoughts. The smaller assignments also provided a “lower stress” approach to writing that focused more on using the written word, as opposed to the spoken word, in class discussions as a tool for idea exploration.

Track 2: Societal Reactions to Science and Technology, Past and Present

The second track, taught in two sections of the engineering/writing FIG, chose a historical focus as an adjunct to reading *American Nerd*. In this section of the course, students read the Nugent book and analyzed the strengths and weaknesses of Nugent’s arguments and the examples he used to support the nerd thesis. As with track 1, the pedagogical goal was to use Nugent to provide connection and identification between science and the humanities and as a springboard to other learning. This track also consisted of three major sections, each with reading assignments, short writing assignments to facilitate comprehension and as a springboard for class discussions, and a culminating unit paper and/or presentation.

The first unit’s first writing assignment was a simple summary, a key skill for people in specialized fields, condensing one of Nugent’s chapters into a brief that would be understandable to nerd and non-nerd alike. As engineers in the workplace often have difficulty distinguishing between expert and non-expert readers, this exercise is a useful beginning to help students learn the skills of reader analysis and adapting materials for a range of readers.

Arguing the Power of the Nerd

A second short writing assignment asked students to develop an argument, based on the following excerpt from Nugent’s discussion of being a nerd: “I was in fourth grade when I first observed that people who liked D&D—people like me—tended to be the *same ones* who liked to play with computers.” Nugent continues, “I was on the “bottom rung, and I wanted nerdiness to be a power that uplifted me.”¹⁵ Students were required to agree or disagree (or perhaps some of each) with Nugent’s statement, incorporating material from Nugent, from additional readings provided by the instructor on nerds in society and the workplace, plus one reading that students

found on their own. As noted in the track 1 discussion, since engineering students respond well to highly structured assignments, this prompt gave clear and precise input about paper length, sources required, tone, and citation format. The first unit of the track-2 classes ended with team presentations about the strengths and weaknesses of Nugent's characterizations of nerds, as well as student analysis of Nugent's portrayals of aging nerds, Anime conventions, creative anachronists, and sci-fi aficionados. As with track 1, students were able to identify with Nugent's examples as well as discern where those examples were oversimplified or his arguments became, as one student noted, "way too tidy."

Nerds in History

In the second unit, students read articles about scientific innovators, including Galileo, Charles Darwin, and Ray Kurzweil. Although students at first tended not to see the nerd aspects of historical figures, readings about Galileo's trial as well as Darwin's complex arguments in support of his theory of evolution provided students with an opportunity to identify with these figures, both of whom were scientific innovators and sorely underappreciated by their contemporaries. Through short writing assignments that helped students navigate these challenging texts, students began to perceive the figures as "nerds extraordinaire" who, despite their current status as "giants" of science were, in their own time, often rejected or (in Galileo's case) prosecuted for their innovation. To further complicate the discussion, students viewed videos on Intelligent Design, in which ID proponents frequently referenced Darwin. In class discussions and in a short writing assignment, students traced the ID arguments back to the original source and evaluated their veracity, discovering that sometimes the ID conclusions were accurate portrayals of Darwin's writing, while others were not.

These readings also provided an opportunity for students to learn key skills. First, students learned to read primary texts from earlier centuries, which are not easy reads and which few students have been exposed to, other than in literature classes. The articles assigned for this unit also resemble the complicated technical texts encountered in upper-level engineering classes and in the professional engineering literature. Second, students gained a perspective of scientific "greats" that is based on how these innovators were perceived in their own time, not through the sometimes rose-colored tint of hindsight. Students had to set aside preconceptions (often cherished ones) of what is true about these figures and meet them in the data of the original text. They also learned to evaluate how original texts are used argumentatively by other scientific experts, helping them to develop critical thinking skills, not to mention a healthy skepticism about use of data, especially in controversial topics. Third, not only did students learn that nerds have always been around, they also began to develop a more complex analysis and evaluation of the scientific or technological innovator and how that person is impacted by societal and cultural attitudes about technology, about change, and (of course) about people who instigate such change.

Writing about Controversial Technologies

Based on this foundation, students then explored a current technological controversy—in this case, the use of radio frequency identification (RFID) chips—and performed guided research to produce two documents, which served as the culmination of the second unit. The first document

was an academic essay, addressed to other experts, that synthesized the literature (class readings) and then extrapolated a position (argument) on the complicated relationship between nerds (innovators) and non-nerds (society). Again, students were provided a significant amount of structure in the assignment—though less than for earlier papers—and asked to document their sources in IEEE citation style. For the second part of this assignment, students wrote an article about RFID chips—what they are, current and potential uses, advantages and disadvantages—for a general, non-expert audience—with the purpose of educating less-technologically-expert readers and advising them whether it was defensible (economically, technologically, ethically) to pursue this type of technology.

Students were required—in addition to addressing the usual rhetorical issues of thesis, organization/development, and citation—to design the article to be reader-friendly (including appropriate illustrations) and to provide, at the end of the article, five relevant “further reading” articles to educate the target reader. Students received a checklist that allowed them to engage in guided peer review outside class. Students also received brief one-on-one feedback from their instructor during conferences. As Dunwoody et al. note in *Fundamental Competencies for Engineers*: “Engineers need to communicate with their colleagues in order to get the work done and to explain the results of their work to the general public. The public demands that engineering concepts be made more understandable to lay people....A professional engineer needs a broad range of skills and the ability to apply them for solving complex problems. Listening and speaking skills, together with writing skills, form the basis for competent and effective communication.”¹⁶ As a final activity of this unit, and as a bridge to the final unit, students read articles by Thomas Mallouk and Ayusman Sen from *Science* (on current research in nanotechnology). They also read two articles from the *Best Science Writing* annual series: by Michael Benson (on the Galileo orbiter), and by K.C. Cole (on physicist Janet Conrad). These were examples not only of excellent writing but also of the possibilities for writing about science, engineering, and technology subjects. Students processed these readings through response/synthesis papers that, like the papers in track 1, required students to express their thoughts cogently, in writing, about a particular reading, either by stating and supporting a point of view and providing evidence for support, or by synthesizing key concepts from multiple readings.

Technical Reports, Boe-Bot Projects

The final project for the engineering side of this linked course was a design project using a small robot (Boe-Bot). For their engineering class, students were required to propose and design an industry-plausible application for the Boe-Bot, implement that design, develop collateral materials (marketing posters) and submit typical documentation of the project through written proposals, progress memos, and a final technical report.

Since the track 2 instructor is also a technical writer, it made sense to closely and deliberately coordinate the work in engineering with the work in writing. Thus the engineering instructor worked with students on technical aspects of the project, while the writing instructor worked with students on the communication aspects. The final writing deliverables—progress memos, formal technical report, and presentation—were evaluated by both instructors and the grade counted for both classes. Although the classwork in this third unit of the course focused on

technical writing, class discussions frequently invoked the nerd theme, most often as a reminder to the students to differentiate between nerd and non-nerd audiences, and to develop reports and presentations that would satisfy the needs of each—a tactic that is essential for effective workplace communication.

In addition, this approach reminded students that writing and engineering—although previously perceived as occupying separate universes—actually have a great deal in common. The process for developing a Boe-Bot design and the process for developing a technical report are quite similar in many ways: both engineers and writers must learn the basic tools and concepts, develop ideas, build a prototype (or draft), test it, get feedback, and then develop an improved product, based on what is learned through the testing and feedback.

Implications for Engineers Writing in the Future Workplace

Placed within the context of technical writing, the nerd methodology allows more than just humor and interesting discussion, as the participants in track 1 of this course illustrate. For example, Wolfe discusses the problem of learning how to interpret data and write conclusions. The issue for many engineering students is somehow to find a way to incorporate the rhetorical methods of humanities writing into their technical expertise. For example, while discussing the masculinity of the nerd, supplemental works such as “A Beautiful Myth” and “Living the Image” were used to help explore the scientific analysis of data. In “A Beautiful Myth,” discussion centered on the main ideas, but an additional analysis of the author’s data set was included. When discussing “Living the Image,” the tables of data were broken down to show how the data reflected the author’s argument. By reviewing the numbers used, and explaining the meaning behind them, a scientific analysis of data was incorporated into an otherwise humanities-oriented course.

This combination of humanities and science writing is the type of rhetorical education that Wolfe indicates is missing in many technical writing texts: “My research suggests that results and data interpretation are central to engineering work, that engineering faculty want writing instructors to help students master these skills, and that data interpretation is often a complex and highly rhetorical act that students do not master in their classroom-based engineering coursework. Given the centrality of data to engineers’ technical communication and its highly rhetorical nature, we would expect discussions of data and results sections of reports to take a prominent place in technical communication textbooks.”¹⁷

The second track of this course took a slightly different path but it also focused on “complex rhetorical acts” of reading primary texts (Galileo and Darwin), audience analysis (summary writing and writing for non-experts on controversial technology such as RFID), critical assessment of arguments and evidence (*American Nerd* and nanotechnology), and documenting technical projects and processes (Boe-Bot reports). We believe both tracks help prepare engineering students for business and academic writing by helping them see the connections between humanities writing, which they have studied through high school and will study in other university courses, and technical writing, upon which these students will base their adult careers.

Thus, the pedagogical underpinnings were the same for both tracks:

- use a topic that allows students to identify and engage enthusiastically with the topic
- deepen the connections through carefully selected readings and highly structured writing assignments that reinforce both analytical skills and communication skills
- reinforce the learning process—common to engineering design and to writing—of generating ideas, making them clear to others (in speaking and writing), getting feedback, and refining the product.

Assessment

Assessing the results of this approach is in its early stages. As a university we rely on the accreditation based assessment tools such as ABET (for engineering) and New England Association of Schools and Colleges (for Arts and Sciences). Both have thorough assessment mechanisms to evaluate students' spoken and written literacy. However, it is not practical to use these larger mechanisms to trace results from particular sections of the first-year writing course, except as guidelines to inform our overall goals.

Since the “nerds write” approach has been used only once, no conclusions can yet be drawn about its long-term effectiveness. We plan to use a writing department assessment rubric to retrospectively compare previous (non-nerd-subject) sections with the sections offered in fall 2009. A fourth section of the course was also offered in fall 2009 that did not use the nerd paradigm, and comparative assessments are being conducted in spring 2010 to compare the “nerd groups” to this control group. Student feedback (received February 2010) indicated generally positive responses to both track 1 and track 2 approaches (complaints about the Nugent text tended toward the faults of his argument, as well as the length of some of his chapters). We anticipate repeating these course materials for fall 2010, which will provide opportunity for more data collection and comparison.

Based on student evaluations from the track 1 section, students found the *American Nerd* material interesting and useful in building writing and critical thinking skills. One noted that the material “helped integrate thoughts and ideas into writing.” Some expressed a preference for using materials in addition to *American Nerd* while others noted that they enjoyed the nerd focus and the related readings. Students' evaluations indicated that they were challenged by the course and as a result put forth substantial effort. These responses lead us to believe that while the *American Nerd* reading might on the surface seem lightweight, the related presentation, discussions, and writing assignments engaged and challenged students.

For track 2 sections, student comments related primarily to the grounding in professional writing techniques (summary, progress report, technical report) as well as to the historical readings, both of which students found useful and engaging. Interestingly, although students cited the Nugent text's usefulness in helping them evaluate data and scrutinize argumentative strategies, most of those who commented noted that they didn't much like the material from *American Nerd*. Some of these objections were substantive, in terms of course objectives (“writer's arguments were weak” “Nugent makes too many assumptions about nerds.”). Other comments were less so (“chapters are too long and boring”; “don't like his writing style”).

Both instructors look forward to using this material again in fall 2010 so that a more helpful comparison can be made. Our question is whether the nerd approach is itself essential to engaging first-year engineering students in writing tasks, or whether it is one of many possibilities for teaching these students.

Conclusion

In order to meet interdisciplinary goals, paired composition and science/math courses need to find common ground. This common ground should be both skill oriented and material oriented. By creating a course in which concepts common to science-oriented students are central, students become less resistant to stepping outside their normal comfort zones. Allowing them a place to explore both intellectually and rhetorically that spans multiple disciplines. The ability to think creatively, write effectively, and analyze critically are skills that both writing and engineering require.

While many engineering students view these as separate realms, giving students a base from which to explore the implications of these dynamics allows them to be able to move between disciplines with greater ease and to transfer skills more readily. Using something as innocuous as an exploration of the nerd eases students into the greater intellectual challenges of both academia and the workplace. By providing this seemingly lightweight touchstone, students are drawn into the material, find it less overwhelming, and feel more confident. This confidence will carry with them beyond the paired courses. As such, the effectiveness of this approach has long-term promise for engineering students.

References

1. Richards, B., Alnajjar, H., Ader, A., Adrezin, R., Isaacs, B., Tempel, P. "Integrating Critical Thinking and Writing Curriculum into Freshman Engineering." American Society of Engineering Education National Conference & Exposition, Albuquerque, NM, June 2001.
2. Klonowski, E., Richards, B. and Tempel, P. "Galileo to Gates: Human Reactions to Science and Technology." Chapter 8 in *Reading Our Histories, Understanding Our Cultures: A Sequenced Approach to Thinking, Reading, and Writing*, second edition. Pearson Education, Inc., 2003.
3. Burke, Kenneth, *A Rhetoric of Motives*. Berkeley, University of California Press, 1969.
4. Burke, Kenneth, *A Grammar of Motives*. New York: Prentice-Hall, 1945.
5. Douglas Downs and Elizabeth Wardle, "Teaching about Writing, Righting Misconceptions: (Re)Envisioning 'First-Year Composition' as 'Introduction to Writing Studies.'" CCC 58:4 June 2007, pp. 560, 572.
6. Nugent, Benjamin Nugent. *American Nerd: The Story of My People*. New York: Scribner, 2008, p. 6.
7. Nugent, p. 7.
8. Smiler, Andrew P. "Living the Image: A Quantitative Approach to Delineating Masculinities." *Sex Roles* (2006). p. 629.

9. Tyre, Peg. *The Trouble with Boys: A Surprising Report Card on Our Sons, Their Problems at School, and What Parents and Educators Must Do*. New York: Random House, 2008, Kindle section 3345.
10. Mendick, Heather. "A Beautiful Myth?" The Gendering of Being/doing 'Good at Maths'." *Gender and Education* 17.2 (2005), p. 206.
11. Anyon, Jean. "Social Class and the Hidden Curriculum of Work." In *Rereading America: Cultural Contexts for Critical Thinking and Writing*. Ed. Gary Columbo, Robert Cullen, and Bonnie Lisle. Bedford/St. Martin's, 2007.
12. Tannen, Deborah. "The Roots of Debate." In *Rereading America: Cultural Contexts for Critical Thinking and Writing*. Ed. Gary Columbo, Robert Cullen, and Bonnie Lisle. Bedford/St. Martin's, 2007.
13. Frederickson, George M. "Models of Ethnic Relations: A Historical Perspective." *Rereading America: Cultural Contexts for Critical Thinking and Writing*. Ed. Gary Columbo, Robert Cullen, and Bonnie Lisle. Bedford/St. Martin's, 2007.
14. Parillo, Vincent M. "Causes of Prejudice." *Rereading America: Cultural Contexts for Critical Thinking and Writing*. Ed. Gary Columbo, Robert Cullen, and Bonnie Lisle. Bedford/St. Martin's, 2007.
15. Nugent, pp. 189-90.
16. Dunwoody, A. Bruce, Patrick J. Cramond, Susan E. Nesbit, Carla S. Peterson, and Tatiana N. Teslenko. *Fundamental Competencies for Engineers*. Toronto: Oxford University Press, 2006.
17. Wolfe, Joanna. "How Technical Communication Textbooks Fail Engineering Students." *Technical Communication Quarterly* 18(4): 351-75.