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Editors
Tracy Bridgeford
Kirk St. Amant

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Editors

Tracy Bridgeford
University of Nebraska at Omaha
Department of English
Arts & Sciences Hall 189P
6001 Dodge Street
Omaha, NE 68182
402.554.3312
‹tbridgeford@unomaha.edu›

Kirk St. Amant
East Carolina University
Department of English
Bate 2201
Greenville, NC 27858-4353
252-737-2540
‹stamantk@ecu.edu›

Associate and Production Editor

Joanne Chapuran
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Programmatic Perspectives

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Issue Preview

Tracy Bridgeford
University of Nebraska at Omaha

Kirk St. Amant
East Carolina University

We're pleased to present the second issue of 2013. The articles in this issue all look at program development from different perspectives—the best instructional methods for different purposes, program visibility and innovations such as online degrees and usability testing.

We begin the issue with Eva Brumberger, Claire Lauer, and Kathryn Northcut who advocate for preparing technical communication students for the workplace by focusing on not only on theory but also production, especially in visual communication. A necessary part of the creation involves tools. The authors present information that shows, in spite of the standard belief in the advanced skills of digital natives, today's college students are not better able to understand and use technology on their own—explicit instruction in the tools of visual communication is required.

Recognizing that the best pedagogical approach is a moot point without students in the seats, Trent Leslie and Kathryn Northcut report results from an on-campus survey of undergraduates measuring the visibility of the technical communication program, which has had problems filling classes and graduation quotas. The purpose of the survey was to determine the extent of knowledge about the BS and MS degrees in technical communication. The results indicate that undergraduates are largely uninformed about the programs, but the survey analysis may foster improved program marketing.

The need to create a balance between theory and application is echoed in the next article as Derek Ross and E. Jonathan Arnett explore the best method for teaching a research methods course for Master's- and PhD-level students. The authors describe an instructional approach that involves an experiential learning process achieved through action-reflec-

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tion learning cycles. Using retrospective analysis of classes taught with this method, the authors determine that this mixed approach is best. The article provides suggested course schedules with "hands-on" activities.

In the Program Showcase, Joyce Locke Carter outlines the development of a visible, successful online PhD program in Technical Communication and Rhetoric. Offered on campus or through distance education, the rigorous standards are the same, but some innovations were required. "Residency" and "full-time" were redefined because most distance students work full-time. One key to the program's success has been the "Nar," a required 2-week on-campus seminar that provides personal opportunities for such activities as dissertation defenses, seminars, doctoral reviews, and networking.

In her guest editorial, Kaye Adkins proposes a method to both promote technical communication programs and recruit high school students by using the Common Core curriculum. This K-12 curriculum aligns with technical communication skills of explanatory writing as well as graphic analysis and design, areas of weakness for many K-12 teachers. Technical communication professors and programs can be valuable resources, helping educate K-12 teachers and simultaneously provide exposure.

Following the guest editorial, Christopher Toth reviews Carol M. Barnum's book, *Usability Testing Essentials: Ready, Set…Test!* Barnum argues that mere speculation about the effectiveness of a website, product, or mobile application is not enough. Testing is needed and should be part of a technical communication program. He provides practical advice for integrating usability testing into the curriculum, as well as setting up and managing testing situations.

We hope you all enjoy the issue and we look forward to receiving more manuscripts in the future. So, don't wait; submit now!

Have a good fall semester, everyone.
Tracy and Kirk

A R T I C L E

Technological Literacy in the Visual Communication Classroom

Reconciling Principles and Practice for the "Whole" Communicator

Eva Brumberger
Arizona State University

Claire Lauer
Arizona State University

Kathryn Northcut
Missouri University of Science and Technology

Abstract. This article argues that technical communication programs—specifically visual communication pedagogy within those programs—must better address the tension between principles and practice, concepts and tools, to effectively prepare students for the 21st century workplace. The authors contend that program outcomes should articulate expectations for both interpreting and producing visual communication, and that the tools required for visual communication should be an explicit part of the curriculum. The article provides an overview of visual communication in technical communication curricula, discusses the relationship between visual literacy and technological fluency, and presents research that counters the notion that students are technologically fluent or comfortable developing such fluency on their own. Finally, the article addresses some approaches for teaching technological tools so that they complement the conceptual content in visual communication courses and support visual communication outcomes at the programmatic level.

Keywords. Technological literacy, technological fluency, visual communication, visual literacy, pedagogy

Technology has driven the field of technical communication in many ways, from the industrial developments that spurred growth in the post-WWI economy to the outsourcing of technical communication jobs in the past decade or so, to the ever-growing reliance on social media

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as a professional venue for corporate communication. And, of course, even aside from these historical patterns, technological tools—for word processing, desktop publishing, image editing, and so on—have become essential to the daily work of the technical communicator, especially with regard to visual work, which often requires specialized software that accommodates more advanced document design and image editing functionality than word processing software can accommodate.

Within the academy, however, some faculty have had an uneasy relationship with technology. We theorize it, analyze it, critique it. We use it, and we expect students to use it. But we are often uncomfortable teaching it for a variety of reasons. Some scholars harbor expectations that students, with their smart phones, iPads, and social media accounts, come with a ready foundation of technology skills. This "digital natives" argument suggests that we need not explicitly teach tools in the technical communication curriculum because students have such a level of ease with technology that they are capable of and comfortable with learning new software and hardware on their own. We may find it easy to latch on to assumptions like this because our skills with the technology may not have kept up with the rapid evolution of most software programs, and thus, we do not feel prepared to teach certain technologies to students, despite the importance of those technologies to the learning and production processes.

There are, of course, other reasons that the teaching of tools often does not figure prominently in technical communication programs, and these predate the digital natives argument (see, for example, Selber, 1994; Selting, 2002). We continue to be concerned that teaching tools diminish the academic validity of our discipline and reinforce the vocational ethos that some attribute to the field. We are likewise concerned that time devoted to teaching tools means time taken from other valuable content in our courses.

Although we are not arguing that our programs should be designed solely to produce a high-tech workforce, both citizenship and employment require increasing technological prowess, and this trend is especially true of employment that requires visual communication abilities. Employers of technical communicators expect a level of technological fluency in addition to communication abilities. Lanier (2009) studied technical communication job postings to determine the kinds of skills employers are looking for in graduates. He suggests that despite the assumption that technical communicators need not learn technological skills because such skills can be learned on the job (Hart, 2007), in fact, job ads calling for proficiency in specialized software tools (such as Adobe Photoshop) exceeded calls for basic technical communication skills. Lanier's "hesitation" to agree with studies that downplay the importance of technology skills "is reinforced by the number of postings asking for candidates with some type of specialized graphics software (24%) and publishing software tools (34%)" (p. 59).

That experience with specialized graphics and desktop publishing software is frequently sought after in job postings is supported by a recent nationwide survey of technical communication graduates (Blythe, Lauer, & Curran, 2013), which found that many of the most frequent and most valued genres that technical communication alumni are completing on the job require a substantial amount of visual language proficiency, including instructions, websites, presentations, promotional materials, newsletters, infographics, and usability materials. Further, image editing and desktop publishing software ranked third, behind only email and word processing software, in the software used most frequently to complete these genres.

Ultimately, we want students to be rhetorically-skilled communicators, not tools jockeys. However, in 2012 and beyond, being a rhetorically-skilled communicator also means being a technologically- skilled communicator. Nowhere is this fact truer than in the area of visual communication, which is an integral part of both print and digital media. Visual communication requires students (and practitioners) to balance an understanding of complex conceptual principles with the use of equally complex software. Put differently, to be truly visually literate—capable of both reading and writing visual communication—students must be able to think visually and rhetorically, and they must be able to craft with technology. And so, within many visual communication courses—particularly those with a production component (e.g., document design)—the end results of students' thinking, collaborating, drafting, and revising are typically mediated by proprietary software packages, such as Adobe's Creative Suite. This situation again raises the sticky question of whether and how we should teach the software tools explicitly as course content. As Allen & Benninghoff (2004) noted, "balancing the demands of both humanities and technological goals within a program or a department raises tensions that are not easily resolved" (159).

In this article, we synthesize research from several disciplines to demonstrate that technical communication programs—and, more specifically, visual communication pedagogy within those programs—must better address the tension between principles and practice if we are to graduate students who are well-prepared for the 21st century workplace. Programs must reconcile a reluctance to teach tools with the technological demands of the workplace, particularly the demands of visual communication.

The article begins with an overview of visual communication and technology in technical communication programs. We then discuss the interconnectedness of visual literacy and technological fluency, followed by an examination of research that counters the notion that students are comfortable with and capable of developing an appropriate level of technological fluency on their own. Finally, we offer suggestions for teaching technological tools so that they complement and reinforce the existing content in visual communication courses and so that they support visual communication outcomes at the programmatic level.

Visual Communication in the Technical Communication Curriculum

According to studies conducted within the past decade, visual communication is now central to many technical communication programs, both in its inclusion in coursework and in its presence in program outcomes.

Course Content

Dayton & Bernhardt (2004) reported that visual communication was a topic of significant interest to the teachers of technical communication who responded to their survey. Respondents also believed that both visual communication and technology were among the most important skills students needed to succeed as professionals.

The data collected by Allen & Benninghoff (2004) support these findings. According to their survey participants, principles of document design were covered in all or most of the courses for almost 70% of the programs included in the study (29 of 42); document design was a featured topic in one or two courses for 24% (10) of the programs. The more theoretical "visual rhetoric" was covered in all or most courses for 43% (18) of the programs, and was a featured topic in one or two courses for 52% (22) of the programs. Given the increased attention visual communication has received in the years since Allen & Benninghoff's survey, it is likely (and our program structures support this) that visual communication is now even more entrenched within technical communication programs.

However, the most common tools used to create and edit visual communication—image editing and drawing/illustration software—figure less prominently. Allen & Benninghoff (2004) reported that image editing software (e.g., Adobe PHOTOSHOP) was formally taught within a course in one-half (21) of the programs surveyed; its use was required but not taught in almost one-quarter of the programs (9). Similarly, drawing software (e.g., Adobe ILLUSTRATOR) was formally taught within a course for one-half of the programs; it was required but not taught in 19% (8) of the programs. Two programs actually indicated that image editing software was the topic of a course, and one program noted the same for drawing software. Overall, though, programs "included a wide range of software tools, but…often they aren't formally taught" (Allen & Benninghoff, 2005, p. 167).

In short, both visual communication and, less so, the tools that support visual communication are receiving attention within courses. We would argue, however, that visual communication remains underrepresented, given the emphasis on visual language in workplace activities (Blythe, Lauer, & Curran, 2013; Brumberger, 2007). According to Blythe, Lauer, & Curran (2013), when alumni were asked for what purpose they completed the genres they wrote most often and valued most, genres that had a higher percentage of being completed for work over school appear to be more visual genres (instructions, promotional materials, newsletters, infographics). The underrepresentation of these kinds of genres in technical communication curricula supports Brumberger's (2007) and Lauer's (2011) claims that we can be doing even more to integrate visual design instruction into our curricula.

Blythe, Lauer, & Curran (2013) also found that this increased need for fluency in visual language and design skill is supported by the small percentage of respondents who reported collaborating on documents with a multimedia or digital consultant. Survey respondents were asked to identify with whom they collaborated to complete the genres they wrote most often and valued most. Blythe, Lauer, & Curran (2013) found that the

> overall rate of writers who reported working with a multimedia consultant was just 2%, with the highest rate of consultation being 6% for promotional materials. This suggests that PTC alumni are largely required to complete visual work without the help of a design specialist and thus they need specific training with the concepts and technologies in this area.

Because this kind of training includes concepts as well as technologies, such training can be integrated into program outcomes without orienting the training exclusively around software, though as we will discuss later in this article, visual design software has the potential to expose students to ways of thinking about design that can be cognitively beneficial outside the software environment.

Program Outcomes

Allen (2010) offered a specific discussion about developing context-specific, institutionally supportable outcomes statements and assessment procedures. Her sample statements of outcomes and objectives included evaluative criteria for standards-setting, specifically designed to include visual communication and technological literacy as likely categories for assessment in programs in Technical and Professional Communication. Her recommendations mapped as well onto more broadly-titled composition/rhetoric programs because she assumes that design is an obvious element in twenty-first century "writing."

In one sample assessment pattern, Allen (2010) suggested that within the general (university-level) category of "communication skills," a Technical or Professional Communication program could identify a broad objective that "students can translate any subject to any group of readers, ranging from expert to managers, to special interest audiences, to lay readers" (p. 48). The sample outcomes were portfolios and final projects. One of the four listed criteria for the evaluation of the portfolio reads as follows: "The selection of work demonstrates developing sophistication of the writing in terms of fluency with style, rhetorical strategies, design, and other features" (p. 48; emphasis added). Design features—and the student's ability to select and defend decisions about those features—were also part of her suggested criteria for final projects.

Allen (2010) further argued that, as portfolios are graded, levels of mastery should be described with reference to various aspects of communication, and she again alluded to visual design. To demonstrate that students were meeting the criteria previously described, she identified three levels of achievement: beginning, moderate, and mastery. For the criterion related to writing fluency, Allen suggested that beginning students would "recognize the visual features of a document" and be "likely to seriously over- or under-use design elements in documents" (2010, p. 54). Moderate success would entail greater ability to defend decisions as well as to develop and choose among alternative versions. Mastery would require the student to "readily analyze" and "weigh alternative stylistic, rhetorical, design, and other communicative elements" (p. 54). The student demonstrating mastery would be able to articulate theory and research that underpin good choices in key elements of the writing, including the design. Regarding technology, Allen (2010) suggested that general outcomes might be phrased as a list of what students can do:

> Use the common technological tools of the discipline, understanding the appropriate situations in which to use each tool and the best means of application; articulate the reasons for using the tool as well as reasons not to use the tool. (p. 46)

A technical communication program outcome might be more specific:

> Can use a broad array of technology for various tasks in the technical communication arena, including word processing, graphics, Web-creation, citation, spreadsheets, project scheduling, presentation, and other software packages; research topics in technical communication through standard and Web-based search processes. (p. 46)

Note the reference to graphics and predominantly visual genres in Allen's (2010) examples. She suggested that, across all technical communication courses, students need "high proficiency in graphics and Web creation; moderate proficiency in project scheduling and spreadsheets" (p. 46). It is only fair to note that Allen's goal is not to dictate curricula, but rather to provide a sense of what program outcomes make sense for us, and how we can begin to articulate the "intersections between the technical communication curriculum and the institution's expressed values" (p. 40).

From an administrative standpoint, the good news is that visual communication outcomes tend to be embedded in programs that have kept some eye on the field's trends throughout the past decades. As Anderson (2010) pointed out in a response to Allen (2010), "When students prepare instructions, proposals, reports, and Web sites, they demonstrate their abilities to design effective pages, adapt content and style to a particular reader, present data in easy-to-use graphics, and so on" (p. 61). It should be unnecessary to add assessment activities for their own sake; the typical work of the course will provide the artifacts necessary to determine whether the program is achieving discipline-specific objectives. Part of good writing is good design, and thus, visual communication is an inherently vital aspect of our writing programs.

And yet, we would argue that technical communication program outcomes should more explicitly address visual communication if it is so central to our work, as the data collected by Dayton & Bernhardt (2004) and Allen & Benninghoff (2004) suggested. And, it is important that the outcomes articulate expectations both for "reading" and for "writing" visual communication, because technical communicators do both.

Visual Literacy

Essentially, the data reported by Dayton & Bernhardt (2004) and Allen & Benninghoff (2004), and the sample outcomes offered by Allen (2010), support a high degree of visual literacy—in its fullest sense, the ability to read, interpret, and create visual communication—as a desired outcome of technical communication programs.

The North Central Regional Educational Laboratory (2003) defined visual literacy as "the ability to interpret, use, appreciate, and create images and video using both conventional and 21st century media in ways that advance thinking, decision making, communication, and learning" (p. 15). Felten (2008) likewise argued that "the capacity to manipulate and make meaning with images is a core component of visual literacy" (p. 61).

At the heart of visual literacy is visual thinking, which enables the problem-solving abilities fundamental to both interpreting and creating visual communication. And this critical ability does not depend on technology. In fact, as Brumberger (2007), Northcut & Brumberger (2010), and Kostelnick (2013) have emphasized, it is all too easy to depend on tools to drive design, which ultimately can result in less learning of the essential conceptual knowledge and problem-solving abilities that make for a literate and effective visual communicator. For example, dependence on pre-existing templates encourages a sense that design need not be context specific. Similarly, the array of interesting visual effects available through design software makes it tempting to create "cool" designs that may or may not be matched to their intended audience and purpose (Northcut & Brumberger, 2010).

At the same time, however, our research and teaching have come to convince us that we cannot ignore technology instruction in our visual communication pedagogy because it plays a central role in the conception and production of visual communication. We still believe that teaching students how to look, how to see, and how to reason visually must form the core of visual communication instruction. But as Felten (2008) emphasized, there is a persistent connection "between visual literacy and emerging technologies" (p. 61). Certainly, "students' ownership or mastery of visual communication technologies does not equate to an ability to create effective visual communication" (Brumberger, 2011, p. 45), but that mastery is one piece—one critical piece—of visual literacy. And, in some cases, mastery of technology may actually support mastery of concepts and principles.

For instance, in a study that compared the results of a creative visual thinking exercise, Lauer (2013) found that there was striking similarity in the visual thinking skills exhibited by those students who had completed the exercise using software compared with those students who completed the exercise by hand, showing that the technology did not necessarily impede and may have facilitated the application of visual thinking skills. In a different study that investigated the design processes of graphic design and technical communication students (160 students total), Lauer (under review) found that technical communication students often cited their increasing familiarity with design software as opening up design possibilities that they had not previously known were even possible. For example, one student wrote,

> As I became more familiar with Adobe Illustrator , I gained ideas about the use of color, shapes and curves, lines, and text in my design. Prior to that, I didn't even know what was possible. I had general ideas, but no real clear details.

In short, to "write" visual communication—an important piece of the visual literacy equation for technical communication—students must have strong technology skills in addition to a solid foundation in visual thinking and problem solving. Put differently, visual literacy for the 21st century—at least for technical communication students, who will create as well as consume visual material—requires both.

Technological Fluency

If students are expected to leave technical communication programs visually literate, and if technology is necessary for visual literacy, is it sufficient to teach visual communication principles without teaching tools? Can we assume that students will develop technological fluency on their own?

Technological fluency, or technological literacy, as it is more frequently termed[1], entails more, of course, than just having technology skills. The North Central Regional Educational Laboratory (2003) defines technological literacy as "knowledge about what technology is, how it works, what purposes it can serve and how it can be used efficiently and effectively to achieve specific goals" (p. 15). Students who are technologically fluent demonstrate both a conceptual understanding of technology tools and an understanding of the ethical, social, and political aspects of those tools. They not only use a range of tools effectively to solve practical problems but also view themselves as proficient with those tools (p. 22).

A number of claims made regarding today's college students suggest that they come by technological fluency naturally and should be less in need of teaching that explicitly focuses on technology. These so-called digital natives (see Prensky, 2001) purportedly "can learn how to use a new software program in a snap" (Palfrey & Gasser, 2008), they "tend to… experiment with new technology until [they] get it right, and to build

1 We prefer the term technological fluency because students more typically learn to "read" and "consume" technology, but most of them do not "write" it. That is, they generally do not create new technology, but rather apply, appropriate, and repurpose existing technology.

by touch rather than tutorial" (Windham, 2005, p. 5.6), and they are "as comfortable with technology as a fish is with water" (Coates, 2006, p. 124). The rationale behind these statements is that, having been "born into" a world in which the personal computer was ubiquitous, students have far more knowledge about and experience with computing-related tasks than those of us who first used a computer during or after college. The assumption is, further, that this generation is more astute in analyzing and critiquing all aspects of digital environments. In short, the idea is that ongoing exposure to multiple technologies in and of itself produces technological fluency. If this is true, it seems to relieve us of the need to offer explicit technology instruction in courses and programs that integrate writing and design.

But, can we really assume that traditional-aged students who have grown up with digital technologies are less in need of explicit instruction in, say, graphics and spreadsheets and Web Design, than previous generations? Has the immersion in technology given students sufficient abilities in visual and technological realms that the design aspects of our courses can be loosely-structured to allow students to simply improve what they already know? According to Bennett, Maton, & Kervin (2009), the digital natives claims "have been subjected to little critical scrutiny, are under-theorised, and lack a sound empirical basis" (p. 776). And, in fact, recent empirical research has found that the digital native may be more myth than reality.

Digital Native Fluency

The scholarship that has examined the digital natives claims has focused primarily on students' proficiency with technology rather than the more nuanced aspects of technological fluency. Still, such research offers valuable insights that can and should inform the ways in which we approach technology in our curricula.

The research findings suggest that, although students certainly spend a great deal of time in front of a screen each day, they are not necessarily confident in their technology skills, adept at using computer technologies, or comfortable learning new software or other technologies. For example, among the 300 college students who participated in McEuen's (2001) study, 91% rated their word processing skills as average-to-expert, and 90% rated their ability to use a computer to communicate with others as average-to-excellent. Not surprisingly, they reported considerably weaker skills in using other types of software (e.g., spreadsheets and databases). However, they also rated themselves much weaker in other technology-related areas, such as being well-informed about computer viruses, identifying a problem as being hardware or software based, or understanding technology copyright issues.

Holliday & Li (2004) found that students predominantly rated their computer proficiency as "average," even though they had been using computers for five or more years. Similarly, a survey of 4,374 college students (Kvavik, 2005) revealed that respondents generally rated themselves as very proficient in email, messaging, word processing, and web surfing, but they reported their skills as being only average or slightly better than average for a variety of tools that included those for graphics, video, and website creation. Kennedy et al. (2006) similarly reported that first-year college students' knowledge and use of a range of technologies varied widely, even though the 1,973 students who participated in the study had excellent access to those technologies.

A more recent survey of 485 students across majors and class standing had similar findings (Brumberger, 2011; Brumberger, unpublished). Respondents certainly relied on a host of technologies in their daily lives, particularly technologies for social networking and personal communication. Interestingly, they were far more traditional in their use of reading technologies: 91% of respondents did not use electronic book reading devices, and roughly three-quarters (73%) indicated that they preferred to read printed copy over digital text. In terms of personal computer technologies—specifically, software commonly used in professional workplaces—students reported skill levels comparable to those in other studies. They tended to rate themselves as somewhat-to-very-skilled in word processing and presentation software, and considerably less skilled in technologies for photo/image editing, illustration, and Web authoring.

It is worth noting here that the literature on self-perceptions of technology skills suggests that students tend to overrate their skills (p. 7.7). Indeed, follow-up interviews conducted by Kvavik (2005) led him to conclude that students "tend to know just enough technology functionality to accomplish their work; they have less in-depth application knowledge or problem solving skills" (p. 7.6).

In short, the students represented by the "digital natives" label inhabit the virtual world primarily as users, not as designers or developers. They are certainly using a range of technologies, but their use is not especially sophisticated, particularly in terms of applying technology to workplace-related tasks. Instead, they use technologies on a surface level, utilizing the obvious features, not questioning the settings or appropriateness of the result to the task at hand.

Gender and Fluency

Studies that have examined the claims of the digital natives argument have also revealed a gender pattern in technological fluency that suggests female students may generally be less technologically-oriented than male students. McEuen (2001), Kennedy et al. (2006) and Brumberger (2011) all reported gender differences. Male respondents generally reported higher degrees of technological skill than did female respondents. Hargittai (2010) noted a comparable pattern in male and female students' reports of their internet skills.

McEuen also found that males expressed more confidence in their ability to learn new software applications and more comfort in using new technologies; likewise, they reported more independent problem-solving behaviors for addressing computer difficulties. Brumberger (unpublished) similarly noted that males were more comfortable than females in learning new software on their own.

More recently, Smith, Salaway, & Caruso (2009) reported a similar gender difference: male students were more likely to be early adopters of new technologies. In keeping with this finding, Brumberger (unpublished) found that male respondents were more likely to prefer reading on screen than were female respondents; males also were more likely to have created a website.

Visual Technology Fluency

The research also makes clear that students are typically less fluent with technologies used for visual communication—graphics and illustration software, web design software, video creation and editing tools, and so on—than they are with other technologies.

For example, students' skills with visual communication technologies were among the weakest reported in McEuen's (2001) survey. On a scale of 1 to 10, where 1 = no knowledge and 10 = expert knowledge, almost one-quarter (22.7%) of the students rated themselves a four or lower on their ability to use graphics software to create illustrations or "image-based expression of ideas" (p. 14).

Kvavik (2005) reported similar findings. Students spend the least amount of time per week on visual communication. On a scale of 1 to 10, where 1 = no use (not 1 hour of use) and 2 = less than one hour weekly, the mean was 1.82 for creating presentations, 1.79 for creating graphics, 1.39 for creating web pages, and 1.34 for creating and editing video/audio (p. 7.4). In other words, students barely used visual communication technologies. Not surprisingly, they also reported the lowest skill levels in these areas. On a scale of 1 to 4, where 1 = very unskilled and 2 = unskilled, the mean skill level reported was 2.45 for graphics, 2.17 for creating webpages, and 2.07 for creating and editing video/audio. Students reported strong skills in presentation software (2.90, where 3 = skilled).

The results of more recent studies suggest that students' fluency with visual communication tools has not changed substantially over the past several years. Smith, Salaway, & Caruso (2009) reported that, although upwards of 90% of their respondents use presentation software, only about three-quarters said they used graphics software. The reported skill levels aligned with student usage: respondents generally ranked themselves as skilled with presentation software but much lower on graphics software. Of the students who used graphics software, 41% indicated no skill or a low skill level, and just under one-quarter (23%) rated themselves as very skilled or expert (p. 54).

Likewise, Brumberger's (2011) findings align with those of earlier studies. She found that students reported much stronger skills with presentation software than with other forms of visual communication software. A full three-quarters of the respondents reported that they were skilled in presentation software. However, students' responses to follow-up questions that collected more details about their actual use of the software support the idea that self-reports tend to inflate skill levels. For example, Brumberger found that the overwhelming majority of students were using pre-existing templates instead of designing their own slides or even looking for more effective templates on the Web. Only half (49%) of the students frequently integrated images in the presentations they created (p. 30–31). These data do not suggest particularly skilled use of presentation technology.

Just over a third (38%) of Brumberger's respondents described themselves as skilled with photo/image editing, and only 18% said they were skilled with illustration software. Additionally, only 15% indicated that they were skilled with web authoring software (p. 31). Conversely, 17% of students said they had no experience at all with photo/image editing software, 41% had no experience with illustration software, and 53% had no experience with web authoring software. Clearly, students are not learning these technologies particularly well on their own, and the vast majority certainly are not fluent.

Fluency Within Technical Communication

The studies cited here suggest that college students in general are almost certainly less technologically savvy than the digital natives argument claims. And should students have strong technology skills in specific areas such as social networking, the studies do not offer any evidence that those skills transfer to students' use of the technologies that are the daily tools of the professional communicator. As importantly, some studies suggest, not surprisingly, that technological fluency may vary with field of study.

Technical communication programs housed within liberal arts colleges and departments, for example, may attract students with backgrounds in the humanities rather than in more inherently technologically (or visually) oriented disciplines. Such students in particular may benefit from explicit instruction in technology tools.

In 2002, an internal program survey of professional writing students at Virginia Tech found that only 37% felt they were sufficiently knowledgeable about common technical communication tools to list software skills on their resume. Almost all of the respondents (98%) felt that the program should offer some type of tools-oriented courses, and over half (55%) believed this course should be required of all students in the program. Eight years later, a survey conducted of students in the same program found that over half of the respondents still indicated that there should be a tools course added to the program offerings.

Dayton & Bernhardt's (2004) survey of teachers of technical communication suggests that these student perceptions maybe be endemic: their findings led them to conclude that "technology skills emerged as a specific area where teaching could be stronger" (p. 32). Dayton & Bernhardt also noted that "comments on technology were directed not only at software skills but also at critical understanding of technology and the ability to learn what is needed and apply appropriate tools" (p. 32), an equally important aspect of technological fluency.

Similarly, Allen & Benninghoff (2004) found that, although programs seemed to be doing a good job of addressing the more nuanced aspects of technological fluency, such as the critical analysis of technology, they were less successful at teaching the tools of the technical communicator. Allen & Benninghoff noted that

> some of the power of learning to use communication tools may be sacrificed if the tools aren't given formal classroom attention. People who learn software applications on their own often limit their learning to the fundamental skills required to make basic use of a software application without getting to the more complex functions. Self-learners also lose the benefits gained from group discussions of what a tool enables and limits. (p. 167)

The most common approaches reported by Allen & Benninghoff (2004) for student learning about tools occurred through "unsupervised self-training" (79%), office hours in which faculty provided one-on-one help (76%), campus training opportunities (60%), and courses in other departments (50%) (p. 168). They again noted that holding students responsible for their own technology training "carries with it the potential for losses in complexity of skills building and depth of cognitive insights" (p. 169); put differently, it can have a negative impact on all aspects of technological fluency.

Kvavik (2005) concluded that the students' motivation for learning technology skills "was very much tied to the requirements of the curriculum" (p. 7.17). In other words, if we make technological fluency explicit in course objectives and program outcomes, we make clear to students that it is central to the work of technical communication and, more specifically, the work of visual communication.

Teaching Technology Skills in the Visual Communication Classroom

However, even if we agree that explicit tools objectives and outcomes should be integral to technical communication curricula, we are left with the question of how best to teach those tools. As Cargile Cook (2002), Kastman Breuch (2002) and others have noted, our goal should not only be to provide students with the skills they will need as they leave our programs and enter the workplace but also to teach them to think critically about technology and to help them become comfortable learning new technologies in the future. The National Research Council (1999) suggested that fluency with information technology is comprised of three types of knowledge:

- Fundamental concepts—the foundational concepts that underlie the technology (p. 18)
- Contemporary skills—the ability to use the technology to accomplish desired tasks
- Intellectual capabilities—the ability to apply the technology to complex situations and to understand the consequences of doing so (p. 17–18)

This tripartite structure provides a strong and balanced framework for teaching technology skills in visual communication.

Fundamental Concepts

Visual communication requires fluency in layered composing and familiarity with other visual language elements that composing software make easier to work with, such as color, typography, hierarchy, depth, line, shape, arrangement, grouping, and others. Software can certainly help in the application and learning of design principles (e.g., contrast, alignment, and so on), but more importantly, it can teach fundamental design concepts that are now almost exclusively enabled by the software. These concepts include layers, photographic editing and cropping techniques, vector/raster image manipulation, and RGB vs. CMYK color models. This functionality is standard in all visual composing software (from Adobe CREATIVE SUITE to open-source options like Inkscape and GIMP), which makes the particular brand or version of software a student uses irrelevant to the future applicability of the concepts it can teach. Rather than being tied to particular tools or version of a tool, these concepts are transferable and will expand the level of design awareness of students in a way that will persist throughout their careers.

For instance, all visual composing software utilizes layers, which allows students the capability of composing spatially by layering various textual and image elements on a digital canvas and, by doing so, investigate how those elements interact vertically rather than just linearly. Composing a document through layers allows students the opportunity to revise by identifying specific details in a hierarchy that can be altered, moved, grouped, or deleted without affecting other elements. Similarly, photographic editing and cropping techniques allow for students to realize concepts of emphasis, framing, bleeds, focal point, figure/ground, and others. Finally, working with raster vs. vector images can introduce them to more sophisticated concepts of resolution and scaling and provide them the knowledge to make the most informed decision about graphical types depending on the kinds of documents and data they are trying to produce.

In each of these examples, the conceptual structure of the software, and the functionality it enables, is tied directly to conceptual knowledge of visual communication and is easily transferred to a wide range of composing and rhetorical situations.

Contemporary Skills

Our pedagogy should explicitly address whether visual communication skills and technological prowess are to be simultaneously developed by students in a visual communication course (such as document design). Particularly if students are to face such dual challenges, then we should scaffold their learning. Effective scaffolding activities may include helping students to focus specifically on software at certain points. For example, a simple layout (a newsletter page, poster, flyer, or form containing design elements such as figures, tables, or other features) can be designed in several different software packages, depending on what is available to the students. Students usually achieve interesting results using multiple packages to design the same document; ideally, they will learn about using the tool's features to achieve desired results rather than adapting their content to the technology. By using the same content across different tools, students are experiencing the same challenges they will be paid to tackle in the workplace. They will also become more familiar with the default settings for text and graphics in various packages, and they will likely completely bypass garish design elements endemic to overly-decorated templates.

One approach to teaching technology skills is to require students to complete software tutorials such as those available through subscription from Lynda.com or Element K. In addition, free online tutorials have proliferated over the past several years. Tutorials can be helpful for reinforcing the foundational concepts of the software. Additionally, for students who already have some basic knowledge of design software, or those who are trying to figure out how to do a specific task, tutorials can be helpful.

However, it has been our experience that such tutorials are typically not, by themselves, sufficient to provide students with the skills they need, nor do the tutorials equip students with strategies for learning software on their own. Part of the difficulty is that the tutorials are often more uni-directional than interactive. Students click through screens or watch videos, but the essential element of creativity is missing, and rarely does the student solve any sort of design problem as a part of the tutorial. As important, the tutorials provide technology instruction entirely removed from context. The only exigence is that the tutorials were assigned. Thus, when students later have to complete an actual project that relies on the skills taught in the tutorial, they often have forgotten much of the content. In short, tutorials are a good complement to other forms of technology instruction, but may not be enough by themselves to support the type of technology learning we want to foster.

A second approach to teaching tools is through workshops conducted within a visual communication course. For example, a typical document design course focuses on the concepts and principles of visual communication. Software tools might be taught through a series of brief workshops that introduce fundamentals of image editing (e.g., color management), illustration (e.g., raster versus vector images), and other relevant technologies. Course projects would require use of the software and application of some of the features addressed in the workshops. Each project would build upon the skills and knowledge applied in the preceding project, with the expectation that students will demonstrate greater tools skills as the semester progresses, just as they should demonstrate more conceptual knowledge.

Although the workshops provide a jumping-off point, the majority of the software learning in this approach once again occurs primarily through exploration rather than guided instruction. However, there are some significant advantages to this approach over teaching tools through independent tutorials. First, the workshops are embedded within the context of the course and provide opportunities for teaching fundamental concepts of both the software and visual communication itself. That is, the workshops can be designed to explicitly reinforce the conceptual knowledge being taught in the class as well as providing instruction in the tools. For example, a workshop on Adobe Photoshop might ask students to improve the contrast in a particular image, to change the focal point through cropping, or to create a unified color palette for a design based on the colors in an image. Each of these tasks requires the use of specific tools but also requires the application of important visual communication principles.

Second, the workshops are inherently interactive rather than passive. Students have a task or series of tasks to complete; they cannot simply look at the screen. In the process of completing the task, they explore, stumble, ask for help, and find their way, all part of the process of learning the technology. As importantly, if the workshops are conducted during class time, they also contribute to the formation of a sense of community that is lacking when students simply complete tutorials. The community subsequently furthers visual communication learning objectives by supporting students' design efforts and making in-class discussions and critiques more productive.

The downside to such workshops is, of course, is that they take class time that might otherwise be used to teach more conceptual knowledge or to do additional course projects that would extend students' understanding of design principles. They also can require a significant time commitment from the instructor if she wants to design them to dovetail with class readings or to scaffold other assignments that will follow in the course. And they may need revision each time the course is taught or each time there is a new release of the software. Finally, they, of course, require the instructor to have the requisite skills to create the workshops and teach the software.

Dedicated courses are a third approach to teaching tools. A dedicated course offers the potential advantages of workshops without detracting from time spent teaching theory and principles. The tools course builds community over a longer period of time and provides many more opportunities for hands-on practice. However, a dedicated course is also not without problems. The most significant of these is the loss of context. That is, instruction that is divorced from rhetorical exigency is unlikely to provide students with either the specific tools knowledge or the strategies and learning habits that they will need to succeed in the workplace. One approach that begins to address this problem is to tie the tools course to a visual communication course, in much the same way as a chemistry lab is tied to a chemistry lecture course. The visual communication lab can be constructed so that the schedule aligns with the schedule of the design course (e.g., at the point when students need to use Adobe ILLUSTRATOR for a project in the design course, they are also practicing it in the lab course). The lab gives students an opportunity to experiment with the software in an environment that encourages exploration within a series of low-stakes problem-solving tasks.

Anecdotal evidence from interviews conducted with students who enrolled in a pilot version of a companion lab course at Virginia Tech indicates that, at the very least, the lab course gave students much more confidence in their technology skills and in their ability to apply their conceptual knowledge of design. Students also stated that the lab improved their understanding of the design technologies. Although the students typically felt that the lab did not help them better understand visual communication concepts, they said it definitely helped them better apply those principles to produce effectively designed documents. That is, they noted that the technical knowledge gained in the lab helped them to carry out their design ideas—to make their ideas “happen,” as one student put it. They claimed that the tools knowledge didn’t help them come up with design ideas, but rather helped them execute the ideas that they had in their heads and that they had sketched on paper.

Another approach that offers much promise involves requiring students to prepare and lead workshops to other classmates (student-led tutorials) as one component of the graded coursework. Any software that may be used by students to complete projects later in the course is fair game for such an assignment: Adobe INDESIGN, AUDACITY, Adobe PHOTOSHOP, GIMP, and Adobe DREAMWEAVER are examples of both open-source and proprietary products that have been used successfully in the past. In this exercise, small groups of three or four students complete a complex assignment: research existing instructions in print and electronic formats; practice using the program; develop instructional materials for one or two tasks that the program is designed to perform; design a brief, unique activity; and present the resulting tutorial to the class (face-to-face or online) in a workshop of approximately 30 minutes. The students are graded not only by the instructor, who evaluates the correctness and the quality (editing, design) of the instructional material, but they are also evaluated by their audience of classmates. As an accountability measure of both presenter and audience, some tangible product must be produced (such as a short video in Camtasia) and posted to a network location accessible to students and instructor (a threaded discussion utility works well).

The audience of classmates tends to be as candid in expressing frustration resulting from poor or incomplete instruction as they are with praise when the tutorial is well-designed and executed. The quality of instruction is also fairly obvious in the posted files: either all the audience members completed the task and successfully posted their example (thus meeting the goal of the activity), or they did not. Anecdotally, instructors using this method of introducing tools in appropriate courses observe that students appreciate the exposure to multiple packages, the hands-on requirement of using software that they may not otherwise open, and the exigency of having to prepare and present software training to a live audience. Students see it as a practical activity and a good use of class time.

The role of the instructor is not fully abrogated in the student-led tutorial, especially when a group of students runs into trouble planning the training, collaborating with each other, or making decisions about what to include in the tutorial. The instructor needs to ensure, prior to the delivery of the tutorial, that the task is useful and relevant to course projects, the instructions are accessible and accommodate the needs of all students in the course, and that the materials used are appropriate. For example, "open any random YouTube video" is not an example of a responsible step for video capture; students need to determine in advance the content that will be used to ensure that nothing offensive or problematic for network security is involved. Although the instructor is still responsible for the quality of the entire course including the student-led tutorial, the instructor's role becomes more of a facilitator and coach than the "sage on the stage."

Intellectual Capabilities

Whichever approach is chosen to help students develop visual communication technology skills, it must also teach students "to use their computer skills in innovative and effective ways to solve real-life problems" (Marsh, 2007, p. 275). That is, it must equip students with strategies that will enable them to further develop their technology skills, transfer those skills to unfamiliar problems, and learn new technologies as the situation dictates. At the end of the day, we want students to reach a comfort level at which they are willing to explore the technology on their own and able to move back and forth with ease among programs as the situation demands.

However, we also want to know that students' software skills are not trumping their design skills—that their designs are driven not by the software, but by their visual thinking and conceptual understanding. And we want, as well, for students to think critically about the software. Incorporating a reflective component (a memo, for example) into each assignment is one approach for encouraging students to consider the ways in which technology shapes their thinking and designing. Kastman Breuch (2002) suggests a similar approach that spans projects: requiring students to "keep a journal in which they reflect on how technology has affected their coursework in a technical communication class" (p. 276).

Conclusion

Practically speaking, the decision of whether and how to teach tools will be dictated to some extent by programmatic and institutional constraints, such as the type of course, the type of students, and the students' access to technology (Sheppard, 2013). Ultimately, however, it must be based not on problematic concepts like the digital native, nor on concerns over how others may perceive our discipline, nor even on how much time there is in the semester or how comfortable we ourselves are with the tools. Rather, the decision should be informed by empirical evidence about what skills students have, what skills they will need to succeed in their careers, and how we can best help them acquire those skills.

Many of us teaching visual communication landed here by our writing skills; we excelled at academic writing, took writing courses, and perhaps wrote professionally—all part of establishing credibility. Yet, many of us moved into multimodal instruction having never taken coursework in graphic design, layout, art, drafting, print publication, or related areas. In a sense, the computer revolution was a double-edged sword for us. We control more aspects of documents now than we did in the past, and that control depends on complex software tools. And so, the list of expectations (of instructors and students) continues to grow, as is evident from Allen's (2010) useful, but potentially overwhelming, description of an effective assessment strategy. Where we once relied on solid writing expertise, our jobs (and the jobs students will hold) now require that we are intimately familiar with new media, social media, online environments, proprietary technologies, and principles of visual design.

Visual literacy and technological fluency have a lot in common: both have to be continually practiced or the concomitant skills become outdated. Design trends change, perhaps not as noticeably as software versions, but observably. Designers of visual technical texts are not typically creative geniuses working in isolation, independently developing the next new thing; they are working in a social context that greatly steers and constrains their options. Yet they need skills beyond those of a user; they need to create, not just populate, templates. They need to investigate contexts of use and employ technologies that will help users achieve results.

Of course, technological literacy is further, and profoundly, constrained by the market forces of the software industry. The tools of our craft typically include personal computer software and hardware, and increasingly, apps for mobile devices. They may also involve specific online environments or analog instruments (think pencils) for low-fidelity prototyping.

Most of us have experienced the shock of a new version of a familiar tool, whether it was a magic marker or a word processing package. Using the same program for several years may enable us, if we work at it, to become power users: using many or most of the features of the program, using the program efficiently, being able to solve problems and recover from errors easily, and knowing the strengths and weaknesses of it to plan projects in advance. The learning curve we face with a major revision of software may be steep; for academics whose time is not solely devoted to document production, the continual relearning process can be onerous.

Much of our teaching outside our comfort zone is necessarily informed by anecdote, assumption, and limited experience—either our own or others'. Scholarship to inform the teaching of visual communication has been sparse or published in fields removed from our own, and we most certainly would benefit from additional research that could provide a solid empirical foundation about best practices for teaching technology to students. As that empirical work begins to emerge on teaching and learning visual technical communication, those findings can and should inform our practice.

Although we believe that more research is needed in this area, our teaching and scholarship has convinced us that technical communication students would benefit from technology instruction that complements the visual communication instruction we already include in our courses and programs. If we integrate research into what we're already doing, share findings, and collectively build confidence, we will continue to develop best practices in the teaching of technical visual communication.

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Author information

Eva Brumberger is head of the Technical Communication program at Arizona State University. She has worked as a technical writer and continues to do freelance writing and editing. Her research interests include visual communication, pedagogy, and intercultural communication. She serves on the executive committee of the International Visual Literacy Association.

Claire Lauer is an assistant professor in the Technical Communication program at Arizona State University, where she teaches courses in multimedia writing and visual communication. Her research interests include investigating the teaching and learning of visual design principles, and examining the ways in which new kinds of composing practices are defined and discussed in writing studies.

Kathryn Northcut is an associate professor of Technical Communication at Missouri S&T. She has taught ESL, writing, and technical communication. She has worked in high-tech manufacturing environments as well as for academic and government employers, and is currently a research consultant for a major educational non-profit.

Program Visibility

A Survey of Awareness about Technical Communication Programs on Campus

Trent Leslie
Missouri University of Science and Technology

Kathryn Northcut
Missouri University of Science and Technology

Abstract. This article reports on a study of Technical Communication program visibility at a small, STEM-intensive public university in the Midwest. Although Technical Communication Bachelor of Science (BS) and Master of Science (MS) degrees have been offered by this program since January 2005, the program has faced an uphill battle in recruiting majors (see Table 1), achieving externally-imposed graduation quotas, and filling courses to capacity. In 2012, we obtained Institutional Review Board (IRB) approval and surveyed residential undergraduates to determine the degree to which the Technical Communication programs were known. The results of the survey suggest that at least among undergraduates, the program does not have good visibility, and students admit to not knowing about most aspects of the program's components and quality.

Keywords. Program administration, recruitment, retention, visibility, marketing, undergraduate research.

The role of the Council for Programs in Technical and Scientific Communication (CPTSC) is, in large part, to promote growth of academic degree programs in technical, scientific, and professional communication. The CPTSC's sense of growth in practice refers primarily to the number of programs, with some emphasis on diversity and dispersal (e.g., Maylath & Grabill, 2009). Internal growth, our concern here, is a key issue for some programs. Among established programs, growth at a certain level, or the achievement of sustainability, may be explicitly or implicitly critical to program health. Program growth (and health) may be measured by a host of variables: head counts, productivity levels or quotas, and/

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or perceived competitiveness. Do we want our programs to grow with respect to numbers of faculty members and/or students? If students, applicants or graduates or both? Do double majors, certificate students, and students minoring in our field count? Are size and growth actually measured by research expenditures? Numbers of articles and books published? Average starting salaries of new hires from our programs in industry?

Growth can be complicated when we move beyond the obvious sense of expansion. Especially for new programs attempting to meet the promises of their proposal, growth targets are sometimes threatening: if programs don't grow enough, will they lose funding or faculty lines? Certainly, consequences result from failure to grow in the right ways, at the right rate. And to further complicate the program administration landscape, a fixation on metrics can, as Dragga (2010a) warned, obscure ethical considerations.

It is hard to imagine a healthy program that is not known and respected among several constituencies on campus and in the broader communities—system, town, state, region, and/or professional organizations; we argue that program quality is as important as size, yet neither is particularly easy to measure. Because of the "problem" Johnson (2009) identified for individuals in our fields "making our intellectual identities visible" (p. 54), it is no surprise that some programs suffer the same disadvantage. Johnson identified our inherent interdisciplinarity as a source of the intellectual identity problem, but pointed out that it is also a great strength of our fields. The degree to which a program is understood and acknowledged surely results from several factors: location, size, reputation, and local context, including the exact nature of the program itself. Unlike personal visibility, which might be measured by awards, publications, invitations, citations and other recognitions, assessment of program quality is trickier. Program administrators may be keenly aware of similar programs nationally, yet unaware of whether their program is recognized and/or respected.

Table 1. The University's uphill battle with recruiting majors

University's Technical Communication Program Offerings & Enrollments (2012)			
Level	Options		Students
Undergraduate	Degree	BS (Onsite only)	16
	Minor		unknown
	Certificate		unknown
Graduate	Degree	MS (Online and onsite)	13
	Minor		unknown
	Certificate	(approved 2012)	2

Within a campus community, different groups and units may have varying degrees of knowledge about its degree programs. The success or failure of a program to spread its message and keep a reasonably high profile is dependent on too many factors to list. This complexity may help explain some challenges of small, relatively new (to their campus) programs:

- a small department or program, especially one that does not offer doctoral degrees, may be invisible to some units on campus, such as sponsored programs;
- the campus reputation may be one of excellence in STEM fields, with much less prominence in arts, humanities, and/or social sciences and related fields;
- departments with disproportionately large service course offerings may be perceived as service departments with lower status; and/or
- campus culture may be slow to change and integrate new programs into the campus identity and narrative

In the absence of empirical evidence to the contrary, anecdotally, the above challenges are suspected to be at play for the particular Technical Communication program in this study.

For this study, we were not concerned with program quality; the program has established outcomes and assessments, both internally-motivated and as a response to various external pressures. We perceive (and have some empirical evidence to support our perception) that students from the Technical Communication degree programs compete well in the job market and tend to succeed in their goals, whether the goals are to work or continue their education. But we don't believe that those students' successes are widely known outside the department.

Program Location

As we consider issues related to growth and status, program location is important (Dragga, 2010; Ford & Lanier, 2011). Location directly impacts the experience of those already working in the program as faculty and students, and department configuration also factors more subtly into attracting applicants and recruiting new students. The typical combination of Technical Communication programs with traditional English Departments (Dragga, 2010), as is the case with this institution, can work for or against the degree-granting programs within a department. A well-respected English department at a comprehensive public university may be a lofty site for launching of a new program; conversely, a small, non-degree-granting Humanities department (such as New Mexico Tech) may make it difficult for even an established Technical Communication program to achieve a unique identity and higher visibility than the host department.

Program location, wrote Dragga (2010), affects faculty and student diversity as well as "graduation rates, academic achievements of graduates, job placement and satisfaction, diversity of graduates' jobs, and ongoing contributions of graduates to their programs" (p. 223). Location factors into the growth potential of a new program, although no magic formula exists. Maylath, Grabill, & Gurak (2010) chronicled the growth of UW-Stout's program, noting that within four years of inception, it was among the largest 10 in the country (p. 267).

Program Visibility

Ford & Lanier (2011) described a process of raising visibility and status of a mature academic program through the establishment of a research group at New Mexico Tech. They frankly admit to experiencing "second class woes" (2011, p. 96) and describe in detail their concerted effort to join the ranks of the applied research community of their STEM-centric campus. The goal for Ford & Lanier was to achieve visibility and status among their research faculty peers; they reported no problems with under-enrollment or recruitment. They did note that their program was the only degree-granting unit within a Humanities department, perhaps one source of the status issue they identified. Through the winning of a contract with their university to revamp the website, they brought in funds for a new research group, established a modern lab/workspace, and demonstrated to the community their skills and value.

Another example of a program visibility challenge was presented by Weiss et al. (2012) detailing the efforts to create a programmatic logo for the purpose of branding. Their concern was not enrollment challenges; rather, they wanted to establish a unique identity while working within the tight constraints of the university's standards. They were able to achieve their goals through the talents of a graphic designer, and planned to implement usage of the logo.

Program Overview

The Technical Communication program in this study went live in January, 2005. It is located within an English Department of a STEM-centric campus in the Midwest. The degree programs are identified as "Technical Communication," and both BS and MS degrees (onsite and online) are offered, along with minors and certificates at the undergraduate and graduate levels. Also in this department, an English Bachelor of Arts (BA) is offered along with several English minors; a fallow English Master of Arts (MA) program is currently "on the books" with no enrolled students.

The Technical Communication MS program funds eight graduate teaching assistants, typically a combination of international and domestic students; an online version of the MS program has been offered since 2012. Thus, the minimum number of graduate students is typically over eight, but the enrolled graduate student population is under 20, including part-time and distance students. The BS program accommodates about two dozen students at most, with some fluctuation but a generally upward trend in enrollment over the seven years in which degree programs have been offered. An overwhelming majority of undergraduates enter as transfer students, with very few students entering the BS program as new incoming first-year students.

Three dedicated Technical Communication tenure-track faculty are employed by the program, with non-tenure-track instructors contributing to course coverage. Eight GTA positions cover most or all of the technical writing service courses offered by the Department; GTAs in this program teach only technical writing, not composition. The service courses are populated mostly by engineers and secondarily by students in the business-related majors with Technical Communication majors populating the upper division electives.

The university size is between 5,000 and 10,000 students with the overwhelming majority of majors housed in engineering departments. Students populate seven science/computing majors and fifteen engineering fields, accounting for most of the students. The seven non-STEM undergraduate degrees are Business & Management Systems, Philosophy, Economics, History, Psychology, English, and Technical Communication.

Physically, the program is located on the top floor of a relatively small building next door to the library. On the same floor are faculty in Languages and Philosophy. The building also houses two additional departments for a total of four, collectively referred to as Humanities/Social Sciences, which is also the name of the building. In the past, a college of arts and sciences was the administrative unit that included these departments plus several others, but the academic college level of administration was deleted several years ago. Space controlled by the English and Technical Communication Department is almost exclusively faculty offices. A small reception area, a workroom (copier), and a library/conference room are the only nonoffice areas. No classroom or laboratory space is controlled by the department or the program.

Facebook was not a departmental concern at this site until 2012, when the department set up a Facebook page, and around the same time, the student chapter of the Society for Technical Communication (STC) set up a Facebook page as well.

The Study

In undertaking this study, we had to consider how program visibility should be measured. Perhaps because program assessment, a hot topic of late, is typically concerned with outcomes along the lines of carefully theorized literacies and competencies (Hundleby & Allen, 2010), discussions of enrollment numbers and program visibility were difficult for us to find in the literature.

Ford & Lanier (2011) were interested in raising their profile as researchers among colleagues; having quickly achieved more demand for their research group's services than they could meet was a clear indicator of their success (p. 103). Their well-established program was not reported to be suffering low enrollment.

In contrast to programs such as those at New Mexico Tech and Wisconsin–Madison, at our research site, student numbers were growing slowly despite the presumed relevance of the degree programs to this STEM campus along with the paucity of competing programs. Leslie had noticed, during his first semester on campus, that classes had low enrollments and the rooms were not filled. This was puzzling. Only two universities in the state offer similar degree programs, and only one offered a graduate (MA) degree; no doctoral-granting universities in technical, scientific, and/or professional communication exist within 100 miles of this campus. The state of awareness about the programs became a research question; we hypothesized that the program was not popular because it simply wasn't well-known.

Rather than assuming that "all publicity is good publicity," we were uninterested in simply knowing whether people thought they had heard of the program. If the program happened to be notorious for some particular person or event, that may not mean that the field or the degree offerings were known. We wanted to know what people knew, or thought they knew, about the program, courses, and faculty. We were also curious about whether the people were aware when they crossed paths with the program. Finally, we sought to measure perceptions of program quality.

Toward these ends, Leslie developed a survey (Appendix A) of residential undergraduates to determine whether his impression was accurate, that Technical Communication as a degree field was not well understood within his peer group. After receiving IRB approval, he deployed the survey using

Survey Monkey. He gained the cooperation of residence hall assistants to send the survey link out to the residents in a snowball approach to participant recruitment (Koerber & McMichael, 2008). The project was conducted in conjunction with Leslie's enrollment in a Research Methods course taught by Northcut. Neither author is currently serving a s program administrator.

Results

Given our short time window, the collection of 69 completed surveys was deemed adequate to address the question about whether and what students knew about the Technical Communication degree programs on the campus. Because of the snowball method of dispersal, no calculations can be made about return rates; we can assume the return rate was relatively low, but we have no way of knowing. (See Table 2 for specifics.)

Among the 69 respondents, 57 (82.6%) were freshmen and sophomores. These students are of primary interest because they are a potential recruitment pool; none of them are currently minoring in English or Technical Communication. On this campus, attrition is fairly high among engineering majors, and retention would be served by seeing them change to a major such as Technical Communication. If the students are unaware of the major, such change of major is unlikely to happen.

Cross tabbing student level with awareness of the degree programs (questions 13 and 1) yielded interesting results. Seventy percent of students (72% of freshmen and 67% of sophomores) were correct in selecting "BS" as a degree offered at the institution. Almost 40% of freshmen and sophomores were correct in indicating that an MS degree was offered. And 56% were correct that a minor in the field is offered.

Yet, 56% of those students erroneously thought that a BA was offered. This inaccuracy may not be a major concern, as the difference between a

Table 2. Compilation of survey responses

Which of the following Technical Communication degrees are offered at (U)?						
	First Year Students		**Sophomores**		**Total Underclass Students**	
BA	58.3%	(21)	52.4%	(11)	56.1%	(32)
BS	72.2%	(26)	66.7%	(14)	70.2%	(40)
MBA	19.4%	(7)	33.3%	(7)	24.6%	(14)
MS	47.2%	(17)	23.8%	(5)	38.6%	(22)
Minor	55.6%	(20)	57.1%	(12)	56.1%	(32)
PhD	16.7%	(6)	33.3%	(7)	22.8%	(13)
None	2.8%	(1)	4.8%	(1)	3.5%	(2)

BA and BS in Technical Communication would be subtle or irrelevant to much of this demographic. More alarming is that 23% of underclassmen thought a PhD was offered in the field, and almost a quarter of students believed an MBA was offered. Clearly, these students were guessing about the degree programs, and they did admit to not knowing in Question 2.

One set of responses that deserves more investigation is the low number of students who indicated that no Technical Communication degrees are offered. This low number, although accurate, may be a researcher effect: the result of a suggestion by the nature of the survey that the programs existed.

When asked about how confident they were in their answers to the first question about the degrees offered, 88.4% of all students were either "not very" or "not at all" confident; the number was only slightly higher for underclass students only. Thus, the students were largely guessing about their answers.

Given their admitted lack of knowledge and their lack of certainty about the degree programs, we were not surprised to see that about 52.9% of all respondents believe the program has done "poorly" or "very poorly" in promoting its courses and majors. When asked to judge the quality of the degree programs, students mostly admitted that they didn't know, at the rate of about 78%. Eleven students (16%) rated the Technical Communication program quality as "good."

The question on the survey about location was about physical location because of the isolation of the program faculty offices on the top floor of a building housing four departments. When asked how often they are on that floor (where several classrooms are also located), 56% of the respondents did not know.

More surprisingly, given the studious and serious reputation of the student body, was the finding that about 40% of all students (42.9% of underclass students) did not know whether they were required to take any of the listed Technical Communication courses listed in Question 8. For several engineering degree programs, English 160 is required; 23% of the students indicated that they were required to take it. For several majors on the campus, English 65 is one of three courses students can choose to meet a communications requirement; 17.6% of students believed they were required to take it. English 240 and 260 are required electives for technical communication majors, of which there were none among these respondents, and they are optional for majors in business-related majors. About 7.5% of the students indicated that they were required to take these courses. Without the ability to cross reference students' majors, we could not determine whether these answers were correct, but feel that the 40% of students who could not answer the question was somewhat alarming.

Discussion

Our goal was to provide data that may inform productive marketing campaigns to potential students, to help the program achieve its goals for growth and/or sustainability. The results of the survey yielded both good news and unwelcome news for the Department and Program of this study.

On a positive note, if these survey results are valid, then over half of the students most likely to be at risk for attrition believe there are bachelor's degrees offered in that field; this possibility would yield a large number of undergraduates who might be successfully invited to consider a Technical Communication degree.

The fact that over half the students are aware of the Technical Communication minor suggests that they might consider minoring; students often turn their minors into majors if they struggle in their first choice of a major. Unfortunately, the students appear to be guessing. The answers to the second question demonstrate that the students were not confident of their answers, with 89% indicating that they were "not very" or "not at all" confident in their selection of the degrees that the program offers.

Not surprisingly, students knew very little, and admitted to not knowing much, about the details of the department such as the number of faculty and number of graduate students. Students overwhelmingly did not know how they would rate the quality of the programs: roughly 78% of respondents, regardless of level. Students also admitted to lack of knowledge about their own courses of study, not knowing which, if any, technical communication courses they would be required to take.

The fact that 13 of the 69 respondents guessed incorrectly that the program offers a PhD is not alarming given this population of undergraduates. However, other constituencies on campus do need to know about the graduate degrees of the program. Administering a similar survey to graduate students, faculty, and staff on campus would be particularly useful, especially if similar percentages of erroneous responses were obtained.

Opportunities Grasped and Missed

Given the high attrition rate of STEM majors on this campus, the Technical Communication program may be well served in marketing its degree options to undergraduates more effectively. With several hundred students enrolling in the program's service courses each year, those courses are a good avenue for educating at least some students. In the past, the program has participated in high-visibility activities on campus such as helping to promote theatrical productions. The program has been present at events that recognize or promote both undergraduate and graduate research and in program showcase events for prospective students. Increasingly, the program is seeing interest in Technical Communication majors from employers at the semi-annual career fair. If a goal for program administrators is greater understanding of the degree programs among students, then these activities and others should be considered to be investments in the program.

Although the Technical Communication degree programs are not well known among undergraduates, certain individual students are. Prominent examples are the half-dozen or so student athletes the program includes at any given time. During Fall, 2012, four football players were Technical Communication majors with the team seeing its most winning season in decades, thus enjoying some local fame. Yet few references are made to these star students' majors, perhaps contributing to the fact that over 40% of the students surveyed did not know whether any of their friends were pursuing a Technical Communication degree. Athletes' majors are not listed in the programs distributed at the games. The team rosters on the athletics department's web site do not list majors. When the players' individual bios are viewed, three of the four do accurately list the majors, but one is incorrect. Two basketball players do accurately list their majors as Technical Communication. In all these cases, the student's major is the last thing listed in their profile, under the heading, "Personal." Working with the athletic program to boost the prominence of the student's major may or may not be possible, but if recognition of the existence of programs is a priority for this department, inquiries may be fruitful.

On this campus, as is typical in STEM institutions, student design teams are popular. They provide popular opportunities for students who plan professional lives in fields related to the teams (such as electrical engineers involved with the Solar House, Solar Car, and Human Powered Vehicle Teams). Yet these teams' competitions also include marketing, information, and other communication goals for which technical communication students are uniquely qualified. During 2012, students in some courses worked informally with student design teams on small projects, such as a brochure or poster, but the majors from this program have little or no history of core involvement on the teams as officers or long-term contributors. Methods for encouraging students disposed toward these teams to join them, and perhaps recognize or reward their participation, might be identified.

The department that is the focus of this study is a good campus citizen, sponsoring various activities in the campus community and the town. These activities are not always credited to the department, reducing the potential impact on prospective students. A departmental strategy for visibility might be undertaken, perhaps in concert with the technical marketing course offered by the program. Marketing itself, and measuring the success of marketing efforts, may be a good way to teach students universal principles with a local example.

With some focused attention, this program could certainly identify additional, or better, opportunities for a higher profile; the opportunities afforded by Facebook are relatively unexplored, and other forms of social media (e.g., Twitter) may be ripe for utilization, especially if currently enrolled students are already heavily entrenched in them. Yet the impact of promotional efforts may be difficult to judge. For this reason, some standards for achievement may be needed.

Setting Benchmarks

As with other forms of program assessment, some observable standard would be useful for determining the success or failure of marketing/visibility efforts (summarized in Table 3). Because our study was concerned with visibility among undergraduates, we propose that some quantitative level of program awareness be set as a goal. The current awareness level of 66.7% may be seen as acceptable or as too low, but in either case, a survey of the same population every two years would help determine whether program visibility is going up or down among undergraduates. Additionally, continuing to ask whether students are certain or guessing in their answers may be useful to know. Ideally, after targeted promotion, students would be more confident in their correct answers. (See Table 3 for specifics on benchmark results.)

Of course, individuals and groups outside the department itself are also critical for program visibility, and they too should be surveyed to see whether they are aware of or misinformed about program offerings. Depending on the base level of these groups, an awareness level between 50% and 75% might be established as a goal for basic knowledge of the degree programs offered. A ceiling for misinformation might also be set; if the current knowledge about degree offerings is considered too low, then attempting to reach out more effectively to more people may be a goal.

Unrelated to this survey, but key to program growth, an obvious quantitative benchmark would be applications at the undergraduate level. Setting goals for both incoming first year students and transfer students could help steer or focus recruitment efforts. If these goals were shared or incentivized by university recruiters and faculty, perhaps progress could be seen and tracked over time.

A final benchmark for this particular program may be course capacity. Currently, not all upper division courses in the program are enrolled at capacity, with upper division courses ranging from 35% to 85% full during the Fall 2012 semester. As these courses are typically capped at 20, a goal of a certain number of courses reaching capacity may be feasible.

Interestingly, the program is unable to count the number of minors it has at any one time because many students are not required to declare a minor early in their program of study. Only if the minor is declared by the student and a minor advisor is assigned is a minor visible to program staff. Not having access to students minoring makes it difficult to promote the program to these students who may be struggling with a different major. More vigorous promotion of the minor might yield more students declaring the minor and thus becoming visible to the program, which can then remind the students of events, degree programs, and specific courses of interest.

The program might also attempt to build on its existing strengths. Most of the upper-division courses for majors are offered on a two-year rotation. Some courses are in high demand by students outside the department, even though they are electives. Identifying the best from among

Table 3. Benchmark Metrics: Poetential Visibility Goals

Category	Measurement	Example of a Goal
Student awareness	Survey responses	80% correct answers about degree programs
Incoming student awareness	Application numbers, recruitment statistics	Moderate increases annually in number of students who apply, are admitted, and matriculate
Non-major awareness	Number of non-majors in elective courses; number of minors	Moderate increases annually in number of students from other majors exposed to the program through coursework; set goal for number of minors
Faculty awareness	Survey responses	90% correct answers about degree programs
Faculty status	Interdisciplinary collaborations	Interdisciplinary publications or grants
Staff awareness	Survey	90% correct answers about degree programs
Administrator awareness	Face to face communications	Number of interactions or contacts between certain offices and academic department faculty

these courses and offering them more often may be a way to reach more campus constituents and enhance the reputation of the program as a valuable asset to the campus.

Challenges

The Technical Communication program has no identity specific to location on campus, as it controls little space. Although professor's offices are the Humanities/Social Sciences building, many courses are offered in a computer-equipped classroom in another building, next to the University Writing Center. Technical Communication service courses are scattered across campus, wherever a computer-equipped classroom can be scheduled for a section. An interesting experiment would be to establish a central location for the programs (a multimedia lab, for example), and then determine whether occupation of space increases program visibility or recognition. However, this is not likely to be feasible, given the shortage of available space and lack of resources within the department.

In some respects, a disincentive for recruitment into the program is built into this university's structure. Proudly advertising extremely high average starting salaries of new graduates, the university stands to see this figure decrease if large numbers of non-STEM graduates were factored into the data, as non-STEM starting salaries are lower (Langdon et al., 2011).

Related to the marketing data, the reputation of the university in this study is as an "engineering school." Although advances were made in recent history with the development of a business school offering an MBA and majors such as Technical Communication at both undergraduate and graduate levels, a name change of this university in 2007 seemed to steer back toward STEM and away from a more comprehensive identity. Attracting high school students to a major they've never heard of in an English department at a STEM institution may never be easy.

Finally, much of the university identity is built on the high level of external funding, as was the case where Ford & Lanier (2011) developed their own research group at New Mexico Tech. Again, departments and programs that bring in research dollars can afford to develop space and opportunities, from scholarships to internships, which lead to a higher profile. Even if the research expenditures of the department were to increase, however, the effect of such an increase on the type of growth that this department wishes to experience would need to be measured or at least monitored.

Faculty may not be well-situated to personally and directly handle some tasks related to program growth, and these include recruitment and solicitation of admissions applications. Certainly, the work of admissions staff is critical, and if university recruiters are actively promoting programs, their services are invaluable in reaching high school students from prime recruitment locations. In this program's case, recruitment is mostly in-state, with small numbers of incoming students from other states and nations. Technical Communication has not been a success story for recruitment of first year students at this institution; an overwhelming majority of the program graduates and current students are transfer students. Certainly transfer recruitment and admissions are working in favor of the program, but clearly high school students are not getting the message about Technical Communication. Thus, high school outreach might be a focal area for marketing.

A final, but not insignificant, area for this program to consider would be the perceived quality of the program. By which metrics is quality measured? What activities, concepts, or events would the program like to be associated with? If these questions are answered, then future surveys can focus on the success of the program in achieving its goals for visibility and reputation.

Conclusion

Despite the obvious limitations of potential bias caused by research effects, a small sample size, and lack of triangulation, we have found that our results offer similar programs more information than is currently available. Either program administrators conduct such work and simply don't disseminate it, or such work is not being conducted widely, if at all. Our results have been shared with the department chair who presides over the programs. The chair supports the plan for additional surveys and hopes to use the results for productive recruitment and marketing efforts. Thus, at this point, the small-scale survey appears to have exceeded our hopes for generating useful data, and we plan to conduct similar studies in the future.

This study was undertaken to measure perceptions about a program with which we are involved, to determine whether a problem exists. Depending on how the data are interpreted, the program may or may not have a problem with visibility; that is a decision for the program's administrators to make. However, they are now armed with results from the survey so that goals for growth and visibility may be developed and a focused marketing effort can commence. Studies of other groups, such as campus faculty, staff, and academic advisors, may yield interesting results as well. Yet with the numbers on hand, we do face a possible ethical dilemma articulated by Dragga (2010a): acting as containers of data rather than filters of data. It's not enough to possess numbers or to seek to make the numbers larger; we must continue to examine their meanings and implications. A bigger program is not necessarily a better program, of course, and neither is a well-known program necessarily better than one that is largely unnoticed on its campus.

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About the Authors

Trent Leslie is an undergraduate from Labadie, MO, majoring in Technical Communication. He was enrolled in Research Methods, TC 302, in Fall 2012, and undertook the data collection for this project during that semester. His anticipated graduation date is 2014.

Kathryn Northcut is an associate professor of Technical Communication. She has published on visual communication in various journals including

Technical Communication Quarterly, *Journal of Technical Writing and Communication*, and the *Journal of Visual Literacy*. She co-edited *Designing Texts: Teaching Visual Communication* with Eva Brumberger, published by Baywood in 2013.

Appendix

Appendix 1. Survey Instrument

1. Which of the following Technical Communication degrees are offered at U?

- BA
- BS
- MBA
- MS
- Minor
- PhD
- None

2. How confident are you of your answer for question 1?

- Very confident
- Not very confident
- Not at all confident

3. Which of the following media do you see that promote U Technical Communication programs on campus?

- Website
- Brochure
- Sign
- Poster
- Slide

Other (please specify)

4. How many of your friends are pursuing a Technical Communication degree?

- 0-3
- 4-7
- 8+
- I don't know

5. How many instructors do you know that hold a Technical Communication degree?

- 0-3
- 4-7
- 8+
- I don't know

6. How many faculty members are affiliated with Technical Communication at U?

- 0-3
- 4-7
- 8+
- I don't know

7. How many graduate students are affiliated with Technical Communication at U?

- 0-3

- 6-10
- 11+
- I don't know

8. Which of the following classes are you required to take for you major or minor?

- Engl/TC 65
- Engl 160
- Engl/TC 240
- Engl/TC 260
- None of the above
- I don't know

9. How often do you go to the top floor of the __ building in a week this semester?

- Once
- Twice
- 3 Times
- 4 Times
- 5+ Times
- I don't know

10. Overall, how would you rate the quality of U's Technical Communication program?

- Very Good
- Good
- Poor
- Very Poor
- I don't know

11. Overall, how effectively has Technical Communication promoted its courses and majors?

- Very Well
- Well
- Poorly
- Very Poorly
- I don't know

12. Are you minoring in any of the following?

- Technical Communication
- English
- Undecided
- None of the above

13. Which best describes you?

- Freshman
- Sophomore
- Junior
- Senior
- Graduate Student

A R T I C L E

To Do is to Learn

The Value of Hands-on Research in an Introductory Research Methods Course

Derek G. Ross
Auburn University

E. Jonathan Arnett
Kennesaw State University

Abstract. Introductory research methods courses in technical and professional communication play a vital role in preparing Master's- and PhD-level students for their chosen specializations. Here, past participants of a "hands-on" introductory research methods course retrospectively analyze the class's approach and discuss the benefits of a hands-on classroom. From our experiences, contextualized against literature, we argue that the most effective introductory research methods courses are those that mix both theory and practice in a hands-on classroom environment. We note important concepts we learned and conclude by providing a sample course schedule that should enable practitioners to readily try our suggestions.

Keywords. Writing Program Administration; Curriculum/Program Development; Empirical Qualitative Research; Empirical Quantitative Research; Pedagogy

> But, on the other hand, Uncle Abner said that the person that had took a bull by the tail once had learnt sixty or seventy times as much as a person that hadn't, and said a person that started in to carry a cat home by the tail was gitting knowledge that was always going to be useful to him, and warn't ever going to grow dim or doubtful.
>
> *from Tom Sawyer Abroad by Mark Twain [Samuel Clemens, 1894]*

Introductory research methods courses introduce students to the variety of research methods available to them in their field of study, suggest potential areas of inquiry, and encourage them to think critically about published research reports that they may encounter. Published research supports the idea that practitioners and academicians alike must be well-versed in research methods to be effective and productive creators

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of knowledge (Coon & Scanlon, 1997; Green & Nolan, 1984; Zimmerman & Long, 1993), but disagreement exists about how best to teach research methods. Although the most common approach—reading and writing about research methods—is an excellent way to introduce conceptual knowledge, our experiences suggest that having students participate in an introductory research methods course which requires them to propose, develop, and actually conduct one or more research projects, in addition to reading about different methodological approaches, may offer more long-lasting, practical, workplace-ready knowledge.

We—the authors—participated in a research methods course while we were PhD students that we believe effectively combined theory and practice by employing a "hands-on"[1] approach that required students to conduct actual, albeit brief, research studies[2]. At the time we took the class, we knew we were learning (and doing) a lot. A retrospective view of the course, now that we've both been teaching our own undergraduate and graduate classes, suggests that the model the teacher, Dr. Rebecca Rickly, followed offered a gestalt approach toward learning research methods that could prove valuable for teachers who wish to consider such an approach in their classrooms or who would like to consider elements of their existing courses more deeply. Although the course we took and the course we envision are not necessarily novel in technical communication—Campbell (2009) calls for a similar classroom approach (p. 233), textbooks advocate similar strategies (see, e.g., Blakeslee & Fleischer, 2007), and we know of many instructors who employ hands-on approaches to teaching—we hope that our reflection on our experiences and proposed course outline can help other educators more deeply consider their course structures.

In what follows, we, now, as tenure-line faculty members, reflect on our experiences as graduate students enrolled in a hands-on research methods course. We provide a review of the literature about "hands-on" approaches to learning, describe the research methods class in which this article originated, discuss the specific lessons we learned as members of

1 The term "hands-on" is perhaps less culturally complex than other acknowledged terminology that speaks to the same end such as active learning, experiential learning, practical knowledge, and praxis. Although we draw on some of these terms during the course of this article as well, we generally frame our discussion from the "hands-on" perspective because it creates, we believe, a more compelling argument in the retrospective framework we employ.

2 We describe the course as effective because students in the course passed with knowledge of the course's stated learning outcomes; the professor who taught the course indicated to us that she found the course successful, and students in the course used course projects as the basis for conference presentations and publications.

this class, and conclude with a proposed outline for a course other teachers of business, technical communication, and professional writing can deploy in their classrooms.

Why a "Hands-On" Approach?

Graduate degree programs in technical communication draw students with a variety of disciplinary backgrounds, and many of these students have never studied empirical research methods before. Accordingly, programs often require students to take at least one "overview" course on research methods that introduces the major concepts behind empirical research. The typical overview course, however, may not fully address graduate students' complex needs: Blakeslee & Fleischer (2007) note that research plays an important role throughout our lives, and "perceived inadequacy in how to do research" (p. 8) is a common student concern. As Spilka (2009) discussed in her article on practitioner research instruction, technical communicators in the workforce make constant use of practical research skills, including collecting data in the workplace, in libraries, databases, and online; observing workplace practices; interviewing and surveying stakeholders; conducting focus groups; running usability tests; and planning and conducting experiments to test documentation (pp. 217–218). Those graduate students moving on to academic jobs will need these same skills, and more, but an ongoing survey tracking PhD students' confidence in their ability to conduct research indicates that 10 to 15% of students who take research methods courses at the graduate level indicate that they do not receive an opportunity to apply what they've learned other than to read and critique published research, and 47% of respondents claim that they are "encouraged to apply what they've learned outside of the research methods class" rather than allowed to practice conducting research in class (Rickly, Papper, Zobel, & Ross, 2011). Additionally, surveys of graduate-level research methods courses indicate that the most common assignments in these courses are research proposals, critiques of existing research, literature reviews, exercises, annotated bibliographies, and proposals for dissertations or other significant research projects (Campbell, 2000; Rickly, 2005). Although these tried-and-true assignments most certainly encourage thought, basing research methods courses solely on a theoretical approach seems ironic because

> we appear to be breaking one of our field's fundamental rules about how our students learn skills (i.e., they learn to write by writing, not by reading about writing). Yet, somehow many business

> and technical communication courses in research methods fail to apply this fundamental rule with respect to research skills. Reading about research is simply not adequate preparation for actually conducting research. (Campbell, 2000, p. 237)

In short, research suggests that for students to be adequately prepared to conduct research, the research methods course should involve a practical skills-development component—a perspective in keeping with Blakeslee and Spilka's (2004) argument that we "need to rethink our pedagogical approaches to our research courses, focusing more on the process of research and on students' experiences as they develop their identities as researchers" (p. 81) as well as Spilka's call in her keynote address at the 2005 Council for Programs in Technical and Scientific Communication (CPTSC) conference to "empower more practitioners to do research."

We suggest that instructors of research methods classes implement experiential learning techniques to achieve this goal. Published research on psychology of learning (see, e.g., Hoover & Whitehead, 1975; Kolb, 1984; Walters & Marks, 1981), indicates that students learn more effectively via an experiential learning process—what we describe in this article as a "hands-on" approach—that "exists when a personally responsible participant cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement" (Hoover & Whitehead, 1975, p. 25) rather than by sitting passively through lectures. Active involvement, which asks students to match classroom-gained knowledge with hands-on, real-world application, forces students into tension-laden cycles of action and reflection in which they internalize knowledge through apprehension/comprehension and extension/intention cycles (Kolb, 1984). In short, students learn most effectively when they hear how to do something and then attempt to make sense of their theoretical knowledge in a practical, hands-on manner.

These action-reflection learning cycles need not be long, drawn out affairs—for example, in the class we took, students had to complete two brief research projects—each of which included proposing a project topic, conducting research on that topic, and presenting results—within two- to three-week timeframes. These small-scale studies gave us the opportunity to solidify our grasp of theoretical content, gain confidence in our abilities, and increase our ability to conduct research projects. As an added benefit, the work originating from our hands-on microstudies has benefited us professionally because it has appeared in multiple conference presentations and, thus far, one published journal article.

We're the first to agree that the hands-on classroom can be a challenging space for both students and the instructor. As students, in addition to readings, papers, and presentations, we had to quickly identify manageable topics that could be researched over a short time span and then actually conduct the research. As teachers in our own right, we also recognize that the hurdles to running such a course, especially for the first time, might seem daunting. Teaching any class for the first time is an education in and of itself, and, additionally, some programs have mandated curricula, so a new from-scratch course might not even be an option. The prospect of managing a large number of graduate students all potentially taking on research projects that may involve unfamiliar ground (or practices) can feel intimidating, and the work of guiding students and assessing their projects can be extensive. Furthermore, the students in a research methods course may possess a mixture of workforce and academic orientations (as was the case in our class) or come from different departments, and students may be getting research training in other classes anyway. So why take the hard route?

The short answer, from our retrospective position as past participants/present-day teachers, is that the rewards outweigh the difficulties. All new courses are difficult to teach, and even changing a course's structure from a tried-and-true model to one that incorporates potentially useful—but new—information or practices is difficult: We hope that our outline might ease this difficulty to some extent. Similarly, although not every program can implement a unique, practice-based research methods course, elements of this approach may be incorporated as units in an existing class because the microstudy components are designed to yield rapid, easily assessed results, and, as happened in our class, a hands-on course can be at least partially student-driven. Students can help develop the course's content by sharing first-hand experiences with each other, and when students present their microstudies as if they were at a professional conference, class members can evaluate the presentations and drive the question-and-answer sessions.

The potential variety of students in a research methods course is, to our minds, a strength, rather than a source of potential fear. Cross-pollination with other disciplines may benefit students and our discipline as a whole, and even if students are getting research training in other classes—potentially even in other departments—, research methods classes dedicated to technical and professional communication or to writing studies allow us to demonstrate how research methods can be used explicitly for our field's purposes. Finally, having students with different goals involved in a class that asks so much of them allows students—even forces them, in some cases—to draw on each other's unique strengths and experiences, ultimately creating rich learning situations.

Constructing the Argument

This article originated as a group project in ENGL 5363, "Introduction to Research Methods in Technical Communication and Rhetoric," a required class for PhD students in the Technical Communication and Rhetoric graduate program at Texas Tech University. The course was also open to Master's students. In addition to this introductory course, PhD students were required to take three in-depth methods courses, either within or outside the department.

As part of the coursework for Introduction to Research Methods, each student was required to complete two "microstudies" in addition to writing a course paper and taking a final examination. The microstudy assignments were based on three brief-but-complete studies described on pp. 60–69 of Christina Haas's Writing Technology (1996). For each microstudy, students prepared Institutional Review Board (IRB) forms for research using human participants (if necessitated by the project) and, after receiving permission, conducted their study over a short time frame (in one case, approximately two weeks from conception to end product) before formally presenting their research in both a 3–5 page paper and a conference-style presentation. Students took on projects as varied as determining the rhetorical elements of scam email[3], determining needs and expectations of writers in a grant-writing agency, comparing First-Year Composition instructors' grading patterns[4], and examining how local child-fostering/-adoption agencies use color on their websites, among others.

Following the in-class presentation of the second set of microstudies, five students elected to work together on a semester paper that would investigate the question of what a research methods course at the graduate level should include[5]. Based on our subjective experiences, we

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3 This study was eventually extended, presented in parts at both the 2006 Association of Teachers of Technical Writing (ATTW) and Computers and Writing (C&W) conferences, and eventually published in the Journal of Technical Writing and Communication (JTWC) as Ars Dictaminis Perverted: The Personal Solicitation Email as Genre (Ross, 2006a, 2006b, 2009).

4 This study was later expanded and presented in parts at the 2006 Conference on College Composition and Communication (CCCC) and C&W conferences as *I Assign Lots of Grades...But Am I Fair and Reliable?* (Arnett 2006a, 2006b)

5 Those students who wished not to participate in this project were given the option of conducting an independent project instead.

hypothesized that a desirable approach to both teaching and learning research methods involves practical application of theory (a "hands-on" approach), but we could not initially articulate why. Therefore, our research for the semester project was aimed at identifying the value of hands-on research in the technical communication classroom.

Toward this end, we conducted three focus group sessions modeled after those described by MacNealy (1999, pp. 176–194), with a facilitator, a note-taker, planned discussion points, and brainstorming sessions; each session's purpose was to identify the elements necessary to a productive hands-on classroom. The first group was both a "practice" session and a productive data-gathering endeavor; the instructor acted as facilitator, and students in the class—project participants and students who opted to work on their own semester-end projects alike—comprised the group's members. Although taking part in the session, we attempted to participate as invited members of a focus group, not as students. The second and third groups were student-run and involved 5–7 PhD students each from the Technical Communication and Rhetoric program who had previously taken the Introduction to Research Methods class. Two doctoral students from another PhD program on the Texas Tech campus came to the third focus group.

Our focus groups and several writing and revising sessions designed to question the teaching of research methods in technical communication at the graduate level formed the basis for both classroom discussion and graded assessment; documents related to our semester paper were turned in via the WebBoard course management tool and assessed by the instructor both for adherence to criteria (e.g., word length, use of viable source material) and by peers for content and relevance to the overall tacit and explicit goals of the group project. Participating class members refined their results to identify two areas of critical value: becoming a member of a research community and learning to manage research projects.

As a class, we felt that these themes encompassed the two key educational aspects students gain from the hands-on teaching of research methods. We then compiled focus group research results and independently written documents from all five students to form a single paper, which was submitted as a collaborative course paper. Later, four of the five authors formed a panel titled Learning to Represent Our Work, Ourselves (Arnett, McMichael, Musick, & Ross, 2007) and presented elements of this paper at the 2007 Association of Teachers of Technical Writing (ATTW) conference.

Two of the authors, after graduating and then working as tenure-track professors, opted to continue with the project and revised the paper into this article. As such, this article represents real responses to the learning process from PhD students who reflected on, conceptualized, and experimented with new knowledge as they tried to make sense of their education and chosen career paths, and the paper's contents have been simultaneously reinforced and tempered by several years of practical experience on the other side of the podium.

Results and Discussion

Two overarching themes about the benefits of a hands-on research methods class emerged from the results of our focus group research and reflections on our personal experience: First, we learned how to become part of a community of researchers, and second, we learned how to manage research projects.

In terms of learning to become part of a community of researchers, we developed tacit knowledge and learned genre expectations. In particular, the practical experience of conducting small-scale research studies helped us to internalize our newly chosen field's methods and values, employ the specialized language used by researchers, and learn how to create and share knowledge in a rhetorically appropriate manner for an audience of professional researchers. In other words, we learned how to be—and be seen as—members of the technical communication research community.

In terms of learning how to manage research projects, the hands-on approach challenged us greatly. The task of implementing theory—as opposed to writing a literature review or research proposal that discussed what we might do if we conducted studies, or playing Monday-morning quarterback and criticizing other researchers' studies—introduced us to a wide range of practical considerations about managing research studies. Specifically, we learned to create project plans, define our research questions, submit an effective IRB proposal, recruit research participants, and learn research technologies. We discuss these themes in more detail below.

Developing Tacit Knowledge

To become a part of a community that both produces and consumes knowledge, students in an introductory research methods class have to learn more than how to act the part. Students must internalize the field's values, learn to use the field's specialized language, and create and share knowledge effectively. Literature suggests that there are two major dimensions of knowledge students gain from research methods classes. One dimension, explicit knowledge, comes from formal study; the second, tacit knowledge, arises through practice and social contact. Research in human cognition and instructional design (e.g., Broadbent, FitzGerald, & Broadbent, 1986; Collis & Winnips, 2002; Lewicki, Czyzewska, & Hoffman, 1987; Reber, Kassin, Lewis, & Cantor, 1980; Wagner & Sternberg, 1985) suggests that when students gather explicit knowledge, they learn only what is in the source material and need to expend conscious effort when they attempt to apply their knowledge to novel situations. In contrast, students create an internalized knowledge base containing "knowledge that is difficult to see and express, personal, and involves subjective perception, intuition, and foresight" (Collis & Winnips, p. 134) when they practice skills and critique each other's work, and students who create tacit knowledge can tap this reserve with little effort when they encounter novel situations.

Experiential learning is a social endeavor, particularly when developing tacit knowledge (Barley & Tolbert, 1996; Brown & Duguid, 2001; Hutchins, 1991). Research in psychology of learning suggests that a combination of tacit knowledge derived from hands-on practice, exchanges with peers, and explicit knowledge derived from classroom-based training is the most effective method of developing internalized, easily accessible knowledge and skills (Eraut, 2000). Hence, requiring students in an introductory research methods course to carry out research projects and present them for peer review may be more pedagogically effective than only assigning literature reviews, annotated bibliographies, or project proposals that will be graded by a professor. The experiential/hands-on approach our class used certainly seemed to validate this argument in that it not only encouraged us to develop a working understanding of method that would allow us to communicate our project designs to our classmates and teacher but also encouraged the kind of tacit knowledge development that allowed us to critically (and productively) engage with our classmates' projects in an attempt to improve methods and solve problems. We didn't just learn for our own projects, we learned for the good of our classmates, making our research methods class, essentially, a model of the sorts of professional interactions we use, as teachers and researchers, every day. Our classroom became a microcosm of the technical communication community, and later, when we presented our panel at the 2007 ATTW conference, it actually became an interactive, functional part of the technical communication community.

Additionally, thinking about the class from a teacher's perspective, the fact that we had to conduct studies, rather than just write about them, helped prevent pseudotransactionality. This term refers to a situation in which students "engage in a transference of information for the purposes of informing the uninformed or demonstrating mastery over content" (Petraglia, 1995, p. 21). Most discussions of pseudotransactionality concern undergraduate-level courses and assignments (see e.g., Spinuzzi, 1996), but graduate students are not immune.

For example, all the members of our research methods class agreed that we wanted to demonstrate our mastery of the subject material to our professor, but because we had to implement research methods rather than write about methodology, we could not show off by submitting citation-larded literature reviews, and we could not use writing skills to finesse our way around theoretical problems. Instead, we had to adopt the mindset of practicing members of the technical communication research community, ask ourselves what "real" researchers would do to solve the problems we encountered, and create documents and presentations that appealed to a wide professional audience of researchers rather than the narrow audience of our professor. This experience supports the advice offered by various theorists of writing instruction (e.g., Berkenkotter, Huckin, & Ackerman, 1988; Bazerman, 1988; Britt, Longo, & Woolever, 1996; Herrington, 1985; McCarthy, 1987), who suggest that instructors of technical writing courses look outside the classroom and ask students to engage with an activity network of professionals to ground their writings in a real context. In the context of our hands-on introductory research methods course, therefore, students entered into the activity network of the technical communication research community by adopting the mindset of practicing researchers, and in doing so, we developed tacit knowledge about the field's values.

Learning Genre Expectations

The numerous classroom elements that comprised our research methods class helped us learn—or at least practice—the many genre-specific elements that comprise the research process. These elements included learning field-specific language and generating numerous writing and presentation components from proposals to final reports and presentations.

In "The Idea of Community in the Study of Writing," Joseph Harris (1989) suggests that "we write not as isolated individuals but as members of communities whose beliefs, concerns, and practices both instigate and constrain, at least in part, the things we can say" (p. 12). Accordingly, technical communicators' command of specialized language functions as a marker of group membership. Bourdieu, Passeron, and Saint Martin (1965) articulated this group awareness as the idea of class ethnocentrism.

Publishing members of an academic community must speak the language of their field in such a manner that other members of the field recognize them as members of the group and therefore as viable sources of knowledge. As Bourdieu et al. suggest, our language indicates "cultural privilege" (p. 8). Proper use of language creates the right to speak and be heard, and part of proper language use, as we rapidly discovered in the hands-on classroom, is the need to define and use complex terminology in a manner consistent with audience expectations, particularly when terms may be broad, context-dependent, or open to interpretation.

As an example of how a poorly defined term leads to problems with interpretation, one of our classmates conducted a microstudy in which the student noted problems with how a grant-funding agency used the word "impact" on its website. The agency stated that grant requests would need to establish the potential impact of the proposed study, defined, in this case, as "service to a wide segment of the community and assistance to those not adequately served by existing resources." But what constitutes acceptable impact? How many people would be considered a "wide segment of the community," and what kind of time frame would be considered effective and impactful? Would the applicant define a project's impact or would the funding agency? As the student researcher noted, the way these questions, and others, could be answered has the potential to entirely reconfigure a grant's potential scope and application.

Dombrowski (1999) makes the case that language is "socially contingent" (p. 212)—so, by extension, student researchers in technical communication must learn to analyze their audiences and define the terms they use. Proper language use, however, also became a significant component to classroom discussion—because we weren't working in isolation, we quickly learned that we all had to have the same definitions, understanding, and expectation of research terminology, otherwise we couldn't comment effectively on our classmates' individual projects, let alone collaborate on our group paper. Our discussions, particularly early on, often involved "what exactly do you mean by X" conversations, which ultimately gave us, we think, a fairly practiced working knowledge of field terminology.

The terminology we learned was put to the test not only in our class discussions and problem-solving sessions, but in the reports and conference-style presentations that the course required. At a basic level, assigning students the task of describing investigative procedures and their results provides students a chance to act on a common piece of advice: consider how they will represent their work, even as they begin a research project. (For example, Markel's Technical Communication (2009), encourages its readers to "visualize the deliverable" as the fourth of 12 steps towards conducting research). However, as our class noted during discussions, this advice is often not treated seriously; the eventual write-up and presentation of results seems to be taken for granted in a sort of "here's the data, here's the analysis, now here's what it means" end-of-the-day affair. We learned that this blasé approach does not work well.

On a professional level, students in a hands-on research methods course learn to write research reports and develop oral presentations that can be shared with experienced researchers, and in doing so, gain direct experience that will improve their skills and benefit their careers. As a concrete example of how carrying out research projects benefited members of our class on a professional level, four members of our class presented elements of this paper at the 2007 Association of Teachers of Technical Writing (ATTW) conference; the results of one student's microstudy were expanded and presented at the 2006 Committee on College Composition and Communication (CCCC) and Computers & Writing (C&W) conferences as "I Assign Lots of Grades…But Am I Fair and Reliable?" (Arnett, 2006a, 2006b); and the results of another student's microstudy were presented at the 2006 ATTW and C&W conferences and were eventually published in the Journal of Technical Writing and Communication as "Ars Dictaminis Perverted: The Personal Solicitation Email as Genre" (Ross, 2006a, 2006b, 2009).

On a functional level, students in a hands-on research methods course also benefit from practice in creating audience-centered, rhetorically savvy representations of their work that address genre-specific formatting-related issues such as verbal and visual style, internal sequence, design of tables and graphics, font choices, grammatical concerns, and presentation formats. These elements, as noted by Blakeslee and Fleischer (2007), are critical steps in developing a formal, academic voice (pp. 191–219). For example, creating research reports from real, collected data required us to first determine what aspects of our data were relevant and useful, determine how to show our data to others effectively, and then learn and follow the formatting guidelines of the professional journals where our results might possibly be published. For our classmates who planned careers outside academia, we expect that learning how to concisely communicate complicated procedures, experiences, materials, and results as well as experience crafting and delivering both written and oral presentations, was similarly useful.

Professional conference presentations often employ visual aids, especially via presentation technologies such as Microsoft PowerPoint, Keynote, or more recently, Prezi or Sliderocket and students learning to present their own research rapidly learn to deal with the complex problems such mediation of information entails. Additionally, as we and our classmates discovered, choosing an appropriate level of formality for the spoken aspect of presentations can be surprisingly difficult. Because speech is less formal than written communication (Biber, 1988), and spoken presentations are somewhat more superficial than textual presentations (Meadows, 1997), we learned a valuable lesson in learning to maintain academic authority while keeping information accessible, useful, and interesting.

Learning how to maintain an audience's interest while still covering the key elements of a research project led us—on reflection—to one of the more important thought cycles of the gestalt created in a hands-on classroom: presentation led to discussion and discussion led to the rethinking of results or, in some cases, the re-envisioning of entire studies. When researchers document research studies, the act of articulating what the results are and mean—for example, what do the results mean in context? how do the results connect with theory? what alternative reasons might explain the results?—often provides a new angle from which to consider the problems being discussed and may spark new ideas about the subject at hand, insight into the implications of what the results mean, or new avenues for research (Graves, 2005), in addition to solidifying the student's understanding of the underlying processes. Thus, our hands-on introductory research methods class forced us to transform explanations into epistemic acts. For example, the question-and-answer sessions following presentation of our microstudies often moved from explanation ("the reason I chose this method is because…") to knowledge-making ("Oh! If I look at my data from that perspective…"). Quite literally, we created new insights and new knowledge through the presentation/explanation process.

Creating Project Plans

The most fundamental yet not-talked-about problem we encountered is the inherent messiness of real-world research. Books popularly used in introductory research methods courses—a sample includes Research Design (Creswell, 2003), Empirical Research in Writing (MacNealy, 1999), Methods and Methodology in Composition Research (Kirsch & Sullivan, 1992), Research in Technical Communication (Gurak & Lay, 2002), and Opening Spaces: Writing Technologies and Critical Research Practices (Sullivan & Porter, 1997)—all provide useful overviews of both research methods and strategies for implementing them, but their authors tend to present research as a sequential process that goes something like this:

1. Identify an area of investigation
2. Articulate a research question
3. Perform a literature review
4. Create an appropriate data-gathering process
5. Develop data-collection instruments
6. Gather relevant data
7. Sort and analyze the data
8. Write a research report

As Blakeslee & Fleischer (2007) note in their textbook, Becoming a Writing Researcher, this sequential model is a polite fiction. "Real research," they write, "is not linear or sequential,"; rather, it is "recursive in nature and is a process, much like writing itself" (p. 11). Reading this description as a practicing researcher makes sense, but, as students, we didn't grasp that real research involves developing multiple aspects of a study simultaneously, then doubling back to revise and/or reconceptualize the different sections as needed, sometimes omitting entire steps, until we actually conducted our own studies. For example, one of this article's authors conducted a microstudy involving quantitative analysis of First Year Composition (FYC) instructors' grading trends. This student collected data (records of FYC instructors' grades) before performing a literature review, articulating a specific research question, or even knowing what specific research question could be answered by the data. Working "backwards" in this manner is not always addressed by research methods textbooks, and a research methods course that culminated in a project proposal would likely have prevented the student from using this topic—and, by extension, presenting at the 2006 CCCC and C&W conferences—because the study's sequence was so peculiar. Thus, class members gained knowledge of how to manage out-of-sequence elements of research through practice and classroom discussion of action and proposed action.

Defining Research Questions

Most textbooks offer advice about designing a research question; for example, Creswell (2003) suggested writing a research question involving "two forms: a central question and associated sub questions" (p. 105). The central question should be broad, general, and related to a particular "strategy of inquiry" (p. 106). The sub questions should "narrow the focus of the study but leave open the questioning" and begin with such words as “what,” “how,” or “why,” use exploratory verbs such as “discover” or “seek,” and focus on a single phenomenon (pp. 105–106). Creswell helpfully notes that this apparently solid central question will then morph over time (pp. 105–106). Creswell’s advice will likely sound familiar to anyone who has taken (or taught) a research methods course, but we found that textual advice of this sort is no substitute for the real experience of developing a research question because researchers all too often discover themselves in one or more of four unenviable situations:

- The research question is moot because a researcher in the field recently conducted and published an all-too-similar (or outright identical) study.
- The potential research study is so novel that no relevant literature exists, and therefore the researcher has difficulty writing a relevant research question (or even contextualizing the study in terms of previous research).
- A peer reviewer considers the research question to be fatally flawed because the research question does not account for an article, book, or line of thought.
- A completed study’s results reveal that although a research question appears to be solid, it actually misses what should be a central concern

Textbooks and research methods classes based on analysis of theory do not often address how to focus on these problems with research questions, as our experience demonstrates. For example, the student who conducted the previously mentioned microstudy regarding FYC instructors’ grading trends found a similar, relatively primitive study from 1955, but no quantitative studies on FYC instructors’ grading since then. In one sense, the lack of similar studies indicated an exploitable gap in the literature, but at the same time, the lack of similar studies posed several practical questions that needed to be answered before the student could develop a research question:

- What audience would be appropriate for a study of FYC instructors’ grading trends?
- What particular issues related to FYC instructors’ grading trends would interest this audience?
- Would this audience even want a quantitative study?

Answering these questions and developing a research question around them provided the student with practical experience that would not have been available otherwise. For one, had the course focused on analysis and culminated in a literature review, the student probably could not have used the topic due to the dearth of citable literature. For two, the research question would have remained in the realm of theory, and neither its validity nor its acceptability would have been tested. Instead, our course required the student to develop an audience-centered, answerable research question and find answers to it.

IRB

We suggest that instructors of hands-on research methods courses require students to follow the IRB process. We found that applying for permission is an educational endeavor in itself, and it introduces an element of realism that cannot be simulated adequately because the process is more than an exercise in filling out forms; it demands careful consideration and project planning. By requiring us to work through the actual, potential physical permutations (and limitations, and potential problems) of our studies, we had to move from an idealized structure of what we might do, to something that we could actually (and ethically) do.

Preparing a Human Subjects Form (HSF) for an IRB can take anywhere from several hours to several days, depending on a study's complexity and the type of documentation a university's IRB requires. For a relatively simple "exempt" study where no harm can come to the human participants an IRB will likely expedite its review, but turnaround time between submitting an HSF and receiving permission to proceed can range from three-to-fifteen working days (Auburn University, 2012; Kennesaw State University, 2010; Texas Tech University, 2011; University of Notre Dame, 2012). In addition, if a researcher wishes to study a workplace, the researcher must also obtain permission from the workplace's management, which may take a significant amount of time and effort, if the management provides permission at all. Both authors of this article have experienced or personally know a researcher who experienced difficulty in obtaining permission to conduct research, had permission cancelled, or experienced a time delay in obtaining permission that either significantly altered (or cancelled entirely) a research project (Arnett, 2011). In a particularly notable case, a PhD student at Texas Tech was forced to change her entire dissertation because she could not get permission to access a worksite (personal communication, November 9, 2011). Again, we found that gaining experience in the relatively sheltered classroom environment, where an instructor can help guide student researchers through the IRB process and lend assistance if a project founders, helps prepare students for future research projects.

In addition to the IRB process itself, the certifications and training now needed in many cases to even be eligible for IRB add educational value. At the time our class was held, Collaborative Institutional Training Initiative (CITI) training was not required at our institution. This training is required at the institutions where we now work, and experience shows that having research assistants complete the training greatly facilitates discussion of research design. Studying and completing questions related to informed consent, confidentiality, records and internet based research, conflicts of interest, and so on, allows for richer, more productive discussions, and would make a valuable addition to the research methods classroom.

Recruiting Research Participants

One potential drawback of a hands-on approach to the introductory research methods course is also one of the approach's greatest strengths: students may need to recruit participants. As we learned, recruiting participants adds a layer of complexity that cannot be truly appreciated by someone who has not followed the process.

To begin, few people will participate in a study out of the goodness of their hearts. Instead, participants require an inducement of some kind, which takes time and money to obtain and provide. In fact, if the cost for inducements is high enough, researchers may need to secure funding, which requires a grant proposal that introduces another layer of complexity and time-consuming labor—a process which, admittedly, is likely well outside the time constraints of the standard classroom timeframe.

Next, research methods students encounter the dual problem of making sure the sample accurately represents the population being studied and determining an effective sampling technique. In our class's case, when we conducted the focus groups that led to the original version of this article, we focused on the value of conducting hands-on research in a graduate-level technical communication research methods class, so, our specific target population was PhD students in the Technical Communication and Rhetoric (TCR) program. In addition, we also wanted to recruit participants from the other 58 PhD programs at Texas Tech University for the purposes of triangulating our data. When planning our microstudies, though, we discovered four significant problems with recruiting participants:

- We could neither afford nor obtain funding for inducements other than doughnuts, juice, and coffee, which limited our power to draw participants from outside our department.

- The number of graduate students in the TCR program was too small to use formal sampling techniques but too large to perform a census, in which researchers contact every possible research participant (Frey, Botan, & Kreps, 2000, p. 125).
- We did not have enough time or the available resources to employ formal sampling techniques and draw a statistically significant number of participants from outside our department.
- The large number of graduate students at Texas Tech overall prevented us from performing a census.

These challenges we experienced in recruiting participants illustrate lessons that came straight from using a hands-on approach in introductory research methods course, and that, in a larger study, might have been insurmountable. However, our small-scale approach and the ability to make our problems a discussion point in class allowed us to get into the complexities of recruitment and problem-solve in ways that theoretical consideration alone could not.

Research Technologies

Although other elements of research—for example, designing surveys, conducting focus groups, conducting ethnographies, and so on—were a large part of our class, one aspect of the hands-on class that struck us as uniquely practical and applicable by students both continuing on in academia and entering the workforce, was learning to deal with research technologies. When conducting focus groups for a microstudy, for example, one class participant found that despite extensive preparation—from determining the order of discussion to writing sample questions to catering the event with specially requested doughnuts—forgetting to check the video camera's batteries and neglecting to bring a power cord nearly wrecked the entire session. In another case, a student shared a cautionary experience during a class discussion: This student lost all of his online survey data collected for another class when the university's survey system inexplicably failed. Although we wish these weren't necessary concerns, retrospect proves these lessons valuable. Simply knowing how to use the cameras, recorders, and various data collection instruments, from effective paper-based survey distribution to online survey or networking software (such as Qualtrix and Skype, respectively), greatly facilitates both process and planning.

The practical knowledge gained from following a research project through from concept to completion includes learning software functions, but as we learned, even the most common programs can pose challenges for researchers unfamiliar with the programs' functions (e.g., managing styles and designing and editing charts and tables in Microsoft Word or Apache Open Office). Furthermore, some computer programs such as the IBM statistics package SPSS and qualitative data management software such as NVIVO or ATLAS.TI that research students may need to use are complex, and although these programs contain help files and their workings are not entirely opaque, the learning curves are steep. Researchers can choose to fall back on other, more familiar programs such as Microsoft Excell, which can run descriptive statistics and help code qualitative data, but even Microsoft Excell has a sufficiently steep learning curve that the program can frustrate novice users. Due to our frustration with these (and other) programs, our class discussions often became pseudo help desks. Because we were all working on research projects at the same time with the same deadlines, our ability to share our research experiences helped us learn to use research technologies more effectively and provided another valuable layer to the education process.

Conclusions

> To have an intuitive sense of what is right and proper, to have a vague feeling of the goal of an extended process of thought, to 'get the point' without really being able to verbalize what it is that one has gotten is to have gone through an implicit learning experience and have built up the requisite representative knowledge base to allow for such judgment. (Reber, 1989, p. 233)

Reflecting on our introduction to research methods class leads us to a series of generalizations: Before students can become professionals and depend on an "intuitive sense of what is right and proper" (to the extent that such a thing is possible), they must have the chance to explore and make mistakes (Reber, 1989, p. 58). The hands-on classroom gives students a safe place to practice their craft and test the waters to develop the professional sensibilities that will inform their careers. A research methods course of the sort we participated in and describe here teaches both theory and practice, and may provide students a more complete base than a course which focuses on only one or the other. Problems encountered in early experiences can be anticipated and corrected in later projects. Experience gained in one project can be applied to those that follow. Sharing experiences with peers—taking advantage of a cohort group to work through problems, as suggested by Blakeslee and Fleischer (p. 154)—helps create tacit knowledge and increase mastery. In brief, a hands-on research methods course lets students begin to contextualize the unique skills necessary for effective research, and in the following section, we suggest an outline for such a course.

Scheduling the Hands-on Classroom

To acculturate students into the language and practice of research in an introductory methods course that addresses each of the key elements identified in this article, we suggest the following timeline, which follows a standard 15-week semester (Outlined in Table 1).

The course outline we suggest here leaves room for an instructor to add projects and readings or to substitute readings. The outline, which is similar to the course the authors participated in, walks students through the research process using discussions about readings and students' research experiences.

Table 1: Suggested Course Schedule for the Hands-On Introduction to Research Methods Classroom

Week	Class Plan and Discussion Topics	Reading Recommendations
1	Class introductions, syllabus, and technology Discussion of what it means to conduct research in technical communication. Assign Journal Analysis[6]	Readings on research in technical communication, e.g., Goubil-Gambrell, 1992; Blakeslee & Spilka, 2004. Overviews on what it means to conduct research, e.g., Blakeslee & Fleischer (2007), Chapter 1 (Me, a Writing Researcher?) Articles familiarizing students with research language, e.g., Sullivan & Porter, 1993.
2	Discussion of IRB protocol, ethics, and the conduct of research Discussion here might also include ongoing grant opportunities such as those provided by the Society for Technical Communicators.	Sample IRBs from your home institution. Related readings from course texts on methods, e.g., Creswell (2003) Chapter 3 (Writing Strategies and Ethical Considerations), MacNealy (1999) Chapter 3 (Overview of Empirical Methodology).
3	Discussion of "good" and "bad" research Discussion of the differences and tendencies in qualitative and quantitative research.	Readings from course texts, e.g., MacNealy (1999) chapter 4 (Concepts Basic to Quantitative Research). Readings related to the production of good research, e.g., Selber, 2010.

6 In this assignment, students familiarize themselves with a journal in their field by examining the last 5–7 years' worth of articles and then reporting on their findings to the class. The purpose here is to begin to familiarize students with the type of work being conducted in their field.

4	Presentation of Journal Analysis findings[7] Students needing to submit IRBs should submit them here, or earlier.[8]	
5	Discussion of textual and rhetorical analysis Discuss in class.[9] Proposal for first microstudy due.	Readings on textual and rhetorical analysis, e.g., Barton, 2008; Huckin, 2008; Selzer, 2008.
6	Discussion of survey research	Readings on survey design and conduct, e.g., selections from Dillman, 2000; Kalton, 1983; Moser, 1959.
7	Continued discussion of survey research	Readings on survey research in technical communication (e.g., Plumb & Spyridakis, 1983) and online survey design (e.g., Singh, Taneja, & Mangalaraja's, 2009) Readings of research using surveys.
8	Presentation and discussion of Microstudy 1	
9	Discussion of case study research Microstudy 2 proposal due in class.[10]	Readings on case studies, e.g., excerpts from Yin, 2002; MacNealy (1999) Chapter 10 (Case Study Research). Readings of research using case studies.

7 Students present their findings and interpretation of their findings to the class. These presentations should both spark discussion on the current state of research in technical communication and open the door to discussion of students' identification of their research interests.

8 In terms of semester timing, we have to note that IRB documentation can take a while to process—contact a representative of the review board or the office that houses IRB and ensure that your class's IRB's can make it through the process in a timely manner. Note that you may need to adjust the schedule to allow time for processing. Some students may wish to create microstudies that could be considered elements of the same project, so only a single IRB need be filed.

9 Students should submit a one-page identification of a research project they can complete in two weeks. This project is designed to force awareness of time constraints, so it should be a complete project. Students should identify a question, method, and sample. They then need to conduct the research and write up the results in a short article.

10 In this second iteration of the microstudy, students are encouraged to either take on new projects or extend their original project. Again, this should be a complete research project conducted in the time left in the semester. The final deliverable is a conference-quality presentation and write-up of the project.

10	Ethics, and Case study research continued Assign Article Critiques 1 & 2[11]	Case study readings continued, e.g., Yin, Bateman, & Moore, 1985; MacNealy 1997. Ethics and research readings, e.g., Kastman & Gurak, 1999; McKee & Porter, 2008.
11	Readings on experimentation, e.g., MacNealy (1999) Chapter 5 (Experimental Research); Charney, 2002; Frey, Botan, & Kreps (2000) Chapter 7 (Experimental Research). Readings of articles using experimental/quasi-experimental methods, e.g., Brumberger, 2003.	Readings on experimentation, e.g., MacNealy (1999) Chapter 5 (Experimental Research); Charney, 2002; Frey, Botan, & Kreps (2000) Chapter 7 (Experimental Research). Readings of articles using experimental/quasi-experimental methods, e.g., Brumberger, 2003.
12	Other methods: Grounded Theory, Participatory Design, Usability Testing	Readings on grounded theory, e.g., excerpts from Glaser & Strauss, 1967; Lewis & Whitely, 1992; LaRossa, 2005; Richards & Morse (2007) Chapter 3 (Selecting a Method) Readings on usability testing, e.g., selections from Barnum, 2011. Readings on participatory design, e.g., Spinuzzi, 2005.
13	Other methods: Feminist Methods, Popular Culture methods Article critique 2 discussion.	Readings on feminist methods, e.g., selections from Reinharz, 1992; Harding, 1989. Readings on popular culture methods, e.g., Mintz, 2006; selections from Hinds, Motz, & Nelson, 2006.
14	Research Analysis	Readings on research analysis, e.g., Hughes and Hayhoe (2007) Chapters 7 – 9; Frey, Botan, & Kreps (2000) Section 4 (Analyzing and Interpreting Quantitative Data).
15	Presentation and discussion of Microstudy 2	

11 For this assignment, students find, summarize, and critique one article using the methods discussed in the class.

The course that served as the basis for this article was open to both Master's- and PhD-level students, so the model we present here should be useful to instructors of both types of student. As input from other professionals in the field and our experiences suggest, however, curricular goals for both Master's and PhD programs may differ: For the former, classes may focus more on skills and techniques (see, for example, weeks 7, 9, and 12 in our schedule, which cover surveys, case studies, usability testing, and participatory design), while the latter may focus more on critical inquiry and theory-building (weeks 3, 5, and 13, for example, cover basic research and the production of "good" research, textual and rhetorical analysis, and feminist and popular culture approaches to research). We view the course we present here as a crossover that encourages both practical application and theoretical understanding, although an instructor could easily modify our model to offer more weight toward desired outcomes. In a mixed course consisting of both PhD and Master's students, assignments and presentations might differ slightly based on students' goals.

For those who might want to implement sections of our schedule, rather than adopt the entire course, a single microstudy unit could easily be completed in a two-to-three week timespan. Weeks 5–8 on our suggested schedule, which take students through the first microstudy, for example, could likely be readily compacted and adopted. As Spilka (2005) suggested, if time is especially tight, a class could conduct small pilot studies (a different way to conceptualize the microstudy assignments we suggest here), or even, if necessary, provide limited instruction in research design and conduct, then require students to conduct a small-scale study in another course such as a capstone or senior seminar (2009, p. 233). Although such an approach would not create the microcosmic climate our class enjoyed, it would still foster valuable, practical research skills.

What we have provided here has been a reflection on a course we considered to be effective, and suggestions for implementation. A future study designed to directly compare the effectiveness of a hands-on course with the effectiveness of a more traditional seminar would be valuable (and could, perhaps, even serve as a course project). A researcher teaching two sections of a research methods course, for example, could use our outline for a hands-on course for one section, and for the other cover similar concepts in a traditional seminar. A comparison considering both student perceptions of the course and student outcomes on a structured assessment tool used for both sections would likely provide a deeper understanding of the way students learn from our methods and materials and offer additional insight into ways to effectively teach research methods.

A course grounded in theory can teach the basic principles of research. However, students deserve to learn that research is complicated, messy, time-consuming, and highly rhetorical so that they may become skilled, successful researchers when they engage in research projects later in their academic careers or in the workforce. Knowledge like this can only come from experience, and we can attest that there is no better place than the relatively safe confines of a classroom setting to experience hard lessons about becoming a member of a research community or managing research projects. When computers fail and data is lost, or when research participants don't show up or get upset at receiving grocery-store doughnuts rather than Krispy Kremes, the classroom makes a good place to work out solutions and implications for future projects.

To conclude, we offer a call to action: If you teach research methods in technical or professional communication, or administer a program that offers methods courses, try or encourage a hands-on classroom. Your students will gain valuable practical knowledge that will serve them well in their future endeavors, both in the corporate and academic spheres.

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Texas Tech University's Online PhD in Technical Communication and Rhetoric

Joyce Locke Carter
Texas Tech University

Abstract. Texas Tech has offered its PhD in Technical Communication and Rhetoric via distance education since 2004. Designed with the same requirements and expectations as its brick-and-mortar modality, the program has grown larger and more selective each year—our current rejection rate for applications stands at 85% and the number of students stands at approximately 55. The doctoral program (in both its modalities) emphasize five general areas: Rhetoric, Composition, and Technology; Technical Communication; Rhetorics of Science and Healthcare; Technology, Culture, and Rhetoric; and Visual Rhetoric, New Media, and User-Centered Design. In addition, the program has the most rigorous course requirements in research methods (4 courses) in the field of writing studies. The program made several institutional innovations in order to gain approval, and these innovations continue to benefit students, among them redefining "residency" to work better with both modalities and redefining "full-time" as 3 hours per semester. One of the most innovative aspects of the online program is its requirement that students attend a 2-week seminar in Lubbock—this "Nar" provides opportunities for dissertation defenses, professional development seminars, intensive graduate courses, lectures by outside scholars, doctoral annual reviews, and ample unscheduled time for students to meet with their committees.

Keywords. technical communication, rhetoric, doctoral program, curriculum, online PhD, program design, distance education.

At Texas Tech, we have degrees in writing studies at the bachelors, masters, and doctoral levels. Although the following article sets out to describe the online doctoral program, it is important to recognize that this particular degree/modality does not exist on its own. The online PhD is part of the larger landscape of our graduate programs more generally, so before we get into the showcase specifics, let's take a few paragraphs to establish that broader context.

About ten years ago, the writing faculty at Texas Tech University made a decision to deviate from our conventional ways of delivering graduate education. Deviate is, in some ways, too strong of a word because what we decided to do was not terribly radical with regard to curriculum or quality or mission. In other ways, perhaps the term deviate is not strong enough. We simply decided we wanted to begin offering our PhD in Technical Communication and Rhetoric via distance education. This decision was not undertaken as a whim—we already had experience with distance education in our master's degree, and we saw the strategic landscape of doctoral education as ripe for such an innovation. We were receiving more queries about online courses and online certificates, students in our PhD program were asking to take classes offered online for our Master of Arts in Technical Communication (MATC) students, and the advanced students were interested in online degrees beyond our MA in technical communication, so we knew the market was probably ripe for such an offering.

Prior to embarking on this new modality, our doctoral program operated in much the same way as every other doctoral program in rhetoric, composition, or technical communication. We fielded applications in December or January, admitted students with teaching assistantships for the following fall, moved students through the curriculum at an average of three courses per semester, and the fall-spring, semester-based school year paradigm balanced graduate teaching with graduate seminars.

Upon undertaking the online modality for our doctorate, this semester paradigm underwent a radical change although the basic structure of the degree remained the same. Our online students did not seek teaching assistantships, did not proceed at the same speed or in the same direction as on-campus students, and the opportunities for professional development could not take place in conventional forums like teacher training workshops or informal meetings in professors' offices. As detailed later, the principle innovation we designed to address these differences was a 2-week seminar/conference/workshop held each May.

History

Prior to the formation of separate graduate degrees, technical writing, rhetoric, and composition took place in Texas Tech's Department of English in the form of electives and tracks for rhetoric/composition and technical writing.

Having a large engineering, agriculture, and professional student population, Texas Tech registered not only English majors into these rhetoric/

composition and technical communication courses but also other majors, including Education students.

In the late 1980's , the faculty (Carolyn Rude, Fred Kemp, Sam Dragga, Don Cunningham, Jimmie Killingsworth, Tommy Barker) began work on separate degrees, and according to the records and minutes I have found, this process was complete in 1991 or 1992; the new MATC and the PhD in Technical Communication and Rhetoric (TCR) admitted their first students in 1992 and 1993.

Eager to serve working technical writers who sought advance degrees via distance education, the program proposed a wholly-online modality for its MATC in 1997, which was approved and began admitting students in 1998. (See Table 1.)

The mission of the graduate programs, in general, is to blend theory, practice, and methods to produce well-rounded practitioners and scholars.

Carolyn Rude was the director of the graduate program from its inception through 2003, when she left for Virginia Tech. During her stewardship, the program grew via more students, more courses, and more faculty. When she departed, the program was big enough to split duties between a program director (overall coordination and undergraduate offerings) and a graduate director. The faculty felt Carolyn's departure was a natural

Table 1. Overview of program history

	MA in Technical Communication	**PhD in Technical Communication and Rhetoric**
On-Campus	Started: 1992 Grads (as of June 2013): 83 Courses per semester: 2.5 Time to completion: 2 years	Started: 1992 Grads (as of June 2013): 58 Courses per semester: 2.5 Time to completion: coursework 1.9 years, quals 2.6 years, grad 4.5 years
Distance Education	Started: 1998 Grads: (as of June 2013): 47 Courses per semester: 1.5 Time to completion: 3.5 years	Started: 2003 Grads (as of June 2013): 29 Courses per semester: 1.1 plus May Seminar Time to completion: coursework; 2.75 yrs, quals 3.3 yrs, grad 4.9 yrs

transitional moment (or creative upheaval) and we spent a full semester brainstorming about what, if anything, we should do to expand our mission or shift our direction.

The online PhD was the most attractive direction for several reasons. First, we had begun talking about it in 2001 and 2002, arguing that we had the faculty and the expertise in distance education, and that the market was ripe for such an effort.

Second, we realized we could leverage our 11 years of experience in doctoral education with our 4 years of experience in online education at the graduate level. In other words, we would not have to invent new capabilities beyond the particular intersection of doctoral education with distance education.

The underlying theoretical approach around which this program was formed was that the degree would employ the same rigor, outcomes, classes, faculty, and expectations as the conventional PhD. It would seek to produce scholar-researchers who could compete alongside our conventional PhD's for top-tier tenure-track positions, and although we were in no position to guarantee our students would land such jobs, we were adamant that the quality of students we produced would be, on average, identical across both modalities. In other words, we wanted the marketplace to be unable to distinguish between newly minted PhDs who had completed their degree conventionally and those who had pursued theirs via distance education.

This concept guided virtually all the logistics and feel of the new program. For example, there is no group of faculty designated as "online program instructors"—rather, all graduate faculty teach courses in both modalities, serve on dissertation committees for students in both modalities, and advise students from both modalities. There is no separate curriculum for online students, no separate inventory of available classes, no separate degree requirements, no separate pool of scholarships or travel opportunities. The only differences between the two programs lie in those areas where distance or the nature of the online learner creates a real need for different policies or procedures. For example, our online students are, by and large, already employed and cannot take 3 courses per semester; as a result, as detailed later, we adjusted our guidelines as to the pace and nature of our course offerings, as well as what constitutes a "full time" student.

Although the online program made sense to the faculty, we faced a couple of serious challenges in getting traction with our proposal at its inception.

One such challenge that was almost a deal breaker during the early days of our proposal was the question of residency and of culture. I have elsewhere detailed this conflict, but the gist of the argument from the upper administration and the state coordinating board was a deep doubt about whether doctoral education could be undertaken at a distance. Wouldn't it be better for students to have hallway chats, to go to happy hour with each other, to participate in the life of letters that characterized these administrators' own doctoral experiences?

A brick-and-mortar experience was not only reinforced by such questions about culture driven by nostalgia or conservatism but also by rules about residency on campus during doctoral studies. At the time, the Texas Tech graduate school required doctoral students to complete 24 credit hours in a 12-month period, which was usually registered as 9 hours in the fall, 9 hours in the spring, and 3 hours in each short summer session. This arrangement was clearly not feasible for our new program, and we set out to argue that although intensive residency might make sense in certain fields, it was a throwback concept for our field, which studies and practices computer-mediated communication.

To address both the culture and the residency issue, the TCR faculty designed a 2-week seminar to address the je ne sais quoi of rubbing shoulders with faculty and chatting with classmates, as well as to provide an alternate concept of residency. The resulting May Seminar, which broke this logjam and allowed us to proceed, is detailed later.

Working our way through the various approval mechanisms in 2003, we were eventually approved at all levels in the spring of 2004. We admitted our first group of students to start coursework in fall of 2004.

The program saw its first graduates in August 2008, and we have graduated 29 PhDs from the online program as of this writing.

Curricular Design

The PhD in Technical Communication and Rhetoric is designed for students with an interest in rhetoric, writing, technical communication, and composition. The aims of study are broad knowledge of the literature on technical communication and rhetoric, specialized knowledge of some aspect of technical communication or rhetoric as reflected in the dissertation research, and ability to conduct ongoing independent research using one or more methods.

As noted above, this curriculum is identical for both on-campus and online student populations, and we feel this uniformity of quality is a key distinguishing characteristic of the program. But beyond the way the two modalities are treated equally, the doctoral program is innovative in both its general scope and its level of customization for each doctoral student. Generally, the program comprises rhetoric and applied rhetorics under a large umbrella that includes technical communication, rhetorics of specific areas (like healthcare, science, new media), composition, and theoretical rhetorics. This broad approach provides numerous opportunities for synergies between otherwise compartmentalized areas of study. (The opposite approach, something akin to a boutique curriculum, might be more narrowly and deeply focused on one of those areas.) Within this synergistic framework is the expectation that students will customize their specific interests via a large and varied faculty and ample electives offered every semester.

The PhD requires at least 60 hours of graduate courses beyond the bachelor's degree and at least 12 hours of English 8000 (Doctor's Dissertation). Further, students must demonstrate proficiency in research methodology. There is room for 15 hours as a minor, but in practice, we haven't seen many students take this route, perhaps because the university still has to make minor courses available via distance education in sufficient numbers, or perhaps because our TCR course offerings are fairly diverse.

Required Courses

Pedagogy (one or both)

- 5060 History and Theory of College Composition
- 5366 Teaching Technical and Professional Writing

Research

- 5363 Research Methods in Technical Communication and Rhetoric

Rhetoric (one or both)

- 5364 History of Rhetoric
- 5361 Introduction to Rhetorical Theory

Foundations

- 5371 Foundations of Technical Communication

The remainder of the credits fall into an approximate 2:1 ratio of theory/methods : application courses.

Research Methods

Research methods courses enhance a student's ability to complete and to evaluate research. In addition to ENGL 5363, Research Methods in Technical Communication and Rhetoric, students are required to complete nine graduate hours in research methods courses with a grade of B or better in at least two of the three. ENGL 5362, 5379, 5388, and ENGL 5389 may count toward the TCR specialization as well as toward methods.

Foci

As we began advertising the online PhD program and fielding queries from the market, we realized that the name of the degree, Technical Communication and Rhetoric, obscured the more varied areas of inquiry we offered. After some investigation, we deemed it was not feasible to rename the degree; however, we did decide that we could articulate these academic areas of emphasis. After a year of refining the categories and their descriptions, we arrived at the following five areas of specialty at the doctoral and master's levels in our admissions, scholarship, coursework, and initiatives:

> **Rhetoric, Composition, and Technology.** The art, history, and theory of persuasion, argumentation, and expression and how such activities are applied and taught.
>
> **Technical Communication.** Theory, history, practice, teaching, and management of workplace communication, including the genres of reports, manuals, and proposals, and the skills of document design, style, and editing in a variety of media.
>
> **Rhetorics of Science and Healthcare.** Consideration of discourse and communication within scientific, technical, and medical fields.
>
> **Technology, Culture, and Rhetoric.** History, theory, and analysis of tools, techniques, and various cultural factors (feminism, ethics, intercultural analysis) in the production and reception of discourse.
>
> **Visual Rhetoric, New Media, and User-Centered Design.** Theories, applications, and research in visual communication from a rhetorical and user-centered perspective, including subjects such as Document design, Web design, Multimedia design, Usability studies, Media studies, Instructional design, and Interaction design.

Although it is not a subject area, we also advertise that we emphasize research methods in our PhD program. In fact, we have the most rigorous course requirements in research methods (4 courses) in the field of writing studies, according to internal market research we have conducted. Each of these areas is covered in more detail in the following section.

Rhetoric, Composition, and Technology

Courses in this focal area seek to augment traditional approaches to composition pedagogy with rhetorical theory, methods of assessment and research appropriate for composition studies, and theories of technology that place the study of composition firmly in a technological milieu, including multi-modality and technologically-mediated forms of communication.

Courses

5060 History and Theory of Composition. Seminar in history and contemporary theories of composition and rhetoric studies. Required for all new teaching assistants and graduate part-time instructors

5361 Introduction to Rhetorical Theory. Classical and modern theories of rhetorical invention

5362 Rhetorical Analysis of Text. Classical and modern theories of rhetorical analysis

5364 History of Rhetoric. Survey of history and theories of rhetoric with an emphasis on applications to written communication

5368 Studies in Written Argumentation. History and theories of written argumentation

5369 Discourse and Technology. Study of the effects of computer networks and digitally mediated knowledge management on theoretical, practical, and pedagogical notions of discourse and discourse communities

Selected Dissertation and Publication Titles

Rhetorical Organization in Contemporary Chinese and English Argumentation: A Contrastive and Comparative Study

Understanding Users Undergoing Change: An Examination of an Innovative Hybrid First-Year Composition Course

New Process, New Product: Redistributing Labor in a First-Year Writing Program

Argument in Hypertext: Writing Strategies and the Problem of Order in a Non-Sequential World

Writing Dialogically: Bold Lessons from Electronic Text

Reading Arguments: How Sophisticated Readers Read Graduate Admissions Arguments

Arguing about Arguments: How Committees Argue and Make Decisions about Graduate Admissions

Technical Communication

Courses in this focal area seek to combine both "on-the-page" approaches to textual production (genres, tools, and techniques) and "off-the-page" studies like pedagogy, project management, and user-experience design.

Courses

5366 Teaching Technical and Professional Communication. Theory and teaching of technical and professional writing with special attention to developing course objectives, syllabi, and teaching techniques.

5371 Foundations of Technical Communication. Theory and practice of technical communication

5372 Technical Reports. Theory and practice of reports and proposals

5373 Technical Manuals. Theory and practice of manual development and design

5374 Technical Editing. Substantive editing and design of technical documents

5375 Document Design. Theory and practice of creating comprehensible, usable, and persuasive texts

5376 Online Publishing. Design and testing of online documents to support instruction and information retrieval

5383 Grants and Proposals. Theoretical issues and practical experience dealing with the genre and process of writing grants and proposals

5387 Publication Management. Strategies of managing processes and knowledge that support publication

5388 Usability Testing and Research. Methods of planning, conducting, and analyzing usability tests

Selected Dissertation and Publication Titles

Knowledge-Building Spaces in Technical Communication: Navigating a Tertiary Orality

Teaching Intercultural Communication in a Service Technical Writing Course: Alternative Ways of Presenting Intercultural Issues in Technical Writing Textbooks and in Real Classrooms

Open-Source Software Development and User-Centered Design: A Study of Open-Source Practices and Participants

The Role of Rhetorical Invention for Visuals: A Study of Technical Communicators in the Workplace

Technical Communication in the Public Sector: Convergence Analysis of Historical Discourse and the Reports of the Immigration Commission, 1911

Web-based Training Evaluation in the Workplace: Practices, Instructional Architectures, and Skills

Ethos and Exigence: The White Paper in Technical Communication

Decision-Making as a Rhetorical Act: The Role of Choice in the Design and Delivery of an Online Education Program

Editing from the Author's Viewpoint: Results of an International Survey

Editing from the Author's Viewpoint: Cross-cultural Results

Rhetorics of Science and Healthcare

Courses in this focal area seek to merge theories of rhetoric (historical, theoretical, and methodological) with intense sites of modern disciplinary activity. Some of these sites are more established, such as rhetorics of science, although others are emergent, such as rhetorics of economics, healthcare, and accessibilities/disabilities.

Courses

5384 Rhetoric of Scientific Literature. The foundational, canonical course for the emphasis. It deals with rhetorical critique of classic science arguments, such as Darwin's Origin of the Species. It also introduces ideas developed further in the specialty courses

5386 Discourse and Social Issues. This course is taught with a focus on social issues that are also of a scientific nature (e.g., environmental, risk communication, classification, and so on)

5369 Discourse and Technology. This course is taught with a focus on documentation of technology as used in the medical profession or in other applications of science

5382 Theory and Research in the Written Discourses of Health and Medicine. This course includes current theory and research in the written discourses of health and medicine, focusing on the roles of technical and professional

Selected Dissertation and Publication Titles

The making of knowledge in science: Case studies of paleontology illustration

Metaphor and Knowledge: The Challenges of Writing Science

Optimism and Pessimism on the High Plains: A Tale of Archaeological Reports

"You Just Don't See Enough Normal": Critical Perspectives on Infant-Feeding Discourse and Practice

Understanding Women's Concerns in the International Setting Through the Lens of Science and Technology

The Medical Normalization of Abnormal Bodies: Intersex and Resistance

Artificial Intelligence as a Discursive Practice: The Case of Embodied Software Agent Systems

Technology, Culture, and Rhetoric

Courses in this focal area investigate synergies between and among rhetorical theory, technology theory, and cultural theory, including productive intersections such as feminist rhetorics, alternative rhetorics, and intercultural rhetorics.

Courses

5365 Alternative Rhetorics. Consideration of non-western, feminist rhetorical texts

5369 Discourse and Technology. Study of the effects of computer networks and digitally mediated knowledge management on theoretical, practical, and pedagogical notions of discourse and discourse communities

5377 Theoretical Issues. Special topics in areas such as cultures, feminisms, and genres

5385 Ethics and Technical Communication. Definitions, philosophies, and applicability of ethics to technical communication problems and solutions.

5386 Discourse and Social Issues. Study of uses of written discourse in problem solving on social issues involving science or technology.

Selected Dissertation and Publication Titles

Linking Contextual Factors with Rhetorical Patterns in Chinese and American Business Letters: Moving toward Convergence?

Culture and Context: Invention and Style in Historical and Contemporary Regulations

Translation Issues in Chinese Folk Medical Texts

Technical communication learning on the United States-Mexico border: Factors affecting cross-cultural competence in globalized settings

A Comparison of Greek and Chinese Rhetoric and Their Influence on Later Rhetoric

The Untold Story about Greek Rational Thought: Buddhist and Other Indian Rationalist Influences on Sophist Rhetoric

Toward a Feminist Rhetoric of Technology

International Digital Studies: A Research Approach for Examining International Online Interactions

Visual Rhetorics, New Media, and User-Centered Design

Courses in this focal area investigate new sites of rhetorical and technical communication activity within rhetorical frameworks and epistemologies. Like most of the courses in our curriculum, these courses are heavily invested in praxis, where theories inform application, and practice grounds theory.

Courses

5365 New Media Rhetoric. Introduction to theoretical and practical complexities and practicalities of working with new media and graphics

5369 Discourse and Technology. Study of the effects of computer networks and digitally mediated knowledge management on theoretical, practical, and pedagogical notions of discourse and discourse communities

5375 Document Design. Theory and practice of creating comprehensible, usable, and persuasive texts

5376 Online Publishing. Design and testing of online documents to support instruction and information retrieval

5377 Visual Rhetoric. Analysis and theory of the persuasive, discursive, and argumentative nature of the visual components of documents

Selected Dissertation and Publication Titles

Web Development: A Visual Spatial Approach

Writing Software Documentation: A Task-Oriented Approach

Cruel Pies: The Inhumanity of Technical Illustrations

Hiding Humanity: Verbal and Visual Ethics in Accident Reports

London through Rose-colored Graphics: Charles Booth's Maps of London Poverty

Document Design: A Guide for Technical Communicators

Multimodal Composing: Teaching Effective Communication Through Exploring Oral, Chirographic, Typographic, and Electronic Culture

The Role of Invention for Visuals: A Study of Technical Communicators in the Workplace

Open-Source Software Development and User-Centered Design: A Study of Open-Source Practices and Participants

Exploring User / Webtext Interactions: An Examination of Gender and Sex Differences in Web Use

The Making of Knowledge in Science: Case Studies of Paleontology Illustration

Research Methods Required

The Technical Communication and Rhetoric Program emphasizes knowledge-making through rigorous research methods course requirements. We believe in having the tools and the experience needed to understand a problem, formulate a research question, and study the issue thoroughly, thus creating new knowledge in our field. Our 4 -course methods requirement is, by our reckoning, the largest number of course requirements in our discipline, and is far above what is expected of students in most other PhD programs in the field. Further, our program offers these research methods courses as part of the TCR curriculum, thus ensuring that students will have the opportunity to apply the methods they learn to problems encountered in our field. Finally, the range of methods courses is diverse, somewhat mirroring the several focus areas (detailed later).

All doctoral students take 5363 Introduction to Research Methods in Technical Communication and Rhetoric and are also required to take 3 more methods courses, either from our own program's considerable inventory of courses or from outside our department.

Courses

5363 Research Methods in Technical Communication and Rhetoric

5362 Rhetorical Analysis of Text

5379 Empirical Research Methods

5388 Usability Testing and Research

5389 Field Methods of Research

Strategy and Innovation

Strategically, the program competes for high-quality graduate students who are bound by geography. One of the key goals the TCR faculty established in the proposal process was that we wanted this online PhD program to have the same degree of rigor and quality as our on-campus version. To signal this commitment to quality, we committed to offer the same range of courses, use the same graduate faculty, expect the same admissions requirements, and apply the same programmatic reporting from the new program as with the existing program. And with the exception of policies that are difficult or impossible to implement online, we have instituted and maintained these equivalencies for 10 years.

Logistically, the online PhD program uses existing resources, existing courses, and existing technical infrastructure, thus keeping the costs of operation under control. We discovered in the beginning, however, that some existing structures and university rules were not adaptable to the new program, and we had to make some concerted arguments with our administration to make the online PhD possible.

First, the university operates on a 9-month budget, and the summer funds always appear at the last minute, which casts quite a bit of uncertainty about summer activities. The online PhD population takes an average of 2+ courses each summer, so it is not feasible, nor is it ethical, to cancel summer classes, even if a budget fails to materialize. For this reason, the faculty agreed that we would teach in the summers with course offerings suitable for our online students to continue to make progress. In grappling with the possibility that we might have to work for free some summer (an event that has yet to materialize), we discovered a university policy that allows summer instructors who work for free to carry the workload credit for that free course into the following school year, thereby contributing to the 9-month workload expectations. This happy discovery has allowed us to shift our summer vacations (metaphorically, of course) into any semester we require. For example, if a professor has a grant to study an archive in England in an upcoming fall semester, we can schedule her for one or two courses in the preceding summer, and carry over those courses into the fall, thereby creating a break that lasts from August until January.

A second complication, mentioned before, was that the university originally required on-campus residency of 24 hours in 12 months. In our proposal we argued that such a requirement would make programmatic innovation impossible, and we proposed an alternative concept of residency comprising 24 hours in 24 months, along with continual enrollment in the online PhD program at 4 courses per year (fall, spring, May, and summer), coupled with mandatory attendance at our May Seminar. After some arguing and justifying, the Graduate School agreed and we use this new concept of residency to this day.

In our second or third year, we became aware of a difficulty our students were having with financial aid. The university defined full-time enrollment for graduate students as 6 hours per semester, and our students were having to register for 3 "empty" hours per semester to gain financial aid, a Kafka-esque situation that found students paying what amounted to a $1600 loan origination fee every semester. Upon digging into the university bureaucracy, I discovered that "full time" was a social construct that could be redefined with a little persuasion. I wrote a proposal to the office of financial aid, the provost, and student business services, and arranged to define our online PhD students as "full time" at 3 hours per semester, based largely upon our earlier definition of residency designed for this program.

Facilities

The online PhD program has its own particular infrastructure needs. For 50 weeks a year, all program activity takes place digitally. Accordingly, the TCR program maintains a variety of servers and software packages to facilitate teaching, research, and the administration of its online degrees. We manage a number of servers within the department, including SQL servers, web servers, media servers, and software license servers. Further, we use university-centralized servers for backup web servers, virtual machine servers, and software servers.

For teaching, the online program has never blessed any particular mode of instruction or software, preferring to expose students and faculty to a wide range of options. However, the program has always offered its courses with a mix of synchronous and asynchronous components. Synchronous software we have used over the years includes our own MOO , Skype, Google Hangouts, Lych, Moodle Chat, Yahoo Instant Messenger, and GoToMeeting, among others. Asychronous platforms have included Wordpress blogs, our own Moodle learning space, Blackboard, a number of our own listserv email lists, and Google Docs, among others.

In addition, different classes make use of software packages that may be used by students in several different ways: license servers to student virtual machines, academic licenses downloadable during the term by students, and deeply-discounted software (primarily Microsoft and Adobe products) available from the university.

Although we try to be frugal with course fees and technology expenditures, we also recognize that technically-mediated projects require us to purchase licenses, or, from time to time, to partner with our students with course fees to buy discounted software.

Most of the tuition and fees generated by online program accrue to the TCR program, and those funds are used, in turn, to maintain this technical infrastructure.

For 2 weeks a year, online PhD students come to campus for the May Seminar. Because the campus is virtually empty, our program has the "run of the campus," and makes use of the university's recording studio, digital media lab, 3-D lab, among other common facilities. In addition, students take classes during those 2 weeks in two of our specialized labs.

ENGL 5388 Usability Research takes place daily in our Usability Research Lab (URL), a two-room facility with eye tracking hardware and software, Morae's suite of usability tools, and ample digital recording equipment to facilitate course learning.

ENGL 5377 New Media Rhetorics takes place in our MUltiple Literacies Lab (MULL), a facility that contains a variety of hardware, software, and training tools for using digital media, video, audio, podcasting, streaming, and instructional design.

ENGL 5375 Document Design meets in our most advanced computer classroom, making use of digital editing tools and Adobe InDesign and the rest of the Adobe Creative Suite.

Faculty

The following faculty teach in the program. One of the biggest changes in the faculty is that the ranking was assistant-heavy in the early 2000's , and as you can see from this list, our ranks are much better distributed post-2010. The faculty contributes to the doctoral program in its diverse range of research expertise. Further, faculty culture is one of sharing, collaboration, experimentation, and team teaching.

- Ken Baake, Associate Professor, rhetorics of science and economics, metaphor and rhetoric theory
- Craig Baehr, Associate Professor, web design, report genre research, professional writing and organizational communication

- Kelli Cargile Cook, Associate Professor, technical communication pedagogy, online writing pedagogy, web-based training, and technical communication program development and assessment
- Joyce Locke Carter, Associate Professor, theories of technology and argumentation, user experience design, rhetorics and economics
- Sam Dragga, Professor, ethics in technical communication, technical editing, intercultural communication, visual communication, and first-year composition.
- Angela Eaton, Associate Professor, editing, grant- and proposal-writing, empirical research, grammar and style research, technical communication pedagogy
- Miles Kimball, Professor, visual rhetorics, history of technical communication, information graphics, intersections of technical communication and culture, web portfolios, archival research
- Amy Koerber, Professor, rhetorics of healthcare and medicine, rhetorics of science and technology, women's studies, internet studies
- Susan Lang, Professor, computer-based instruction in composition and literature, intellectual property issues, hypertext, textual theory, data-mining methods
- Kristen Moore, Assistant Professor, technical communication in the public sphere, especially public policy and participation, critical and rhetorical methodologies, and the rhetorics of race and gender in technical communication and STEM fields
- Rich Rice, Associate Professor, contemporary composition and rhetoric, new media and professional writing, TA training, portfolio assessment, distance education and service learning
- Rebecca Rickly, Professor, gender and communication, online and oral discourse analysis, methods and methodology, theories of rhetoric(s), and literacy issues
- Abigail Selzer King, Assistant Professor, organizing and rhetoric (especially connected to identities, genders, nationalism, and meanings of work), interpretive and qualitative methods, including rhetorical criticism, argumentation analysis, microhistory, and computer-assistive qualitative data analysis

- Brian Still, Associate Professor, medical discourse, theories of technology, online communities, internet activism, medical discourse, techno-pedagogy, and open source issues
- Sean Zdenek, Associate Professor, disability and web accessibility studies, the rhetoric of closed captioning, deaf studies, sound studies, methods of rhetorical criticism, and animated software interfaces

Other faculty who have taught in the online PhD program and who have moved on to other jobs include Kirk St. Amant, Thomas Barker, and Amanda Booher. Fred Kemp retired in 2012.

Students and Graduates

We currently admit approximately 13% of applicants to the program, a fact we attribute to our quality (egotistically) and to the lack of adequate competition (realistically). Our retention rate is quite high, around 90%, and reasons for attrition include health and family problems, burn-out, and getting overwhelmed by work duties in their other lives. In other words, these reasons for dropping out mirror what we see in our on-campus population.

The online PhD student is typically a little bit older than the more conventional on-campus PhD student, with an average age in the late 30's. Further, most of our students (90%) already come from the academy, where they hold positions as adjunct instructors, administrative staff, advisors, and occasionally tenure-track positions. The remaining 10% of our students work in industry as consultants, technical writers, freelance writers, grantwriters, or usability researchers.

Women outnumber men 2:1. Of the 55 currently registered students, 15 (27%) are men. Of the 29 students we have graduated, 11 (38%) are men.

Many of our students who enter the program tell us that after graduation, they expect to keep their current job, earning a raise, promotion, and new opportunities in their institution. Indeed, some of their employers pay for their doctorate with the expectation the newly-minted PhD will continue to work for them for a certain period of time. Of the 29 students we have graduated to date, 21 have remained in the same institution. The other 8 used the PhD to change jobs, earning tenure-track jobs at universities.

All students are active in the field, from conference participation, publications, leadership, and research.

May Seminar

The most distinctive feature of this program is the intensive 2-week May Seminar, a cross between a bootcamp and an academic conference. As mentioned above, this face-to-face requirement, also called the 'Nar, the May Workshop, and the MayMester, was crafted partly in response to questions about residency and culture. The May Seminar also creates an opportunity to recharge students' batteries in the event that they languish after coursework or after quals—no matter how crazy a student's other 50 weeks are, they can count on a culture of inquiry and support when they come to campus. Finally, the TCR program uses the Seminar as a way of exposing online students to all the knowledge that on-campus students learn in between classes.

A Culture of Knowledge Exchange

One of the fundamental assumptions about distance education in general, and about this PhD program specifically, is that context is hard to come by. One should take this warning with a grain of salt, of course, as the nature of class experiences, collaborations, and advising varies with the people involved and the technology used. However, it is certainly arguable that doctoral education entails much more than just coursework, with its learning outcomes often neatly bounded by the 15-week syllabus. How does a program -- a group of faculty -- share the values of its field with its students? How can we fill the gaps between course learning outcomes with a culture of the scholar/researcher?

The May seminar is one of our program's main ways of addressing these questions. At its core, the 'Nar builds and maintains a culture of inquiry, research, and scholarship, even as it achieves the more pragmatic goals of orientation, intensive coursework that helps students make faster progress, and encouragement to students to continue making progress toward graduation.

In many ways, it is a simple approach, as we believe in putting people together in space and time not only to learn the ropes about the program and the academy but also to bounce ideas off each other.

Specifically, we cram the following things into the 2-week event:

- Students present their research to the faculty and to each other in a variety of formats (posters, 20-minute conference presentations, longer lectures, "speed-dating" called Rapid Rhetoric, and research network forums). These presentations give students who may not have been able to attend scholarly conferences the chance to test their ideas in a safe environment and to refine their methods and theory in a supportive, if perhaps a bit competitive, space. The audience of faculty and fellow students also offers formative criticism designed to address performance, poster design, and engagement.

- The faculty presents its research at every lunch session so that students can get to know what we are working on. In fact, our guide is not to present something already in print, but to share what we are working on, even if the project is not finished. By working without a net, so to speak, we hope to model what we think scholarly inquiry looks like and to hopefully show our students what sharing formative ideas looks like.
- Faculty, students, and invited guests spend lunches together in unstructured space designed to facilitate brainstorming and the sharing of ideas.
- The students live together for the 'Nar, with the expectation that so-called "off" time can be good for support and for brainstorming, not to mention providing students with the chance to build their own culture within and among their cohorts. A good example of such an emergent tradition is that it was decided sometime in the past that the third time cohorts came to the 'Nar, they would host a barbeque for their classmates, and this tradition has continued since 2007.
- When possible, we schedule dissertation defenses so that students can get a glimpse of what is expected of them eventually. Because most of our students do not work at a doctoral degree-granting institution, the defenses scheduled at the 'Nar are the only times they get a chance to attend.

Annual Review

Online students have their annual reviews during the 'Nar, and this meeting with their committee follows the same format and purpose as it does for the on-campus students. In the first year, students are assigned committees, and in subsequent years students meet with their dissertation committees.

During this hour-long ritual, every facet of the student's progress and character is up for discussion. Committees discuss their assessment of student strengths and weaknesses, incompletes, independent studies,

Table 2. Session List from 'Nar 2013

Joyce Carter	Session 1a: Topics for 1st-year students: preparing for first-year annual reviews; understanding the role of your 1st-year committee & developing a degree plan
Angela Eaton	Session 1b: Research grant writing
Sean Zdenek	Session 2: Topics for 1st-year & 2nd-year students: selecting a chair & committee; identifying possible dissertation topics; setting publishing/presenting goals, etc.
Craig Baehr	Session 3: Publishing your research
Becky Rickly & Grad Students	Session 4: Topics for 2nd-year & 3rd-year students: writing a dissertation proposal, preparing reading lists, preparing for Quals, preparing IRB documents, etc.
Susan Lang & Grad Students	Session 5: Topics for post-Quals students: writing the dissertation & preparing for the dissertation defense—intent to graduate forms, graduate deadlines, etc.
Kristen Moore	Session 6: Topics for the job search: creating/updating CV & job search materials–cover letters, teaching philosophy statement, teaching portfolio; preparing for job interviews and the job talk
Susan Lang	Session 7: Topics for writing program administration

internships, committee and/or title changes, transfer courses and their equivalencies, planning for quals, and dissertation prospectus, among other items. The committee and the student also discuss accomplishments from the previous year and forecasts of publications and conferences in the upcoming year.

First-time students also begin a discussion about their eventual dissertation committee. Professors may suggest names, but our culture/procedure is to respect the student's own decision about the makeup of the dissertation committee.

Committees and students document their action items, letting the Graduate Director know about changes to the student's expected grad date, changes to the committee, recommended courses, progress plans for incompletes, and committee recommendations about continued support (if the student has a teaching assistantship).

Professional Development

The faculty takes all the professional development workshops and meeting that we normally hold during the long semester for our on-campus students and distills these experiences into workshops for our online students. Table 2 (from May 2013) includes typical types of workshops we hold during the 'Nar.

Outside Visitors

Because we do not know if our students come from doctoral granting institutions, we want to expose them to ideas beyond their faculty; therefore, we invite scholars they had likely read in their graduate courses to visit for a day or two, give a lunch talk, and participate in 'Nar activities. We invite two scholars each year, one for each week, and aim for a balance of theory and practice, rhetoric/composition and technical communication, men and women. We encourage our visitors to give lunch talks over their next project, not one of their finished projects, for reasons previously mentioned.

2005	Laura Gurak & Saul Carliner
2006	George Hayhoe & the Computers and Writing Conference
2007	Johndan Johnson-Eilola & Lee Brasseur
2008	Mary Sue MacNealey & Robert Johnson
2009	Karen Schriver & James Porter/Heidi McKee
2010	Jeanne Fahnestock & Michael Hughes
2011	Steven Katz & Howard Reingold
2012	Carolyn Rude & Charles Bazerman
2013	Gerald Savage & Cheryl Ball

Cohorts

Part of the culture of the 'Nar is that every group of new students creates its own identity, complete with a name and sometimes other identity materials. For example, the Quadrophonics unveiled their identity as a jewel cased CD featuring a faux musical act, and contained a CD with their bios, full color "band" photographs taken around campus, liner notes, and a track-by-track description of "songs" that illustrated their experience in the 'Nar. The cohorts help provide a long-term safety net and context for success in the program, and students report that they rely on their cohorts for support, especially after they are finished with coursework.

2005	Frodotypicals
2006	M2
2007	Third Degreez
2008	Quadrophonics
2009	Fifth Iteration (2009)
2010	Something with a Six

2011 Co-Hearts Seven

2012 In-fin-eights

2013 Nine Lives

Challenges

No program, especially an innovative one, comes without challenges.

Managing Growth

One of the TCR faculty's greatest challenges has been dealing with growth. The net effect of creating the online PhD was to double the size of our graduate program.

In our 2003 proposal, we had figured conservatively on admitting 2-4 students per year, but even with rejection rates as high as 87%, we have still realized annual admissions of 8-11 students. Fortunately, the program began to hit equilibrium, with the number of graduations more or less matching the admissions beginning in 2008-9 and continuing to this day.

Dealing with larger number of graduate courses offered online has not been terribly difficult, as it is a simple matter of good planning. What is quite a bit more difficult is choosing the right blend of courses so that online PhD students, as well as online MA students, have a good choice of courses each semester that will help them make progress towards degree completion.

Far more complicated than graduate teaching is dealing with the bulk of PhD work that comes after coursework: the qualifying exam, the development of the dissertation project, and serving on dissertation committees. It is not unusual for members of our faculty to find themselves chairing three or four dissertations and serving on seven or eight other committees. What we have realized is that it is best for each faculty member to say yes or no to prospective dissertation committees based not on total work, but on anticipated yearly flow—so that even if I am serving as chair for three students, each of those students is at a different point in research. With one, I am developing qualifying exams and helping with IRB issues. With the second, I am helping with research methods and initial chapters. And with the third, I am working to get the dissertation finished and ready for a defense. Clearly, not every dissertation workload can be managed this precisely, but such a strategy is one way for faculty to visualize the post-coursework workload.

As is the case with any tenure-track job, our faculty have to manage their personal balance between teaching, service, and research; the online

PhD's size and the diversity of its students' dissertation topics requires a lot of time that often pulls faculty away from their own research. The size of the doctoral population, along with the various stages of dissertation work, makes the difficulty balancing teaching, service, and research especially difficult.

Assessing a non-traditional population

Because the population of the online PhD program is typically already employed and 75% of the students expect to keep their current job upon graduation, conventional programmatic outcomes assessment need to be tweaked, lest it appear that we have a placement rate of a paltry 25%.

For outcomes assessment purposes, we group our graduates into one of the following "paths" then link their job before undertaking the doctorate with the job they land after graduation.

Conventional Path (already in the field as teacher, but now seeking tenure track job)

Upgrade path (lifting ceiling at institution—taking administrative or teaching jobs and stability, but staying in that institution)

Switching Path (changing careers from master's-enabled work in fields like advertising, science, and so on)

Credential Path (already a consultant, but the PhD commands higher rates and respect in the market)

Supporting Our Online Graduate Students Financially

Although all of our on-campus students are offered teaching assistantships, online students rarely receive such appointments, as they generally expect to keep their current jobs. Clearly, any sort of financial support helps, and we do offer online students with opportunities such as research assistantships and departmental travel funds. But the main tool we have to support graduate students is the graduate teaching assistantship, and the rules for this position require that the student work only for the university. This model works fine for conventional, on-campus students, but rarely applies to our online students. It is technically feasible, but practically difficult.

Negotiating with the Bureaucracy

Because the online PhD program behaves in unconventional ways (at least from the perspective of various university offices), we spend a larger share of time arguing, advocating, and educating those offices than we do for on-campus students. In other words, the administration of this program requires considerably more bureaucratic effort than other programs do. Some of the offices that I have had to deal with in unusually intensive ways include student business services, the registrar, the class schedulers, the keeper of faculty workload calculations, facilities planning, information technology, and class evaluation, just to name a few.

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Author information

Joyce Locke Carter is an Associate Professor of rhetoric and technical communication at Texas Tech University, where she teaches undergraduate and graduate courses in argumentation, usability research, publication management, and rhetoric and technology. She wrote the proposal for, and currently manages, the Texas Tech PhD degree offered via distance education.

Technical Communication and the Common Core

Explanatory and Informational Texts for College and Career Readiness

Kaye Adkins
Missouri Western State University

Abstract. Although the implementation of the Common Core Curriculum in K-12 education is still unsettled, it offers an opportunity for post-secondary technical communication programs to work with area school districts. The Common Core's emphasis on explanatory writing, and the standards' inclusion of graphics and digital publishing correspond well with the expertise found among technical communication faculty. This article suggests that the Common Core may offer a way for technical communication programs to promote the field and to recruit high school students into their programs.

Keywords. technical communication, Common Core, career readiness, K-12 education, curriculum.

It's a perennial question for technical communication programs: How do we both publicize technical communication as a career choice and recruit students? At the 2012 Council for Programs in Technical and Scientific Communication (CPTSC) Director's Round Table, the discussion of these issues turned to exploring ways to develop relationships between our university programs and high school students and teachers. A number of key points quickly emerged: To begin, we have often observed that students rarely come to college planning to major in technical communication. Rather, they often find our programs by accident. If, however, we can identify effective ways to introduce the field to high school teachers—and through them to high school students—we may attract students to our programs.

The Common Core Standards, a new set of national guidelines for assessment in K-12 education, offers administrators and faculty of technical

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communication programs an opportunity to collaborate with high schools. While no one is sure exactly how the Standards will be implemented, they require students to work with informational and explanatory texts, the kinds of texts that are at the core of technical communication curriculum. Thus, this requirement offers post-secondary educators and administrators an opportunity to introduce technical communication into the high school curriculum. Moreover, it allows them to do so in a way that can effectively build connections between university faculty and high school teachers and between university programs and area high schools.

Connections

Many university faculty have not spent much time thinking about the Common Core. After all, it affects high school teachers much more than it does those who teach at the post-secondary level, even those who teach general education classes like composition and math, the focus of the "college readiness" element of the Common Core. I certainly hadn't given it much thought until I was asked by our National Writing Project (NWP) site to help with a Common Core workshop.

At past NWP workshops, I had given short talks about technical communication, and these talks usually included an overview of careers in the field as well as one or two short activities that teacher-participants could take back to their classrooms. This time, however, I was being asked to help prepare and deliver a day-long event devoted to introducing principles for evaluating procedural and instructional texts and that offered guidelines for creating and using those texts in their classrooms. The workshop was prompted by Missouri's adoption of the Common Core Standards for English Language Arts.

Because of time limitations, I prepared for the workshop by simply reading the state Common Core materials given to me by the NWP team. However, after the previously noted discussion at the 2012 CPTSC Directors Round Table, I wanted to learn more about the Common Core. I particularly wanted to understand why the NWP site felt the need to teach area high school English teachers about technical communication pedagogy. Moreover, I wanted to explore ways to expand on the initial workshop.

Addressing such factors is no simple task, for implementation of the Common Core is just beginning in the states that have adopted it. As a result, there are many questions about how the Standards will be measured and exactly how those results will be used. Within this context, educators are just beginning to get some sense of how the Standards might affect their classrooms.

This article provides program administrators and educators in post-secondary technical communication programs with an introduction to the Common Core in English Language Arts. The article uses my experience with the NWP workshop to suggest ways we, as technical communication educators, can help our colleagues teaching in middle and high schools respond to the literacy outcomes outlined in the Common Core Standards. As we do so, we can introduce them to opportunities to enrich their Language Arts classrooms with content and activities drawn from technical communication as well as introduce their students to career opportunities in the field.

History

As Rothman (2012) explained, the Common Core Standards can be understood as a response to the No Child Left Behind Act (NCLB) of 2002. While No Child Left Behind was intended to introduce national standards for education, in practice each state was permitted to establish its own measure of proficiency of NCLB outcomes. As an additional measure of the national outcomes, students are also required to take the National Assessment of Educational Progress (NAEP), a test often referred to as "the nation's report card." While students might show satisfactory progress on the state tests, the NAEP revealed the wide range in actual state standards, as states with high success rates on their own measures often recorded low NAEP scores (Rothman, 2012a). This situation brought into question the entire system for comparing state progress under NCLB.

At the same time, teachers found that the required tests were reducing the time that they had for real teaching and learning. In essence, the focus of NCLB meant that they were now under intense pressure to prepare students to do well on the standardized tests while being discouraged from teaching anything not directly related to the tests (Rothman, 2012b). Even in states where progress in college preparation was indicated by acceptable NAEP scores, research suggested that "employers and college instructors found students weak at comprehending technical manuals, scientific and historical journals, and other texts pivotal to work in those areas" (Gewertz, 2012, p. 11). This career readiness, however, had not been emphasized under NCLB. Additionally, tests for NCLB often do not include these kinds of informational texts.

In response to these problems, the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO) began working on the Common Core State Standards for mathematics and English Language Arts in 2009. The final version of the Common Core Standards was released in June 2010, and as of November 2012, forty-five states and three territories had signed on to the Standards. Two states decided not to adopt the Standards, arguing that their existing standards were more rigorous (Rust, 2012). More recently, concerns about the cost of implementing the Common Core, as well as concerns about Federal control of education outcomes, have led some states that originally adopted the Common Core Standards to now consider rejecting them (Higham, 2012; Strauss, 2013).

In spite of these concerns about its implementation, most states are proceeding with the Common Core Standards. Rothman (2012b) reported that teachers find the Standards themselves to be clear and sensible. He is hopeful that the Standards will move classroom preparation “away from conventional fill-in-the-bubble formats to provide much better measures of student abilities to think critically and solve problems” (p. 58). In fact, many involved in the development of the Common Core Standards and many educators working to implement those Standards explicitly argued that the Common Core would move assessment beyond multiple choice tests and reduce the pressure to focus classroom activities only on test preparation. In his explanation of the Common Core Standards, David T. Conley (2011), co-chair of the Validation Committee for the Common Core, anticipated that the Standards will “create the opportunity for U.S. schools to move beyond test-prep instruction that fosters shallow learning” and to “vault education over the barrier of low-level test preparation and toward the goal of world-class learning outcomes for all students” (p. 17). Conley explained that the Common Core will achieve this level of learning by encouraging students to learn in a context that embraces complexity, relating what they are learning to what they know—which Conley argues results in better learning and retention.

The Common Core Standards

The Common Core Standards call for students to demonstrate the following abilities:

- Write for specific audiences
- Write for concrete purposes
- Explain concepts
- Support tasks
- Use technology to publish texts
- Create texts that are easily read and understood

These requirements mean that the Common Core encompasses many things that members of our field consider central practices in technical communication. As a result of this overlap, the Common Core provides educators and administrators in post-secondary technical communication programs with an interesting mechanism for making contact with students in high schools through partnerships with their teachers.

For many high school English teachers, the most notable characteristic of the Common Core Standards is the call for students to practice reading and writing with informational texts (Gewertz, 2012). The common core identifies informational texts as including "literary nonfiction, as well as historical documents, scientific journals, technical manuals, biographies, autobiographies, essays, speeches, and information displayed in charts, graphs, or maps, digitally or in print" (Gewertz, 2012, p. 11). Students will be asked to read "for the purpose of being able to 'do'" and write "for the purpose of explaining" (Bartholomew, 2012, p. 83). They will also be asked to draw on informational texts when they write, finding support and connections to their ideas in the texts themselves, not on their outside experiences or prior knowledge (Greene, 2012). This emphasis on informational texts parallels the emphasis on informational texts in the NAEP, especially for high school students (Greene, 2012), and the Common Core emphasis on college and career readiness. Career readiness has clear connections to technical communication, with the field's study of workplace writing. As technical communication faculty share their expertise in informational texts, they can seek ways to partner in developing materials and activities that high school teachers can use in their classes; at the same time, high school students can be introduced to careers in the field and university programs that can prepare them for those careers.

Teachers who look at the Common Core Standards often feel challenged to bring these new kinds of non-fiction texts into their classrooms. In the past, non-fiction texts in English Language Arts classes have generally consisted of autobiography or some other form of personal narrative, but the Common Core Standards expect students to read non-fiction texts that analyze processes and problems; they expect students to read for information and to be able to evaluate the quality of that information. This context requires a different approach to reading and responding than many Language Arts teachers have practiced (Gewertz, 2012).

As a result of such factors, some high school teachers have even expressed concern that the new Standards will result in the disappearance of literature from the high school curriculum. In essence, the Standards are seen as replacing literary analysis with the argumentative essay, although state and district officials state that fiction will remain central to the English curriculum (Bartholomew, 2012). The emphasis on informational texts, however, does gradually increase each year from first through twelfth grade, with the goal that by the end of twelfth grade, students will be reading journal articles. Technical communication's study of how readers approach informational texts can provide support for the achievement of these goals. The study of how readers process informational texts and of how informational and instructional texts are evaluated for usability can provide teachers with principles that they can use to develop guidelines to help their students learn how to read these kinds of texts. At the same time, the study of how information is structured and how visual signals are used for clear understanding can serve as the framework for developing classroom activities that lead to the writing of these kinds of texts. Everything from our familiarity with the traditional structure of scientific articles (IMRAD—Introduction, Methodology, Results and Discussion) to how readers process and use texts offers support for several of the general goals of the Common Core.

The Common Core Standards offer an outline of what it will mean to be literate in the twenty-first century. This definition of twenty-first century literacy includes the ability to "pick carefully through the staggering amount of information available today in print and digitally" (p. 3), to adapt "communication in relation to audience, task, purpose, and discipline" (p. 7), and to "employ technology thoughtfully to enhance . . . reading, writing, speaking, listening, and language use" (p. 7). Each of these practices is common to most technical communication courses, and our field offers a strong body of research that can help teachers prepare their students to demonstrate these outcomes. One final element of twenty-first century literacy is also a concern of technical communication. The Standards recognize that our students will be living and working in a global community, suggesting that they should "actively seek to understand other perspectives and cultures" and to "communicate effectively with people of varied backgrounds" (p. 7). Intercultural communication and understanding of the global marketplace have become a fundamental topic in technical communication, with research, publication, and cooperative programs multiplying rapidly. Not only can technical communication educators bring our expertise to colleagues in high schools, but perhaps we can find ways to include high school students in our cooperative, inter-institutional international projects.

High school English teachers aren't the only ones faced with changes in their approach to reading and writing in their classrooms. The Standards call for analytical reading and writing skills to be used across the curriculum. Accordingly, students are expected to learn the disciplinary textual practices of history, social studies, science, and technical fields (Phillips & Wong, 2012). This expectation poses a new challenge in districts that have never used a writing-across-the curriculum or implemented writing in the disciplines programs (Phillips & Wong, 2012). In all of these courses, students will be asked to apply analytical skills such as identifying main ideas as they demonstrate their understanding of texts. Moreover, they will be asked to do so in addition to demonstrating more traditionally testable written communication skills such as spelling, mechanics, understanding sentence structures, and vocabulary (Bartholomew, 2012). This interdisciplinarity is integral to the study and teaching of technical communication. Technical communication practitioners work in a wide range of fields—ranging from software to agriculture to defense to finance. Technical communication researchers study communication practices in these fields, and technical communication faculty design curriculum to prepare students for careers in any number of these fields. This preparation means that we have identified the core competencies for communication in a variety of industries, and these interdisciplinary communication competencies are something that we can share with high school teachers.

The Common Core in the High School Classroom

It is worth noting that the Common Core Standards are not to be addressed separately. Their strength is in asking teachers to address multiple Standards at once and asking students to synthesize information from multiple texts. The Standards offer this example: "When editing writing, students address Writing Standard 5 ('Develop and strengthen writing as needed by planning, revising, editing rewriting, or trying a new approach') as well as Language Standards 1-3 (which deal with conventions of standard English and knowledge of language)" (National Governors Association Center for Best Practices (NGA Center) & CCSSO, 2010, p. 5). Advocates of the Common Core argue that this complexity is a key element that offers an improvement over the standardized tests currently used for No Child Left Behind.

This apparent complexity has proved intimidating for some teachers, however, especially for teachers with little preparation in the teaching of reading and writing. Vicki Phillips and Carina Wong (2012), advocates of the Common Core who work for the Bill & Melinda Gates Foundation, argue that these teachers are eager for supporting materials. With adequate support, Phillips and Wong suggest, science and social studies teachers will welcome the opportunity to add writing to their courses. The Gates

Figure 1 Sample Assignment Set for Common Core Implementation. (Source: Phillips & Wong, 2012, p. 33).

College and Career Readiness Anchor Standards for Reading

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

9. Analyze how two or more texts address similar themes or topics to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

Foundation has worked to develop useful advice about addressing the writing expectations for the Common Core, and the tools for putting that advice into practice. Phillips and Wong explain that the Foundation sought a framework that would provide the guidance that teachers wanted, but that would "honor the creative tension in teaching" by designing activities that were clear, yet open to experimentation and adaptation to individual students and classrooms (p. 33). To illustrate this complexity at work, they offer the example in Figure 1. This assignment integrates the writing and reading expectations of the Common Core; it is one of a set of sample assignments that Wong and Phillips propose that teachers use as they implement the Common Core Standards in their classrooms.

This example illustrates how the Standards build from one level to the next. In this example, students in grades 6–8 might only be asked to respond to Task 1, while students in grades 9–10 might also be asked to meet the Level 2 expectations and students in grades 11–12 might be asked to meet all three levels. To those of us who teach technical communication this template might seem simplistic and obvious. Yet, Phillips and Wong report that teachers, especially those who are not English Language Arts teachers, find these kinds of templates helpful as they prepare to teach with the Common Core in mind. As we work with our colleagues in high schools, we may develop templates like these, but we should also use our expertise and experience to provide activities and resources that represent the rich field of scientific and technical communication. We can offer our knowledge and expertise in the field through workshops and recommended reading lists. We can provide them the resources that they need to learn more about these topics. For example, we might offer a workshop about teaching students to read and evaluate scientific articles, or we might offer a short course on Tufte's (2001) work on the visual display of information.

Anchor Standards

Each set of Common Core Standards is founded on "Anchor Standards," which are then elaborated for each grade group. The Anchor Standards for English Language Arts provide a framework for assessing how well students read both literary and informational texts and how well they write well-supported arguments and informative or explanatory texts. This framework recognizes that reading and writing are closely connected and addresses the importance of building students' reading and writing skills over time. The NGA Center and the CCSSO (2010), authors of the Standards, suggest that students should learn "three mutually reinforcing writing capacities: writing to persuade, to explain, and to convey real or imagined experience" as they learn to write arguments, informative/explanatory texts, and nonfiction and fiction narratives (p. 5). These capacities are echoed in the anchor standards for reading. The reading and writing standards are expanded as students advance, with each level building on the last.

In this article, I discuss how the anchor standards are to be applied in Grades 11–12, for these grade-level standards are intended to indicate students' readiness for our university programs. I have also included the complete Grades 11–12 Reading Standards for Informational Texts in Appendix A and the complete Grades 11–12 Writing Standards in Appendix B.

The Anchor Standards for English Language Arts include two sets of somewhat parallel outcomes, one for reading and one for writing. Obviously, not all of these outcomes are unique to technical communication, but the field's interest in informational and procedural texts relates to the reading of informational texts and to the writing of explanatory texts that dominate the outcomes for twelfth graders. Technical communication faculty can share their expertise in these kinds of writing with high school teachers, many of whom do not have much background in working with informational and explanatory texts.

Figure 2 Anchor Standards for Reading (Source: NGA Center & CCSSO, 2010, p. 35)

College and Career Readiness Anchor Standards for Reading

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Standards for Reading Informational Texts

The anchor standards for reading offer the framework on which specific grade-level standards are based. They offer four broad outcome areas that students are expected to meet. (See Figure 2.) The first set of reading standards expects students to identify key ideas in texts, as well as supporting evidence for each of the key ideas. Of special interest for technical communication, with its emphasis on definition and procedures, is the requirement that students be able to "analyze a complex set of ideas or sequence of events," like those found in a process explanation, and to follow and explain their development over the course of a text.

The second set of anchor standards asks students to analyze and evaluate word choice, structure, and author's point of view through a rhetorical lens. Technical communication can bring to this standard the field's emphasis on rhetorical analysis, especially its interest in how texts are influenced by their purpose. Think, for example, about how the difference in purpose of instructions and process explanations influence the form, content, and rhetorical style of those texts. Especially relevant to this set of standards is technical communication's work with definitions. In particular, the field addresses the expectation that students "analyze how an author uses and refines the meaning of a key term."

The third set of anchor standards asks students to integrate knowledge and ideas. At first, technical communication does not seem to be as relevant for this Standard because it specifically refers to "seminal U.S. texts." However, this standard also includes the expectation that students be able to use and evaluate a variety of information sources, including information displayed visually. Clearly, our work with visual display of information in charts, graphs, and infographics is helpful here.

The final standard, asking that students be able to read a range of texts of various complexities, is a fairly general standard, stating that students should be able to read and comprehend "literary nonfiction." This standard mentions informational texts, but does not seem as directly related to technical communication practice or research.

Technical communication pedagogy offers ways to help high school teachers address many of the reading standards. Although many Language Arts teachers are comfortable teaching students how to analyze plot and character in literary texts, they may never have been introduced to guidelines for analyzing documents that include definitions, procedures, and graphic displays of information. And although they may include discussions of audience in their literature courses, those concerns are quite different from the concerns of technical communication for audience—concerns such as how, why, and where audiences will be accessing texts or concerns about whether and when elements such as definitions or visuals are appropriate for the intended audience. These concerns are key to the variety of ways of presenting information that are addressed in the reading standards.

As technical communication educators share our study of these kinds of texts with our secondary education colleagues, we can make this a collaborative project. Working with high school teachers, we may perhaps be able to identify texts that will help them meet the expectations of the Common Core, meet their classroom goals, and introduce students to the field of technical communication. Together technical communication educators and high school teachers can look for texts that will not only interest their students but will also introduce their students to the kinds of texts common to technical communication and interest them in the problems and issues related to the reading of those texts.

For example, we might develop units that would ask students to analyze texts such as instructions found on social networking Web sites or in college admissions guides. Writing assignments might include the creation of texts such as user guides for online games or instructions for popular crafts. If a high school English teacher is interested in asking students to publish their work on a blog, a partnering technical communication educator can work with the teacher to develop materials that will help the students analyze and evaluate the Help material for the blog site. Or a technical communication educator and a high school science teacher might work together to develop a unit in which students would study information about a process like fracking—developing guide sheets for analyzing and comparing process explanations and definitions offered by different organizations, and analyzing those sources through a rhetorical lens—with the ultimate goal of writing up the student research.

Standards for Writing

The anchor standards for writing offer the framework on which specific grade-level standards are based. They offer four broad outcome areas that students are expected to meet. (See Figure 3.) The first set of writing standards asks students to work with a variety of text types and purposes. The standards indentify three types of texts that students should be able to write: argumentative texts that use evidence to support claims, narrative texts, and informative/explanatory texts. These last texts provide the greatest opportunity for technical communication programs to support teachers teaching in Common Core settings, and based on my experience at the

PLWP workshop, it is the type of text where our expertise is most needed, as many high school Language Arts teachers are poorly prepared to teach students to write instructional and explanatory texts.

The second standard not only asks that students "produce clear and coherent writing" but also asks that students "use technology, including the Internet, to produce, publish, and update individual or shared writing products." Clearly, our experience with various media and with collaborative writing is relevant to this standard. We can help high school teachers understand the variety of ways that students can publish materials through blogs and Web sites, and where we have the resources, we may also be able to help their students publish smart phone and tablet apps and eBooks. Collaborative projects are integral to many of our classes, but high school teachers, having had so many bad experiences with group

Figure 3 Anchor Standards for Writing (Source: NGA Center & CCSSO, 2010, p. 41)

Before we write instructions

- Analyze audience—age, expertise, learning styles, motivation
- Analyze goals of the user—to learn, to do, to understand
- Analyze tasks—simplicity or complexity, frequency, using existing knowledge or building new expertise
- Analyze context—conditions, equipment, time, regulatory environment

As we write instructions

- Identify all equipment, skills, area preparation
- Identify steps, grouping if necessary
- Working from the completed process backwards is helpful
- Identify interim goals
- Use illustrations when helpful
- Create navigation tools
- Let the reader know the process was successful

After we write—test our document

- Usability testing
- Behavior protocol: Tester watches as user interacts with object, software/interface, document, etc. Users simply do the task and results are recorded (for example key strokes)
- Think-aloud protocol: Tester takes notes as user interacts with object, interface, document, etc. User verbalizes all thoughts and responses. These are recorded.
- Protocol-aided revision: Tester follows instructions as user works through them, making notes for revision during the testing session and reviewing/revising afterwards based on the recorded data

projects, often shy away from these kinds of projects. Technical communication educators can share our strategies for designing and supervising successful collaborative projects.

The third set of standards asks students to research and write, using literary and informational texts as both subject and source, and to apply the grade-appropriate reading Standards as they conduct their research. With the emphasis on using texts in research, the standards do not lend themselves to research methods and expertise that are unique to technical communication, but introducing our colleagues to alternatives, especially to ways to use techniques like think-aloud protocols, to help students evaluate their informational texts, can help enrich high school classes.

Finally, the standards ask that students write a range of texts and work on short- and long-term projects. As with the reading standards, this requirement is a fairly general standard, not specifically related to technical communication practice or research.

The first two anchor standards for writing offer the best opportunity to work with our colleagues in secondary education. As with the reading standards, these writing standards are common in technical communication. Technical communication educators can share with our high school colleagues our knowledge of informative and explanatory texts, with the creation of visuals, and the use of technology to create and distribute texts. Again, we can collaborate with our colleagues to develop assignments that meet the Common Core expectations that will engage their students and will introduce their students to the kinds of texts that our courses include. The NWP workshop mentioned earlier in this article offers an illustration of the first step in this type of work. In this workshop, I introduced high school teachers to the basic principles of writing instructions, including the use of visuals. For this reason, an in-depth examination of this workshop could provide readers (i.e., educators and administrators in post-secondary education programs in technical communication) with a framework they might use to make similar kinds of connections to students (and teachers) in local high schools.

NWP Workshop: Technical Communication and the Common Core

The goal of the PrairieLands Writing Project (PLWP) workshop to which I was asked to contribute was to provide area elementary, middle school, and high school teachers with strategies for including the writing of explanatory texts in their classes. At the time I conducted this workshop, Missouri had adopted the Common Core and would begin implementation in the 2012–2013 academic year (Missouri Department of Elementary & Secondary Education (MDESE), 2012). The starting place for the PLWP team was a "Make" workshop that they had attended at another NWP site. (A "make" workshop includes a session in which participants create items and then write instructions for creating the item, based on what they have experienced during the "make" session.) The NWP team organizing the workshop had decided to follow the pattern set by the previous workshop, a workshop focused around a crafting activity (i.e., creating sock puppets or bottle cap jewelry). Teachers attending the PLWP workshop came from elementary, middle, and secondary schools in the northwest Missouri region. Among the teachers was a group from the local technical high school. This group was especially interested in the workshop and was eager to serve as unofficial assistants during the writing activity. They saw the workshop subject as a validation of their teaching, both in the Common Core emphasis on workplace preparation and in the emphasis on the kinds of instructional texts that they already were asking their students to create.

My opening remarks provided an overview of technical communication and then explained how including technical communication projects in their courses could help teachers meet the expectation of the Common Core Standards. In my presentation, I focused specifically on the Grades 9–10 Writing Standards, because that focus met the needs of most of the teachers participating in the workshop. In this article, however, I refer primarily to the Anchor Standards and to the Grades 11–12 Standards both for reading informational texts and for writing because those are the final Standards for college readiness.

A "Make" Workshop and Instruction Writing

The Common Core expectation that applies most directly to technical communication is also the one about which teachers have expressed the most anxiety: The writing of informative and explanatory texts. The PLWP "Make" workshop clarified how little most English teachers know about the kinds of writing so familiar to technical communication teachers (e.g., technical definitions and instructions). For all except the technical institute teachers, most of the concepts that I presented were new. For example, topics such as identifying steps to be included in instructions and incorporating visual design into texts were considered "novel" and "original" by many attendees. Many had not thought about the differences between instructions and process explanations, and as we discussed those differences, they began to understand that each of the two genres had specific purposes and audience assumptions that affect their form and content.

During the workshop, those technology teachers in attendance were enthusiastic and supportive, sharing their experience with teaching informational and explanatory writing. For example, one machine shop teacher explained that his first assignment in the semester is to ask students to create guidelines, posters, and signs for safety procedures. These teachers were pleased to see that the type of writing that they teach and appreciate is validated by the Common Core and was practiced in the workshop. Their response reflected the pride expressed in an article in Technology and engineering teacher (Rust, 2012) that notes

> Truth be known, technology and engineering teachers have long been covering a number of the expected ELA and math outcomes since our students read and write technical reports, perform basic and complicated math functions to solve problems, research and prepare presentations, use medial tools, and synthesize data, to list a few. (p. 34)

The technology teachers at this workshop were equally at ease with the writing exercises, often guiding their groups during the writing activity. This factor suggests that high school technology teachers can be valuable partners and advocates as we try to build relationships with school districts.

After my opening remarks, the teachers moved to the "make" part of the workshop. Participants were divided into groups, each group working on a small craft project such as making string geometry pictures, bottle cap jewelry, or sock puppets. This activity would provide the content for the final session of the workshop.

That final session introduced the teachers to teaching the writing of procedures and instructions . I briefly explained principles of clear process explanations and instructions and gave them specific guidelines to collaboratively write their instructions. I included information about alternatives to text such as flowcharts and script formats for procedures and about effective use of illustrations. Then, I introduced the writing activity with the guidelines in Figure 4. These guidelines were my own, drawn from the work that I do with students when they write instructions in my technical communication classes. I explained each of the three stages in the guidelines to the workshop participants, relating them to general stages of the writing process (prewriting, drafting, revising). One of the advantages of an exercise like instruction writing is that it offers students concrete audiences and goals, which in turn helps them understand the value of techniques like audience analysis. During our discussion of writing process explanations and instructions, the teachers were engaged and enthusiastic, eager to apply my advice in the writing activity.

The workshop participants were divided into the same groups as they had been for the craft portion of the workshop (e.g., the bottle cap jewelry group worked together to write one set of instructions). The groups wrote their instructions on large sheets of paper and shared them with the entire workshop at the end of the writing session. During the writing process, they faced many of the same challenges that their students would—they expected to be challenged a bit by writing collaboratively, but they were surprised by how unfamiliar the writing of instructions was. They were used to reading instructions, and even to writing assignment prompts, but they had never really thought about what goes into writing effective, usable instructions. As they shared their instructions with the whole workshop, they discussed the challenges they faced with this type of writing and highlighted what they learned during the process. They found most of what they had just practiced to be new; they especially welcomed my advice on writing in groups, and they were especially frustrated by the expectation that they include illustrations. During our discussion, I could see that the high school teachers participating in the workshop would welcome additional workshops specifically devoted to topics such as creating and assigning collaborative writing projects, teaching students to use graphic elements in their texts, or evaluating instructional texts with usability testing. We did not have time to include usability tests of the instructions, but many were enthusiastic about asking students to write and test instructions in class as another approach to peer editing. Such an activity seems to be well within the expectations of the Common Core Standards for writing, especially Standard 2, and would lend itself to a longer workshop and a collection of resources for area high school teachers.

Secondary Educators Want to Learn

Standard 2 for Grades 11–12 emphasizes the writing of informational

Figure 4 Guide for Writing and Testing Instructions from PLWP "Make" Workshop

Task 1. After researching ______________________(information texts) on _______________(content), write _____________(essay or substitute) that argues your position on _____________(content). Support your position with evidence from your research.
Level. 2. Be sure to acknowledge competing views.
Level 3. Give examples from past or current events or issues to illustrate and clarify your position.

and explanatory texts, especially the "effective selection, organization, and analysis of content" (CGA Center & CCSSO, 2010, p. 45). The Standard suggests organization in which "each new element builds on that which precedes it to create a unified whole" and suggests the inclusion of headings and graphics. The writing of effective instructions inherently addresses these Standards, and during the writing portion of the workshop, the teachers began to see the connections. However, many teachers attending the NWP workshop were unfamiliar with principles of creating unity from a numbered set of steps, of using headings and organizing lists, and of deciding what kinds of graphics to use and how to use them (all foundational technical communication practices). As a result, I spent most of my time during the Workshop's writing session working with the groups on these issues, often with the help of the technology teachers who participated.

An additional element covered in Standard 2 worth noting is the use of metaphor, simile, and analogy to provide clarity for complex topics. Although many English teachers are familiar with these stylistic techniques in literature, they may not have thought about them in the context of informational texts. As part of our wrap-up, we discussed ways to use these techniques in their instructions, as well as how this activity could be expanded in their classrooms to address more of the Standards such as testing for appropriateness to audience and using technology, especially Internet sites like WikiHow, to publish student writing.

Reaching Out to Area High School Teachers

The opportunity to introduce area high school teachers to technical communication—as a field, as a career choice for their students, and as an academic major—found me, but technical communication educators should actively seek out similar opportunities. If there is a National Writing Project site on our campuses, that is an obvious place to start, but we can also contact area schools directly. Although the "Make" workshop was a good place to start, a close reading of the standards suggests many other approaches that can help high school teachers prepare to address. Many teachers are unsure about how to approach explanatory texts—both as texts to be read and texts to be written. They are uncomfortable with assigning group writing projects. They may not know how to help their students publish their work digitally. All of these are directly related to Common Core Standards outcomes, and all of these are areas in which technical communication educators have expertise.

Closing Remarks

The Common Core offers technical communication programs an opportunity to build connections with area high school teachers. We have expertise to offer, not just to English language arts teachers, but to teachers in history, social studies, science, and even technology education. In building these connections, we can act on the challenge raised at the CPTSC Director's Round Table—seeking ways to connect with high schools and recruit students into our programs. We can seek to work with NWP sites, as I did, or we can reach out to school districts and offer workshops, seminars, and support materials.

All of this assumes that the original vision of the Common Core will remain intact as it is put into practice. At this point, no one is sure how the Common Core Standards will work out. With tight budgets and pressures for efficiency and standardization, the Common Core may prove to have the same problems as No Child Left Behind, especially as large testing companies seek to capitalize on the Common Core through standardized tests and test preparation material. However, technical communication programs and faculty can offer an alternative. If we support our colleagues in secondary education, and make it possible for them to implement the original vision of those who wanted to improve, enrich, and complicate the assessment of reading and writing, perhaps we can help shape the way that the Common Core Standards are implemented in their classrooms and in their school districts. Even if the Common Core Standards are ultimately rejected, it seems likely that "college and career readiness" will continue to be a concern, a concern that can provide a bridge between secondary education teachers and university technical communication programs.

For more information on the Common Core Standards, visit the Web site for the national Common Core State Standards Initiative, ‹www.corestandards.org›. Many state Departments of education also have Web sites with information about how the standards are being implemented in their state. For example, the MDESE (2012) shares information about how the state is implementing the Common Core at ‹http://dese.mo.gov/divimprove/curriculum/Common_Core.html›.

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Appendix A

Reading Standards for Informational Text Grades 11–12 (NGA Center & CCSSO, 2010)

Key Ideas and Details

- Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

- Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
- Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Craft and Structure

- Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
- Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
- Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Integration of Knowledge and Ideas

- Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words to address a question or solve a problem.
- Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses).
- Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.

Range of Reading and Level of Text Complexity

- By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR [College and Career Readiness] text complexity band proficiently, with scaffolding as needed at the high end of the range.
- By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR [College and Career Readiness] text complexity band independently and proficiently.

Appendix B

Writing Standards Grades 11–12 (NGA Center & CCSSO, 2010)

Text Types and Purposes

- Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.
- Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.
- Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- Provide a concluding statement or section that follows from and supports the argument presented.
- Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

- Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on the element that precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
- Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
- Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.
- Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
- Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).
- Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.

- Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Production and Distribution of Writing

- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

- Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Apply grades 11–12 Reading standards to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").
- Apply grades 11–12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opin-

ions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., The Federalist, presidential addresses]”).

Range of Writing

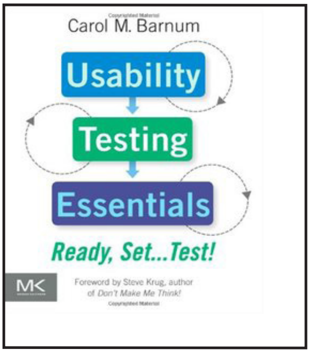
- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Author Information

Dr. Kaye Adkins is the director of the Master of Applied Arts in Written Communication and a professor at Missouri Western State University. She has presented and published on curriculum design, metaphor theory, and policy and procedure writing. She consults and conducts training workshops on policy and procedure writing and compliance documentation. Dr. Adkins is the co-author of two technical communication textbooks, *Technical Communication: A Practical Approach* and *Technical Communication Fundamentals*.

Book Review Editor

Laurence José, *Grand Valley State University*



Usability Testing Essentials: Ready, Set...Test!

Author
Carol M. Barnum

Morgan Kaufmann Publishers
2010. 382 pp.

Reviewed by Christopher Toth
Grand Valley State University

In *Usability Testing Essentials: Ready, Set…Test!*, Carol M. Barnum offers a straightforward and comprehensive approach to the rhetorical art of usability testing. Program administrators will find this book helpful if they are working on curricular development, especially if usability testing currently does not have a place in the course structure or they are looking for ways to offer students a solid foundation in usability testing. From the beginning of her textbook, Barnum argues that simply guessing how a user might respond to a website, product, or mobile application is not enough. Instead, usability testing—the process of learning about users by observing them using a product to accomplish a specific goal—is an essential core. It is also a natural and necessary component of technical communication, a field concerned with managing information to allow users to act.

The credibility of this book—and one of the main reasons program administrators should be interested—is that Barnum offers first-hand accounts of her experiences with usability testing as both a practitioner and a consultant. In addition to her years of teaching at Southern Polytechnic State University, Barnum is a usability pioneer and is often credited with creating the field. She also knows how to present clear, effortless, and en-

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gaging writing. At times, her informal tone seems more like a conversation than instruction as she imparts insightful material about usability testing. Her work is simply a must read.

Overall, Barnum keeps the focus of this guidebook on the most important element of usability, which is the end user, not the product. From start to finish, Barnum insists that usability should be invisible to the end-users; they will only notice it when a product is not easy to learn, easy to use, intuitive, or fun.

As with all good usability testing, Barnum's comprehensive text is easily accessible to the reader in clearly digestible chunks. The chapters outline chronologically all the necessary steps for pre-planning, planning, conducting, analyzing, and reporting. Readers can enter the book at any point to suit their skills level, comfort level, and needs.

Administrators with some usability experience and knowledge may jump into the later sections about actually conducting usability testing or reporting the results. However, program administrators who are new to usability testing should probably start from Chapter 1 as the basic vocabulary is defined and the goals of usability testing are outlined.

Chapter 2 may be most helpful for program administrators reluctant to implement usability testing in their programs because of cost, space, or other concerns. A common misconception, Barnum asserts, is that usability testing is a financial drain or overly time intensive. As this chapter title suggests, usability testing can be conducted "Here, There, and Everywhere." After outlining the basic necessary equipment, Barnum adds information about specialized equipment useful, though not required, for unique testing situations. Program administrators will be especially interested as she discusses the setup costs and provides a table that shows how constructing a student formal lab can be relativity inexpensive. If programs are still recovering from the economic woes of the financial crisis, Barnum provides alternatives such as informal labs, field testing, or remote testing—methods that can allow the introduction of usability testing into a program before investing in a formal lab.

Chapters 3 and 4 provide information about a toolkit of techniques situated within user-centered design and about an understanding of users and their goals. Chapters 5 and 6 offer planning and preparation advice for the usability testing. These chapters might be nice companion material for research methodology courses because they discuss study participants, survey and questionnaire design, IRBs, informed consent forms, interviews, and so on. These chapters feed nicely into Chapter 7, which concerns itself with the actual conducting of the usability test.

The next steps in the process, analyzing the findings and reporting on them, are covered in Chapters 8 and 9. Especially nice is Barnum's advice for working with both qualitative and quantitative data, as many technical communications programs utilize both types. Although the focus of these chapters is on the data gained from usability testing, some material may be repetitious for programs that already offer students extensive research methodology courses.

Finally, the book concludes with Chapter 10 on conducting international usability testing. Given the internationalizing efforts of many technical communication programs, this chapter will be a welcome addition for many program administrators. In it, Barnum discusses the subtle shifts necessary in usability testing of international audiences and the possible complications that may arise. At first this chapter seems disconnected from the previous nine; it might have been better to directly integrate its content into sections within earlier chapters. However, from a usability standpoint, if readers are specifically interested in this topic, it is nice to have it all in one place.

Another key feature of this textbook is the extended case study at the end of many chapters throughout the book. The case deals with Holiday Inn China and its usability testing remotely performed in the U.S. on its website. The case study will help readers make practical connections to the individual chapters' content.

In addition to the textbook, the companion website offers many useful resources. In particular, the site contains an instructor's guide with sample syllabi and assignments, as well as classroom exercises and discussion questions. Program administrators will find the site useful if they ask instructors, especially those new to usability testing, to teach a course on this topic.

The book will work well as a stand-alone textbook in a course dedicated exclusively to usability. However, because some programs do not have the luxury of entire courses dedicated to this topic, the textbook can also function as a supplemental text, particularly in technical communication, writing for the web, or document design courses that address usability concerns. Because of its organization, an instructor can easily select portions that will be most useful for their course goals and their students of differing backgrounds.

In general, you cannot go wrong with this book. It sets out to offer a comprehensive textbook on usability—for students, for instructors, for program administrators—and it does just that.