Assessing the Feasibility of Online Writing Support for Technical Writing Students

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ABSTRACT

This dissertation unites two seemingly unrelated fields, writing centers and technical writing, to study the feasibility of creating an online technical writing resource. Despite prolonged attention to multiliteracies and collaboration in both subfields, writing centers and technical writing do not commonly implicate one another in their shared mission of shaping students to become savvy writers with an awareness of rhetorical concepts and situations. This dissertation establishes how complementary these two fields are based upon their shared pedagogies of collaboration and multiliteracies. I suggest that a service design approach is beneficial to writing center research. Similarly, the technical writing field has little research and scholarship dedicated specifically to online writing instruction and pedagogy.

Historically, writing centers have served students from all disciplines, but research demonstrates the effectiveness of specialist over generalist writing support. Taking a specialist perspective, I use service design methodology to gather input from student and instructor stakeholders about how online writing tutoring and web resources can address their needs. Using survey and interview data, I designed and piloted an online tutoring service for students enrolled in the Technical Writing service course at Virginia Tech.

In student and instructor surveys, participants reported that they were highly unlikely to use online tutoring sessions but were more likely to use a course-specific website. Additionally, student interviews revealed that the Writing Center is not necessarily a highly-used resource, especially for upper-level students. Instructor interviewees indicated some misunderstandings and limited views of the Writing Center's mission. Nevertheless, a small number of participants in both groups spoke to a need for specialized tutoring in the Technical Writing course.

In terms of feasibility, integration of online services for this course poses the greatest challenge because it relates to the amount of change needed to successfully integrate online tutoring or web resources into the curriculum. With some attention to how OWLs and synchronous online tutoring can be an asset to teaching technical writing online, I argue that the pilot project described in this study is relatively feasible.

Assessing the Feasibility of Online Writing Support for Technical Writing Students

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GENERAL AUDIENCE ABSTRACT

A feasibility study addresses whether or not an idea or plan is good. In the case of this dissertation, the idea is whether or not to offer online writing services—such as tutoring and a repository website—to students enrolled in Technical Writing at Virginia Tech. In order to study the feasibility of this plan, I first argue for bringing together the fields of writing centers and technical writing. Two strong reasons for uniting these fields are based upon their shared methods and practices of teaching collaboration and multiliteracies. *Multiliteracies* in this dissertation refers to critical, functional, and rhetorical computer literacies; each literacy is important for Technical Writing students to develop as they enter their future careers.

Historically, writing centers are places on a college or university campus where students from all disciplines can go for tutoring; this is known as the *generalist* approach to writing tutoring. However, research demonstrates the effectiveness of a *specialist* approach—where a tutor is familiar with a student's discipline—to writing tutoring over generalist writing support. Therefore, I take a specialist perspective in this study. I use service design system of methods to gather input from student and instructor stakeholders about how online writing tutoring and web resources can address their needs. Service design is commonly used in the service economy, such as restaurants and hotels, in order to design or redesign services. In particular, service design focuses on people and their needs. Using survey and interview data, I designed and piloted an online tutoring service and a website for students enrolled in the Technical Writing service course at Virginia Tech.

In student and instructor surveys, participants reported that they were highly unlikely to use online tutoring sessions but were more likely to use a course-specific website. Additionally, student interviews revealed that the Writing Center at Virginia Tech is not necessarily a highly-used resource, especially for upper-level students. Instructor interviewees indicated some misunderstandings and limited views of the Writing Center's mission. Nevertheless, a small number of participants in both groups spoke to a need for specialized tutoring in the Technical Writing course.

In terms of feasibility, integration of online services for this course poses the greatest challenge because it relates to the amount of change needed to successfully integrate online tutoring or web resources into the curriculum. With some attention to how online writing labs and synchronous online tutoring can be an asset to teaching technical writing online, I argue that the pilot project described in this study is relatively feasible.

Dedication

This dissertation is dedicated to everyone who treated me as less than a strong, intelligent woman and scholar. To the former dean who called me "a 12-year-old girl." To the writing center manager who fumed in my face and glowered at me for not informing her that I took an interim manager position at another writing center. To the ~~men~~ little boys who thought they could own me or tell me to move to New Orleans. To the professor who verbally expressed their frustration with me when I felt uncertain about completing a project. To the fellow student in my PhD program who said upon meeting me for the first time, "No one gives a shit about writing centers." I have proven each and every one of you wrong by doing this research, writing a dissertation, and earning a PhD.

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Chapter 1: Introduction

Study Exigence

After my first assistantship at Virginia Tech in the Engineering Communications Program (ECP) ended, I began teaching in the Professional and Technical Writing Program. The first time I taught ENGL 3764: Technical Writing was online during the winter session, which lasts three weeks. The dizzyingly fast course bewildered both me and my students. What I found especially troubling was that the library was closed for the week of December 26 to 29, and the Writing Center was closed for the duration of the course. Some of my students needed a great deal of writing support, which was difficult to offer in an online environment, even though I offered to meet with them synchronously online. After setting up a meeting time that coincided with all the interested students' schedules, I opened Google Hangouts, an online videochat platform, and waited. None of my students showed.

A short week later, my students began collaborating on their group project. While the user documents they produced were acceptable, I could not help but think that they needed more scaffolding and guidance in order to successfully collaborate online. For their final projects, I assigned a proposal, and it was then that I really realized the depth and kind of assistance my students needed. Most had trouble distinguishing between a research report and a proposal, or even identifying an audience to write a proposal for. I

sent countless emails to students about proposal topics, research, and project scope in an attempt to steer them in the right direction.

I later learned that most of the Technical Writing courses were offered online, and in talking to other graduate teaching assistants (GTAs), discovered they, too, encountered similar challenges in teaching the course in the winter session. Many of us were teaching the course for the first time without the benefit of taking the professional writing pedagogy course. Coming out of my work in ECP, I felt that my Technical Writing students could benefit from getting writing feedback from an instructor who was familiar within their disciplines. Having served as a professional writing center tutor before I began my doctoral program, I was familiar with what is known as the generalist approach to writing tutoring. However, after learning the foundational principles of materials science and engineering through the course I acted as GTA for in ECP, I felt my familiarity allowed me to provide more accurate advice to students on their critical review of materials papers.

Digital Studio Pilot Study

A short while later, the former chair of the Department of English determined that the computer lab, used as a classroom during the day, should be opened in the evening to provide students with a workspace. This decision aligned with my research interest in technical writing and writing centers, so I was awarded permission to pilot the Digital Studio in the Department of English's newly renovated computer lab (room 360). In order to study what kinds of services should be offered in the Digital Studio, I began thinking about an overarching research question. Beginning in August of 2018, I became the coordinator and received permission to conduct my study out of this room. I recruited

Professional and Technical Writing majors—three in the fall and two in the spring semester—to intern in the Digital Studio and act as tutors. I trained the interns to provide the services deemed most useful and desired in the research stage, observed services provided, and maintained contact with students and faculty participants.

Study Outline

With this study, I am merging two fields by assessing the feasibility of offering online tutoring and web resources to students enrolled in ENGL 3764: Technical Writing at Virginia Tech. I argue that scholars and practitioners in writing center studies and technical writing both have the potential to learn how to improve writing instruction and support for students from each other's fields. Therefore, I employed survey and interview methods to answer the following research question.

Research Question

> *What are the needs of Technical Writing instructors and students that an online, interactive space (such as an OWL) can address?*

In the fall of 2018, I began designing surveys and interviews to study how to create an online support system for students enrolled in Technical Writing. For instance, survey findings from students who took Technical Writing revealed what kinds of help they sought while completing their assignments, such as whether or not they visited the Writing Center, and what kind of services or resources they would have preferred to use if provided. Survey findings from Technical Writing instructors reflected firsthand observations and experiences with students to determine what kinds of support services

instructors would find useful. 11 students and 7 instructors indicated in the survey that they would be willing to participate in a follow-up interview in order for me to gather more in-depth feedback about their experiences. Because I argue online writing instruction (OWI) and its support structures have a great deal of room for improvement and reimagination, I was interested in participants' wildest and most creative suggestions for support. Figure 1 below offers a visualization of the relationship between my methodology, methods, and research participants.

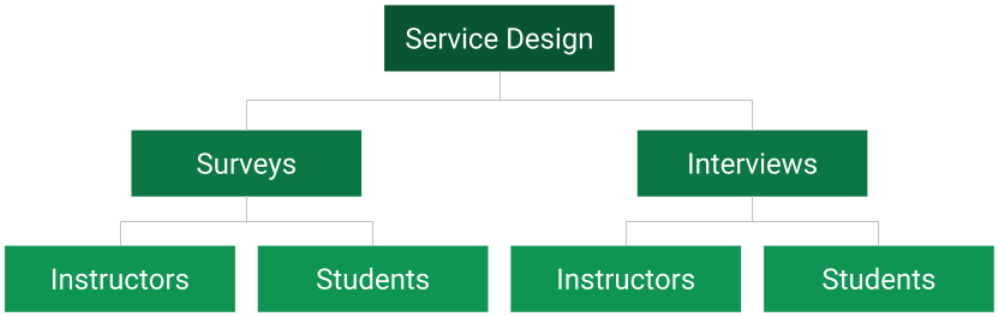


Figure 1: Relationship of Methodology, Methods, and Participants in this Study

A feasibility study addresses whether or not an idea or plan is good. Carolyn Rude (1995) refers to this genre as a report for decision making that "addresses internal concerns—decisions made for the organization" (p. 170). To conduct this feasibility study in the Department of English's Technical Writing service course, I first argue the reasons why such a service is necessary. Many university community members, especially those in the Department of English, may wonder why a specialized space for writing support is needed when a well-established writing center, affiliated with the Department of English, already exists. My study does not intend to impinge upon or replace the main Writing Center. Rather, the 360 Digital Studio is meant to offer two

kinds of services that the main Writing Center does not offer: specialist and online tutoring.

Fixing What Isn't Broken

In some ways, proposing to create an online writing lab (OWL) for Technical Writing students may seem like a solution to a problem that doesn't exist. The average grade distribution in ENGL 3764: Technical Writing is a 3.55, so most students pass the course with what seems like no problem. However, technical writing and writing centers are evolving. Professionals in these fields could very well maintain the status quo, but that would be a decision that doesn't account for the evolving nature of higher education. The proliferation of online courses is a major evolution in higher education, but I argue that these courses are forging ahead without adequately preparing students, faculty/instructors, and departments.

At Virginia Tech, approximately 65% of the sections of Technical Writing were offered online in Fall 2018 (15 online, 8 face-to-face) and Spring 2019 (17 online, 9 face-to-face). However, only students enrolled at the National Capital Region campus can request synchronous online tutoring from Virginia Tech's Writing Center ("Writing Center"). So while students might be passing the course by and large, the fact that they can't receive online tutoring puts Virginia Tech in opposition to the CCCC Position Statement of Principles and Example Effective Practices for Online Writing Instruction (OWI). Most relevant is OWI Principle 13: "OWI students should be provided support components through online/digital media as a primary resource; they should have access to onsite support components as a secondary set of resources" ("CCCC Position

Statement"). In other words, if students are taking an online writing course, they should have access to an online writing lab (OWL) (Martinez & Olson, 2015). Therefore, Virginia Tech's writing tutoring practices are somewhat out of alignment with the writing field's leading professional organization.

But being out of alignment with a field position statement doesn't necessarily mean Virginia Tech's Technical Writing course is broken and needs fixing; rather, it can pilot specialized writing support services designed to improve students' perceptions of their course performance, especially for students taking the course online. Specifically, 360 Digital Studio services can concentrate on scaffolding students' collaborative projects and multiliteracies. Aligning the institution with the field's position statement would be an added benefit of my study. I employed user experience and service design methodologies to study the feasibility of offering online writing services by employing methods of surveying and interviewing participants.

Study Significance

My feasibility study of creating online writing resources for technical writing students offers insights to both writing center studies and the technical writing fields in order to contribute to both fields' knowledge about supporting online writing instruction (OWI).

OWI Principle 15 states, "OWI/OWL administrators and teachers/tutors should be committed to ongoing research into their programs and courses as well as the very principles in this document" ("CCCC Position Statement"). However, there are not many research studies about OWLs. The majority of scholarship on OWLs surfaced in the mid-1990s (Blythe, 1997 & 1998; Harris & Pemberton, 1995; Healy, 1995; Hobson, 1998;

Palmquist, Rodrigues, Kiefer, & Zimmerman, 1995) and seems to have peaked in the early to mid-2000s (Blythe, 2002; Breuch, 2004; Breuch, 2005; Coogan, 1999; Inman & Sewell, 2000). While other scholarship has certainly been published since that time, no book-length collections have come out, and with a few exceptions (Bemer, 2015; Neaderhiser & Wolfe, 2009; Shea, 2011), there are few large studies. Therefore, my study can add to the scant research on OWLs which writing and writing center studies scholars have been calling for. For instance, Dana Driscoll and Sherry Wynn Perdue (2012) argue that writing center scholars can contribute to an institutional acceptance of writing center work by calling for replicable, aggregable, data-driven (RAD) research in which scholars present their work in the same IMRD (introduction, methods, research, discussion) format as scientific articles. Similarly, Doug Hesse (2012) asserts, "If a writing program is recognized as a place where research happens, [...] the program has constructed a stronger ethos" (p. 143). By using service design research methodology, I intend to produce RAD research that contributes to the researcher ethos of the writing center field. Because of the writing center field's history of marginalization (North, 1984), I believe developing a scholarly research ethos will help to elevate the field by challenging the view that it is "just service."

In addition to contributing much-needed research about OWLs to the writing center field, my feasibility study also increases the amount of available research on creating discipline-specific or specialist tutoring services. While various kinds of writing centers exist—including engineering, business, and multiliteracy centers—the majority are interdisciplinary or "generalist" writing centers. Developing discipline-specific writing center spaces contradicts one of the founding principles of writing centers:

"Writers work on writing from a variety of courses" (Harris, 1988). Nonetheless, these disciplinary spaces for writing support seem to keep cropping up.

Lastly, the service design methodology itself is something that I hope will make a valuable contribution to the writing center field. Writing center researchers have used usability methods for some time now, but to my knowledge, service design is relatively new. This methodology is relevant to and appropriate for writing center research because of its focus on people. Writing center work is highly context dependent, and service design can offer a systematic approach to creating, improving, or revisiting writing center services. In particular, some scholars in the field are interested in how OWLs serve students. Therefore, when students, instructors, and tutors perhaps never meet in a face-to-face environment, a connection should be established between writers and tutors in the same environment in which they take their class.

Merging Writing Centers and Technical Writing

The technical writing and writing center fields seldom overlap with one another, despite the fact that both share similar historical origins, tend to experience marginalization from their parent discipline of writing studies, and highly value collaboration and multiliteracies. Within writing studies, the work of writing center and technical writing fields have been historically misunderstood and devalued because their foundations coincide with services developed for students who "can't write." First, writing studies has misunderstood writing center work by conceiving it as skill-and-drill practices exercised in current-traditional rhetoric models. Stephen North (1984) famously responds to the field's misunderstanding of writing centers by disputing their association

with grammar, remediation, and "special problems in composition" (pp. 433-434). Along the same lines, technical writing is a field that developed after general composition courses failed to produce engineers with what their colleagues considered competent writing skills (Connors, 1982). In the early 1900s, engineering journals and weeklies "decried" new engineers' writing (Connors, p. 5), even going to far as to call it "wretched" (p. 6). From their very beginnings, then, writing centers and technical writing have been commensurate with writing deficiencies.

Devalued because of attitudes about bad writers and bad writing, writing centers and technical writing must also contend with the problem of who claims the two fields' work. Robert Connors points out that both English and engineering faculty in the mid-1940s ostracized service courses, noting that, "neither freshman composition nor technical writing courses were claimed or championed by either side" (p. 12). Conditions for the course remained the same through 1959 when technical writing was "Still considered a low-level service course [...] assigned to graduate students and instructors" (Connors, p. 14). Writing centers are frequently viewed as "a low-level service," as North's "manifesto against [...] marginalization" demonstrates (Carino & Stay, 2002, p. 92). In Connors' historical documentation and in North's own English department, literature faculty presented their work as superior to that of technical writing and writing centers. Instead of being viewed as a site of research that contributes to theories and practices for teaching writing, "writing center work is [...] regarded as akin to other types of 'support services,'" meaning it is beneath "the 'real' work" of the tenure-track professor (Trimbur, 2000, p. 31). When faculty refuse to take ownership of this work, I believe this presents conditions for these two fields to become further denigrated as

service. Furthermore, if graduate students and instructors mainly perform the work, the work itself and these fields by extension become easier for those in academe to look down upon.

Even more troubling, it's not just academe that disparages teaching writing. Not only has technical writing "occupied a support position in" academia, but also in "corporate spheres" according to Johndan Johnson-Eilola (1996, p. 246). I support Johnson-Eilola's contention that failing to question the role of service can place educators at risk, no matter their status. Like technical writers and instructors, writing center professionals (WCPs) can also relate to occupying the low status of a "support position" in higher education settings. Continual association with "bad writers," low status, and "mere service" has left these two fields with residual misconceptions that I argue are tough to dislodge, despite some academics' experience otherwise. I urge those who would believe these two fields are no longer marginalized to spend some time in a two-year college or other institution that supports students who experience systemic barriers to higher education.

Nevertheless, technical writing and writing center scholars need not continue to occupy positions as "outlaws" (Carino & Stay, p. 92). Rather, scholarship from these fields can offer methods for overcoming or responding to a shared sense of marginalization. One way to begin to bridge technical writing and writing centers is with Johnson-Eilola's concept of symbolic-analytic work, which he argues will "relocate [increase] the value" of technical communicators' work by shifting away from a support role. By Johnson-Eilola's definition, "**Symbolic-Analytic Workers** possess the abilities to identify, rearrange, circulate, abstract, and broker information. Their principal work

materials are information and symbols, their principal products are reports, plans and proposals" (p. 255, his bolding). In many ways, what Johnson-Eilola describes sounds a lot like writing center work: for example, instead of working with paying clients, tutors work with students to assist them in increasing their ability to revise and improve reports, plans, and proposals—genres typically included in the technical writing service course. A writing center tutor can alert a student that the proposed tasks in a proposal need more specific detail or that sections need descriptive headings. Recently, writing centers have even ventured into the "corporate sphere" at the Federal Reserve Bank in Philadelphia, revealing an emergent application for writing center practices in the workplace (Weber).

My feasibility study, then, merges technical writing and writing center fields by designing writing support services for students enrolled in my department's technical writing service course. I begin by outlining technical writing's and writing center studies' shared pedagogies of collaboration and emphasis on multiliteracies. I use these shared pedagogies to evidence how these fields are compatible for alignment in my study. In tracing shared values between these two fields, I suggest ways in which writing centers can support curricular goals in the technical writing service course. Next, I contextualize discipline-specific (specialist) and online tutoring, two services my pilot study provides because they are not currently offered to technical writing students in my institution's main Writing Center. In order to conduct this study, I then propose integrating technical writing methodologies with writing center research. Lastly, I sketch the study's outline and its implications for each field and writing studies as a whole.

Shared Pedagogies in Technical Writing and Writing Centers

Collaboration and multiliteracies offer a rich foundation around which to focus the benefits that my study can offer stakeholders. Not only does collaboration provide a theoretical and pedagogical foundation for my study, but I also use collaboration as a practice during the planning and piloting stages of my study by seeking students and instructors as participants. First, pedagogies of collaboration are common and even foundational practices in both technical writing and writing centers. In fact, Mary Lay (1991) finds collaborative writing so integral that she suggests including this concept in any definition of technical writing. Additionally, Nancy Coppola (1999) emphasizes that collaboration in the technical writing service course is not just between students but also "among students and teachers" (p. 262). Indeed, students in many technical writing courses are assigned collaborative projects in order to prepare them for workplace writing scenarios (Grover, Cook, Harris, & DePew, 2017, p. 251). The ability to write collaboratively with colleagues, although under-researched according to Allen et al. (2004), is in high demand. According to a more recent study of alumni from professional and technical communication (PTC) programs, respondents reported collaborating with work colleagues on 40% of their work (Blythe, Lauer, & Curran, 2014, p. 279).

Whereas technical writing literature considers collaboration in terms of how workplace tasks are delegated and defined, collaboration is defined a bit differently in writing centers. Landon Berry and Brandy Dieterle (2016) offer a useful summary of Muriel Harris's explanation of two main kinds of collaboration:

> (1) multiple authorship collaboration, oftentimes seen in group projects or group essays where writing decisions are jointly made, and (2) collaboration in learning about writing, seen in peer consultations in multiliteracy centers where tutors facilitate learning about writing but the writer makes all final decisions regarding the text being discussed. (p. 18)

The first definition, multiple authorship collaboration, is the kind with which technical writers are likely most familiar; the second is more typical in writing center settings. Collaboration based on learning about writing tends to be one-on-one between a student and a tutor or teacher (Harris, 1986), but some writing centers are seeing an increase in group consultations (Berry & Dieterle). Group consultations can be especially beneficial to technical writing students involved in collaborative projects, preparing them to work with colleagues and in online environments. Like technical writers, WCPs are also finding the modes and mediums in which they collaborate are changing, most notably because of the Internet (Hobson, 1998; Inman & Sewell, 2000). Therefore, it is my hope that Digital Studio interns serving as tutors will also learn valuable collaboration skills by using Zoom, a videochat platform, for online tutoring sessions.

A second reason for bridging these two fields is that they both devote attention to multiliteracies, a topic which has also gained importance because of web and mobile technologies. Kelli Cargile Cook (2002) outlines six "layered literacies"—basic, rhetorical, social, technological, ethical, and critical—that should form "a theoretical frame for technical communication pedagogy" (p. 5). In Cook's estimation, integrating these literacies into course assignments allows students to develop "specific workplace skills" that are applicable not just to "a specific vocation" but also to "lifelong learning"

(p. 24). Stuart Selber (2004) also supports bringing multiliteracies into the classroom by using a framework for approaching functional, critical, and rhetorical computer literacies. Like Cook, Selber believes students need to be exposed to a "wide array of literacies [...] in order to participate fully and productively in the technological dimensions of their professional and personal lives" (p. 234). However, Selber doesn't think that teaching and integrating computer literacies into the curriculum comes easily; he asserts, "Significant departmental and institutional investments must be made in support structures that will make it possible for a critical mass of teachers to do their very best work" (p. 233). While Selber does not mention writing centers, they can certainly be fashioned as a "support structure" in the endeavor to prepare students to be not only users of technology but also its designers and critics. In that way, offering online tutoring is not just about the medium but is also about how tutors use technology like Zoom to engage with students in conversations about technical writing.

Some writing centers have refigured their spaces, services, and tutor training to accommodate students working on multimodal assignments in response to Selber and New London Group's (1996) emphases on incorporating multiliteracies into writing instruction. In a somewhat prescient example, Thomas, Hara, and DeVoss (2000) relate how Internet Writing Consultants at Michigan State University help students develop web pages and web content, encouraging "clients to draw designs for their Web pages on paper, creating visual maps of their sites and planning the information for each page," as well as "suggest[ing] ways to use hypertext to its fullest" (p. 72). These activities should sound familiar to those in technical writing. Other scholars propose even more extensive possibilities for multiliteracy centers. For instance, Murphy and Hawkes (2010)

reimagine WCPs as digital content specialists with an array of skills, such as Extensible Markup Language (XML) scripting, which the specialists can use along with "style sheets, and object technology [to] create tutorials, rich media reports, and utilities that can be shared with colleagues" (p. 180). Here, Murphy and Hawkes's idea to train tutors as digital content specialists is evocative of Johnson-Eilola's definition of symbolic-analytic work where tutors use their functional, critical, and rhetorical literacies to assist writers with rearranging information in a digital environment.

Concentration Areas for the Digital Studio Feasibility Study

This study is an effort to offer two kinds of services that Virginia Tech's main Writing Center does not offer: specialist and online tutoring. Writing center scholars tend to value a generalist approach to tutoring writing (Greiner, 2000; Harris, 1988; Remington, 2010), so specialist tutoring approaches that reflect disciplinary expertise do not receive as much attention in the literature. However, what the relatively few studies on specialist tutoring approaches have found is that familiarity with disciplinary genre conventions lends to the effectiveness and accuracy of writing advice (Dinitz & Harrington, 2013; Mackiewicz, 2004; Smith, 2003; Wolfe, 2009). While my study does not propose to end the ongoing generalist versus specialist tutoring debate, it does operate on the premise that specialist tutoring approaches may benefit students enrolled in the Technical Writing course. Tutors trained with a generalist approach to writing tutoring may not be familiar with concepts and genres important to the technical writing field. For

instance, Technical Writing course objectives include designing graphic content and producing online and print documents. Writing coaches can assist with these assignments to a certain degree, but a lack of familiarity with design principles might leave them unequipped to offer extensive feedback on the rhetorical choices associated with these objectives. I predicted the Professional and Technical Writing majors I recruited to serve as intern tutors in the Digital Studio would have specialized knowledge to contribute to developing and piloting this service. Thus, feedback from tutors in this study could offer students a different perspective on their work than could the main Writing Center.

Technical Writing Methodology in a Writing Center Setting

Broadly, this study employs both qualitative and quantitative methods in order to obtain a variety of data that reflect what resources users want and how these resources should be designed. Knowing the extent to which technical writing and writing centers value collaboration and multiliteracies, this feasibility study seeks to introduce user experience (UX) and service design methodologies to writing center research. Because I surveyed and interviewed students and instructors in order to pilot the Digital Studio, my study is an example of how collaboration informs service design. User experience is intended to "reduce the friction between the task someone wants to accomplish and the tool that they are using to complete that task" (Buley, 2013). In a higher education setting, students often seek writing center services in order to "reduce the friction" between their current writing abilities and those they are expected to demonstrate in a

specific writing assignment—and, later, in the workplace. Therefore, this methodology is appropriate for designing writing support services for technical writing students.

In order to focus on people and their writing needs, I used surveys and interviews. While these methods are not new to writing center research, UX and user-centered design methodologies are used infrequently in writing center scholarship (Blythe, 1998; Brizee, Sousa, & Driscoll, 2012; Brizee & Wells, 2016; Salvo, Ren, Brizee, & Conard-Salvo, 2009). Notably, all of the research cited here has been conducted by writing studies scholars associated with Purdue University's Online Writing Lab (OWL). Usability testing was a particular focus in all of this scholarship, showing the researchers' attention to how users interacted with resources on the Purdue OWL's website. Though not a method to be overlooked, usability testing is generally employed after a service or resource has been designed, and because this is a feasibility study, the foremost concern is gathering input from key stakeholders to design services for Technical Writing students. Therefore, UX and service design offer *a way of thinking about* how to create writing support services in addition to assessing the feasibility of offering these services as a way to reduce friction between users and their goals.

Designing a Specialized Writing Service *with* Technical Writing Students

Various scholars have published on the process of creating specialized writing centers (Dadas, Dubisar, Landrum-Geyer, & Ronald, 2014; Jacobs, Opdenacker, & Van Waes, 2005; Kuiper & Thomas, 2000; Palmquist, Rodrigues, Kiefer, & Zimmerman, 1995; Tomlinson, 2014; Walker, 2000). Scholarship in this area certainly acknowledges students as important stakeholders, but students themselves did not seem to be directly

involved in *designing* writing services. For instance, Elizabeth Tomlinson claims to have "fair grasp of student needs and desires" (p. 6) and therefore only interviewed faculty while researching how to create a business communication center. To highlight one of the guiding principles of service design, Andy Polaine, Lavrans Løvlie, and Ben Reason (2013) note, "Service design is about designing *with* people and not just *for* them" (p. 41). I account for this concept in the study by conducting surveys and interviews with students, asking about resources they used while taking the course as well as their likelihood to use potential resources. This approach gives students an opportunity not only to estimate their interest in potential services but also to offer ideas that myself, their instructors, and the department might not have imagined.

What service design offers here is an "understanding [of] how different touchpoints work together to form a complete experience" by "do[ing] research with people in the situations where they use the service. Study how people use a service at home, on the road, and at work, and then connect the dots" (Polaine et al., p. 45). Because this study focuses on the feasibility of offering online tutoring services, touchpoints can include the devices students use, the LMS where they access their course information, and Zoom, the platform used to provide tutoring services.

Outline of Chapters

Chapter 2: Literature Review

This chapter is organized around variables and terms in my Research Question, including the following scholarship areas: OWLs and online writing tutoring (OWT), the

specialist versus generalist debate, the emergence of specialized writing centers and multiliteracy centers, collaboration, and technical writing concepts and pedagogies.

Chapter 3: Methodology

I describe the rationale (methodologies) for using user experience as an umbrella and service design as a focus in the study. Methods include surveys and interviews of instructors and former students of Technical Writing in order to answer the following research question:

What are the needs of Technical Writing instructors and students that an online, interactive space (such as an OWL) can address?

Chapter 4: Student Results

I detail the student survey and interview results of this study to determine what their needs are that an online, interactive space can address. I discuss the findings and offer some analysis of the data in this chapter.

Chapter 5: Instructor Results

In this chapter, I turn to the instructor survey and interview results of this study to determine what their needs are that an online, interactive space can address. I discuss these findings, including some comparison to the student results, and offer some analysis of the data in this chapter.

Chapter 6: Discussion & Conclusion

I conclude by assessing eight areas of feasibility based upon four overall findings in the student and instructor data. What do these findings tell the Department of English

about the Technical Writing course curriculum and the students it serves from a variety of STEM majors? How feasible is it to offer online services to students enrolled in Technical Writing based upon the data reported herein? Additionally, I offer some suggestions about how service design methodology benefits writing center research.

Conclusion

While the majority of writing centers serve students from all majors (the generalist tutoring approach), a growing number of specialist writing centers seem to be cropping up throughout the country. According to the National Census of Writing, 26% of survey respondents reported their institution has a course-based or writing fellows program ("Four-Year Institution Survey"). Surely, technical writing students visit their writing centers and receive appropriate revision advice. At the same time, scholarship has emerged that challenges the generalist tutoring technique, one of the hallmarks of writing center practice. Another hallmark of writing center practice, face-to-face tutoring, is also changing as a result of the prevalence of online courses. To contend with these changes, technical writing and writing centers can join forces using their shared foci on collaboration and multiliteracies in a way that may elevate the status of the two fields within the larger field of writing studies.

Not only that, but also methodologies typically used in technical writing—specifically, user experience and service design—may offer writing center researchers a way of expanding their thinking about the purposes behind traditionally used methods of surveying and interviewing. Service design holds potential relevance to and appropriateness for writing center research because of its focus on people. Because

writing center work is highly context- dependent, service design can offer a systematic approach to creating, improving, or revisiting writing center services. In particular, WCPs are interested in how effectively online tutoring serves students. When people constitute the heart of writing center services, establishing a connection between the two is important.

Chapter 2: Literature Review

Introduction

In Chapter 1, I outlined a problem with the Technical Writing service course at Virginia Tech: many of its sections are taught online, but the Writing Center does not offer online tutoring for students enrolled at the main Blacksburg campus. Although these courses are online, the registrar considers students to be enrolled through the Blacksburg campus, not the National Capital Region campus, which is currently the only campus allowed to receive online writing tutoring (OWT). The exigence for this study is further framed by the CCCC Position Statement of Principles and Example Effective Practices for Online Writing Instruction (OWI), specifically Principle 13, which states that students should receive support in the same environment in which they take the course. Additionally, shared pedagogies of multiliteracies and collaboration between writing center and technical writing studies offer appropriate reasons to unite these fields.

A study such as this allows an opportunity for collecting, analyzing, and reflecting on data, as well as theorizing how students learn in the Technical Writing service course at Virginia Tech, particularly the one offered online. Therefore, I interviewed and surveyed former student and instructors of Technical Writing to answer the research question, *What are the needs of Technical Writing students and instructors that an online, interactive space (such as an OWL) can address?* To pave the way for such a study, several areas of writing center and technical writing scholarship are relevant to review:

1. I provide a brief history of writing centers in general, followed by an overview of services provided by online writing labs (OWLs), such as asynchronous, synchronous, and hybrid tutoring. Understanding the breadth of online tutoring practices informed the decisions I made for the Digital Studio pilot project at Virginia Tech.
2. I describe specialized writing centers and multiliteracy centers in order to provide context for the type of online writing services that would differentiate what the Digital Studio does from what the main Writing Center does.
3. I offer some contextualization for the Technical Writing service course, including pedagogical concerns about genres, multiliteracies, online courses, and collaboration. These contexts help to further situate the online writing services that were targeted toward Technical Writing students and instructors.

A Macrohistory of Writing Centers

Writing centers are typically positioned to serve writers from all disciplines (Harris, 1988). However, writing centers have a traditional association with English departments, which led to a misunderstanding about their purpose and precipitated Stephen North's (1984) landmark *College English* article. In other words, for reasons likely stemming from a lingering association with the practice and theory of current-traditional rhetoric, writing centers were misperceived as "fix-it shops," an understanding that North sought to dispel and that continues today. The fix-it shop writing center model is closely tied to the skill-and-drill practices of current-traditional rhetoric. Writing centers have worked hard to distance themselves from this model, and this move is partly

assisted by tutoring writers from across the disciplines instead of exclusively from the English department. In fact, in *The Idea of a Writing Laboratory*, Neal Lerner (2009) traces the history of writing center theory back to classrooms described as laboratories as early as 1908 (p. 20). Later, Helen Parkhurst devised the Dalton Laboratory Plan which "was adopted worldwide by the mid 1920s" (Lerner, p. 18). These early classrooms did not focus solely on writing; rather, the Dalton Laboratory Plan applied to a one-room schoolhouse in which all subjects were taught. In that way, Lerner is arguing that the writing center model has always had a multidisciplinary scope.

A decent amount of scholarship exists on OWLs and asynchronous or synchronous writing tutoring (Breuch & Racine, 2000; Carlson & Apperson-Williams, 2000; Chewning, 2008; Prince et al., 2018; Yergeau, Wozniak, & Vandenberg, 2008), but more research employing empirical or replicable, aggregable, data-driven (RAD) research methods (such as Arzt, Barnett, & Scoppetta, 2009; Book, 2018; Denton, 2017; Hewett, 2006; Raign, 2013; Thompson, 2014; Wolfe & Griffin, 2012) is needed in order to advance much-needed theories and pedagogies for OWT. In writing center journals specifically, very few published articles address the topic of OWT or mention the topic in a substantive way (Prince et al., 2018, p. 13). In summary, decisions about how to support online writing students, whether in first-year or upper-level courses, seem to be based more upon institutional context, pedagogical assumptions, and theory than on empirically researched inquiry because much of the scholarship in this area applies a how-to rather than a why-to approach.

Early Online Writing Tutoring and OWLs

The first publications on synchronous online tutoring (Marsh, 2005, p. 6; Palmquist, 2003, p. 404) appeared in a 1995 special issue of *Computers and Composition*, "Writing Centers Online." This topic was somewhat prescient at the time because the majority of online tutoring in the mid- to late-1990s was likely asynchronous, taking place via email and word processors, but some writing centers were offering synchronous writing feedback using conferencing systems such as Daedalus (Johanek & Rickly), MUDs (Sherwood, 1998, p. 222), and MOOs (Sherwood, p. 228). This type of feedback was delivered via online chat rooms, so it still differed quite significantly from the traditional face-to-face tutoring model where students and tutors could simultaneously view a student's written document. Mike Palmquist, in writing about this special issue, observed that, "Word-processing programs played an important role in attracting students to the writing center and in supporting outreach efforts" (p. 400). His observation gives credence to the expansion of writing centers' focus from face-to-face to OWT and resources. Because the Digital Studio contains computers that are loaded with a variety of design software, I thought this presence would affect students' and instructors' impressions of what the pilot project is intended for.

Similarly, some of Eric Hobson's (1998) early observations in *Wiring the Writing Center* seemed appropriate for a project like the Digital Studio. Hobson covered issues including questions from "budget conscious administrators" regarding "the allocation of the current monetary and physical resources" when a center goes online (p. xvi), and the need "to retheorize the center in terms of its mission and configuration" in response to "technology's influence" (p. xxiv). Importantly, Ray Wallace (1998) observes that the arrival of technology in the writing center changes "the perception" of it "very quickly,"

from center to "computer labs" (p. 167). Along with the idea that the center is a computer lab comes contestations about how the space is used. That is, if a center is misconstrued as a lab, its purpose becomes muddied for stakeholders. As the Digital Studio is located in a computer lab, I wanted to be conscious of how this might affect students' and instructors' understandings of how to use the space. In addition to that, the space serves multiple purposes to different groups of students because both students enrolled in any English course and students majoring in the Department of English are welcomed to study and print course-related materials. Online writing consultations, however, are only available to Technical Writing students during the pilot stage.

Tutor Training.

In addition to where the Digital Studio is located and the hardware and software resources it contains, I was also concerned about the field's discussions of training tutors for online interactions which became more prevalent in the early 2000s. Although conversations about tutor training for both synchronous and asynchronous conferences began in the 90s, scholars continued to question the goals of online tutoring and how to train tutors to transfer what traditionally happened in face-to-face settings to digital ones. Technological challenges focused many of these conversations around practical procedures, but some scholarship also approached theoretical frameworks. For instance, Lee-Ann M. Kastman Breuch and Sam J. Racine (2000) call for challenging traditional writing center "orthodoxy" by stating, "tutors must be prepared to write on clients' papers" in order to "provide written comments, questions, and suggestions [...] —a practice found invasive in face-to-face tutoring" (p. 255). To David A. Carlson and Eileen Apperson-Williams (2000), technology "severed" the relationship developed

during face-to-face tutoring, a perspective perhaps informed by the writing field's strong theoretical foundations on social cognitive learning. In contrast, Randall L. Beebe and Mary J. Bonevelle (2000) find technology an integral part of tutor training, observing that it "should also include how to use software while tutoring" (p. 60). That some of the theory and pedagogy for face-to-face tutoring did not transfer directly to online tutoring became more and more apparent, signaling a need for a redefinition of these long-held beliefs.

Tutor training continues to evolve as practitioners and researchers explore new practices resulting from online tutoring. Diana Awad Scrocco (2012) discusses tutor training for asynchronous sessions by researching what her tutors reported in reflections. The tutors' main suggestions to improve training included "involving experienced OWL tutors, initiating in-person conversations about OWL strategies, and asking students for feedback about tutors' OWL responses" (p. 12). The literature often relies upon student evaluations, typically gathered using surveys, in order to assess writing center services, an important part of determining whether or not students' needs are being met. In another study of synchronous tutoring, Kathryn Rosser Raign (2013) examined transcripts of online tutoring sessions and coded for immediacy and avoidance techniques. Raign focuses on tutor training, claiming that tutors must close the digital gap between them and the student by fostering what she calls *immediacy, "*the sense of closeness or shared purpose—between two people attempting to communicate" (n.p.). The number of techniques used directly correlated to a student's satisfaction with the tutoring session: "the higher the percentage of immediacy techniques (which indicates a lower percentage of avoidance techniques) the tutor used, the higher the satisfaction score of the student."

Raign therefore recommends training tutors to use specific immediacy approaches and refrain from using specific avoidance approaches, providing a list of approaches for each that emerged in her coding scheme. Compared to earlier scholarship, suggestions for tutor training in this decade are more specific and seem to show greater trust in technology than earlier accounts that portrayed it as "severing" the relationship between tutor and student (Carlson & Apperson-Williams) and as a Panopticon of sorts (Healy).

Document Design.

Besides the software and other technologies used in online tutoring, some authors also mention document design (Breuch & Racine, p. 251; Trimbur, 2000, p. 30). Document design is a critical component of technical communication as well as an objective in many technical writing service courses (Nagelhout, 1999; Paretti, McNair, & Holloway-Attaway, 2007; Tebeaux, 1995), and without new technological developments, the focus of writing center work couldn't have been effectively shifted. John Trimbur (2000) writes that because of "recent trends in writing center theory and practice to see literacy as a multimodal activity in which oral, written, and visual communication intertwine and interact" (p. 29), he predicts "writing centers will more and more define themselves as multiliteracy centers" (p. 30). More recently, scholars have credited Trimbur for bringing this trend to light in the writing center field (Berry & Dieterle, 2016; Carpenter & Lee, 2016; Sheridan & Inman, 2010). Even though Trimbur is right that supporting multiliteracies has become a more prevalent part of writing center work, the name *multiliteracy center* does not seem to have become widespread (though Michigan Tech did rename its center to Multiliteracy Center).

Technology's Influence on Online Tutoring.

Technology persisted at the forefront of the literature from 2000 to 2010. In 2003, Palmquist noted the emergence of WebEx and similar programs which "allow writers and teachers to schedule meetings; interact through chat, video, or telephone in real time; and share writing (as well as control of a word-processing program) at a distance" (p. 406). These kinds of programs now allowed users to see one another and share screens synchronously, whereas before, computer technology was fairly limited to textual interactions. This evolution of computer support, Palmquist argues, changed the focus from "text production" to "providing resources that help students learn to write" (p. 407). Breuch (2004) agrees with this view, advocating for a more critical use of technology instead of "expecting [asynchronous and synchronous] tools to simply imitate face-to-face discussion" (p. 20) in her book, *Virtual Peer Review*. She forwards the view that virtual peer review in "online writing centers may encourage tutors and students alike to associate technology with writing and tutoring activities" (p. 137). In this way, technology can be seen as something integrated with the writing process, not just a tool applied afterwards to digitize words. Moving into digital environments that added users' verbal and visual cues might also give online tutoring participants the ability to iron out the confusion that Sarah Rilling (2005) notes is sometimes produced by asynchronous tutoring. Rilling observes that due to a lack of dialog between tutors and students as well as time constraints, "Students have commented that they did not always understand our questions or our comments" and that "A more interactive form of CMC [...] may provide the answer to this problem" (p. 370). That asynchronous tutoring often restricts

communication concerns many writing center professionals (WCPs) and goes against the field's foundational theories and practices

Breuch (2005) was also concerned by the variety of definitions for online writing centers. Using Jane Lasarenko's analogy, she notes that on the "lower rung" of online writing centers are informational websites or repositories, such as the Purdue OWL, while online tutoring services occupy the "higher rung" (pp. 21-22; cf. Sheridan). She usefully asks, "Are online writing centers a radical new way of conducting writing center work, or just a repurposing of the familiar?" (p. 24). Using Donald Norman's idea of a conceptual model as a way of "understand[ing] the way things are supposed to work as well as provide explanations for when things don't work" (p. 22), Breuch argues that online writing centers should embrace new conceptual models such as a cybercafe or studio. For instance, the studio conceptual model connects writers to resources, their classes, the university, and potentially even other universities, using a workshop metaphor (Breuch, pp. 35-36). Breuch's article inspired my decision to name the pilot project the Digital Studio, which the former chair of the Department of English liked and approved. Despite Breuch's efforts to re-conceptualize online writing centers, many still exist as online repositories (Sheridan). Such a model can be useful, however, given that the Purdue OWL received 410 million pageviews from 2016 to 2017 ("OWL Fact Sheet"). As the most famous and most used repository OWL, the Purdue OWL might render others like it useless, making Breuch's argument about conceptual models all the more important for today's online writing centers.

Melanie Yergeau, Kathryn Wozniak, and Peter Vandenberg (2008) draw on Trimbur's (2000) call for writing centers to focus more on multiliteracies, contending that

audio-visual-textual (AVT) conferencing "inevitably engag[es] student learners with more than 'just' print literacy" by immersing them in the various programs and technologies used for such a tutoring session. The authors use Bolter and Grusin's notion of remediation to consider ways in which an online tutoring session replaces elements of a face-to-face one, urging WCPs, "we should ask ourselves what elements are gained in this transformation, and what elements are lost." Yergeau et al. even include video clips of tutoring sessions to give readers a sense of the environment and interaction for themselves. Also concerned with the integration of software with writing center work, Amber Buck's (2008) case study begins by arguing for a critical examination of Microsoft Word's interface during tutoring session in order "to determine the ways in which technology changes these conferences and to develop effective practices for the inclusion of computers into writing center tutoring sessions" (p. 397). For instance, Buck suggests disabling the grammar checker so attention to lower-order concerns (LOCs) doesn't overly occupy the session. Along the same lines, Bill Chewning (2008) researches the feasibility of using a variety of technologies to offer online tutoring in University of Maryland - Baltimore County's writing center. Chewning explains that one technology, Blackboard's "Live Tutorial," proved infeasible because it was clunky and oriented toward group instead of one-on-one tutoring (p. 52). He also points out that video chats require a lot of bandwidth, which would be frustratingly slow for many students using the university's dial-up internet. Even though video chats might have been the newer, fancier technology at the time, Chewning took usability into account and opted for a more appropriate technology for online tutoring, a learning management system (LMS). Particularly relevant to this dissertation study, Chewning thinks technical

writing is more amenable to online tutoring than creative writing because the latter needs "f2f, real-time interaction [to] generate ideas, promote open discussion, and allow for a more free-flowing exchange of information between tutors and tutees" (p. 59). Students responding to my survey expressed similar ideas about technical writing being suited to the online environment, which I discuss in more detail in Chapter 4.

State of Online Writing Centers & Multiliteracy Centers.

Stephen Neaderhiser and Joanna Wolfe (2009) decided "to see how and to what extent OWLs have adapted or progressed" (p. 52). The authors center their research questions around technologies used for online tutoring, how those technologies were or weren't adopted, and what new services had surfaced. Reporting their results from the 2006 Writing Centers Research Project, Neaderhiser and Wolfe found that 23% of the 266 survey respondents' centers offered online writing consultations (p. 61). Of those consultations, 91% were asynchronous, via email (p. 61). Many writing centers (74%) also indicated that they received "no funding for online writing centers" (p. 65). This lack of funding may explain why so few writing centers were offering synchronous tutoring, despite the fact that some centers began practicing this method 14 years earlier. The hopes of some scholars to use technology to push boundaries of writing center work (Beebe & Boneville; Breuch & Racine; Palmquist; Trimbur) were still far out of reach, at least according to Neaderhiser and Wolfe's research.

The decade rounded out with David M. Sheridan and James A. Inman's (2010) edited collection, *Multiliteracy Centers: Writing Center Work, New Media, and Multimodal Rhetoric,* which takes up Trimbur's call. Drawing upon Robert Scholes and Gunther Kress, Sheridan urges writing centers to expand their purview to "all kinds of

texts" and not focus solely on "language alone" (p. 3). Sheridan feels the stakes of neglecting such a shift in focus are, in the words of Cynthia Selfe, "having composition studies become increasingly irrelevant" (qtd. in Sheridan, p. 4). Important to this dissertation study, Jackie Grutsch McKinney (2010) asserts, "The multiliteracy model employs specialized tutors for specialized sessions" (p. 213). While Digital Studio tutors received training in tutoring practices, PTW students likely have familiarity with ENGL 3764 course concepts and objectives. Upper-level PTW students should have proficiency in many of the needed literacies and thus will serve in specialist tutor roles.

Some writing centers in this decade went full technophile while others remained somewhat luddite, but the majority seem to be "straddling the virtual fence," as Hobson put it (p. ix). In other words, despite the advancements in technology, not many writing centers were experimenting with synchronous tutoring yet, and directors and faculty expressed apprehension about online tutoring in general (Breuch & Racine; Carlson & Apperson-Williams; Chewning; Neaderhiser & Wolfe). As compared to earlier in the decade, 98% of undergraduates and 99% of graduate students were going online in 2010; of undergraduates, 59% owned desktops and 88% owned laptop computers (Smith, Rainie, & Zickuhr, 2011). With an increase in students going online and owning computers, one might expect more online services to be offered in writing centers, but a significant lack in funding at many institutions likely influenced the majority of tutoring to take place asynchronously rather than synchronously. Finally, defining "typical" online writing center work would be next to impossible given the diverse experiences and attitudes present in the literature.

Recent Advances in OWT and OWLs

As with earlier scholarship, researchers in the present decade continue to interrogate the relationship between technology, pedagogy, and theory for online writing center services. Joanna Wolfe and Jo Ann Griffin (2012) embarked on a study that "attempted to compare OWI directly with face-to-face interactions to see what is gained or lost in the virtual environment" with the goal "to persuade skeptics of OWI to reconsider the medium's potential advantages and to begin developing theories and practices of OWI" (p. 62). This is the first study in the writing center field to compare face-to-face with online tutoring, and it sought to question the field's valorization of face-to-face conferences. Wolfe and Griffin included both desktop and tablet technologies for the online tutoring, finding that these sessions were "nearly as pedagogically effective as face-to-face sessions" and that there were "no significant differences in our expert raters' perceptions of the instructional quality of the sessions; moreover, participants were equally satisfied with the consultations regardless of environment" (p. 83). As a result of their study's findings, Wolfe and Griffin recommend using audio and desktop-sharing for online tutoring (p. 85). This finding is significant for the Digital Studio pilot project because, as I mentioned in Chapter 1, Zoom—a synchronous video meeting platform that allows screen sharing—is available at Virginia Tech to use for online tutoring. In terms of theoretical developments for OWI, the authors also recommend disabling grammar- and spell-checkers in any word processing software if the goal of tutoring is to more closely attend to higher-order concerns (HOCs) (cf. Buck). Echoing earlier advice (Beebe & Bonevelle), Wolfe and Griffin's research supports training both student writers and tutors how to use the conferencing technology, with an emphasis on tutors' use of tools for pedagogical effectiveness (p. 86). With this study, the writing center field began to

see a critical engagement with online tutoring from an empirically researched perspective.

Questioning Asynchronous Tutoring.

Operating upon founding documents and experience, the writing center field has traditionally valued face-to-face, in-person tutoring; as such, Wolfe and Griffin's research shows that synchronous can be just as effective as face-to-face tutoring. Because synchronous tutoring has many of the hallmarks of face-to-face conferences, it tends to be favored over asynchronous. Nevertheless, more recent data from the National Census of Writing demonstrates that asynchronous tutoring still prevails as the most dominant form of online tutoring, yet synchronous sessions may be on the rise. The question remains whether or not writing centers are taking advantage of the increase in internet-using, computer-owning college students and advances to the kind of synchronous meeting platforms Palmquist was so optimistic about in 2003.

Although synchronous tutoring became more widely used in the 2000s, asynchronous tutoring practices didn't go away. Judy Arzt, Kristine Barnett, and Jessyka Scoppetta (2009) studied a hybrid method where "writing associates" met face-to-face with students in psychology, special education, and English classes as well as provided written feedback on student writing submitted via email. Overall, students were quite satisfied with both the writing associates program and especially the online tutoring: "An overwhelming 97% of participants maintained that they would continue to email their papers to the online tutoring account" (n.p.). In fact, Arzt et al. mention that in their writing center, online tutoring sessions outnumber face-to-face ones. Therefore, some online writing centers have good reason to use an asynchronous or hybrid tutoring

method. Their writing associates worked on an internship model, earning upper-level English credits, just like the model I am using for the Digital Studio pilot.

Pushing back against foundational beliefs, some scholars continue to investigate the value of asynchronous tutoring. Jesse Kavadlo (2013) provides extensive excerpts from asynchronous sessions provided to show the year-long development of one an online tutor. Kavadlo argues that OWT needs to happen more critically despite the writing center field's reservations about asynchronous tutoring methods. She notes the difficulty in providing feedback electronically to writers, contending that "the inexperienced tutor may lapse into editing" (n.p.). For this reason, Kavadlo provides online tutors with a template of sorts to follow as they begin to develop their feedback skills. Taking a more evocative stance, Kathryn Denton (2017) makes the case that there is little research on online tutoring and that the field has dismissed asynchronous tutoring without proper attention and research inquiry. Denton notes an overall distrust of asynchronous tutoring in the literature, but emphasizes that these attitudes are mostly based on lore, not research: "Initial scholarship on this format urged caution and reinforced fears of asynchronous online tutoring grounded in lore and stemming from mistrust that the practices surrounding this format look too different from other tutoring practices" (p. 179). She briefly overviews the results of her study, stating that asynchronous tutoring was beneficial to students and that the tutors felt "their interactions [did] not feel impersonal, depersonalized, or anonymous" (p. 197). The remainder of her study's results are slated to be published in a forthcoming issue of *Writing Center Journal*, and will hopefully add to the slowly growing amount of RAD research that the field desperately needs in order to galvanize OWT theories and pedagogies.

OWI and OWLs.

Although Beth Hewett began using the acronym OWI (online writing instruction) as early as 2001, a book-length collection on the subject wasn't published until 2015, *Foundational Practices of Online Writing Instruction*, co-edited with Kevin Eric DePew. Being that the first articles about synchronous online tutoring appeared in 1995, two decades is quite a long time to wait for book espousing foundational OWI practices for the writing studies field. The book dedicates one chapter to OWLs, simply titled "Online Writing Labs." Diane Martinez and Leslie Olsen (2015) begin their chapter with the simple assertion, "OWI should be supported by online writing centers" (p. 183). They go on to detail how OWLs can use the CCCC's *A Position Statement of Principles and Example Effective Practices for OWI* to guide choices made for their services. For instance, Martinez and Olsen cite Principle 13, explaining, "This guideline suggests that students who meet asynchronously through the LMS should have asynchronous tutoring available, while students who meet synchronously should have synchronous tutoring available" (p. 190). They note the impression many people have that online tutoring is inferior to face-to-face tutoring (p. 191), indicating that the attitudes of some WCPs have not fallen away. They go on to offer advice for providing asynchronous and synchronous tutoring, as well as describe how to select and train tutors. Alerting faculty to the OWL's services is also of key importance because they will pass on the information to students (p. 203). Lastly, Martinez and Olsen emphasize that students need to be trained how to use the technology for accessing online services (p. 203), just as other scholars advised (Beebe & Bonevelle; Wolfe & Griffin).

The Current State of OWLs.

Sarah Prince, Rachel Willard, Ellen Zamarripa, and Matt Sharkey-Smith (2018) wrote about their decision to coin the term *online writing tutoring* (OWT) in order to distinguish it from the term OWL because, as Sheridan noted, OWLs can be either a repository of static information on a website or an online tutoring service. Instituting this simple acronym is reasonable given that it will help focus the field's ongoing conversations about this practice. In conducting this review, I found a great deal of scholarship referring to OWLs but which also discussed OWT services, sometimes adding to the difficulty of identifying trends in the literature. On a related note, the authors point out, "OWT-specific principles are either absent from the literature or conflated with OWI principles. OWI principles, created for teaching online courses, do not address tutoring as pedagogically distinct from classroom teaching" (p. 14). Prince et al. assert that "the number of writing centers conducting OWT is currently unknown" (p. 10) but find some evidence that the numbers have been steadily increasing since 2006 (p. 12).[1] In other words, one of the questions Neaderhiser and Wolfe sought to answer remains ambiguous: "How many writing centers are taking advantage of synchronous technologies that mirror the dynamics of face-to-face (f2f) consultation, and how many rely on asynchronous email?" (p. 52). In addition, Prince et al. found relatively few publications discussing OWT in various writing center-related journals (p. 13). Therefore, Prince et al.'s analysis of writing center publications reinforces my earlier

[1] Prince et al. cite Neaderhiser & Wolfe's article, which states 266 out of 498 survey respondents filled out the section on online operations. Prince et al. calculated this to mean 53% of writing centers offered online services, a perhaps unreliable statistic as this is not exactly what Neaderhiser & Wolfe report. That participants filled out this segment of the survey does not automatically mean they offered online services as they were not required to indicate which mediums they used (email, chat, etc.) and could also indicate using multiple mediums (email *and* chat, for instance).

assertion that additional research on either synchronous or asynchronous tutoring is a dire need.

To try to put Prince et al.'s assertion into perspective, I collocated statistical data reported in the literature reviewed or referred to in this chapter. Table 1 shows a summary of this data in chronological order, keeping the focus on this review's historical organization. First, we see the results detailed earlier from Neaderhiser and Wolfe, who observed several trends in their data. These trends include: few centers offered synchronous tutoring, and those that did were research universities with access to more innovative technologies; centers were more likely to experiment with "innovative web delivery"; and OWLs suffered from little interest and funding (Neaderhiser & Wolfe). Neaderhiser and Wolfe's research questions suggest that they were optimistic about the technologies writing centers might have been using to offer synchronous online tutoring, but the survey results signaled that most centers had not progressed beyond the asynchronous method that Joyce Kinkead described in the late 1980s.

Table 1: Statistical Data about Online Writing Tutoring Services

Type of Tutoring	**Neaderhiser & Wolfe (2009)** (n=266)	**OWI State of the Art (2011)** (n=158)	**National Census of Writing (2014)**		**Bemer (2015)** (n=100)
			2-year (n=155)	4-year (n=609)	
Asynchronous	91% (of the 23%)	50.3%	43.9%	38.1%	unknown
Synchronous	17% via text messaging[2]	25.8%	26.5%	30.9%	unknown
Either	23%	unknown	58.1%	54.4%	43%

[2] They report on five mediums used for synchronous online tutoring. Text messaging seems to refer to online chats.

Both	unknown	unknown	12.3%	14.6%	unknown

In 2011, the CCCC Committee for Best Practices in OWI conducted a nationwide survey of higher education writing instructors of fully online classes (Hewett et al., 2011). According to the report generated from this survey, "just over half the respondents (50.3%) indicated writing center consultants were available for asynchronous online consulting, and 25.8% reported tutors available for synchronous online consulting, while 22% indicated that they outsourced online tutoring" (p. 24). More recently, the National Census of Writing (data collected up until October 2014) shows ~54% of four-year institutions and ~58% of two-year institutions offer either asynchronous or synchronous tutoring services.[3] In a smaller study, Bemer found that 43% of the writing center websites she analyzed offered some kind of online tutoring; it is not specified whether those services were asynchronous or synchronous. Since 2009, it is probably safe to assume the number of institutions offering online tutoring has increased. Currently, the National Census of Writing is recruiting participants for another round of surveys which will provide a more accurate representation of the state of OWT.

From the type of research conducted in the 2010s to present, I would argue that not much has changed in the state of online writing centers since Neaderhiser and Wolfe's publication nearly ten years ago. We are still heavily reliant on asynchronous tutoring. We have little empirical research about tutoring in online environments, and other than survey data, empirical studies take place at single institutions. That we tend to research in isolation in the writing center field may explain why there is no new or generally accepted conceptual model of online writing centers. If students don't know

[3] The National Census of Writing separates its data by two-year and four-year institutions.

what to expect of a service or can't identify its conceptual model, how likely will they be to use it? This question holds key importance to this feasibility study, for designing an online service is one thing, but whether students will actually use it is another.

Qualitative empirical research is the norm in the writing center field (Liggett, Jordan, & Price, 2011; Babcock, Manning, & Rogers, 2012), but very little of it focuses on online tutoring. In fact, in Rebecca Day Babcock, Kellye Manning, and Travis Rogers's book, *A Synthesis of Qualitative Studies of Writing Center Tutoring 1983-2006*, only two studies of online tutoring are cited. From these two dissertations, Babcock et al. offer the following takeaway: "Online tutoring sessions can lessen pressure and frustration for both tutor and tutee (Robertson, 2005; Moser, 2002)" (p. 40). However, these studies seem to be about asynchronous tutoring, further reinforcing Prince et al.'s call for more research on OWT. I also support Babcock et al.'s assertion that the writing center field needs to develop "a theory grounded in data rather than in abstractions in order to present a complete model of what happens in tutoring sessions. Rather than borrow theory from other disciplines, we need to construct our own" (p. 5). Knowing how many centers offer online tutoring of some sort is an imperative first step before moving on to subsequent steps of studying what happens in OWT in order to construct such a theory. As some of "the earliest adopters of technology" (Palmquist, p. 396), writing center researchers should position themselves as testers of technology's pedagogical and theoretical applications for OWT.

Specialist Writing Centers

Alongside the integration of technology with writing center work, another area of development is relevant to this study: specialist writing centers. These kinds of centers

serve writers in specific disciplines, are fewer in number, and therefore occupy less attention in the literature. Because this dissertation study examines instructor and students of Technical Writing, and a generalist Writing Center already exists at Virginia Tech, exploring how the specialist tutoring approach differs from the generalist approach can provide further exigence for assessing how feasible it is to offer online writing support in this context. Specialist tutoring may also be under-researched because it suffers from the same problem as writing center research overall: that there is "little actual research on the effectiveness of specific tutoring practices" (Babcock et al., p. 2). The generalist approach is understandable given the fight writing centers have to be recognized as a valuable university entity. The more writers a center can serve, the more value it may have at the institutional level. At the same time, some researchers believe, "'Most writing center claims of success are not evidence-based'" (qtd. in Babcock et al., p. 2). The generalist technique is rooted in the belief Alexis Greiner (2000) expresses in her chapter, "Tutoring in Unfamiliar Subjects," from Ben Rafoth's tutoring manual. Greiner suggests tutors can offer feedback to writers from disciplines other than their own by remaining cognizant of the limitations of their expertise (p. 89).

While the writing center field has understandably tried to distance itself from the misconception that only students in English composition courses can receive tutoring (Trimbur, 2000, p. 30), and furthermore that such tutoring only involves sentence-level or LOCs, some scholars have researched the effects of specialist instead of generalist tutoring techniques. Isabelle Thompson, Alyson Whyte, David Shannon, Amanda Muse, Kristen Miller, Milla Chappell, and Abby Whigham (2009) find in their examination of published empirical studies that the lore-based writing center assertion, "Tutors do not

need subject-matter expertise to work effectively with students," is not supported by empirical research findings (p. 83). In their statistical analysis of 3,050 writing center conferences, Thompson et al. found, "students' perceptions of tutors' expertise and of having their questions answered exerted the strongest influence on students' conference satisfaction" (p. 95). Therefore, Thompson et al.'s findings corroborate those of the other empirical studies they cite. In this section, I describe in more detail some of the literature that investigates specialist approaches to writing advice.

Summer Smith (2003) investigates the specialist approach in her study of instructor responses to engineering students' papers by asking, "[T]o what extent does a teacher's level of expertise in a paper's subject actually affect his or her reading and evaluation of the paper?" (p. 39). Half of the instructors she selects have engineering expertise and half have technical writing expertise. Her study finds, "when reading papers outside their areas of expertise," both sets of instructors "devoted only about 2% of their statements to evaluating validity" (p. 53). Whereas writing instructors commented frequently on their lack of expertise, engineering instructors hardly mentioned it (p. 69). Smith believes that both kinds of instructors have something to learn from one another. For writing teachers, Smith suggests they can "evaluate validity by increasing their attention to nontechnical cues of invalidity, such as unqualified generalizations and internal inconsistencies within a paper" (p. 72). Engineering teachers, on the other hand, tend to "limit themselves to evaluating technical appropriateness," so Smith concludes they could consider rhetorical appropriateness more often (p. 72). Of course, Smith's study examines teachers, not tutors, so her results offer partial insights to the specialist versus generalist debate.

Responding to Smith's study, Jo Mackiewicz (2004) asks, "[W]hat happens when a writing tutor lacks expertise in the conventions of engineering writing, as well as in the subject matter of a student's writing?" (p. 317). Overall, in her study of three non-expert tutors and one expert tutor, she finds the non-experts offered more surface-level feedback (LOCs) and even some incorrect advice to engineering writers. The reason tutors offered incorrect advice seemed to stem from their familiarity with composition essays, offering advice such as adding a thesis statement—even though the writer's purpose was not to be persuasive but informative—and removing first-person point of view. The expert tutor, on the other hand, offered acceptable advice due to her 20 years of experience as a technical writer and established a better rapport with her tutee. Thus, Mackiewicz's study supports the idea of building the Digital Studio at Virginia Tech because ENGL 3764 students are often assigned technical reports and proposals in which familiarity with those genres is optimal in order to provide useful feedback. While not all ENGL 3764 students are engineering majors, I extrapolate from Mackiewicz's point that it is possible for these students to receive incorrect or surface-level revision feedback from generalist tutors, which could not only waste their time but could also lend to the damaging reputation writing centers advocates want to avoid.

In the second edition of the tutoring manual I mentioned above, Carol Briam's (2005) chapter, "Shifting Gears: Business and Technical Writing," responds somewhat to Mackiewicz's concerns about the generalist tutoring approach. Briam begins by pointing out that students and tutors have likely not learned the stylistic characteristics of business and technical writing (p. 63). As a result, Briam offers three characteristics tutors should look for in business and technical writing: that it contains "useful headings and visual

cues, is clear and concise, and is human" (64). However, Briam focuses some of her suggestions on surface-level writing qualities such as verb choice and parallelism (p. 67). She proposes, "Even when tutors don't understand a text, they can still offer editing advice" (p. 68), advice that Mackiewicz and staunch writing center theorists would likely find problematic because it can reinforce the association with a grammar fix-it shop. Somewhat along the lines of Smith's observations about expertise, Briam suggests tutors ask themselves, "[W]hat can I notice about this sentence even if I don't know what on earth it's about?" (p. 68). Even if a piece of writing is outside the tutor's expertise, Briam advises, "Rule number one is: *Don't be afraid to ask questions*" because through the process of a writer explaining difficult material to someone else, it may become clear that they don't actually understand what they wrote and the information can be simplified (p. 70). So what begins as a chapter on specialist advice—notably, only one of three publications I have found directly addressing technical writing in a writing center center setting—reverts to offering generalist advice. Although I have a few more sources in the generalist-specialist dispute to discuss, the amount of scholarship on the intersection of technical writing and writing centers is sparse to nonexistent. This sparsity lends exigence to my project.

In another study of writing advice outside of a writing center setting, Joanna Wolfe (2009) selects 12 technical communication textbooks to examine how they treat topics important to engineering writing. Of these textbooks, Wolfe classifies 10 as generalist and two as engineering-specific (p. 354). She reports, "[S]ome of the advice offered in these textbooks contradicts the rhetorical conventions of engineering discourse" (p. 353), much as Mackiewicz found some tutors' advice to engineering

writers to be incorrect. For instance, the technical communication textbooks Wolfe analyzes suggest using active voice over passive voice, an unacceptable practice in engineering writing because it is "an object-oriented discipline" (p. 356). Wolfe also finds it problematic that eight out of nine generalist technical communication textbooks[4] address MLA formatting, which "no technical discipline [she] know[s] of uses" (p. 358). In one particularly relevant example, Wolfe indicates that Mike Markel's (2004) handling of data, results, and numbers is somewhat sloppy and more reflective of a business communication course (p. 366). Wolfe asserts, "Many students in these disciplines will enter jobs where they are expected to solve problems about data and demonstrate numerical reasoning. Yet our textbooks do little to prepare students for this type of writing" (p. 368). Wolfe's comment about preparing students was important for me to consider when creating the Digital Studio because tutors may rely on textbooks to give them proper guidelines for assisting Technical Writing students from various disciplines. Coincidentally, many instructors at Virginia Tech, including myself, use Markel's textbook for Technical Writing. With the exception of Briam's chapter, no other tutoring handbooks I am aware of offer guidance for working with technical writing students.

Some institutions are working around the dissensus by offering both generalist and specialist tutoring. Melissa Bugdal (2010) informs readers that in her writing center, there are two kinds of tutors: peer consultants and writing mentors. Writing mentors, Bugdal writes, "serve in a more specific role than Peer Consultants, and [...] the Writing Mentor is paired up with specific courses and instructors in order to help students in that particular course in a one-on-one situation" ("Generalists or Specialists"). Sue Dinitz and

[4] One generalist textbook from the total sample of 10 offered no information about citations

Susanmarie Harrington (2013) employ a somewhat similar approach, using specialist tutors known as writing fellows in their WID Mentor Program (p. 94) and generalist tutors in their writing center (p. 95). In their literature review of the specialist-generalist debate, the term *writing fellows* arises in Writing Across the Curriculum (WAC) contexts (p. 76). Like Mackiewicz, Dinitz and Harrington conduct a study of how tutor expertise affects a tutoring session. They report, "[S]essions with tutors who have disciplinary expertise are often more productive than sessions with tutors who lack this expertise, in part because it allows them to be more directive in ways that enhance collaboration" (p. 74). Based upon their coding of recorded tutoring sessions, Dinitz and Harrington found similarities among sessions whose tutors they deemed "expert," such as "focus[ing] on global issues, not local ones" and "push[ing] students to go further by asking questions to extend discussion" (pp. 85-86). Focusing on global instead of local issues (often referred to as HOCs and LOCs in writing center jargon), overlaps with Mackiewicz's observation about specialist tutoring. In much of writing center lore and tutoring handbooks, tutors are advised to focus on higher order concerns (HOCs) over lower-order concerns (LOCs), although this does not preclude them from helping writers with LOCs. This theory verifies why researchers in the above studies value sessions in which tutors do not solely address LOCs: these sentence-level preoccupations are what implicated writing centers with remediation. As a result, it is important to note that multiple scholars reporting on this debate favor the specialist approach because of its heightened awareness of HOCs.

This differentiation between generalist and specialist tutoring points to one of the exigencies for creating the Digital Studio. Studies involving teachers, tutors, and textbooks all seem to settle on the notion that at least some level of specificity is

beneficial to providing advice or feedback on student writing. Even when generalist approaches are used, writing center scholarship acknowledges the limitations of a tutor's expertise and attempts to intervene with more specialist recommendations. Based upon this scholarship, sparse though it may be, I believe the use of specialist tutoring techniques in the Digital Studio are worthwhile. My study does not attempt to reconcile the generalist-specialist debate, nor am I studying the difference between generalist and specialist tutoring, but it can add to the "empirical data" which Dinitz and Harrington note is lacking in the scholarship (p. 77). As the models at some institutions demonstrate (Bugdal; Dinitz & Harrington), it is not necessarily adversarial to offer specialist writing tutoring in a space outside the writing center. In fact, some institutions offer writing tutoring in other kinds of specialized centers that I describe in the following section.

A Horse of a Different Color, But a Horse Nonetheless

Most writing centers serve writers across the institution, but in some instances, certain schools or programs decide to offer students disciplinary writing or multiliteracy support. While the focus of these centers may differ from the broader field of writing center studies, their theories and pedagogies remain student-centered, collaborative, and socially constructed. Because of their specialized focus, engineering, business, and multiliteracy centers can offer useful takeaways for the feasibility of the Digital Studio at Virginia Tech.

Engineering Writing Center (a one-off).

In a somewhat anomalous example, Kristin Walker (2000) describes how the Electrical and Computer Engineering (ECE) department at the University of South Carolina created a writing center for its students. The ECE Writing Center has several

overlaps with writing center theory and practice, such as reading student work aloud, not editing student work, and discussing higher-order concerns such as audience and organization (p. 370). At the same time, the ECE Writing Center departs from writing center theory and practice in a few ways, such as by helping grade student work and by employing consultants "trained specifically in technical writing and the discourse of a particular engineering discipline" (pp. 370-371). Walker uses genre theory as the theoretical foundation for this center because it "stresses the situated nature of all writing" and reflects the needs of "a specific audience and has a specific purpose" (p. 371). A version of Walker's engineering writing center exists here at Virginia Tech in the Materials Science and Engineering Department where I served as a graduate teaching assistant for two years. This program was built by Marie Paretti, the former Assistant Director of the Professional and Technical Writing Program (Dubinsky, 2000). The presence of the Engineering Communications Program indicates that disciplinary-specific writing support efforts already exist on campus, emphasizing yet again that the Digital Studio would not necessarily conflict with the "main," multidisciplinary-serving Writing Center. Of course, ECP operates as curriculum-embedded support, not an optional resource for all students like the Writing Center.

Engineering Support in a Generalist Writing Center.

Just recently, Robert S. Weissbach and Ruth C. Pflueger (2018) published a teaching case about their collaboration as an engineering professor and writing center director, respectively. This study asserts that training writing center tutors to understand the genre of a lab report for an electrical engineering class improves the effectiveness of their tutoring and the students' perception of tutoring effectiveness. The engineering

professor and writing center director worked collaboratively to develop tutor training. The authors collected surveys of student satisfaction as well as tutoring reports over several semesters. While the tutors received some training, they did not otherwise have technical backgrounds in the discipline, showing that just some training—that includes a list of technical terms and a checklist—can improve tutoring effectiveness. One caveat to this collaboration is that it took place over the course of seven years, an indication that developing an appropriate program to train generalist training tutors to offer specialist feedback takes time, research, and commitment.

Business Writing Centers.

The first sub-genre of writing centers are those serving business schools. Some of these centers use the word *communication* instead of *writing* to highlight their assistance with presentations and other student endeavors that are not strictly textual. As with the literature addressing technical writing in writing centers, Elizabeth Tomlinson (2014) recently noted "the dearth of scholarship about BCCs [Business Communication Centers]" (p. 6). In her 2012 search, she found only 23 BCCs, most of which "were founded within the past 10 years" (p. 6). The same year Walker wrote about the ECE Writing Center, Shirley Kuiper and Martha Thomas (2000) outline their process of developing a business communication center, also at the University of South Carolina. Relevant to this exploration of the Digital Studio's feasibility is that their center "differs from the traditional writing center in that it is discipline-specific (i.e, dedicated to business communication) and provides consultation in both written and oral communication" (p. 53). Rather than treating how their Center for Business Communication differs from so-called traditional writing centers, Kuiper and Thomas's

article provides a detailed account of the process they underwent which they feel led to the acceptance of the center's proposal and the media attention it received when launched.

A year later, Frank Griffin (2001) offered a more in-depth explanation of the reason his HBCU established its Business Writing Center. In traditional writing centers, Griffin identifies the common audience as the instructor because students often visit because they are working on an assignment for class (p. 72). However, in a business writing center, he forwards the idea that the audience can be expanded to that of "the profession awaiting the graduating student" (p. 73). While the majority of students visit Griffin's writing center for assistance with course-related assignments, just over 20% seek job- and internship-related support (p. 75, 77). Multidisciplinary writing centers often encounter visits from students with job application materials and surely provide competent if not imperative revision advice. Griffin's data collection points to another aspect of disciplinarity within the professional and technical writing field, though: students enrolled in these courses often complete job package assignments. While students across Virginia Tech can still seek tutoring from the Writing Center for their resumes and cover letters, students enrolled in ENGL 3764 would more than likely benefit from the curriculum-based Digital Studio's feedback.

In another exploration of a nontraditional writing center, Geert Jacobs, Liesbeth Opdenacker, and Luuk Van Waes (2005) conduct a study of Calliope, the online "writing center" at University of Antwerp designed to support students in business and technical writing courses in five languages. However, unlike traditional writing centers, Calliope has no tutors; instead, it provides learning modules which are interactive and non-linear

(Jacobs et al., pp. 9-10). The authors note that "Calliope is integral to classroom instruction" because there is no physical writing center at their university (p. 11). Instead of offering "General advice on writing," which is the traditional approach of writing centers, the authors "opted for a context-based and genre-specific writing approach" (p. 11). Overall, their assessment of one module finds that Calliope is moderately effective "in boosting the learners' confidence about writing press releases" (p. 15). As I mentioned at the outset of this section, students who enroll in the winter session of ENGL 3764 have zero writing center services available, so Jacobs et al.'s model may lend some ideas to developing a website for the Digital Studio.

In some writing centers, face-to-face and other forms of hybrid tutoring may not be an option. When a Japanese institution experienced a decrease in use of the business writing center, Gene Thompson (2014) surveyed students and found out many of them wanted online resources and very few (6%) had used the face-to-face tutoring service because of schedule conflicts. As a result, that service was suspended, and the writing center went to more of a repository OWL model. By adding resources students requested and by embedding the writing center within the same LMS used for a first-year writing course, the revised OWL experienced a dramatic increase in student use. Therefore, Thompson's research shows that in some contexts, the OWL as repository holds value for its users.

Two final explorations of the business sub-genre focus on faculty relationships and disciplinarity. First, Tomlinson outlines how she helped create the Business Communication Center (BCC) at West Virginia University by interviewing faculty about their perceptions of teaching writing-intensive courses and asking what resources would

help their students and themselves. In addition to traditionally trained writing center consultants, Tomlinson's BCC also employs subject-area tutors (p. 9). Like other centers providing disciplinary support, the BCC's staff "developed genre-specific resources, such as tips for writing an executive summary, approaches to constructing a business plan, and pointers for presentation design" in response to faculty's goals for students (p. 9). In a similar effort, Caroline Dadas, Abby Dubisar, Denise Landrum-Geyer, and Kate Ronald (2014) acknowledge that in Miami University's Howe Writing Initiative (HWI), "we know [faculty's] assignments intimately, and we get to know students as they move through the core business curriculum and into their major courses" (n.p). Because of their program's embeddedness within the curriculum, the authors believe they, "develop a familiarity with some business principles; for this reason, we feel comfortable in telling students that the HWI can provide more specialized guidance than students may receive at the university-wide writing center" (n.p.). Again, these authors credit curricular familiarity with an increased ability to assist students with their writing, a lesson that could serve the Digital Studio well.

Multiliteracy Centers.

The second sub-genre is the multiliteracy center. Whereas engineering and business writing centers provide disciplinary support, multiliteracy centers tend to expand their services to visual and oral projects, as the name suggests. John Trimbur (2000) notes a new (at that time) tendency in writing centers to provide support for multimodal compositions and connects this with changes in the global and knowledge economies (p. 29). Following in Sheridan and Inman's (2010) footsteps, whose collection I described in greater detail above, Russell Carpenter and Sohui Lee (2016) recently edited a special

edition of *Computers and Composition* on multiliteracy centers. Just as contributors to Sheridan and Inman's *Multiliteracy Centers* did, Carpenter and Lee consider Stuart Selber's (2004) understanding of functional, critical, and rhetorical computer literacies commensurate with the purpose and goals of multiliteracy centers. In a nutshell, Selber uses the following metaphors to encapsulate these three literacies: functional literacy sees computers as tools, critical literacy sees computers as cultural artifacts, and rhetorical literacy sees computers as hypertextual media (p. 25). According to Carpenter and Lee, these literacies of "rhetorical knowledges of modalities, technical and technological knowledges, and socio-cultural knowledges and understandings [impact] 21st-century communication" (p. v).

In one example of a multiliteracy center, Landon Berry and Brandy Dieterle (2016) explain their reason for choosing the name Digital Workspace is based on "the intent of being both a dedicated and flexible space conducive to meet a variety of needs of both tutors and tutees" (p. 27). They note, "The title of the space itself seems to be impacting tutor perceptions of when it might be appropriate to use," and that "tutors mentioned it would be conducive for group work or when there was a need for technology" (p. 27). Berry and Dieterle's analysis highlights how the naming of a space affects how users perceive that space and, thus, how they actually use it. Informed by Berry and Dieterle's explanation as well as Breuch's conceptual models for online writing centers, I suggested the name Digital Studio to the former chair of the Department of English, who immediately approved it. I intended the naming process as one way to ensure that the Digital Studio's services aren't confused with the main Writing Center's.

For many authors, writing center work is logically connected to multiliteracy center work because of its concentration on communication. They argue that because communication takes place in a variety of contexts, not just in black and white on a letter-sized sheet of paper, part of the new work of writing centers is to support students creating textual, oral, and visual projects. The overlap here with the Digital Studio is that ENGL 3764 students are tasked with creating the kinds of projects described in multiliteracy center literature. Technical writing research shows what kinds of communication are produced most often and are most valued in professional and technical writing jobs. For instance, Stuart Blythe, Claire Lauer, and Paul G. Curran (2014) report from their findings of a survey of technical and professional communication alumni that email, instructions/manuals, web sites, and presentations are the top four types of documents written most often and most valued in their workplaces (p. 273). As all of these documents arguably require not just functional but also critical and rhetorical computer literacies, and that some are not purely textual but visual and oral as well, multiliteracy centers seem well-equipped to shore up students' competencies in these areas. In that way, the Digital Studio can encompass this expanded view of writing center work. Furthermore, multiliteracy center scholarship doesn't seem to address helping students with functional computer literacies in online settings. Rather, these kinds of tutorials have been researched in face-to-face settings (Bancroft, 2016; Buck, 2008), so the Digital Studio has the potential to expand empirical inquiry to this area should students request such assistance during tutoring sessions.

Contextualizing the Technical Writing Service Course

Just as generalist writing centers serve writers from multiple disciplines, so too do technical writing service courses. As I pointed out in Chapter 1, the technical writing service course originated from a desire to improve engineering students' writing, but today's course sees students enrolled from other disciplines as well. At Virginia Tech, some of these majors include computer science, economics, wildlife and fisheries, and building construction, as well as multiple kinds of engineering. Because of the variety of majors that students have in this course, supporting and emulating disciplinary writing and genre conventions becomes tricky for the instructor. As Ed Nagelhout (1999) points out, the course "cannot be the specific writing situations of all disciplinary practices" (p. 286). I argue the service course and writing centers encounter similar difficulties when it comes to disciplinary writing because it requires a certain amount of expertise to both understand a text and provide writers with effective feedback, not to mention introduce genre conventions. In fact, the University of Cincinnati has developed several specialized technical writing courses serving medical sciences, information technology, and psychology majors (Arduser, 2018). Furthermore, the disciplinary writing situation applies both to writing center tutors and technical writing instructors. As the research I cited in the previous section demonstrates, expertise affects satisfaction of a tutoring session (Thompson et al.) as well as the focus on HOCs rather than LOCs (Dinitz & Harrington) and the appropriateness of advice (Wolfe). In the service course, students might not value an assignment if they cannot identify its relevance to their discipline's writing and genre conventions, or they may discount an instructor's feedback if they believe "cover letters are dead" or "memos aren't used in engineering firms." As the technical writing service course has evolved from a fix-it shop mentality for engineering

students to a primer on various workplace genres for STEM majors, its purpose undergoes cycles of consideration in the literature.

In 1999, *Technical Communication Quarterly* published a special issue on the service course in which several authors contemplated its focus and pedagogy. For example, Nagelhout believes the service course should be centered around:

> help[ing] students develop the tools for analyzing language and understanding writing in more complex ways, to provide them with opportunities to reflect on their writing, to think critically about rhetorical situations, and to create, design, and write 'texts' that can be developed through a variety of media. (p. 286)

I would argue these goals are applicable to just about any writing course, however. The question Nagelhout's description elicits then becomes, *How does the technical writing service course differ from first-year writing and other English department courses?* Nagelhout rightly asserts, "the technical writing classroom is certainly more than 'standardized' forms and reports" (p. 286), but I contend that technical writing students should both encounter and write in certain workplace genres before seeking employment. If students aren't exposed to certain forms and reports, how will they identify or analyze them as genres with specific purposes in the workplace? To that end, introducing students to the difference between a form or template and a genre should be part of the service courses's agenda.

Writing in the same special issue of *TCQ*, Carol David and Donna Kienzler (1999) shared a new approach to the service course, a course that remained relatively unchanged at their institution for 50 years. David and Kienzler attest that "emancipatory pedagogy" is the answer to updating the service course because it gives students more

choice in the type of assignments they complete. More importantly, emancipatory pedagogy is a way to change the "preferred mode of most of our technical communication students, who prefer hearing the 'right' answers and receiving prescriptive assignments" (p. 272), to another mode in which students become participants in service learning projects and learn how to "analyze, synthesize, and evaluate parametric problems" (p. 280) by employing critical thinking and problem-solving skills. David and Kienzler attest that emancipatory pedagogies used in STEM service courses should be transferred to the technical writing service course, offering several assignment descriptions that are representative of such pedagogies. Along somewhat similar lines, Nancy Coppola (1999) advocates for a task-oriented pedagogy based upon social construction theory. Using this combination of theory and pedagogy, Coppola suggests "the new technical communication service course would include these concepts: collaboration between and among students and teachers, student as active participant in the learning process, meaning dependent on social and cultural contexts, feedback and iteration, and workshop environment" (pp. 262-263). David and Kienzler also emphasize collaboration and student-centered learning, but Coppola recommends portfolio assessment both because ABET 2000 (Accreditation Board for Engineering and Technology) recommends it (p. 251) and because it is a "cultural artifact" of "an advanced level of literacy" required for technical communication students (p. 252). Staying true to student-centered pedagogy, students were allowed some choice in what documents to include in the portfolio. Despite that portfolios are common in writing courses, I find assignments along the lines of what David and Kienzler recommend allow students to practice the kinds of projects they may be tasked with on the job. When

students see a more immediate application for their course assignments in the so-called "real world," they may be more likely to retain and transfer skills obtained by completing those assignments.

Genre-Obsessed

Nagelhout's attempt to distance the service course from "'standardized' forms and reports" points to one of the ways in which the course has been misunderstood by students and faculty. Preferable to forms and templates is Carolyn Miller's (1984) concept that genre is social action, which has enjoyed considerable staying power in the writing studies field. Ostensibly, Miller's understanding of genre highly influences many technical writing researchers and instructors. As such, genre is often the method used to teach technical and professional writing (Read & Michaud, p. 105, 2018). For Elizabeth Tebeaux (1995), genres assigned in the class include proposals, correspondence, reports, and instructions (p. 372). Nell Ann Pickett (1997) suggests the technical writing service course should "emphasize process explanations, instructions, descriptions, analyses through classification and cause-effect, various kinds of reports, feasibility studies, proposals, business correspondence, job application materials, data interpretation, graphics and visuals, and page layout and document design" (Pickett, 1997, p. 288). Many of these genres are taught in ENGL 3764.

The problem with teaching technical writing using a focus on genres is that students may not have the chance to develop a view of genre that is as nuanced as Miller's. While students might understand that a proposal *does* something different than a report, they might not fully embrace that all genres constitute social action of some kind and that individual contexts and situations affect how those genres look and are applied in

various environments. In the three abbreviated terms where I have taught ENGL 3764, at least a handful of students in each class had trouble distinguishing between the purpose of a report and a proposal. In a survey of engineering graduates, Melinda L. Kreth (2000) surmises that her respondents didn't seem to understand the rhetorical concept of purpose: "Rather than specifying why they wrote what they did, the overwhelming majority simply reiterated what they wrote, listing specific kinds of documents" (p. 144). This may indicate that the respondents see technical writing more as a genre and/or a format than an occasion for writing with a specific purpose in mind. Kreth further notes:

> Respondents seemed to think of 'purpose' only in terms of specific genres (e.g., reports, proposals, work orders, etc.). Perhaps those who did not cite a purpose had not been trained to think (explicitly, at least) about the purposes of their writing and, therefore, lacked explicit rhetorical awareness. (p. 145)

Even more disappointing to technical writing instructors, Kreth reports, "only 6% (9 of 162) cited a technical writing course as helpful" for learning how to write like an engineer (p. 146). Kreth's survey results seem to indicate that the technical writing course doesn't benefit engineers much, theorizing that, "engineering students need writing courses that are tied more closely to their particular engineering specialty, rather than to engineering in general" (p. 150). Consequently, Kreth's study may give further credence to the efforts Lora Arduser (2018) describes at the University of Cincinnati to develop specialized technical writing courses, in addition to specialist tutoring research.

Another concern with a genre-based approach to teaching technical writing is how often those genres are used in students' future workplaces. Whether or not technical writing should be fully or partially dedicated to preparing students to meet industry

demands is sometimes broached in the literature (Cook, 2002). Ann Marie Francis (2018) endorses the view that technical and professional communication (TPC) courses "have specific objectives to improve students' understanding of the necessary techniques to communicate effectively in their future STEM careers" (p. 69) and conducts a survey of TPC instructors to determine how much time they believe engineers spend reading and writing various workplace documents. She compares her survey results to Don Cunningham and Jill Stewart's 2012 survey of engineers as a way of determining how well TPC instructors match "assignments to industry writing requirements" (p. 47). The genres Francis included in her survey are correspondence, meeting minutes, technical reports, proposals, management reports, and manuals. Overall, the survey results showed that "instructors who responded have a fairly clear understanding of the time engineers spend reading different types of documents," with the exception of meeting minutes (p. 67). Survey respondents underestimated the time engineers spent both reading and writing meeting minutes. Additionally, instructors overestimated the time engineers spend writing management reports and manuals (p. 68). Francis's research underscores the importance of aligning TPC curriculum with engineering industry, and she calls for more research on including multimodal assignments because it is unclear "how often engineers write using multimodal technology in their professional jobs" (p. 70). I will treat multiliteracies more fully in the following subsection, but for now, it is important to distinguish between multimodality and multiliteracies. Multimodal typically refers to the assignments that students produce which contain more than written text. Examples from Francis's analysis of TPC instructors' syllabi include assignments asking students "to create wikis, incorporate visual rhetoric, design websites,

and author blogs" (p. 66). These multimodal assignments often incorporate multiliteracies, but the two are not one and the same.

Rather than centering courses around genre, some scholars instead continue to endorse the more expansive objectives advocated for in the scholarship at the turn of the century (Nagelhout; Coppola; David & Kienzler). For instance, Marie Paretti, Lisa McNair, and Lissa Holloway-Attaway (2007) mention technical and professional communication courses cover objectives such as "rhetorical analysis, document design, genre writing, working in a team, and editing for clarity and conciseness" (p. 328) as well as "collaboration (with subject matter experts as well as coauthors), writing to audience/user needs, learning and operating new technologies, and self-motivation and self-critique" (p. 329). Offering another, perhaps more general perspective, Breuch (2004) presents the following as integral content for technical writing courses: "theory and practice about oral, written, and visual communication genres, collaboration, intercultural communication, and ethics," asking if technological literacy should be added to this list (p. 492). Both Paretti et al. and Breuch mention collaboration, which I will elaborate on shortly because it is especially important to the fields that I am attempting to fuse in this dissertation study. In the meantime, Breuch's reference to literacy illuminates another, more recent objective in the service course. As Coppola indicated at the end of the last millennium, "we need to begin anew the process with a redefinition of literacy or literacies for our technical communication service course" (p. 264). Indeed, this redefinition of literacies is treated in depth by several technical writing scholars.

Multiliteracies in the Technical Writing Service Course

In Chapter 1, I gave a brief overview of the respective categories of multiliteracies that Kelli Cargile Cook (2002) and Selber believe should be part of technical writing and writing curriculums. Insofar as how multiliteracy intertwines with or affects pedagogy, several points of view, often overlapping, are present in technical writing scholarship. First, there is computer literacy. For Selber, computer literacy is a *functional literacy*, meaning that students understand how to use a computer with the goal of getting a job (p. 25). Functional literacy is a prerequisite for students to develop critical and rhetorical literacies, but Selber explicitly says the latter two are not more important than the former. After all, students must understand how to use computer technology before they can critique it or produce it. Ed Nagelhout (1999) offers a similar definition: "Computer literacy in the technical writing classroom means developing the interface capabilities necessary for success in a post-industrial, information-laden, linguistically-diverse society" (p. 290). For Nagelhout's purposes, computers are integral to conducting academic research via the Internet and desktop publishing (p. 290). So while using computers fulfills a long term goal of entering the workforce, the short term goal involves using computers to achieve academic success.

Similar to what Selber calls functional literacy, Cook uses the term *technological literacy*, which by its "most basic definition [...] means that communicators know how to use computer applications" (p. 13). Cook pushes for an expanded definition that "incorporates principles of usability and user-centered design" because being proficient with technology isn't enough; it requires combining with rhetorical literacies (p. 14). Breuch (2004) also uses the term *technological literacy* with a definition similar to Cook's, explaining it as "the ability to use technology; the ability to read, write, and

communicate using technology; and the ability to think critically about technology" (p. 483). Selber elaborates the distinction between using, critiquing, and producing technology more extensively, whereas Breuch places all three literacies under the umbrella term technological literacy. Regardless of the depth of description, these multiliteracies can and should be supported by the Digital Studio's online tutoring services. Offering tutoring via Zoom may in fact provide students and tutors the opportunity to become functional users of an online meeting platform while discussing critically a student's document or graphic design.

Indeed, a critical approach to technology is the second of three literacies that Selber forwards should be part of any English department student's education. According to Selber, *critical literacy* is "about the ways students might be encouraged to recognize and question the politics of computers" (p. 75). In order for students to become critically literate, they must be able to recognize design cultures, use contexts, institutional forces, and popular representations (Selber, p. 96). Breuch likewise finds context, including "political, economic, social, and cultural factors [...] may impact the creation, design, access, and use of technology" (p. 272). Although Breuch's article was originally published two years before Selber's book, Selber does not cite her; nonetheless, the two use similar vocabularies to express similar ideas. The main difference is that Selber applies his framework of multiliteracies to English departments in general, whereas Breuch applies hers to the technical writing course. In the technical writing course at Virginia Tech, the fourth course-level objective is, "Use conventions of various workplace genres, such as proposals, instructions, correspondence, reports, and slide decks, with [an] understanding of how the genre conventions can be used as heuristics

and as principles of arrangement." While using genre conventions to produce digital work requires more of a functional literacy, understanding those conventions as heuristics requires students to critically analyze the context of their workplace or wherever else those genres are used in their lives.

Cook, Nagelhout, and Selber agree that rhetorical literacy is a pedagogical concern in the technical writing course. Yet again, definitions vary slightly, but the overall concern about rhetorical computer skills is largely similar. First, Cook believes rhetorical literacy, "requires students to understand and be able to analyze, evaluate, and employ various invention and writing strategies based upon their knowledge of audience, purpose, writing situation, research methods, genre, style, and delivery techniques and media" (p. 10). However, Cook's definition does not specifically concentrate on computers or technology and rather encompasses objectives that might be included in any college writing course. Nagelhout also outlines rhetorical literacy without specific attention to technology, saying it, "means helping students explore the differences between fact, inference, and opinion, examining how each of these might work effectively in different situations" (p. 289). Again, Nagelhout is specifically addressing academic research, so his definition is a bit narrower than Cook's. While these understandings of rhetorical literacy come to bear upon the technical writing service course, I believe Selber's construction of rhetorical literacy is most appropriate for today's students, especially those at a polytechnic institute like Virginia Tech. Selber advances, "rhetorical literacy insists upon praxis—the thoughtful integration of functional and critical abilities in the design and evaluation of computer interfaces" (145). Rhetorical literacy in Selber's estimation means students are ready to produce technology

in addition to using and critiquing it. Many ENGL 3764 students are STEM majors who will likely play some part in the creation of technology, and ideally, their education at some point should dispel the instrumental view of technology (Haas, 1996). The technical writing service course is one place where this can and should happen.

Pedagogy in the Online Technical Writing Course

Like the writing center field, technical writing has experienced a shift in its pedagogical focus as a result of technology and online education. Multiliteracy in terms of using and composing with computers is largely responsible for this shift, especially as computers and internet technology began to allow students in greater numbers to take courses at a distance. In 1995, Tebeaux proclaimed, "For technical communication teachers, distance education is an uncharted frontier" (p. 366). While significant changes to the technologies for delivering online education have occured, I believe Tebeaux's 23-year-old statement is still true: "practice is running ahead of theory" (p. 366). In some ways, faculty and instructors aren't to blame for this because they are often meeting demands from institutional administrators and students. The mad dash to go online has left many instructors grasping and struggling to keep up with demand for courses, especially with classroom space at a premium across most campuses.

Tebeaux explains one of the primary tenets of distance theory is that it allows students to be more independent learners and teachers to be facilitators encouraging dialogue (p. 368). One large distinction between the distance and classroom-based technical writing course is that "assignments, not the teacher, are the central focus the course" (pp. 382-383). Tebeaux argues that, "Technical writing courses are particularly good candidates for distance delivery because the course is practice oriented and requires

regular writing and feedback" (p. 384). One of the challenges, however, is that the distance course "may preclude collaboration" and "is product oriented" (p. 386). Important to my study, Tebeaux notes that in the first version of the distance technical writing course at Texas A&M, "faculty and tutors are available at announced times to answer questions" (p. 370). She mentions later that her graduate assistant "conduct[ed] the weekly help sessions" (p. 385), and that students could call or email with questions, so even in the early stages of technical writing courses taught with the Internet, student support was a key consideration. Tebeaux argues that faculty need "to reconsider how we deliver instruction and how we can use technology to achieve pedagogical goals we once considered sacred" (p. 389). Her admonition is quite similar to how some writing center scholars advocate for appreciation of asynchronous tutoring (Bruech & Racine; Denton).

However, not all technical writing educators agree that technology and pedagogy affect one another. Mike Markel (1999) fundamentally disputes the idea that distance courses require new pedagogies and instead contends, "the pedagogy used by an effective classroom instructor of technical communication is already very close to that of the ideal distance educator" (p. 210). Markel points out that John Dewey disavowed teaching via lecture in the 1930s (p. 213) and discounts the theoretical argument that distance education centers students instead of teachers as a "straw man" (p. 219) because technical communication classrooms are already student-centered. Moreover, he believes lecture is rarely needed, so what instructors do in face-to-face courses can be done just as easily online: teach "students to learn how to learn, to be questioning, analytical readers and writers who know how to participate effectively in any rhetorical context" (p. 218). If video lectures aren't needed in the online technical writing course, Markel doesn't

suggest what pedagogical tools can be used to teach students critical thinking and rhetorical skills.

David Gillette (1999) finds pedagogy in online technical writing courses to be more akin to design, or what might now be referred to as experience or user experience design (UX or UXD). He describes the copious amount of time he spent designing and updating the website for his course, responding to student emails (at least two hours per day, he estimates), and developing visual metaphors that show students how to interact with the course website. Like Breuch's conceptual models for writing centers, Gillette is also influenced by design scholars, which led him to create a "lobby" and other visual metaphors for his online course. Ultimately, he lands on the analogy of "the ghost in the machine" (p. 33), a description one of his students used for his presence in the course. In this role, he agrees with his student that "the true job of an online instructor is to stand in the background and keep things running smoothly" (p. 33). This relatively passive view of an online instructor's persona, however, is something that certain online technical writing instructors feel at odds with, as I will discuss in Chapter 4.

Technical writing faces many of the same challenges as other online courses. In the infancy of online courses, instructors and administrators were concerned—and still are concerned, I believe—by how well students learn in online as opposed to traditional face-to-face classrooms. In a study at North Carolina State University, Brad Mehlenbacher, Carolyn R. Miller, David Covington, and Jamie S. Larsen (2000) sought to compare conventional and online versions of the same course, Communication for Engineering and Technology. The course is NC State's version of the service course as it is a general education requirement for engineering and many other majors and "focuses

on various professional genres such as proposals, formal reports, and instructions" (p. 172). Mehlenbacher et al. found "no significant difference between the Web and the conventional conditions by final course grade" (p. 174), but they did identify several interesting trends among their data. For one, females performed better than males in the online course (p. 175). Next, in the conventional course, "students who showed higher computer anxiety ratings tended to get lower grades" (p. 175), bringing functional literacy's importance into focus. Lastly, they note, "Students in the Web-based condition sent significantly more email messages to the instructor than the students in the conventional condition" (p. 175), confirming other scholars' assertions that online courses are more laborious for instructors (Griffin & Minter, 2013). Most important to the authors, however, "Our results indicate that reflective (versus active) learners and global (versus sequential) learners performed better," indicating to Mehlenbacher et al. that "reflective learners who prefer solitary, quiet problem-solving as opposed to group discussion of problems may have been more comfortable in the Web course" (p. 176). Mehlenbacher et al. intended the course website to be fairly interactive in its design, so they hypothesize that their results suggest that emulating online what happens in the classroom presents great challenges to instructors (p. 176). They go on to observe that technology prevents seamless online interactions, dubbing those interactions "awkward at best" and attributing this to the fact that internet tools, which allow writing instructors to teach online the way they would in classrooms, "are very much 'in development'" (p. 178). Despite that 18 years have elapsed since this study's publication, tools such as

LMSs are still not designed in a way that fully supports instructors' pedagogical approaches in online writing courses.[5]

In fact, contending with LMSs is one of the topics treated in Kelli Cargile Cook and Keith Grant-Davie's (2013) edited collection, *Online Education 2.0: Evolving, Adapting, and Reinventing Online Technical Communication.* In the editors' introduction, Cook and Grant-Davie recognize that LMSs have simplified online writing instruction in some ways and complicated it in others, asking, "Why and how are we using these newer developments in our classes, and to what end?" (p. 2). Reiterating this point, they highlight the fact "that pedagogical aims should drive the use of technology, not vice versa" (p. 3). At University of Nevada, Las Vegas, Denise Tillery and Ed Nagelhout explain that their decision to create a template for their business writing course using the university's LMS was due to financial cutbacks and a desire to unify the content of over 70 sections of the course. They describe how they made do with an "imperfect system" (p. 26), acknowledging they can't achieve the "ideal of user-centered design, because neither we nor our instructors, nor our students have access to the actual software designers" (p. 43). In that way, the LMS aided their pedagogical goal to keep the course content consistent. Lisa Melonçon and Lora Arduser speculate in their chapter, "Choosing to work within the institution's [LMS] will provide [communities of practice] members with a level of technological support that does not come with an open-source or instructor-funded option" (p. 83). However, because the two formed a collaborative approach to developing an online version of the University of Cincinnati's business writing course, they decided to discontinue their use of the university's LMS. Unlike

[5] I argue this point in depth in a manuscript currently under review at *Computers and Composition.*

UNLV, Melonçon and Arduser's context presented another possibility for delivering an online course, demonstrating that decisions about using or disavowing an LMS must often be made under various administrative and institutional constraints. In the case of Virginia Tech, our Technical Writing course is now required to have Technology-enhanced Learning and Online Strategies (TLOS) approve its template in order to comply with NC-SARA's Quality Matters rubric ("QM Rubrics & Standards"). Therefore, instructors' pedagogical practices must take the Canvas LMS's affordances and constraints under consideration when designing assignments and providing support mechanisms and resources for students.

The chapters in Cook and Grant-Davie's collection are organized into three main areas: evolving programs and faculty, adapting to changing student needs and abilities, and reinventing course contents and materials (p. iii-iv). In addition to Tillery and Nagelhout's and Melonçon and Arduser's chapters, other chapters in the first section address designing courses specifically for online delivery instead of reimagining face-to-face courses (Maid & D'Angelo), encouraging instructors to adapt pre-designed courses to fulfill a social constructivist pedagogy (Dutkiewicz, Holder, & Sneath), and developing a teacher mentoring program in order to sustain an online writing program amid a variety of changes (Jaramillo-Santoy & Cano-Monreal). The second section begins by observing the increasing numbers of international students in online courses and how that affects the technical writing field's treatment and understanding of communicating in a global economy (Thrush & Popham); reporting updated results of a survey of online technical writing students (Eaton); studying students' participation in online discussions and hypothesizing that their deftness in carrying discussions could be

owed to their penchant for online gaming (Tucker); using Second Life and "cybergogy" to create a virtual world for online courses (Scopes & Carter); and concludes by reminding instructors that students have varying levels of internet access and familiarity with digital technologies (Gibson & Martinez). In the third and final section, scholars describe transforming instructional materials for online learning environments (Cason & Jenkins); creating valuable learning experiences for students through file organization, evaluation rubrics, and instructor ethos (Jones); applying activity theory to the online classroom (Tesdell); and examining how intellectual property and privacy may affect how students negotiate activities such as collaboration and peer review online (Stillman-Webb).

In the chapter holding the most relevance to this dissertation study, Britt Fagerheim demonstrates how libraries are evolving and adapting to meet the needs of online students. Returning to the subject of LMSs and their prevalence in online education, Fagerheim observes, "library resources are often not well-represented," causing some libraries "to incorporate selections of library electronic resources into courses" in the LMS (p. 273). Fagerheim further suggests faculty can "create electronic reading lists" and adopt ebooks as a way of integrating library resources with the LMS. Moreover, Fagerheim highlights that librarians are often available via instant messaging and text message, but laments that difficulty often arises in "Making sure that students know librarians are available to help them and that they know how to reach a librarian" (p. 280). Although this collection does not refer to writing centers as a mechanism for supporting online technical writing students, much of what Fagerheim offers about online library services can also hold true for online writing centers. This is one reason why I

created a page describing the 360 Digital Studio's services in the Technical Writing Canvas template as part of the first module. If the LMS exposes students to the online tutoring service I am piloting, perhaps they will remember and take advantage of that service.

A fairly new issue of *Technical Communication Quarterly* addresses online writing instruction (OWI) for technical writing courses. Pedagogy is mentioned broadly in training graduate students to teach technical writing online (Grover et al., 2017), but I find technical writing pedagogy is not specifically defined for online settings. Instead, scholars mention the need to adapt face-to-face pedagogies for online learning environments. When it comes to developing online technical writing courses, authors in this special collection discuss conducting usability testing (Grover et al.), "incorporating social media" (Vie, 2017, p. 345), and reviewing for readability, technical usability, and access (Warner & Hewett, 2017). Only one article mentions directing students to seek the support of an online writing center or OWL. Laura Gonzales and Isabel Baca (2017), in calling for more culturally and linguistically diverse online programs in technical writing, outline several "strategies for working with multilingual TPC students in online environments," including "sharing writing-related resources (e.g., links to university writing centers)" (p. 275). Furthermore, a writing center that trains tutors to work with multilingual writers can be considered a specialized center, even if that area only occupies part of its writing conferences overall. This brief mention seems to indicate that technical writing scholars either don't consider online writing centers and/or OWT as a significant part of the support system for the online service course or aren't publishing about the intersection of the two. In the Spring 2018 issue of *Programmatic Perspectives*

entitled "Revisiting the Technical and Professional Communication Service Course: Histories, Pedagogies, Values, and Trajectories," writing centers aren't discussed. As I examined at length in the first section of this chapter, OWCs and OWT are still a developing area in writing center scholarship, so communicating their importance and ability to support technical writing curricula is a need I see arising from the literature. Technical writing scholarship could also benefit from additional attention to online pedagogy or "cybergogy," and I agree with Melonçon and Arduser's assertion that, "To date, only a handful of resources about online teaching are available specific to technical communication" (p. 76).

As one last point about the pedagogical challenges faced in an online course, discussion boards seem worth mentioning as instructors assign them quite often (Cho & Tobias, 2017). Drew Virtue (2017) finds that implementing small groups and discussion leaders increased student interaction in an online technical writing course. He notes that, "Discussion forums function as a tool to create discussions, but the asynchronous nature of online courses leads to issues related to participation and student presence" (p. 219). Some writing center scholars expressed similar concerns about asynchronous tutoring. Virtue's study offers a small example of how online pedagogy differs from, but doesn't necessarily acknowledge that, small group discussions are also a pedagogy used in face-to-face courses. Perhaps the difference is the use of a moderator and the tasks required of students: "they were expected to initiate the discussion, make connections between posts, answer inquiries, and facilitate the needs of the small groups" as well as write "a brief reflection that asked them to describe the most positive contribution from a group member, the group dynamic, and how they supported their group" (p. 224). The way

Virtue scaffolds his students' participation in the discussions is quite purposeful and detailed, which is one method of communication Angela Eaton's (2013) survey respondents suggested their online instructors should use. In other words, students may need some prompting about how best to interact with one another in an online course. After all, discussion boards are a pedagogy rooted in collaboration as a way of facilitating social interaction and building knowledge (Cho & Tobias, 2017). The notion of collaboration leads me to one final area of importance for this study.

Pedagogies for Collaboration

I pointed out in Chapter 1 that collaboration is both a pedagogical tool and a curricular objective that the writing center and technical writing fields share. In the discussions and definitions of the technical writing service course above, multiple authors emphasize the importance of collaboration (Breuch; Coppola; David & Kienzler; Paretti et al.). In addition to those, William Hart-Davidson (2001) backs Johndan Johnson-Eilola's argument that collaboration is one of four core competencies for technical communication. Citing Johnson-Eilola, Hart-Davidson asserts that collaboration involves, "Working on distributed teams with an attention to the success of the collaborative practices used, and a commitment to improving them" (as cited in Hart-Davidson, p. 150). In this section, I concentrate on how technology affects collaborative writing projects, how collaboration is defined and taught in some technical writing courses, and how one writing center has started to support students working in collaborative writing teams.

Technology and Collaboration.

What kinds of technologies facilitate collaboration is an extremely important question for technical writing and writing center studies. Collaboration often means exposing technical writing students to "a wide range of technologies that will facilitate that process" (Blythe, Lauer, & Curran, p. 281). Paul Benjamin Lowry and Jay F. Nunamaker, Jr. (2003) performed a study on college students to see essentially whether they preferred doing collaborative writing with a traditional word processor or the tool created by the authors, Collaboratus. The authors assert, "Research regarding [collaborative writing] tools shows that software designed with specific collaborative features allows groups to better collaborate than groups using word processors" (p. 278). Because word processors do not support coordination and group awareness well, Lowry and Nunamaker find they are ill-suited to collaborative writing. Some of their findings include, "Collaboratus groups were generally more productive than Word groups" and "Collaboratus groups produced higher quality documents than Word groups, according to external judges, but not in terms of perceived quality, although the perceived results were in the predicted direction" (p. 288). In essence, the tools used for collaboration impact how well a collaborative writing product turns out and how its collaborators feel about the project's quality. In Anne Parker's (2010) terminology, the *team*, the *process*, and the *project* are all interdependent, and Lowry and Nunamaker's research demonstrates how technology can either support or detract from the collaborative process and the team's performance. Additionally, collaboration that utilizes technology is another way in which the technical writing service course's main objectives are reliant upon, at the bare

minimum, functional computer literacies. I would even go as far to theorize that students with critical and rhetorical literacies may become more effective collaborators.

Collaborative Projects in Technical Writing Courses.

Many technical writing instructors approach and assign collaborative projects for the same reasons Parker (2010) outlines. Not only does the technical writing field value collaboration, but so does ABET and the Canadian Engineering Accreditation Board (Parker, p. 208). Parker points out that social interaction is not the sole focus of collaboration: the point is also "to produce a document that, as a finished product, must 'speak' for itself" (p. 209). Therefore, Parker advocates a threefold model for collaboration that includes the team, the process, and the project. She describes each as follows:

> The "project" will be a document or report; in other words, a finished product. It is also a product that someone else has requested and needs. Since, in technical communication, it is always reader-centered (and it is often a client who is the reader), this product will be the goal, a necessary outcome, of the collaboration. The students who interact so they can reach that goal are clearly the "team," and the "collaborative process" is the way they will reach that goal. (p. 210)

Parker concludes that "introducing collaborative projects into the technical communication classroom can be an effective way to prepare students for the demands of the workplace and the profession" (p. 214). As Eaton notes in the results of her 2010 survey, technical writing students' reasons for taking online courses increasingly focused on career preparation, rising significantly from 19% in 2002 to 81% in 2010 (p. 139). Eaton reasons this could be the result of the economy, but it could also be possible that

industries are becoming more interested in hiring employees with superior technical writing skills.

Returning to Paretti et al.'s study, the collaborative process, as Parker calls it, does not always receive explicit treatment from instructors. As Paretti et al. put it, "including collaboration is not the same as teaching it" (p. 329). The authors reiterate, "the existence of group projects does not necessarily correlate to instruction in collaboration" (p. 330). Their study found that students "are distrustful of asynchronous tools to support real communication (face-to-face) and they characterize relying on e-mail or discussion posts to exchange information as only simulated communication" (p. 340). The authors explain, "We framed the collaborative project, introduced tools such as Skype and Blackboard, and outlined our goals for the students but provided very little instruction or project management of the actual collaboration" (p. 337). Survey and focus group results seemed to indicate that students wanted more information about the collaboration than they received, despite the fact that they didn't request this information from their instructors nor seek it out independently. Nonetheless, this leads the authors to conclude that technical writing students need "instruction that enables them to manage such collaborations themselves" (p. 349). Although many college courses include collaborative projects, my experience is that instructors including myself assign them without actually teaching students *how* to work as a team. Adding collaboration instruction to an already long list of objectives to the service course, however, may not be the first priority for many instructors. An alternative option could be to seek assistance from other support systems in the university, such as the writing center.

Supporting Collaborative Writing Projects in the Writing Center.

Kathleen M. Coffey, Bridget Gelms, Cynthia C. Johnson, and Heidi A. McKee (2017) recently studied the integration of team writing consultations in the Howe Writing Initiative (HWI) at Miami University. Many of the teams they consulted with were Farmer School of Business students in a class where an industry analysis report was assigned. The faculty and HWI agreed "to try requiring team consultations for drafts" (p. 153). In preparing consultants to work with teams, they found Joanna Wolfe's (2010) book, *Team Writing: A Guide to Working in Groups*, quite useful. The authors believe HWI consultants played a "key role" in "Helping teams navigate the 'divide-and-conquer' approach to writing team papers so that they instead 'divide-and-unite'" in order to write more integrated reports with a "team voice" (p. 160). Coffey et al. conclude by suggesting that more research on team consultations in writing centers needs to happen, especially for online consultations (pp. 173-174) and point readers toward scholarship such as Wolfe's in professional, technical, and business writing about how team writing works.

Like many courses at other institutions, Virginia Tech's Technical Writing service course often involves a collaborative writing project. This might take the form of a proposal or a report, or in my abbreviated winter session course, students create a user document in the form of an infographic intended to provide research-based problem-solving advice on a specific topic. Because the Digital Studio is housed in a classroom in the Department of English, students can meet as groups to work on their technical writing projects as well as to consult with interns on project development. The interns read Coffey et al.'s article in order to prepare them for the possibility of working with

collaborative writing groups. Being that this is a feasibility study, I was interested to find out if students would use this service. Advertising this service was a first step, so I distributed a flyer to Technical Writing instructors outlining services and linking students to an appointment calendar for online tutoring. I also visited two sections of a colleague's face-to-face class to highlight the Digital Studio's services. Students from these two sections did in fact end up visiting the Digital Studio for collaborative writing consultations. Despite that online consultations were available, all of the student groups elected to come to the Digital Studio in person.

Conclusion

In this chapter, I have covered ground relating to technology and pedagogy in writing center studies and technical writing. The writing center field, while often acting as a proponent of technology, has struggled to both integrate and research online tutoring services extensively and empirically. Often, this is due to WCPs' positions as administrative staff and a lack of higher education's awareness of the writing center as a site of research. As a result, Denton (2018) is rehashing conversations about asynchronous tutoring methods that originated in the late 1980s, while calls for more research and coining a specific acronym for online writing tutoring (OWT) are being made in order to legitimize this area of writing center work (Prince et al.). Amid this effort to theorize the writing center field's use of digital technology, the technical writing field has contended with shaping its pedagogy and curriculum in online learning environments. Despite prolonged attention to multiliteracies and collaboration in both fields, writing centers and technical writing do not commonly implicate one another in their shared mission of shaping students to become savvy writers with an awareness of

rhetorical concepts and situations. If technical writing instructors could consider writing center colleagues as supporting their curricular endeavors, perhaps the two could create meaningful ways of collaborating on tasks designed to cultivate students' multiliteracies. I argue this potential exists in my dissertation study and provides the exigence for piloting online tutoring services and resources to Technical Writing students.

Chapter 3: Methodology

In Chapter 1, I outlined the exigence for this dissertation study, which revolves around a lack of online writing tutoring (OWT) available to students enrolled in online courses at Virginia Tech. In particular, I found this problematic for my students when teaching the course online over the winter session when the Writing Center is also closed. This led me to seek guidance from the Conference on College Composition and Communication, one of the leading organizations in the writing studies field, on appropriate practices for online writing instruction (OWI). According to A Position Statement of Principles and Example Effective Practices for Online Writing Instruction, in particular Principle 13, students should be able to receive writing support services in the same environment in which they are taking the course. Basically, this means students taking courses online should have access to online writing support. I then turned to the field of writing center studies to see what kinds of online support has been provided to students, and those services include asynchronous and asynchronous tutoring as well as online repositories of information (such as the Purdue OWL). I also researched the context of the technical writing service course in online settings, finding that the delivery method for this course has remained relatively unchanged for over 20 years. In Chapter 1, I briefly explained the methodology of this study and why user experience and service design are appropriate for a feasibility study concerning online tutoring services for technical writing students, which I now expand upon in greater detail.

Context of this Study

The specific case in this study is the ENGL 3764: Technical Writing service course offered in Fall 2018 at Virginia Tech. There were 23 sections of the course taught by 8 instructors and one graduate teaching assistant. The total enrollment at the beginning of the semester was 506 students. Of those courses, 15 were online and 8 were face-to-face. For a numerical representation of this information, see Table 2.

Table 2: Number of Sections, Instructors, and Students of ENGL 3764 in Fall 2018

Course Sections	Online	15
	Face-to-Face	8
Number of Technical Writing Stakeholders	Instructors	8
	GTAs	1
	Students	506

Studying the feasibility of offering online writing services and piloting the Digital Studio aligned with the former Department of English chair's goal to offer students a study space where they could print assignments for free and use department computers. When Dr. Hausman learned about my dissertation project, she agreed to allow me to coordinate the Digital Studio and recruit three PTW majors to serve as interns. In addition, she approved one other GTA to help cover the hours since the studio is open for more than 10 hours per week, which is the number of hours of one assistantship. The room we used is Shanks 360, a recently renovated classroom with Macintosh computers, a printer, a projector and screen, five large, wall-mounted monitors, and three large tables ideal for groups of students to work collaboratively. Because classes are conducted in this room during the day, it is occupied until roughly 5 PM, Monday through Thursday, and until 2:15 PM on Friday. As a result, the studio's hours begin after classes end for the day.

Visualization of Methodology

The relationship of the methodology, methods, and research questions in this study may be usefully visualized in the graphic below. This graphic reiterates the relationship I wish to demonstrate between service design, users, and the methods I chose to gather users' input. Service design prioritizes people, and with people at the center of this research, I rely mostly on qualitative methods, augmented by one quantitative method intended to give me a bigger picture of Virginia Tech's Technical Writing service course. The participants involved in this research are stakeholders in the service: students, instructors, and interns. My research question addresses the feasibility of offering synchronous online tutoring services and web resources. With this triangulation, I convey my findings for the study in Chapters 4 and 5. I attempt to fulfill Polaine et al.'s advice to offer a high level of insight for Virginia Tech's Department of English to make decisions about the future of the Digital Studio and recommendations about online tutoring for students enrolled in ENGL 3764.

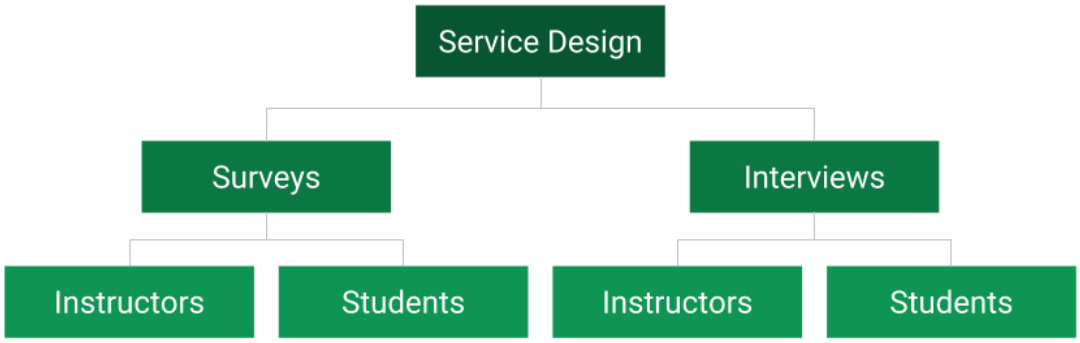


Figure 2: Relationship of Methodology, Methods, and Participants in this Study

Methods

With the distinction between service design and user experience in mind, as well as service design's relevance to my project, I will now reiterate my research question and explain the research methods correlating to each. The methods described below have all been given exemption under Western IRB Research Protocol #18-200. This exemption was issued on March 16, 2018, and was updated on July 30, 2018.

Research Question

What are the needs of Technical Writing instructors and students that an online, interactive space (such as an OWL) can address?

There are two sets of participants for the methods used to answer this research question: previous ENGL 3764 students and ENGL 3764 faculty and graduate teaching assistants. I first address surveys and then interviews for each set of participants.

Surveys.

Surveys are a commonly used method in UX (Bargas-Avila & Hornbæk), service design (Curedale), technical communication (Blythe, Lauer, & Curran, 2014; Eaton, 2013; Francis, 2018; Read & Michaud, 2018) and writing center research (Blythe, 1998; Dadas et al., 2014; Grutsch McKinney, 2016; Salem, 2016; Thompson et al., 2009). Sarah Liggett, Kerri Jordan, and Steve Price (2011) also note that "Although surveys [...] are often *methods* for gathering qualitative and quantitative data, the writing center community also uses them *methodologically* as a distinctive way of making knowledge" (p. 68). While Liggett, Jordan, and Price refer to national or large-scale surveys, I believe that it is still worthwhile to obtain "a big picture description of a population, particularly

the population's attitudes and beliefs" (Grutsch McKinney, 2016, p. 73). Determining how former ENGL 3764 students feel about the course can be helpful in making knowledge about the specific case that I am studying. Jackie Grutsch McKinney notes that surveys are "one way to 'test' assumptions on which we operate, to see if our own perspectives play out in the larger population" (p. 74). Therefore, I surveyed students about their experience taking ENGL 3764 and instructors about their experience teaching the course, which allows me to quantify responses to questions listed below in order to design services. Participants indicated their willingness to take the survey by checking a box stating that they agreed to participate in a research study which the IRB considers exempt.

Student Survey.

In arguing for outcomes-based assessments for technical writing, Michael Carter, Chris Anson, and Carolyn Miller (2003) suggest surveying advanced and graduating students "about the value of students' experience in technical writing classes" (p. 108). Although my project does not focus on outcomes assessment, I employ the recommendation to survey and interview students regarding their experience in Technical Writing. Specifically, the survey includes questions about how valuable the course was, whether or not students had a job or co-op during their time at Virginia Tech, and the applicability of genres and skills to their work.

I distributed this survey before my pilot project in order to obtain quantitative data about the kinds of services that stakeholders desire and feel likely to use. The questions on the student survey are intended to address several concerns for creating the Digital Studio. For instance, because my study is particularly concerned with students taking

Technical Writing online, I surveyed respondents about whether or not they took the course online or face-to-face, and to explain in which environment they prefer to take classes. In addition, the survey asked students about activities and assignments they found difficult, both of which are based upon the Technical Writing curriculum here at Virginia Tech. As a member of the department's Technical Writing Task Force, I am intimately connected to the course-level and lesson-level objectives we revised and created in order to get the course approved for online instruction (a requirement from the university's Technology-enhanced Learning and Online Strategies division). I also included assignments that were reflected in Stuart Blythe, Claire Lauer, and Paul Curran's (2014) study of the kinds of writing professional and technical communication (PTC) alumni do, what kinds are done most often, and what kinds are most valuable (p. 267). I also derived questions about assignments and strategies learned from Dadas et al.'s survey of business writing students. The categories of student survey questions in order to design appropriate services included:

1. Beneficial and challenging assignments (genres) and activities
2. Students' experiences and relationships with online and face-to-face courses
3. Work experience and the course's effect on workplace writing preparation
4. Resources used and likeliness to use potential resources
5. Demographic information

A full list of the survey items is available in Appendix A.

Instructor Survey.

As the literature review in Chapter 2 shows, involving faculty and graduate teaching assistants (GTAs) is key to my research process because they have firsthand

observations and experiences to relate about teaching ENGL 3764. Their experiences and expertise help in designing services. Similar to the student survey, I asked instructors if they had taught the class online, face-to-face, or both, as well as why they preferred teaching in a certain environment. Some of the questions that I asked instructors in order to design appropriate services include:

1. What genres and activities challenged their students?
2. What resources do their students use and what resources do instructors wish existed?
3. How likely do they think students would be to use services such as online tutoring and a physical space for collaboration?

A full list of the survey items is available in Appendix B. In the survey responses, instructors indicated their willingness to participate in a follow-up interview in order to gather more in-depth feedback about their experiences teaching ENGL 3764.

Interviews.

Requesting interviews from survey respondents is a way to combine quantitative and qualitative methods to answer RQ 1. Tina Sacks (2015) observes, "Qualitative methods also provide an opportunity to uncover conceptual and analytical domains that would be impossible in a close coded survey or other quantitative data collection method" (p. 755). In my study, the conceptual and analytical domains are the potential support systems in place for teaching and learning technical writing. In addition to interviews revealing data that surveys cannot, Irving Seidman (2013) advocates using interviews because, "Social abstractions like 'education' are best understood through the experiences of the individuals whose work and lives are the stuff upon which the

abstractions are built" (p. 9). Seidman goes on to say that while a great deal of "research is done on schooling in the United States [...], little of it is based on studies involving the perspective of the students, teachers, [and] administrators [...] whose individual and collective experience constitutes schooling" (p. 9). Therefore, my study can partially "represent 'decolonizing methodologies' that give voice to groups that are typically silenced" (Sacks, p. 754).

Another key reason for interviewing is its methodological congruence with writing center theory and practice. As North wrote, "The essence of the writing center method, then, is this talking" (p. 443). While North is here referring to the talk that occurs during a writing center tutoring session, the idea that writing center work necessitates talk should also impact how writing center research is conducted.

In service design, "depth interviews," as they're called, are used because they're "good for uncovering values, opinions, explicit and latent information, interactions, and idea inspiration" (Polaine et al., p. 50). Interviews can give me insight into why students and faculty want certain resources and even what services might look like, not just a list of resources that survey results would provide. Taking into account that humans are at the center of both writing centers and service design, using interviews as a method partially fulfills my goal of overlapping two writing studies fields.

Student Interviews.

In the survey responses, students indicated their willingness to participate in a follow-up interview in order to gather more in-depth feedback about their experiences with ENGL 3764. During these interviews, I asked students for their permission to take an audio recording for transcription purposes and if they wanted to use a pseudonym to

keep their participation anonymous. All students elected to use their real first names. The interview questions that I asked were intended to qualify survey questions, such as the following:

1. Where were some of the differences between online and face-to-face courses for students?
2. How valuable were assignments or activities in preparing students for workplace writing?
3. What tools or resources would they like the Digital Studio to provide?

A full list of interview items is available in Appendix C. A total of 11 students participated in follow-up interviews, all of which except two took place in my office, Shanks Hall 239. One interview was conducted online via Google Hangouts and another took place in Torgersen Hall.

Instructor Interviews.

Like the student surveys, instructors also indicated their willingness to participate in follow-up interviews in the survey responses. All instructors—some of whom where graduate teaching assistants (GTAs)—agreed to allow me to take an audio recording, and all but one instructor used their real name. That participant chose a pseudonym. Some of the interview questions included:

1. What activities/assignments do students find most challenging and beneficial, and why?
2. What skills should students take away from course that are difficult to teach during class?
3. What tools or resources would instructors like the Digital Studio to provide?

A full list of interview questions is available in Appendix D. A total of seven instructors participated in follow-up interviews, which took place either in Shanks Hall or the Newman library.

Analysis

Polaine et al. highlight three levels of insight for service design research: *low* being what research participants say, *medium* being what researchers saw, and *high* being a combination of techniques to determine "what the insights mean strategically for the industry and the client's project, along with suggested recommendations and solution for the client" (pp. 48-49). A high level of insight is obviously the goal of any dissertation or other writing studies research in order to convey meaningfulness not only to the stakeholders involved in the research, but also external stakeholders in the field. I will summarize what participants said in interviews and reported in surveys in order to arrive at insights for technical writing stakeholders concerned with supporting students in online courses, particularly the service course, and for writing centers concerned with online tutoring practices and theories.

Survey Analysis

The number of responses to the student survey was high enough to apply two statistical tests to the data in order to determine if there were any significant correlations. The two tests that I conducted, Chi-square and ANOVA, are a way of comparing two pieces of data, such as 1) the setting in which a student took the course (face-to-face or online) and 2) their gender identity. If there are any correlations between the two pieces

of data, these statistical tests help determine the likelihood that the correlations are due to chance. In Wolfe and Griffin's (2012) study of tutors' and students' preferences for online tutoring technologies (see Chapter 2), the authors offer an extensive and precise explanation of the meaning of this kind of statistical analysis:

> The *p* value indicates the likelihood that a distribution is due to chance. Thus, the lower the *p* value, the more reliable the reported trends are believed to be. A *p* value of .01 indicates a 1% likelihood that results are due to random chance; a *p* value of .05 indicates a 5% likelihood of chance; a value of .10 indicates a 10% likelihood of chance. Values of less than .05 are considered statistically significant; those from .05-. 10 are marginally significant. It is worth noting that a statistically significant finding does not automatically mean the researcher has interpreted the data correctly. (p. 72)

Some of the results that I report in Chapter 4 are considered statistically significant, so I report the *p* values of that data.

Interview Analysis

By transcribing interviews in full myself, I follow Irving Seidman's (2013) suggestion, "Interviewers who transcribe their own recordings come to know their interviews better" (p. 118). Furthermore, I approached the analysis of these interviews using "a close reading plus judgment" by "mark[ing] with brackets the passages that are interesting" (p. 120). From there, I looked for themes within the passages I marked "and then studied the categories for thematic connections within and among" individual passages as Seidman advises (p. 121). By looking for thematic connections, I hoped to identify areas that concerned both students and instructors or areas that concerned each

separately. Because my participants volunteered to be interviewed, taking Seidman's other recommendation to develop participant profiles seemed less appropriate for my data. While creating user profiles is typical in service design, I would have needed a wider variety of participants to create profiles representative of Virginia Tech students, and most of the participants who volunteered for interviews were white males.

After marking passages of interest, I then began organizing and analyzing thematic connections (Seidman, p. 128). The program that I used to assist with transcribing and coding, MAXQDA, also allowed me to make notes on these passages, stay organized, and identify themes. As Seidman emphasizes, interviewers concentrate on identifying what a participant's "experience is and the meaning *they* make of it, and then [...] make connections among the experiences of people who share the same structure" (p. 130). Connecting participants' experiences is congruent with service design because this methodology deliberately designs *with* participants, not *for* them. Next, I devote some attention to the field of user experience and how it relates to technical communication research.

Why User Experience and Service Design?

Before giving more background about user experience and its intersection with technical writing and a study in the writing center field, I would first like to offer an anecdote about this project that brings service design into focus. In the fourth week of the fall 2018 semester, I sat down with two of the Digital Studio interns to discuss their recent reading. As we began talking about Beth Hewett's (2015) *The Online Writing Conference: A Guide for Teachers and Tutors*, one intern mentioned the importance of

asking a student for details about their assignment. This led the other intern to emphatically detail her recent experience in the Writing Center as part of an assignment for the writing center theory and practice course she took. The assignment essentially asks students in the course to be secret shoppers, a service design method that Robert Curedale (2016) suggests using. The Digital Studio intern, who was also enrolled in the writing center course, made a tutoring appointment for the Writing Center using WCOnline, a common software for writing centers. The program allows students to indicate what they'd like to work on during the tutoring session (see Figure 1 where it asks, "What would you like to work on today?").

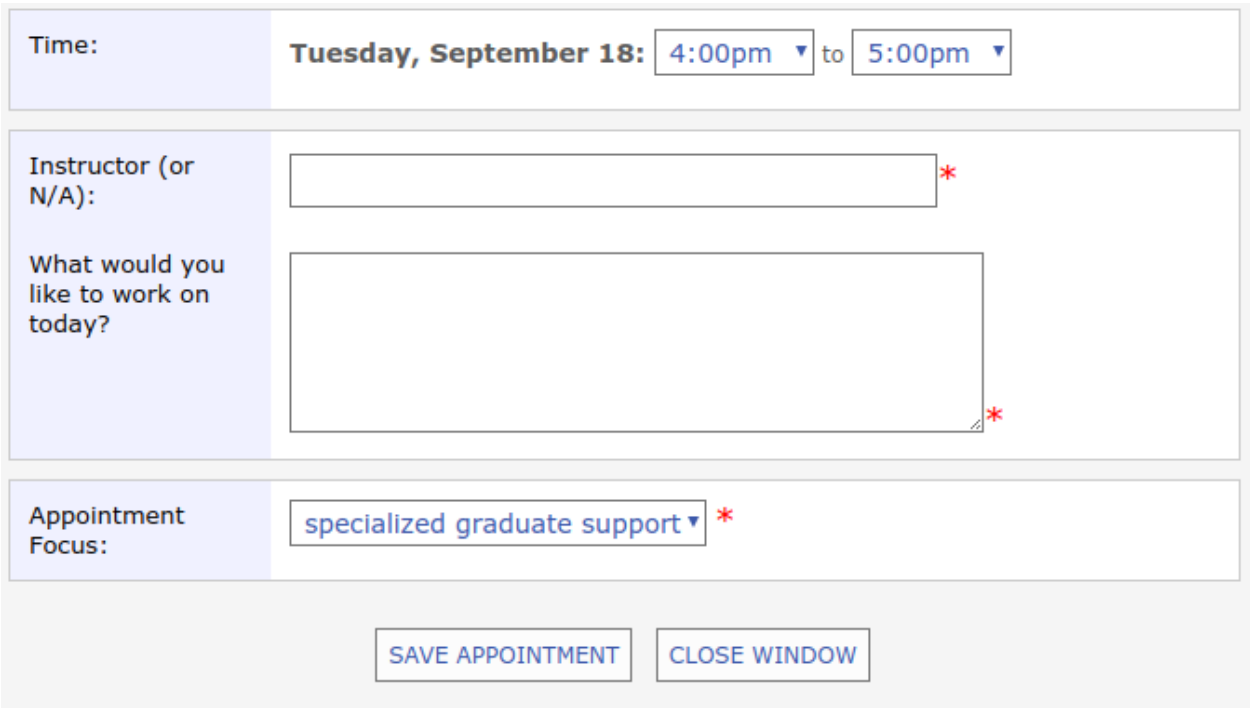


Figure 3: Online appointment interface for WCOnline

The intern wrote in this field that she wanted to work on her resume, but when she arrived at the appointment, she reported that the tutor was "clueless" and obviously hadn't read her appointment details. The tutor's lack of awareness annoyed her and made

her question why she had bothered filling out the field in the first place (other than that the form requires it). While she and the tutor began to look at her resume, the tutor produced their own resume and proceeded to detail its strengths. The tutor did not offer their resume as an example in an attempt to show the intern how she could improve hers; rather, the session as the intern saw it became more about how effective the tutor's resume was. This is an example of a negative service experience that then caused the intern to think that Writing Center tutors might not be skilled in offering resume feedback.

As the intern told this story, I reached for my copy of Andy Polaine, Lavrans Løvlie, and Ben Reason's (2013) *Service Design: From Insight to Implementation*. This level of participation gave the intern insight into a service that she will provide in the future once she passes the writing center course. In the intern's example, it truly was a secret shopping experience because the intern isn't tutoring in the Writing Center yet, so the tutor didn't know her. Polaine, Løvlie, and Reason explain that through participation, researchers can gain:

> [A] unique, firsthand understanding of the way users feel and behave, and it is an excellent strategy for developing empathy and asking questions clients might not think of. Researchers can experience things for themselves that may be hard for someone to describe to them. (p. 57)

Without considering experiences such as these, services are then designed for people and not *with* people, which ignores a key tenet of service design (Polaine et al., p. 41).

User Experience and Technical Writing

To begin with, it is important to understand that user experience (UX) is an interdisciplinary field that "combines communication, psychology, human-computer interaction (HCI), social science, design, technology, and other specialized knowledge areas" with the goal of "designing for interconnectedness, where tasks and texts no longer exist individually or in a silo, but instead connect across a broad and complex landscape of interfaces and environments" (Lauer & Brumberger, 2016, p. 249). While the UX field is traditionally influenced by anthropology and cognitive psychology disciplines (p. 93), Janice Redish and Carol Barnum (2011) find in their experience that technical communicators have much to offer. Because technical writing is intently focused on the user, Claire Lauer and Eva Brumberger (2016) assert, "UX is a natural extension of the work that technical communicators already do" (p. 249; cf. Redish & Barnum, 2011). Not only are technical communicators poised to perform UX work, but Redish and Barnum (2011) also argue that the technical writing field "brings theory and research to UX" (p. 93). James Conklin and George Hayhoe (2010) agree that research and user experience intersect in technical writing: "By revealing how specific groups of people construct their social worlds, qualitative research can enrich our understanding of the user experience" (p. x). In this study, interviews form the basis of the qualitative method to gather insights from students and instructors.

UX typically employs qualitative research methods since it comes out of several social science fields. In a meta-analysis of articles from three scientific repositories, Javier A. Bargas-Avila and Kasper Hornbæk (2011) found the top four most common UX research methods were questionnaires, semi-structured interviews, live user observations,

and videorecordings (p. 2693). Bargas-Avila and Hornbæk further report, "Half of the studies are qualitative (50%, n = 33), whereas 33% (n = 22) use quantitative methods, and 17% (n = 11) use both methodological approaches" (p. 2693). While mixed methods were not as common in these studies, my study does use mixed methods, as questionnaires are quantitative measures even when short-answer questions are included (Pratt, 2009). Bargas-Avila and Hornbæk seem disappointed to find that, "Many studies use self-developed questionnaires without providing items or statistical validations" (p. 2689). Therefore, I not only provide the question items in Appendices A and B, but I also performed statistical analyses of the survey results.

In brief, UX is a multidisciplinary field designed to bring disparate areas together in order to emphasize "interconnectedness." In higher education, the word "silo" is often used to invoke the ways in which work happens and tasks are accomplished due to the separation of disciplines (Bear & Skorton, 2019). In service design, Polaine et al. blame "Silos within organizations" as a force that "can prevent engaging and positive service experiences from happening" (p. 86). Even within the writing studies discipline, I cited literature which argues that the writing center and technical writing fields are marginalized by their "parent" discipline, the institution, and industry. Therefore, my study's very methodology is a way to pursue interconnectedness between two fields by embracing a methodology that relies on several disciplines to inform its work. Once again, the goal of UX is to "reduce the friction between the task someone wants to accomplish and the tool that they are using to complete that task" (Buley, 2013). In the previous chapter, I argued that while initially it may seem as though an online tutoring service for technical writing students is designed to reduce the friction between students

and their assignments, it is better to think of this as friction between students and the writing they will do in their future workplaces. In order to make strides toward this larger goal, which is not achievable within the confines of this study, I draw upon service design methodology because it is a logical first step in scaffolding the way in which students think about technical writing.

Difference Between User Experience and Service Design

UX can be thought of as an umbrella for service design and other methods, and the two often intersect. However, there are still differences between the two. Let me offer an example that I will connect to this study. Online banking applications offer a service to users, whereas what users see and experience while using the app is UX. My personal banking app requires me to enter a four-digit code to open the app, immediately bringing up an overview of my accounts. I can quickly see how much money I have in my accounts in a user-friendly interface. The process of logging in and the interface's appearance are part of my user experience. The service is online banking, where I can view my accounts, transfer money between accounts, and deposit checks. This last service I will connect to the one I am creating and studying in this dissertation. Before moving to southwest Virginia, I banked with PNC, but there are no branches in this area. At first, I thought that this would be a problem because I couldn't deposit checks. I was wary of using PNC's online banking app; somehow it seemed less secure to me as a user than the online banking I typically did through a web browser. However, if I wanted the money, I was going to have to use the app or drive a couple of hours to North Carolina and visit a physical branch. In using the app, I discovered a service that I previously thought was unnecessary and even a little suspect. Even though I've switched banks, I

hardly ever visit the branch because I'm comfortable now with using the services provided in the app. It's a service that I didn't know I needed or wanted. In the future, I would like to further research how online tutoring can likewise become a service that Technical Writing students didn't know that they wanted or needed.

A couple other differences between UX and service design are noteworthy. First, UX often refers to people as customers, whereas service designers prefer the word "users" because "there are contexts in which a service user might not be a customer or because a service user might also be a service provider (such as a teacher or a nurse)" (Polaine et al., p. vii). Calling students customers is a highly undesirable practice, even though education is considered an intangible good. I believe the purpose of education should not be to profit from the students and people who finance a student's tuition, hence why for-profit universities are often treated with contempt. In this study, the main users of the service will be students, but thinking of service providers such as the Technical Writing instructors and Digital Studio interns is also a key part of designing such a service.

Another difference is that user experience often centers around digital interfaces and interaction, "but service design covers a broader range of channels than this" (Polaine et al., p. vii). In the Digital Studio pilot, I intended for students and interns to interact with each other via Zoom, a digital meeting platform, but a strictly UX methodological orientation would cause the focus to be more on Zoom's interface design rather than the tutoring service itself. In that way, UX can encompass higher education and student support services, especially when learning happens online and requires digital interfaces

and environments. As a result, I devoted some attention to the usability of making online tutoring appointments through the Digital Studio's website.

Honing in on Service Design

According to Curedale, service design is a methodology born out of the service industry resulting from a post-industrial economy. Its purpose is to help design new or redesign existing services. Initially, some writing center professionals (WCPs) might bristle at the word "service" because of its association with the marginalization of writing center work. In Chapter 1, I cited John Trimbur's (2000) point that writing center services are often considered beneath "the 'real' work" of the tenure-track professor (p. 31). Despite this negative association with "service," I believe that service design can prove a useful methodology to those conducting writing center related research because of its focus on understanding interactions between people (Polaine et al., p. 22). Service design methods are borrowed from social science disciplines, and service design takes cues from pedagogy because "lots of learning processes [are] linked to services" (Curedale, p. 5). Education is considered an intangible good in service design (Curedale, p. 3), but even so, services can become tangible through human interactions (Curedale, p. 23). This confluence of focusing on people while designing an intangible good, specifically a pedagogical service linked to the process of learning to write in technical genres, makes service design a highly appropriate methodology here.

One reason Curedale gives for designing services is "To create more value with existing resources" (p. 25). In the case of the Digital Studio, a classroom was available in the evening hours in Shanks Hall, an existing resource, but now is available for students to use outside of class time. This classroom has become an ad-hoc learning space for

writing support. Elliot Felix (2011) addresses the notion of service design within the context of learning spaces, forwarding the belief that, "Service design can enable institutions to [...] enhance the experience of students and faculty by embedding services within learning spaces—services that promote interaction, provide access to experts, and respond directly to user needs" (n.p.). As an example of a learning space enacting a service design mindset, Felix offers the University of Pennsylvania's information commons, where events and workshops are hosted, including partnerships with entities such as the writing center. Felix also suggests that writing consultations and tutorials are examples of services to apply service design to in learning spaces. He concludes, "Service design can help colleges and universities keep pace with change by supporting learning with staff that are proactive and services that are more targeted, efficient and personalized" (n.p.). Indeed, this dissertation study targets specific students by piloting an online tutoring service.

Service Design in a Feasibility Study

According to Deborah J. Bowen et al. (2009), a feasibility study is "any sort of study that can help investigators prepare for full-scale research leading to intervention" (p. 453). Furthermore, these kinds of studies:

> enable researchers to assess whether or not the ideas and findings can be shaped to be relevant and sustainable. Such research may identify not only what—if anything—in the research methods or protocols needs modification but also how changes might occur. (Bowen et al., p. 453)

In this dissertation study, I am assessing the feasibility of offering synchronous online tutoring and web resources to students enrolled in Technical Writing. For instance, surveying previous students can provide information to the Department of English about

how well the service course is fulfilling students' expectations and their feelings of readiness for workplace writing genres. If the survey and interview results show that students are adequately prepared for workplace writing and are satisfied overall with the course, then an intervention may not be necessary. Those findings will form the basis of my recommendation to the Department of English about the Digital Studio. I will also address how sustainable the Digital Studio is as a student-facing departmental resource.

Chapter 4: Student Results

Introduction

In this dissertation so far, I have addressed the exigence for this study in Chapter 1, which arose out of a need that I saw for students enrolled in online sections of Technical Writing. Without access to writing support in the same setting which they took the course, the Department of English at Virginia Tech is slightly out of alignment with the CCCC Position Statement of Principles and Example Effective Practices for Online Writing Instruction (OWI). Because more sections (65%) of Technical Writing are offered online than face-to-face, I felt this was a particularly important reason to investigate the needs of students and instructors that an online, interactive space (such as an OWL) could address. I employed both interview and survey methods to gather input from the two stakeholder groups.

In Chapter 2, I reviewed literature about online writing centers (OWLs), including asynchronous and synchronous tutoring methods. The majority of the literature and current methods indicate that the writing center field is still largely reliant on asynchronous tutoring methods, despite the advancement of videochat technologies such as WebEx, Zoom, and Google Hangouts. I also reviewed literature relating to specialist writing centers, which are situated within specific disciplines or departments and serve a specific student population rather than the general population. The generalist approach to tutoring is foundational to the field (Harris, 1988) and more common in writing center practice, but studies on the specialist approach to tutoring and writing advice reveals that

familiarity with disciplinary genre conventions lends to the effectiveness and accuracy of writing advice (Dinitz & Harrington, 2013; Mackiewicz, 2004; Smith, 2003; Wolfe, 2009). In addition, there is interest in multiliteracies and collaboration in the writing center field, which are two pedagogies it shares with the technical writing field. Because this study focuses on the Technical Writing service course at Virginia Tech, I included literature that situates this course within the context of higher education. While scholars in the technical writing field have published about online versions of the course for over 20 years, there is scant attention paid to online writing support other than what is offered by the instructor or LMS.

To guide my approach to studying the needs of Technical Writing students and instructors, I turned to service design methodology in Chapter 3. Service design comes out of the service industry and borrows many of its methods from the social sciences. In particular, service design focuses on designing new or redesigning existing services, with a focus on "designing *with* people and not just *for* them" (Polaine, Løvlie, & Reason, 2013, p. 41). Because educational interactions are considered intangible services rendered tangible through human interactions (Curedale), I argued that service design was an appropriate methodology to import to a study focusing on writing center-esque services for Technical Writing students. To gather as much input from the two stakeholder groups as possible, I employed the quantitative method of surveying. Then, to deepen and complement participants' survey responses, I conducted follow-up interviews with 11 students and 7 instructors. This chapter focuses on the student results from these two methods.

Student Survey

To help me answer my research question, *What are the needs of Technical Writing students and instructors that an online, interactive space (such as an OWL) can address?*, I distributed a survey in the Spring 2018 semester to current and former Technical Writing students via an email link. The survey was open from March 19, 2018 to July 3, 2018 and received a total of 276 responses. In what follows, I will relay some of the quantitative as well as qualitative data that contextualizes the service course in the Department of English at Virginia Tech. Knowing the course's context for students contributes to determining which of their needs could be addressed in an online interactive space.

Results

More than half of the students who took the survey were enrolled in the course in Spring 2018 (~58%). Of the 514 students enrolled in the Spring 2018 semester, 162 took the survey for a 31% response rate. The survey was also distributed to students who previously took the class, and the majority of those students took the class in 2017 and 2016. A summary of these results is in Table 3 below. While I requested email addresses from Virginia Tech's Enterprise Systems for students who had taken the course in Fall 2017, I received emails from students who had taken the course long before that—one student as far back as 2009. I excluded responses from students who took the course before 2015 because there were not enough to be considered statistically significant.

Table 3: Survey Participants by Year Enrolled in Technical Writing

Year Enrolled	# of Students	Percentage
2018	182	65.94%
2017	56	20.29%

2016	30	10.87%
2015	6	2.17%
2014	1	
2009	1	

Slightly more students who took the course face-to-face participated in the survey (~56%), as shown in Table 4, and this could be because some instructors agreed to give their students class time to complete the survey toward the end of the spring semester. While I was interested in targeting service design on students who took the course online, the results from the face-to-face students nevertheless provide insights about the course.

Table 4: Course Setting

	# of Students	**Percentage**
Online	122	44.20%
Face-to-face	154	55.80%

Preference for Online or Face-to-Face Courses.

After indicating whether they took the course face-to-face or online, the survey asked students, "If you have taken courses both online and face-to-face, which setting do you prefer and why?" Table 5 shows an overwhelming number (~60%) of the 126 students who answered this open-ended question indicated that they preferred face-to-face. Of those 126 students, 21 indicated that they took the course in a different setting than the one they preferred: 3 students took the course face-to-face but said that they preferred online courses, while 18 students took the course online but said that they preferred face-to-face courses. Although this is a very small segment of the students surveyed, the fact that most of them would have preferred to take the course face-to-face could be an indicator that an extra section of the course should be offered in this setting. In the spring and fall of 2017, over 70% of the Technical Writing courses were online.

This number dropped to approximately 65% in the spring and fall of 2018, but the majority of sections were still online.

Table 5: Course Setting Preference (n = 126)

Preference	**# of Students**	**Percentage**
Online	29	23.02%
Face-to-face	75	59.52%
Depends	22	17.46%

I coded some of the most common reasons why students said they preferred certain course settings over others, the results of which are available in Table 6. First, many students said something along the lines of convenience or efficiency as a reason for preferring online classes. One student felt this course was best to take online because it was "just a requirement to satisfy for graduation and was not super helpful." This is the kind of student that I'm particularly concerned about. Would they have had a different experience if they'd taken the course face-to-face rather than online? This student had an internship, job, or co-op, and perhaps not surprisingly, rated this course a 1 on the scale of value. Furthermore, the student indicated they would be unlikely to use any of the services that I suggested. They also said that their instructor "incorrectly taught résumé edits." On the other end of the spectrum, one student said that taking the course online "made me think for myself more," so this might be a positive outcome for a student who needs or wants an added challenge.

Second, for those who preferred face-to-face courses, many wrote that they needed some kind of human interaction or felt like they learned better in that environment. Interestingly, one instructor whom I interviewed talked about not feeling like a "real teacher" in the online course environment, so it seems that for some in-person

interaction is a strong component of what they consider as education or learning. One student seems to equate the value of a course with the mode in which it is offered: "[I]f I wanted to take an online class, I'd go somewhere like Phoenix University for a lot cheaper." Another student mentions that online classes "feel like I am teaching myself." In fact, in one of my student interviews, Julia, said that online classes often feel like they are being taught by the textbook, not the instructor. She noted that this was often the case at another university in Virginia and quipped that it felt like the degree was therefore awarded by McGraw/Hill University. While she was not specifically referring to the Technical Writing course at Virginia Tech, I often worry that when I teach this class online, that is how my students might feel.

Third, those who replied "it depends" often indicated that the kind of course that they were taking affected whether they decided to take it online or face-to-face. For instance, many students wrote that if it was an "easy course," they opted to take it online. Similarly, if a course had a lot of technical content, they mentioned a preference to take it face-to-face. This made me question what constitutes a "difficult" or "easy" class, and whether or not students perceive Technical Writing as an easy class. If students think that the course is easy, they may not be inclined to use online tutoring services, but I will report on students' likelihood to use potential resources in a subsequent section.

Table 6: Reasons for Course Setting Preference: Online, Face-to-Face, or Depends

Reason for Preference	**Online**	**F2F**	**Depends**	**Total**
Convenience & Efficiency (Time, Schedule, Pace, Commute)	18	2	5	25
Course suited to online environment	5	1	4	10
Type of class, difficulty or type of content	0	0	14	14
Personal Connection	0	13	1	14
Student-Teacher Relationship	0	11	0	11

Learn better or more	0	12	4	16
Interaction, Immediacy, or Asking Questions	0	14	2	16
Live lecture or teaching quality	0	5	0	5
Regular or more rigid schedule or deadlines	0	17	0	17

Ten of the surveyed students commented that they thought that this course *in particular* is suited to an online setting. Although the survey question was referring to courses in general, some students explained why they preferred taking this class online, saying that it was suited to that environment. One student felt that this class didn't have "as much need for in-person contact."

Taken together, these kinds of comments about student preferences for course setting provide important perspectives about how students learn best and also how they feel about the Technical Writing course. Using students' survey responses to offer more targeted services to future Technical Writing students may encourage students to find more value for the course, or at least see its connection to their future writing tasks.

First-Year Writing Course Experience

To determine how much background students might have with writing at the college level, the survey asked whether or not they took any first-year writing courses, ENGL 1105 or 1106, at Virginia Tech. Because Technical Writing is a junior-level course, instructors expect students to already possess college-level writing skills, such as the ability to write clear, grammatically correct prose, and familiarity with at least one citation style. However, this expectation is likely based upon what instructors know about the composition curriculum at Virginia Tech. While a good number of Technical Writing students took ENGL 1105 and/or 1106, almost 52% received transfer credit for these courses (see Table 7 for full results). For some students, this could mean that by the time

they enter Technical Writing, they may not have done much or any college-level writing. As a result, students may be unfamiliar with the writing concepts that instructors assume that they understand.

Table 7: Did you take ENGL 1105 or 1106 at Virginia Tech?

Course or Transfer Credit	No. of Students	Percentage*
Received transfer or AP credit for the course(s)	139	51.87%
ENGL 1105: First-Year Writing	17	6.34%
ENGL 1106: Writing from Research	43	16.04%
ENGL 1106 & Received transfer credit for 1105	26	9.70%
ENGL 1105 & ENGL 1106	43	16.04%

*some responses excluded because what the participant intended was unclear

Job, Internship, or Co-op and Course Value

The survey also included a question about whether or not students had had a job, internship or co-op requiring workplace writing during their time at Virginia Tech. Slightly more students have not had a job (~52%) than those who have (~48%). Initially, I sought this information because technical writing typically happens in a workplace, but this question really started to affect my initial research question because I became increasingly concerned about what affects students' ability to transfer what they learned from the course to the workplace. However, I conducted a feasibility study, not a transfer study, so writing transfer will have to become part of my future research agenda.

The majority of students, or ~37%, rated the course a 4 on a scale of 1 to 5, with 1 being not valuable and 5 being highly valuable. The full range of students' responses is available in Table 8. At first, I was pleased with this result, but then I started to drill down a bit more. When I calculated the *average* or *mean* of the course value, it came out to 3.38, which is hovering right around neutral. The median rating is 4, which sounds a

lot better, but it might not be the most beneficial way to look at this data. Looking at the totals another way, 47.46% of students rated the course value as a 3 or lower, and 52.54% rated the course a 4 or 5. In other words, about half of the surveyed students find the course valuable, whereas roughly the other half find it unvaluable or are neutral about its value. If one of the main goals of the Technical Writing service course is to prepare students for their future workplace writing, but they do not find the course valuable, I question how likely are they to transfer what they learned.

I also wanted to know whether or not there was a difference between how students valued the course and the setting in which they took the course. While there is no statistically significant comparison to note, I did find that of the 21 students who took the course online when they preferred face-to-face courses, the average course rating was 3.22. This is very close to the average course rating of students who had a job, internship, or co-op.

Table 8: How valuable was this course in teaching you genres and concepts you can use in the workplace?

Rating	**No. of Students**	**Percentage**
1 (not valuable)	23	8.33%
2	37	13.41%
3	71	25.72%
4	103	37.32%
5 (highly valuable)	42	15.22%

There is a correlation between course value and whether students have had a job. Additionally, there is a difference between whether students had a job and the median rating of the course value as a 4. This gap in students' ratings is displayed visually in the Figure 4 bar graph. The difference is statistically significant with *p* value of 0.015. The average course value for students who:

- have not had a job, internship, or co-op is 3.54, and
- have had a job, internship, or co-op is a 3.2.

This was a bit of the opposite of what I expected: I thought that students who had work experience would rate the course higher because they would have firsthand experience about how important technical writing is. Instead, students who *have not* had a job tend to rate the course as valuable, or a 4, more frequently than students who *have* had a job. However, it's possible that students who have job experience might feel as though they've already learned by *doing* what we teach in the Technical Writing course. This finding is fueling my impending research agenda because I want to further investigate the connection between a students' work experience and the technical writing service course.

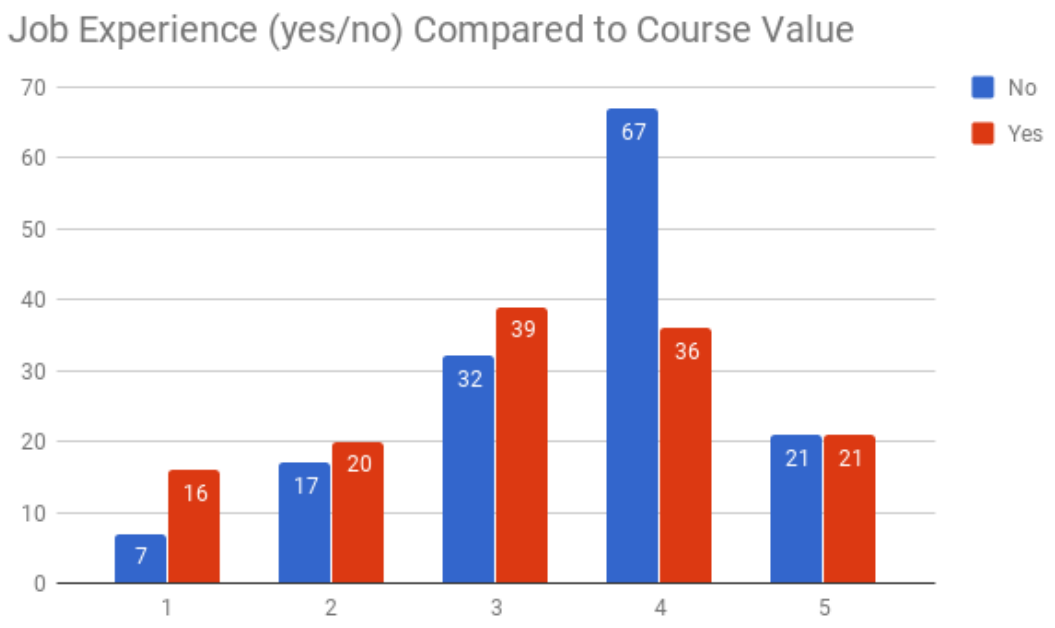


Figure 4: Comparison of Job Experience to Course Value

Most Valuable or Applicable Genres and Skills.

Next, students rated which genres that they learned in the course would be most valuable to their future workplace writing. The breakdown of students' ratings are presented in Table 9. The most valuable genre to students was the job application package, and the least valuable genre was websites. One problem with this finding might be that once students actually enter the workplace, some genres becomes more relevant than others. However, they don't know this because they don't have a job yet. On the other end, students rated websites the least valuable genre that they learned. Not all instructors teach this genre as part of the curriculum.

Table 9: What genres did you learn in this course that will be most valuable or applicable to your future workplace writing?

	Highly valuable or applicable	**Somewhat valuable or applicable**	**Somewhat unvaluable or inapplicable**	**Highly unvaluable or inapplicable**	**N/A (didn't learn this genre)**
Email or professional correspondence	138	75	18	15	28
Instructions, user document, how-to	72	98	56	13	35
Job application materials	146	79	24	12	13
Memos or short reports	127	97	33	14	3
Presentations	83	99	42	13	37
Proposals	107	98	34	15	20
Progress or informational reports	122	99	31	14	8
Websites	49	78	59	28	60

In addition to genres, I asked students to rate which *skills* that they learned in the course would be most valuable to their future work. Those five skills include audience analysis, collaboration, designing a document, design principles, and editing grammar and mechanics, and the full range of student answers is available in Table 10. Perhaps unsurprisingly, they rated collaboration as the most valuable skill. As for the least valuable, students chose audience analysis less frequently than the other options, which

could be an indication that instructors need to do a better job of relating *why* audience analysis is so important in technical writing.

Table 10: What skills did you learn in this course that will be most valuable or applicable to your future work?

	Highly valuable or applicable	**Somewhat valuable or applicable**	**Somewhat unvaluable or inapplicable**	**Highly unvaluable or inapplicable**	**N/A (didn't learn this skill)**
Audience analysis	93	114	36	11	22
Collaboration	133	86	24	12	21
Designing a document	115	90	37	18	16
Design Principles	103	98	41	19	15
Editing grammar & mechanics	114	94	36	13	19

Difficult Activities and Assignments.

In order to think about what kinds of services to design, I asked students what activities they found difficult in the course. These activities are listed in descending order according to students' selections in Table 11. The highlighted color represents answers that students wrote in themselves, and all other items were supplied in the survey. They rated graphics and visual design as the most difficult, with topic selection for assignments coming as a close second. Given that students rated audience analysis as the least valuable skill, perhaps it makes sense that about 23% found the process of analyzing an audience difficult. While we can *read* about audience analysis in the textbook or other materials provided by the instructor, to me this begs the question: What are effective methods for *teaching* the act of audience analysis, especially in an online course?

Table 11: What activities did you find difficult in this course?

Graphics/Visuals Design	29.20%	Organizing Info to Write Assignment	16.06%
Topic Selection for Assignments	25.18%	Textbook Readings	9.85%
Audience Analysis	22.99%	None / N/A / Easy Class*	9.12%

Document Design	19.71%	Quizzes	8.39%
Document Formatting	19.71%	Group*	1.46%
Conducting Research	18.61%		

*student write-in response

When asked which assignments students found most difficult, they selected the progress and informational reports most frequently, followed by the collaborative project. These assignments and the others students had to choose from—and wrote in themselves—are in Table 12 below.

Table 12: What assignments did you find difficult in this course?

Progress / Informational Reports	29.93%	None / Nothing / N/A*	9.49%
Collaborative Project	24.09%	Presentations	9.12%
Memos / short reports	20.80%	Job application materials	7.30%
Proposals	20.80%	Web sites	7.30%
Instructions, user document, how-to	17.52%	Email / professional correspondence	2.19%

*student write-in response

When considering both activities and assignments, only 30% of students at most experienced difficulty. There do not seem to be overwhelming difficulties in this course, which could partially explain why some students wrote in a response such as "nothing" or "N/A" for these questions. As I mentioned in Chapter 1, most students pass this course because the grade point average is a 3.55 (cite institutional research). However, as I argued in Chapter 1, that students pass the course does not necessarily mean that they value it and find it applicable to their future work. Again, the average value of the course is 3.38, just slightly above neutral, or leaning toward a "somewhat valuable" rating.

Resources Sought and Likelihood to Use Potential Services.

Above all other resources, students reported using examples, whether from the Internet, the textbook, or posted by the instructor in the LMS, while taking the course. The resources students selected, in decreasing order of frequency, is presented in Table 13. Like in the two previous questions, students could check as many responses as applied, so students selected "examples" at almost twice the rate that they did for progress and informational reports and graphics and visual design. As can be expected, 50% of students selected "emailing your professor" as a resource. The next most common resource was the Purdue OWL, and that combined with Internet examples as resources has influenced our thinking substantially as the consultants and I designed the Digital Studio's website.

Table 13: What kind(s) of resources did you seek while taking the course?

Examples (online, textbook, LMS)	63.50%	Textbook index	21.17%
Emailing your professor	50.36%	Office hours (if available)	14.60%
Purdue OWL	39.05%	Library	5.11%
Asking friend/family member	28.47%	Writing Center	4.74%
How-to videos	25.91%	None / N/A / Easy*	4.74%

*student write-in response

Lastly, students reported their likelihood to use potential services: online tutoring sessions, a physical space for collaboration, a course-specific website, and how-to videos. The full range of their responses is shown in the stacked bar graph in Figure 5. Students indicated they were least likely to use online tutoring. However, given the exigence of my study—that most sections of Technical Writing are offered online and online tutoring at the Virginia Tech Writing Center is currently offered only to students enrolled at the National Capital Region campus, and the CCCC position statement on OWI—I included

online tutoring as an option. Since the Department of English was also asking me to oversee a computer lab, I added "physical space for collaboration." Students reported being most likely to use a course-specific website, with 18.47% indicating they would be highly likely and 40.22% indicating they would be likely.

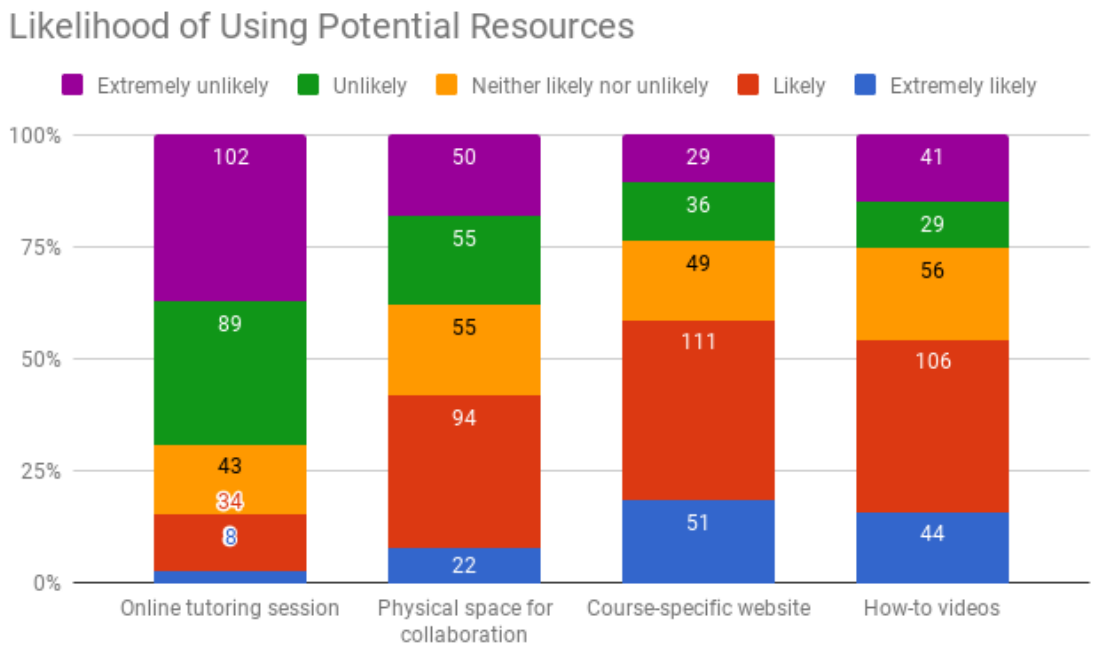


Figure 5: Likelihood of Using Potential Resources

Because many students mentioned efficiencies of time as a main reason for preferring online courses, and that the majority of students reported that a course-related website was the resource that they would be most likely to use, creating this website is one way to design a service that matches this student preference. For students who prefer face-to-face courses, which was the majority of participants, remaining flexible with appointments to be online or face-to-face is another way to meet their needs.

Students' Suggestions for Resources.

The follow-up question in the survey was, "What kind of resources or support would you have liked to see in this course that were not mentioned above?" 49 students elected to write in responses to this question, and of those, 17 (or ~34%) specified wanting additional examples, guides, and resources. For instance, one student requested, "More examples. From engineering, I want very strict rules to follow and I had to find out 'rules' on my own." More common, however, were students' desires for specific types of examples such as by genre, formatting guides, documents written by VT students, examples matching the assignment directions or expectations, and even one suggestion for "break down examples like Purdue OWL." In response to these comments, the Digital Studio consultants have sought examples to accompany the various genres represented on the website. In fact, the Goods and Services Proposal web page includes an example proposal written by a former Technical Writing student at Virginia Tech.

Another use of this space in the survey was students' negative comments about the course. The student who claimed that their professor incorrectly taught resume edits also shared they thought the course was offered too late in their college career: "If the information is taught correctly and in a more useful manner and the course is offered earlier in college, then it would be a very beneficial class to take!" This students' comment aligned with Fabio's point of view, which I will share in the Student Interviews section.

Another student wrote that the "online class is really bad" and went on to vehemently express, "READING ASSIGNMENT IS THE WORST!! THIS CLASS IS FOR ENGINEERS DON'T EXPECT US TO READ LITERATURE." While it is unclear

why this student had to read “literature,” and also what is meant by “literature,” there is a certain attitude about what the student expected from this course. Similarly, another student referred to the course as “busy work,” another lamented about inconsistencies in the amount of work assigned in different sections of the course, and yet another shared, “its [sic] not a useful course the way it is formatted at least in the lecture.” The latter student seems to be hinting that a lecture is not necessary for Technical Writing and that perhaps an online setting is more appropriate. One final student wished they had been given, “An opportunity to prove I can write without wasting my time.” In retrospect, I should have designed the survey to include a space for students to provide feedback about the course, perhaps following the course value question. Designing effective services, after all, requires investigating the “fail points” in the course. With effective services in place, it could be possible to intervene in the student’s course experience.

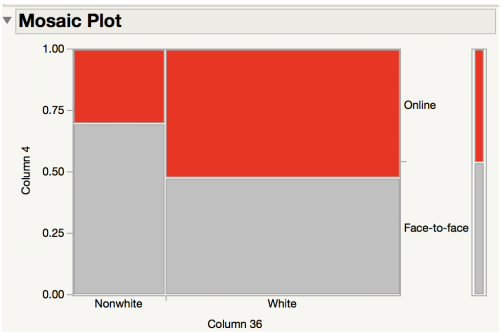
Demographics.

To get an idea of the average student in this course, I asked for participants to volunteer their demographic information. Participants were not required to answer these questions, and in many cases, did not. The majority of students identified as male (~56%), while fewer students identified as female (~33%), and very few identified as non-binary or agender (~1%). Roughly 10% of students chose not to indicate their gender. About 61% of students reported their racial identity as white, about 24% identified as nonwhite (I collocated students’ reported racial identities in order to determine a statistic), about 3% reported identifying with two or more races, and about 12% left the question blank. Regarding their disability identities, about 91% of students also did not report this information. Roughly 7% identified as able-bodied, and slightly

less than 2% reported a disability. The median age of students is 21 and the average age is 21.26. Therefore, Technical Writing students are mostly traditional college undergraduates. The majority of students, or 78.5%, are not first generation college students, about 20% are first generation, and another 1.5% were unsure. Students reported a wide variety of majors, but the four most common degree programs were Civil and Environmental Engineering, Computer Engineering, Computer Science, and Electrical Engineering. Table 14 includes a more extensive representation of students' most common majors.

Table 14: Most Common Majors

Animal and Poultry Science	1.24%
Building Construction	3.31%
Chemical Engineering	9.09%
Civil and Environmental Engineering	17.77%
Computer Engineering	18.18%
Computer Science	20.25%
Electrical Engineering	13.22%
Environmental Science	3.31%
Fish and Wildlife Conservation	2.07%
Food Science and Technology	3.31%
Mechanical Engineering	1.65%
Packaging Systems and Design	2.07%
Statistics	2.48%
Water: Resources, Policy, and Management	2.07%



Contingency Table

Column 36	Column 4: Face-to-face	Online	Total
Nonwhite	46	20	66
	19.74	8.58	28.33
	36.51	18.69	
	69.70	30.30	
White	80	87	167
	34.33	37.34	71.67
	63.49	81.31	
	47.90	52.10	
Total	126	107	233
	54.08	45.92	

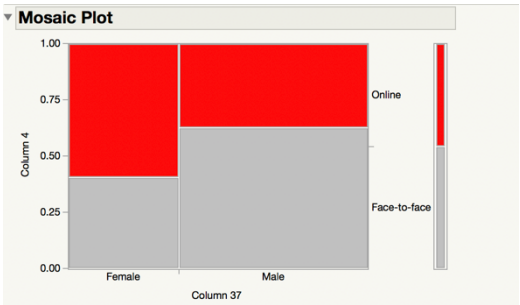
Figure 6: Likelihood of Nonwhite and White Students to Take Course Online or Face-to-Face

The majority of statistical significances emerged when looking at demographic data compared to other data in the survey. First, students who identified as white were much more likely than those who did not identify as white to take the course online, with a *p*-value of 0.0019 when students with two or more races and students who didn't respond were excluded from the statistical test. The mosaic plot in Figure 6 provides a visualization of the differences between these two demographics of students, and the contingency table shows the distribution of each variable. This is an interesting finding given that in Fall 2018, 18,119 or approximately 65% of a total 27,811 Virginia Tech undergraduate students are white ("Enrollment Summary"), and the majority of students who took this survey are white. Indeed, most of the sections of this course are offered online, as I indicated in Chapter 1. I did not ask students why they took Technical Writing online or face-to-face but rather which setting they preferred to take courses in, so this would be a good question to include if I were to repeat the survey. Knowing why

nonwhite students might prefer to take the course face-to-face could provide more information about how to design effective writing support services as well as what factors affect the course's value for them.

Statistically Significant Findings.

In addition to white students being more likely to take the course online, females were also much more likely than males to take the course online, with a *p*-value of 0.0009 when nonbinary or agender students and those who left the question blank were excluded from the statistical test. Refer to the mosaic plot in Figure 7 for a visual representation of these variables in comparison with one another. This is especially interesting given that the majority of students who responded to this survey are male and took the course face-to-face. However, because the majority of course sections are online, it is also possible that students had to take the course in a setting other than the one they preferred. In general, there are more male than female students on Virginia Tech's campus as a whole, both at the undergraduate and graduate levels ("Office of Institutional Research &



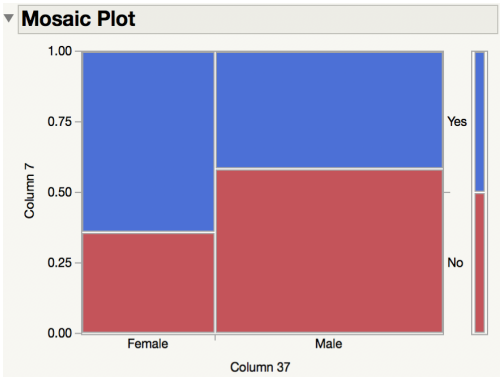
Contingency Table

Column 37	Column 4: Face-to-face	Online	Total
Female	36	53	89
	14.94	21.99	36.93
	27.48	48.18	
	40.45	59.55	
Male	95	57	152
	39.42	23.65	63.07
	72.52	51.82	
	62.50	37.50	
Total	131	110	241
	54.36	45.64	

Figure 7: Likelihood of Female and Male Students to Have Work Experience

Effectiveness"). Knowing this likelihood about Technical Writing students, I should have targeted more females who took the course online for follow-up interviews. I asked for volunteers to participate in a follow-up survey and contacted every student who responded "yes" and provided their email address. Of those students, 11 followed through with interviews, three of whom identified as female. Expanding this group would likely have provided more diverse information from the interviews that I conducted, so that is a shortcoming of my study.

In this chapter, I mentioned that there was a statistically significant relationship between students who had work experience and their rating of the course's value. There is an additional significance between a student's likelihood to have had work experience and their gender: females were more likely than males to have had a job, internship, or co-op, with a *p*-value of 0.007 when nonbinary or agender students and those who left the question blank were excluded from the statistical test. A mosaic plot and a contingency



Contingency Table

Column 37	Column 7: No	Yes	Total
Count / Total % / Col % / Row %			
Female	32	57	89
	13.28	23.65	36.93
	26.45	47.50	
	35.96	64.04	
Male	89	63	152
	36.93	26.14	63.07
	73.55	52.50	
	58.55	41.45	
Total	121	120	241
	50.21	49.79	

Figure 8: Likelihood of Female and Male Students to Take Class Online or Face-to-Face

table representing these variables is available in Figure 8. A very slight statistical significance also exists in the relationship between race and work experience, with white students being somewhat more likely that nonwhite students to have had a job, internship or co-op (*p*-value of 0.0125 when students with two or more races and students who didn't respond were excluded from the statistical test). Taken together, this likely means that white females are both more likely to take the course online and to have work experience upon entering the course. Looking at gender, course value, and work experience, Table 15 provides the average course ratings according to this cross-section of students.

Table 15: Average Rating of Course Value by Gender and Work Experience

	Course Value	**# of Students**	**Percentage**
Female with job	3.33	57	20.65%
Male with job	3.13	63	22.83%
Female without job	3.47	32	11.59%
Male without job	3.60	91	32.97%

While there is only a 0.14 point difference between how females with and without work experience rate the course's value, there is a larger difference of 0.47 between males with and without work experience. In other words, there is almost half a point difference in how males rate the course's value based upon whether or not they have work experience. The reason for this could possibly be that female students feel that they learn just as much or as well in the classroom as in the workplace, whereas what male students learn about technical writing might correlate more to which experience they have first: taking the course or having a job. However, I can only speculate about the reasons why a student's gender seems to correlate with how they rate the course value.

One takeaway for both instructors and writing center consultants here is to factor in whether or not a student has work experience when they are providing feedback or advice on an assignment. If a student, and especially a male student, has work experience, he may think that the course is not as valuable and that he might not have as much to learn. Asking such a student to draw upon their work experience when completing an assignment might seem logical, but it is also reasonable to remind the student that the writing or communication practices at one company might not be the same as another. As I discussed in Chapter 2, there is a difference between teaching students a genre versus a template approach to technical writing, so emphasizing a genre-based approach may be even more important for male students with work experience.

Student Interviews

The eleven students who agreed to participate in follow-up interviews contributed their perspectives on their disciplines, pedagogy, online classes, instructional technology, the Writing Center, and much more that shaped my approach to designing writing services that are student-centered. These students asked to be referred to by their first names, which were alphabetically as follows:

1. Alex, a computer science major and member of the Corps of Cadets
2. Anna, a chemistry major
3. Connor, a civil engineering major
4. Elliot, a statistics major
5. Fabio, a building construction major and member of the Corps of Cadets
6. Jake, an electrical engineering major

7. Judy, a computer engineering major
8. Julia, a political science and legal studies double major
9. Matthew, a computer engineering major
10. Paul, a chemical engineering major
11. Vince, an electrical engineering and mathematics double major

Of these 11 students, all but two identified as white or Caucasian, one identified as Asian and Pacific islander, and one identified as Egyptian. Seven students identified as male, three as female, and one did not share gender or racial demographics. Four students took the course face-to-face, and the other seven took it online.

In service design, people, props, and processes come together to inform how users access or are prevented from accessing a service. However, designing a service without a specific, fully formed description or model often caused participants in my study to guess what exactly I had in mind. But I didn't *want* to have anything in mind; I truly wanted to develop a service using the participants' collective input. When doing anything in an educational setting, the teacher often plans the structure of the learning activity. Students typically have little to no say in how they participate in classrooms, whether physical or online, and this situation puts students in the passenger seat. Clearly, the instructor is the driver of educational objectives because of their experience and expertise, but through writing center work, I have often found students are put at a disadvantage when instructors do not consider the student perspective. Perhaps because they are not used to occupying a position of power, the students I interviewed did not necessarily supply wildly creative suggestions for improving their experiences with online education.

Nevertheless, I will include a few preferences that became evident to me through the interview process.

Why Technical Writing Students Mostly Don't Use the Writing Center

In order to design a synchronous online tutoring service, I asked students, *Have you ever used the Writing Center for this course? Why or why not? What about for other courses?* The majority of students I interviewed stated that they had not used the Writing Center for their Technical Writing course or any other course, for that matter. The reasons they gave were varied, and I will summarize the most common ones below.

Misunderstanding of the Writing Center Mission.

Some of the students' comments about the Writing Center indicated that its mission is unclear to them. Connor, after stating that he had not used the Writing Center, suggested he would be "more likely to use" online services. He then described this online service to be somewhat akin to asynchronous tutoring: "an online place [you] could turn in your paper to get grammar corrections and advice, that would probably be useful." Here Connor's misunderstanding of writing centers hearkens back to the concerns Stephen North expressed over 30 years ago (see Chapter 2): Connor sees the writing center as a place that will provide "grammar corrections." Then again, he also mentions "advice," so it's possible Connor somewhat understands the mission and purpose of writing centers, or just lacks familiarity with the pedagogical vocabulary.

Other students simply did not think that they had a need to seek Writing Center services because of personal habits and preparation. For instance, Alex observed, "So long as I have time, I don't procrastinate, I can usually put out pretty good writing." Alex

therefore showed an understanding that writing takes time. For Jake, the need to use the Writing Center was absent because he claimed to have taken a very good English class in high school "that set me up pretty well for college." While he didn't particularly enjoy taking that class at the time, he reflected that it had a lasting effect on him academically.

Several students whom I interviewed did not seem to see themselves as the type of student who would seek Writing Center tutoring. Anna explained that she was "not one to go in and ask for help with writing." Furthermore, Anna said she wouldn't have used the Writing Center "unless I was really motivated and really struggling." Similarly, Elliot remarked that his grades in Technical Writing were "generally 90s and above," so he did not feel the need to use the Writing Center. Elliot's perspective represents my concern from Chapter 1: that because most students pass the course with a B or above, creating online writing support services might seem fruitless. Indeed, survey participants did not report being very likely to use online tutoring services. For many students, unless they are "struggling" and not getting good grades, they would not use the Writing Center. As Fabio put it, "The Writing Center has mentorship for people who are aren't great at writing."

Location.

Several students attributed their location or the Writing Center's location as a reason for not using it. For example, one of the reasons Connor gave for not using the Writing Center was because it was "out of the way." Alex expressed an interest in getting help with his résumé if the Department of English had a physical space offering writing services because it would prevent him from having to walk to "the Career Center [...] way on the fricking other side of campus." Because he is a cadet, Shanks Hall is more

convenient to Alex's location on campus. Julia took the class online during the winter session and would not have been able to use the Writing Center—if it was even open—because she "was four hours away" from campus. Along the same lines, Matthew mentioned that he did not use the Writing Center because the class "was online, so I was in Pennsylvania." Similarly, Anna enrolled in Technical Writing online over the summer, so she could not have used the Writing Center even if she wanted to because she was not in Blacksburg. As I explained in Chapter 1, only students enrolled in courses at the Northern Virginia campus can request online tutoring from the Writing Center; all others must visit the Writing Center in person. Elliot, who also took the course online in the summertime, was unaware not just of the Writing Center's location but its entire existence: "I didn't know we had a Writing Center until I took the class. Like I went through freshman, sophomore, junior year without knowing we had a Writing Center."

Using the Writing Center for Other Courses.

While seven of the students I interviewed did not use the Writing Center at all, four mentioned using it for classes other than Technical Writing. Vince, who worked in his community college's learning center, visited the writing center before transferring to Virginia Tech to get help from someone who could demonstrate proofreading techniques. Vince also showed an understanding of writing center theory and pedagogy by immediately adding, "I know a lot of people in the writing centers don't like to proofread an entire paper, but you know, get an idea. 'Hey, can you check this to make sure my pronouns are done correctly?' or whatever." Having also worked in the writing center, he knew how time-consuming proofreading was, and explained his tutoring method was to "show you how *I* typically proofread on your first page, and then you can proofread your

paper." Judy, Julia, and Paul all used the Writing Center for their first-year writing courses at Virginia Tech. Judy thought the Writing Center "helped a lot," whereas Julia remarked that when she went for her first ever college paper, "it wasn't like, *overly helpful*." Then again, she attributes this to the fact that "it was a pretty simple paper, so I don't know how much they could've really helped with that."

Takeaway about Writing Center Use.

At least from the small subsection of students I interviewed, it appears that students, if they used the Writing Center at all, only used it for their first-year writing courses and discontinued use thereafter. This behavior could partially explain why survey participants were not eager to use online tutoring services. For various reasons, in a junior-level writing class, students seem to think that they no longer have a need to use the Writing Center, if they ever had a need in the first place. As long as they weren't struggling, were getting good grades in the class, and were receiving adequate feedback from their instructor, the Writing Center didn't cross their minds as a potential resource for the Technical Writing course.

Assignments and Activities that Students Value for Workplace Preparation

When I asked interviewees about the assignments and activities that best prepared them for the workplace, I received a variety of responses, including the job application package, group proposal projects, social media guidelines, memos, user manuals, reports, and even two responses that *all* the assignments were useful.

Job Application Package.

Three students found the job package valuable, which is consistent with the survey results. First, Connor thought résumé writing was valuable because he had not gotten "any real feedback" until taking Technical Writing. As Connor puts it, the résumé, because it is "turn[ed] into real companies [...], is probably the most useful thing you're doing." Second, Julia recounted making a website for her job package assignment, which she later used for her law school applications. She claimed, "And that was really cool. I never thought about doing that [making a website] before. So that definitely prepared me to go into the workplace." Third, Fabio observed that the résumé and cover letter assignment in his class was "the best one," but he lamented, "if I'd taken this course freshman year, [the job package] would have been exponentially more helpful looking forward." Before taking Technical Writing, he had written résumés and cover letters, but felt as though they were "somewhat of a foreign concept." Despite the fact that job application packages are not a genre specific to the technical writing field, many students placed a great deal of value on the assignment, perhaps largely because they could see a clear application for these documents to their lives.

Group Projects and Proposals.

For two other students, the group projects were valuable, but for different reasons. According to Jake, the group projects were a highlight of the class because in his electrical engineering major, the class sizes are quite large, so he appreciated that in Technical Writing:

> that class was 20 [students]! And we had more laughing, and more fun, and everybody in that class knew each other, and I never get to experience that in any

> of my classes. And so, that to me was the best part of that class. Just knowing everybody.

Jake also knew that in his future workplace, he would be working with multiple people. On the other hand, Matthew found that the group project, which was a request for proposals, "could help me understand, like, how to best read through [...] an actual document and [...] go through the motions of preparing one myself. [pause] So it was more of, like, formatting than writing skill, I guess." Unlike Jake, Matthew was not concerned about the collaborative part of the project but rather the genre itself and its novelty because, in contrast to instruction manuals, he had never seen an RFP before. The newness of this genre to him seems to have affected its value for his learning.

Immediate Application for Genres Learned.

Like Matthew and Connor, other students also needed to be able to envision themselves using a genre in the future in order to find it valuable in the class. For Elliot, reports were an important genre because, "Especially for the career I'm going into, I'll have to write up a lot of reports pretty frequently, so learning that language and structure was very helpful." Similarly, Alex responded that social media guidelines were the "kind of thing I can actually see myself very easily being tasked to me once I graduate." I thought this was an interesting response given that Alex is a computer science major, so I assumed he would find writing documentation more applicable as a practice common to programmers and software developers. While Elliot and Alex were concerned about their future workplace writing, Anna found memos a relevant genre, noting that she had written two memos for her sensor evaluation class that semester. Again, as was the case

for Connor, Anna imparted significance to an assignment for which she saw an immediate application in her life.

Resources and Course Materials that Students Value

When I asked students about the kinds of materials and resources they thought made online classes better, they indicated a variety of items, from textbooks to videos to interactive chat and discussion technologies.

Textbook.

Multiple students felt pretty strongly that a good textbook was a must to have in the class. For instance, Connor said that a textbook is his preferred way of learning but, surprisingly, did not have one for his online class. He seemed to think that a textbook was not quite as necessary for an online class, "but it might be extra useful for those just because you're learning online sometimes it's nice to have it in front of you so you can just learn it." Matthew, Fabio, and Anna also stated that a textbook was an important resource for an online course. In fact, Fabio noted, "the textbook was an excellent resource, honestly." When I asked him which textbook he used, he told me it was Dr. Jen Mooney's self-published book, *Professional Writing: An Introduction to Writing in the Workplace.*

In contrast to these students, Judy and Julia had less positive experiences with textbooks. In a different online course, Julia had an online textbook which she disliked because it was "insanely expensive" and contained too much interactive text that was highlighted. Her dislike seems to be connected to the course's pedagogy because the textbook followed modules which were then attached to "built-in quizzes, and so, the

teacher didn't do anything." Therefore, to Julia, the format and design of the textbook are of high importance. Judy dislikes textbooks in online courses for a somewhat similar reason to Julia. She prefers watching videos to reading a textbook because, as she put it, "Assigning reading isn't teaching me anything." At the same time, Judy has a negative view of online classes in general because she places emphasis on the effect her physical presence has on the teacher's perception of her: "If they saw me in class, they'd see I was paying attention."

Digital Media.

More than one student articulated a preference for some kind of digital media as a resource or material for an online class. While they used different terms to describe these materials, they had a clear desire for learning and interaction that was not purely text-based. Matthew and Vince both voiced a preference for videos like the ones created by Khan Academy. Along the same lines, Julia and Judy like to watch recorded lectures. Interestingly, Jake thoroughly enjoyed the audiobooks used in some of the literature courses he'd taken. Although Alex did not refer to specific examples as the other students did, he stated that "a mixture of media" was necessary for him in an online course because, as he put it, "If it's just text, I'm going to very quickly lose focus." All of these resources indicate multiple students' desire for an aural component in an online course.

While not media per se, Elliot and Vince both took their course with a professor who used Slack, a direct messaging application. Elliot felt as though the discussion assignments he needed to post to Slack were "not at all" valuable because "it was very rare to receive helpful feedback." Vince, on the other hand, expressed fondness for Slack as "it was really easy to talk to people one-on-one," including to his professor and "for

collaboration." The difference here seems to lie in how each student understands the purpose of this digital tool: Vince saw Slack as a way to connect with the people in the course, whereas Elliot saw it as an inappropriate tool for having classwide discussions. This difference of opinion should alert instructors and anyone providing curricular writing support that the technology implemented in an online course must be purposeful and clearly explained to students.

Synchronicity and Accessibility.

A final kind of resource for online courses that students deemed valuable relates to synchronous activities and accessible materials. Students discussed a couple ways in which their courses could implement synchronicity. Connor and Fabio both articulated a desire for online office hours. For Connor, being able to ask questions was important in an online class: "[S]ome sort of direct communication with the teacher would be helpful. Or even a TA." Although he was not necessarily imagining the kind of online writing support piloted in this study, his comment nevertheless points to the importance of synchronous conversation and the limitations of emails. Similarly, Anna and Julia disclosed an interest in conversation for the reason that it contributed to their learning process. However, Anna noted the caveat that "talking to people" is helpful "Depending upon how knowledgeable and personable they are." In addition to online office hours, Fabio also spoke about the materials which his instructor made available as PDFs so he could access them without needing an internet connection. Having the materials in this format gave him greater flexibility in the online course. This comment brought to mind the PDF versions of handouts available on the Purdue OWL's website, a resource Jake mentioned using in his Technical Writing course. As the Digital Studio pilot project

develops, converting website resources to PDF is an idea the consultants and I are considering.

Students' Imagination for the Future of Online Courses

Hoping to gain insight about the question of "what's next?" for online education, I asked students a very broad question about what they would be able to do in an online course if they essentially had no constraints. Most of the students didn't necessarily envision anything radical. For instance, when I asked Matthew this question, he seemed fairly content with the online classes he had already taken. He observed, "I know people like to push technology, but…just reading the book is enough for me. In most cases." He went on to say, "I think one thing online courses could do better is direct to content that *isn't* theirs [...] there's a lot of stuff online, and it would be helpful to direct the students to what's quality." So while Matthew emphasized the importance of a good textbook for an online course, he also seemed to acknowledge seeking online resources but perhaps does not want to spend a lot of time looking at websites that do not contain "really good, succinct information."

Social Cognitive Learning.

For most of the other students, interaction with other people or environments was desirable. Alex and Fabio wanted collaboration with classmates, while Jake had field trips—or what is known in education as a flipped classroom model—in mind, and Paul and Vince described virtual reality or online simulations. For Vince, virtual reality could be used to simulate a physical classroom, even going so far as to implement the motion detection technology used in video games. Anna felt online synchronous lectures were a

preferable option because they make participating easier for her as an introvert. Likewise, Elliot and Julia also wished online classes would simulate face-to-face ones. Julia articulated what she had in mind as follows:

> [V]ideo chatting, and the professor kind of leads a discussion that way? 'Cause one of my favorite parts about the classes I'm in now, 'cause they're kind of like the smaller, more topic-based classes since I'm a senior, is the discussions. I've learned a lot through them. [...] [S]ome of the best thoughts just come to you on a whim in discussions, so I think it would be, like, less formal and maybe get more insight from people.

Although Julia studies political science and is perhaps unaware of social cognitive learning theory, it is certainly applicable to what she is describing here. Learning with others in a social setting is a cornerstone of education in general, but certainly a mainstay of the university as an institution.

Students' Suggested Resources for the Pilot Study

Because the former Department of English chair was providing a classroom to use in the evenings for the Digital Studio pilot project, I knew that I would need to think about how to use the physical space. How would the services in the physical space differ from those offered online? Would Technical Writing students be likely to use the physical space? According to the survey results, there were only slightly more students who would be likely to use a physical space (~45%) than students who were unlikely (~38%). These percentages reflect combining the highly likely and likely categories, as well as the highly unlikely and unlikely categories. In the interviews, this finding played out similarly.

Physical Space.

Five students listed services they would be likely to use in a physical space. As I mentioned earlier, Alex told me he would like to have somewhere closer to his dorm to receive support with his résumé. He also remarked that he would like "a large quantity of templates for various document styles [...] that show you different ways you can set them up" and "make it look." Alex thought this resource could be "physical or online, it doesn't particularly matter." Paul expressed a similar interest in having a tangible set of examples available in a computer lab, "like one of those old style rotary laminated things." Jake and Anna both suggested that a physical space would make meeting with groups for collaborative projects easier. Jake emphasized the lack of study space available on campus, noting that he often studied in the dining hall as a result, and Anna admitted, "it'd be nice to have a place to meet face-to-face that is more easily accessible on campus." Given the role that collaboration plays in both technical communication and writing center studies, considering how to design a service that supports students working on collaborative writing projects seems especially important for this study.

A couple students outlined specific resources that they would like to see in a physical space. Drawing from his experience working in a learning center and writing center, Vince included computers, laptop space, texts used by the instructors, and "helpful handouts" on his list of resources. Indeed, "helpful handouts" returns to the idea of making web content into PDFs and perhaps even laminating them into a set as Paul said. Thinking about another coveted resource on campus, Judy imparted her desire for access to free printing. The classroom where the Digital Studio pilot project is taking place contains a printer, and so I obtained permission from the former chair of the

Department of English for students in any English course to print course-related assignments.

Several students also disclosed that they found a physical space unnecessary. Elliot, for example, did not think any kind of "physical collaboration space, or any kind of a space for this course" was needed, and seems to attribute problems his group had with their project to a "group member not doing his fair share," but that his "experience overall was pretty good." Matthew and Judy also shared this view, perhaps because, as Matthew put it, he did not "know how it would really be different than the Writing Center." Matthew and Judy's comments highlight the need for carefully distinguishing the Writing Center's services from the Digital Studio's services. In my emails to Technical Writing instructors to promote the services, I have tried to be particularly cognizant of this nuance and variance to show that the Digital Studio offers specialized support from Professional and Technical Writing majors.

Specialized Services.

One student, Julia, recognized the importance of a distinction between the Writing Center and what would become the Digital Studio. Julia's response to my question about tools or resources for a physical or online space was:

> It might be nice to have [...] writing help for the specific type of documents that you're trying to write because, like, I learned in these classes that a memo is very different than a service proposal, like stylistically and, or like a user document or something. So being able to say, like, "OK, I'm writing like a user document. What specific writing like styles or writing vocabulary or something like that should I be using?"

Julia's insight is rather singular compared to the other students, however, and I should disclose the fact that she took both Professional Writing and Technical Writing courses with me. While I cannot be sure I mentioned my intention for my dissertation project to her explicitly, she may have picked up on some of my inclinations. In addition to this kind of support, Julia also believed, "having some background training in being able to use [online meeting platforms] would definitely be very helpful, I think." She did not specify whether or not such training should be offered online or face-to-face, but both environments could possibly be used. Since I developed the pilot project with online consulting in mind, demonstrating to students how to use Zoom should be part of the process. During training sessions with consultants, I asked them to assist students with learning how to use Zoom, and they practiced using it themselves.

Online Space.

Students stated two services with an online environment in mind, both of which have been detailed above: online asynchronous tutoring and a library of example documents or assignments. While I had envisioned synchronous consulting services, Connor's description more closely matched an asynchronous model where a student submits a document, then a tutor writes their feedback on it and returns it to the student. Akin to the idea Alex and Paul shared, Elliot also vocalized that "a library of a handful of examples for each genre would be helpful," although he noted one problem that might arise as a result would be students "following them like a template." Again, guidance from instructors or consultants would likely be needed in order to help students avoid this behavior.

Summarizing Student Results

In this chapter, I have reported the results of a survey and 11 interviews with students to answer the research question, *What are the needs of technical writing students and instructors that services in an online interactive space can address?* The findings of these research methods yielded a multidimensional view of the Technical Writing service course at Virginia Tech, online education, preparation for workplace writing, and student demographics in the service course. From the survey results, it has become evident that many students (over 50%) enter Technical Writing without having taken a writing course at Virginia Tech. This in turn is likely to affect students' familiarity with college-level writing and expectations at Virginia Tech. Students who have some kind of work experience tend to place less value on the Technical Writing course, as they may have learned some of these skills and concepts on the job. Making Technical Writing applicable and valuable to these students, I believe, should be of concern to instructors and writing support professionals, especially if it is the only writing-intensive course they take at Virginia Tech. Furthermore, while the job application package was of great value to students according to the survey results, other genres were equally as important to students when I spoke to them individually. Overall, students did not report finding activities and assignments in the course terribly difficult, but they did encounter some challenges with graphic and visual design, selecting a topic for an assignment, writing progress or informational reports, and working on a collaborative project. Despite these challenges, students did not indicate a huge willingness to seek online tutoring or a physical space for collaboration, but were slightly more inclined to view a course-specific website or how-to videos. Lastly, a student's race and gender correlated with the setting

in which they took the course and with their likelihood to have work experience. This raises questions about why certain students prefer to take this course online and how that should affect the design of services for Technical Writing or maybe even other online writing courses. Additionally, if students have work experience, how should consultants interact with them if they do seek writing support?

From the interview results, I discovered more in-depth reasons that may explain why students were disinterested in online tutoring sessions. For the most part, students either only used the Writing Center during their freshman year or not at all. Many students also felt they did not need Writing Center services because they were getting good grades in the course and not "struggling." In that respect, a blunt answer to my research question might be, *Students do not see an overwhelming need for services in an online interactive space.* However, their experience with writing-intensive courses at Virginia Tech, and perhaps college-level writing more generally, is rather limited. In addition, many students placed high importance on the job application package, which is a genre all college students should learn but is not necessarily a technical one. Is it the sole responsibility of the Technical Writing course to teach students this genre?

A more challenging aspect of the Technical Writing service course may be to emphasize a genre-based approach rather than the format approach that students like Matthew highlighted. It is possible that orienting students toward the tendency of genres to have a specific rhetorical intention but a variety of formatting, visual designs, and content lengths could help them recognize genres when they appear elsewhere and, therefore, use them effectively. Different genres held importance to different students, likely because of the genre's immediate application to their lives. If students can learn to

place higher value on genres they might not be using immediately for job applications and other courses, but rather can envision themselves using a genre as Elliot and Alex could, perhaps negative attitudes about the course might also be affected. A certain disregard for the course is even more challenging to overcome when the course is offered online, for as Matthew saw things, "it was mostly engineers trying to get the class out of the way over the winter." For some students, then, the course is an obstacle to get over rather than an objective to fulfill and enhance their education.

Although most students did not see a need for online tutoring in the course, nor visits to the Writing Center more generally, there was a sense in both the survey comments and interviews that many students want online courses to be interactive in some way, whether through digital media, live discussions, or even simulations. Vince and Elliot's instructor used Slack to enable real-time conversations, and many instructors used a textbook, but it was unclear from students if Technical Writing instructors used other, more interactive resources in the course. Knowing the writing center and technical writing fields support a social cognitive theory of learning, and that some students implicitly value this kind of approach as well, I would argue that we, the instructors of Technical Writing, are not currently doing enough to foster this kind of learning in the online sections of the course. I believe online synchronous consultations could be one way of augmenting or accompanying the online learning experience for students in a way that could also enhance their understanding of and preparation for the kind of collaboration and multiliteracies they will need to enact in the workplace. In order to determine instructors' attitudes toward the course and potential needs for online support,

especially the online sections, I move in the next chapter to sharing their survey and interview results.

Chapter 5: Instructor Results

Introduction

Because my concern about a lack of online writing support services for students resulted from my experience teaching the Technical Writing course, I consider instructors another important participant group for this study. While they may or may not be aware of the CCCC Position Statement of Principles and Example Effective Practices for Online Writing Instruction, the fact exists nevertheless that instructors are fully responsible for supporting all of their students' needs in an online course. Moreover, students taking the course in both online and face-to-face settings only have access to the Writing Center in person. The writing center field generally practices and has studied three main methods of offering online writing support, which include asynchronous and synchronous tutoring as well as online writing repositories (such as the Purdue OWL). The technical writing field centers its pedagogical concerns around training GTAs and instructors for teaching the service course online, but it does not make much reference to other forms of support such as writing centers. To study the feasibility of designing online writing support for Technical Writing students and instructors, I turned to service design methodology. Service design is used to design new or redesign existing services, and that can encompass educational services such as tutoring or learning spaces (Felix). After discussing students' attitudes toward the Technical Writing course, its genres, and its resources through surveys and interviews, I now turn to similar areas of concern for Technical Writing instructors.

Instructor Survey

Just as I did with students of Technical Writing, I also distributed a survey to instructors of this course at Virginia Tech. The survey was open from March 17, 2018 to July 12, 2018. Of the 15 instructors and graduate teaching assistants (GTAs) to whom I distributed the survey, 13 responded, for a response rate of approximately 86%. Instructor insights about their teaching practices are important to consider when designing services for their students; ignoring their insights could result in students never finding out that services exist in the first place.

Results

Because there are substantially more students than instructors of Technical Writing, it is not possible to apply any meaningful statistical tests (e.g., Chi-square or ANOVA) to the survey data. As a result, I will report the direct results of this survey.

Teaching Experience.

The majority of respondents (~38%) either had little experience (taught 1-5 sections) or a great deal of experience (16+ sections) teaching the course (see Table 16). This is likely because GTAs would have only taught the course during their time in the PhD program in Rhetoric and Writing. In addition, a rotating set of GTAs could potentially affect students' perception of the course's value and effectiveness, depending on how well the GTAs are trained and prepared. Offering online consulting and resources could, therefore, be just as beneficial to students as to new GTAs with little to no prior

experience teaching Technical Writing. I will discuss this idea in more detail in the conclusion.

Table 16: How many sections of ENGL 3764: Technical Writing have you taught?

Sections Taught	Percentage
1-5 sections	38.46%
6-10 sections	15.38%
11-15 sections	7.69%
16+ sections	38.46%

Instructors not only had a variety of experience in how often they have taught the course but also the setting in which they have taught it. Roughly half (~46%) of instructors have only taught the course online, while the same number have taught in both online and face-to-face settings (see Table 17). One instructor had taught the course solely face-to-face. Four of the five instructors who have taught 1-5 sections of the course did so in an online setting. In other words, the majority of instructors who have only taught online also have taught fewer sections. On the other hand, four of the five instructors with experience teaching 16 or more sections have taught the course in both settings.

Table 17: In what setting(s) have you taught and which setting do you prefer?

	Experience	Preference
Online	6	1
Face-to-face	1	4
Both settings	6	2

The survey also asked instructors in which setting they preferred teaching if they had taught both face-to-face and online. The majority of instructors who responded to this question indicated that they preferred teaching the course face-to-face. The one instructor who explained their response wrote, “If I had to pick one [reason], I'd say that face-to-

face communication makes dialog easier." Similar to the students who answered this survey question, the immediacy and synchronicity of communication was a reason for preferring face-to-face courses.

The instructor who preferred teaching the course online disclosed their reasoning as follows:

> [S]o much of the course content lends itself to an online environment. Also, much of technical writing will actually occur online for those who become technical writers upon leaving college—so in some ways, I find the online course a closer version to what a technical writer might actually experience in the workplace in terms of planning, drafting, publishing, and receiving feedback.

This instructor's reasoning for teaching the course online is sensible given the connection to the environment in which a technical writer typically works. However, the service course is intended for non-majors who may or may not—and more likely will not—end up in the technical writing profession. Regardless of the profession that students enter, they will more than likely write and communicate in online, collaborative environments.

The remaining two instructors who responded to this question had a slightly different preference. One instructor preferred each setting for certain reasons:

> When I teach online, I miss getting to know the students personally, but I also enjoy the ability to work on the course on my own time (as students do). When I teach face-to-face, I enjoy getting to know the students, but that is in and of itself sometimes a letdown when you realize that X number really don't want to be there.

The instructor's comment that students "really don't want to be there" relates back to some of the findings in the previous chapter. Students have a slightly greater than neutral value for the course, according to the average rating of 3.38, and some students like Matthew felt the course mainly consisted of "engineers trying to get the class out of the way."

These types of comments are also a return to exigence for my dissertation study, which I described in Chapter 1. Although most students pass the course and do not encounter difficulties as far as grades are concerned, their value of the course can perhaps be colored by their preconceived notions of what the course should be. In Chapter 4, I shared some of students' negative comments about the course, which were sometimes related to their instructor's teaching methods, but also tapped into the attitudes that students have about the requirement to take this course. Designing effective online writing resources, then, can be a matter of improving the students' course experience instead of acting in the way that many students expect tutoring services to operate: as a bolster for students who can't write well, as the findings from the student survey and interviews in Chapter 4 indicated. Part of the design of the online resources needs to acknowledge and challenge misconceptions about the writing center while also differentiating the Digital Studio's services from the Virginia Tech Writing Center. In addition, services need to be targeted and marketed to Technical Writing students as specialized for the course and offered by Professional and Technical Writing majors.

Difficult Activities and Assignments.

Whereas students did not report having as much difficulty with course-related activities, instructors more frequently indicated that certain activities gave their students

pause. Only 18.61% of students found conducting research for a written assignment challenging, but 61.54% of their instructors rated this activity as difficult for students. Students were more concerned with designing graphics and/or visuals (29.2%) and selecting a topic for an assignment (25.18%). Instructors, by contrast, were perhaps less concerned with what might be considered detail-oriented tasks and instead thought that students had difficulty concentrating on more abstract concepts (audience analysis) and critical thinking skills (organizing information to write an assignment), as shown in Table 18 below. Conducting research is an activity perhaps more associated with the library rather than the writing center; however, from my experience as a professional tutor, students often needed concurrent support with research and writing. Separating the two activities is often difficult, so it would be worthwhile to consider how online writing support services could weave in or direct students to appropriate research support. Furthermore, instructors' concerns about their students' ability to conduct research can be connected to the fact that over 50% of the students surveyed received transfer or AP credit for their first-year writing courses. As I pointed out in Chapter 4, this high number could indicate that many students enter Technical Writing without much experience writing at the college level. Some of the instructor's interview comments further illustrate their concerns with research and will be discussed in the interview section.

*Table 18: What **activities** do your students find difficult?*

Conducting research for a written assignment	61.54%
Audience Analysis	53.85%
Organizing information to write an assignment	46.15%
Designing graphics and/or visuals	46.15%
Designing a document	38.46%

Selecting a topic for an assignment	30.77%
Other	30.77%
Formatting a document	15.38%
Quizzes	7.69%

Besides activities, I also asked instructors to report on the assignments that they perceived as most difficult for their students. One instructor commented in the survey, "this seems like a good question for my students," which points out the fact that an instructor can only guess what a student finds challenging. An instructor might gauge difficulty by how well a student performs on an assignment, for example. Nevertheless, I was interested in asking both stakeholder groups this question in order to determine if students' and instructors' perceptions align. Or, if their views do not quite match up, I could hazard a guess about why that might be and use that in the service design.

The two assignments that instructors suspected were the most strenuous for students were the collaborative project and reports. The full range of assignments that instructors selected, in decreasing order of frequency, is available in Table 4. This finding closely matches what was found in the student survey: progress/informational reports were the most frequently selected assignment (29.93%), followed by the collaborative project (24.09%). The collaborative project is a staple across sections of Technical Writing at Virginia Tech, but the type of genre that students work in varies by instructor. Some instructors include various genres within a collaborative project, such as a memo, a progress report, and a final proposal. The literature that I cited in Chapter 2 suggests that writing centers have only begun to dabble in offering group tutoring sessions, while the technical writing field suggests a great deal of scaffolding for such assignments. I

maintain that both fields need to produce additional studies that attend to scaffolding and supporting collaborative writing projects, especially for online courses.

While collaborative projects frequently produce obstacles for students, the same number of Technical Writing instructors (61.54%) find this to be true of reports. Personally, I have found that many of my students could not discern between an informational or research report and a research proposal. For many students entering the course, reports may be a new genre, especially if they have not taken any writing-intensive courses in their disciplines. If they did take either of the first-year writing courses, they would not have been exposed to report writing, so students often have to make an adjustment from essay writing to report writing.

Students in certain majors seem to receive greater exposure to technical writing genres than others. For example, Connor, a civil engineering major, remarked that his courses required writing "A lot of reports." Along the same lines, Fabio, a building construction major, shared that he had "to write up certain technical documents" in his classes. Belonging to the Corps of Cadets, Alex was quite familiar with memorandums. However, the kinds of reports students write in these courses and in the Corps may vary from the kinds that they are asked to write in Technical Writing. An effective informational report may require synthesizing existing research and/or reporting on primary research, whereas a memorandum does not require this, and the kind of reports that Fabio wrote were "based upon what we were doing in class that had to do with what we were studying. So construction principles." What Fabio is referring to certainly sounds like a kind of informational report, but one in which students were supplied with the research or concepts to include. Because Technical Writing serves a variety of

majors, there is no way for instructors to individualize this kind of information (a problem which Ed Nagelhout [1999] is cited for in Chapter 2). This circumstance, along with instructors' concern about students' abilities to conduct research, could partially explain why instructors indicated that reports present a multifaceted challenge to Technical Writing students.

*Table 19: What **assignments** do your students find difficult?*

Collaborative project	61.54%
Reports (progress, informational)	61.54%
Proposals	53.85%
Instructions, user document, how-to	23.08%
Email or other professional correspondence	15.38%
Job application materials	15.38%
Other	15.38%
Web sites	7.69%
Memos, short reports	0.00%
Presentations	0.00%

Resources Offered and Perceived Preferences of those Resources.

In order to design resources for Technical Writing, I thought it best to know how to accompany existing resources. Putting student and instructor perceptions together also allows me to make some informed decisions about what to do in the Digital Studio's pilot project. In Table 20, I combined the resources that instructors referred students to along with the instructors' perceptions of their students' use of these resources. Every instructor, not surprisingly, supplied their students with their email address and sample documents. The importance of providing sample documents to students cannot be understated: this was the most frequently selected resource that students sought (63.5%),

and many also wrote this in the open comment section of the survey. Additionally, the ability to contact their instructor and ask questions was a prevalent concern for students in both the survey and interviews. Recall that immediate and in-person accessibility to the instructor was a reason many students preferred face-to-face rather than online courses. However, responding to student emails in an online course can be highly time-consuming, often more so than face-to-face courses (Griffin & Minter, 2013). As a result, offering synchronous online consultations could be a way of alleviating the amount of time instructors spend corresponding with students and also providing the kind of interactive connection that many students expressed a desire for. At the same time, a large number of instructors offer the writing center and library as a resource to students, but none thought students preferred these resources. This finding corresponds with students' low purported likelihood to use online tutoring sessions, low selection of these resources in the survey, and the lack of use or understanding of the writing center disclosed in the interviews. Again, these findings suggest some heavy groundwork is necessary for designing and offering online writing services so they are well understood by both students and instructors.

A majority of instructors (84.61%) offer office hours and feedback on drafts to students. While students did not select seeking office hours in high numbers on the survey (14.6%), quite a few did specify that they wished this resource had been offered in the open comment section of the survey; a couple also spoke about online office hours in the interviews. Even though instructors may think that their students do not often use their office hours, some students may still like to know the option is there should they need it. If a student needs assistance outside their instructor's office hours, seeking online

synchronous tutoring or looking at a course-specific website could be a viable option. Seeking the instructor's feedback on their work was not an option that I included in the student survey and is, therefore, a shortcoming of the study. Nevertheless, four students wrote about wanting some kind of feedback or analysis from their instructor in the survey, and one student mentioned how important his instructor's feedback was to him in the interview.

Few instructors (15.38%) seemed to think that the textbook was an important resource to students. A slightly higher number of students in the survey (21.17%) selected the textbook index as resource they sought, but the examples option included those from the textbook, online, and the LMS, which students said they relied on with a much higher frequency (63.5%). Two students also wrote in the survey that a "Common textbook" and "A decent textbook" were a resource they would have liked to have. In addition, I acknowledged in Chapter 4 that four students recommended a textbook as a resource that made online courses better. Therefore, a high-quality textbook is perhaps more valuable to students than instructors might have considered in this survey.

Another resource that instructors are perhaps less aware that their students value is the Purdue OWL. Nearly every instructor (92.31%) pointed students to this as a resource, but only two (15.38%) thought their students actually used or preferred this resource. In the student survey, the Purdue OWL was the third most commonly selected resource (39.05%), and one student even wrote that they would have liked to have "break down examples like Purdue OWL." Despite the plethora of examples and resources from the Purdue OWL, most of them are related to academic writing, not technical writing. A scant overview of memorandums is provided, for instance, but when the Digital Studio

consultants reviewed the Purdue OWL's resources in the Fall 2018 semester, they found areas that could be expanded and included on the Digital Studio's website.

Table 20: Resources Offered and Perceived Preferences

	What kind(s) of resources do you offer or inform your students about?	**Which resources do you notice your students use most frequently or seem to prefer?**
Email address	100% (13)	84.61% (11)
Textbook index and/or glossary	69.23% (9)	15.38% (2)
Office hours (online or F2F)	84.61% (11)	30.77% (4)
Feedback on drafts	84.61% (11)	61.54% (8)
Writing Center	69.23% (9)	0
Library	61.54% (8)	0
How-to videos	69.23% (9)	15.38% (2)
Sample documents (web, textbook, LMS)	100% (13)	76.92% (10)
Purdue OWL	92.31% (12)	15.38% (2)

Perceived Likelihood to Use Potential Services.

To remain consistent with the questions that I asked to students, I also asked instructors how likely they thought their students would be to use these potential resources: online tutoring sessions, how-to videos, a course-specific website, and a physical space for collaborative projects. Figure 1 displays the full breakdown of instructors' selections via a stacked bar graph. Instructors' estimates about what resources their students would prefer matched up well with what students reported. Like students, instructors did not think online tutoring sessions and a physical space would be likely to get used. Instructors were fairly optimistic about students' likelihood to use a course-specific website and how-to videos. 53.85% of instructors thought students were likely or extremely likely to use a course-specific website and how-to videos (see Figure 1). 18.47% percent of students indicated they would be extremely likely to use a course

specific website, and a similar number of instructors (15.38%) thought so, too. As with all of these comparisons, however, it is important to keep in mind the point I made at this chapter's outset: the results of the student survey are more statistically meaningful because the number of participants far outnumbers that of the instructor survey. I would argue that a course-specific website is still worth developing if 51 Technical Writing students thought they would be extremely likely to use it, and another 111 students thought they would be likely. Put together, that is over 58% of student survey respondents who would potentially use resources hosted on a website.

As for instructor write-ins about additional resources, a few made suggestions, including a "Repository of assignment examples," "Actual best practices," and "more samples and brain storming [sic] activities." Like students, instructors also seemed to want examples to work from but that are a resource to them as instructors, not as resources for their students. One instructor also noted that the types of resources offered

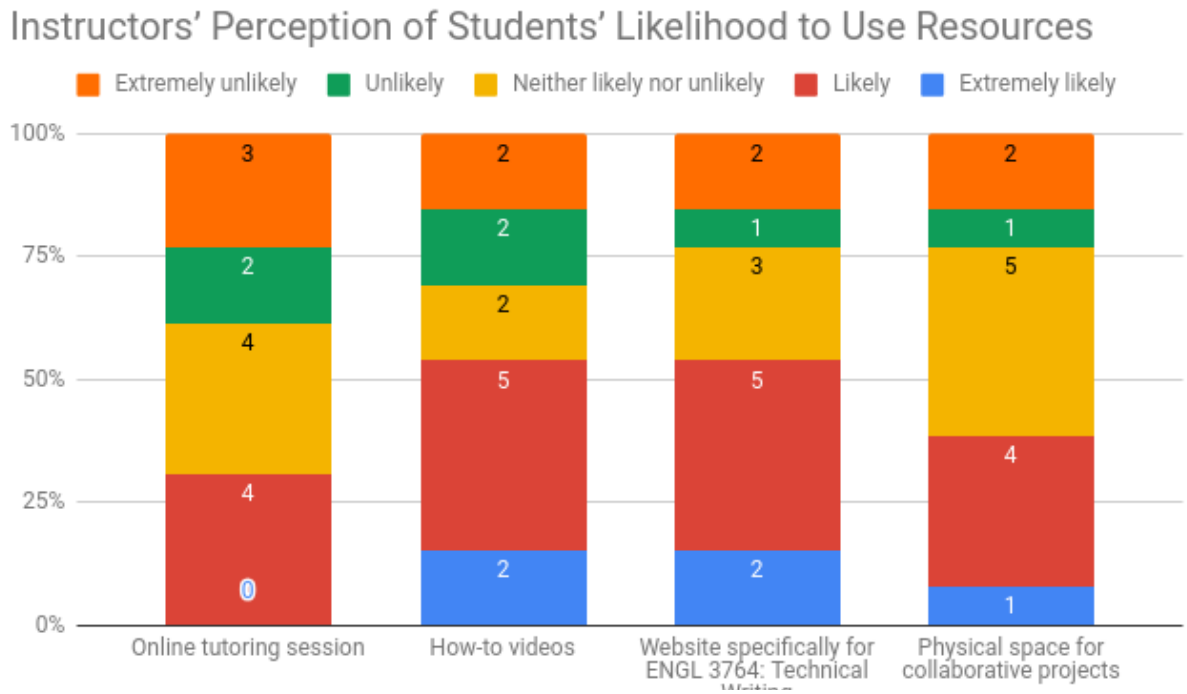


Figure 9: Instructors' Perception of Students' Likelihood to Use Resources

are likely dependent on the setting in which students take the course: “Online students seem more likely to take advantage of online tutoring than students who get to see me in class throughout the week.” Because the majority of students take this course online due to the majority of sections being offered online, this comment would seem to support the creation of online tutoring services.

Demographics

The majority of instructors participating in this survey identified as white (~69%) and having no disabilities. Two participants identified as biracial, and two participants did not report their race. Approximately 54% identified as female, ~30% as male, and two elected not to report their gender. Seven of the female participants (~53%) taught the course online. Interestingly, as I disclosed in the last chapter, female students are statistically more likely to take the course online than male students. It is unclear in this study whether or not gender has an effect on students or instructors in the online setting, but it is a curious trend nonetheless.

Instructor Interviews

Seven of the 13 instructors who participated in the survey agreed to a follow-up interview. The instructors’ insights were invaluable to understanding their approaches to teaching Technical Writing, their experiences with online teaching and the LMS, and their thoughts about the Writing Center and potential future services. To align their perspectives with the student interviews, I will address many of the same topics as in Chapter 4, as many of the questions were similar. However, I also asked questions about

what hurdles they experience in teaching the course, especially in the online setting, in order to get a sense of the props and processes that interfere with or support their teaching. Knowing this information, I reasoned, could assist me with effective service design.

The instructors that I interviewed are as follows:

1. Andy, an Advanced Instructor
2. Brooke, a graduate teaching assistant
3. C.N., an Instructor
4. Jen, a Senior Instructor
5. Kathy, a Senior Instructor
6. Kelly, a graduate teaching assistant
7. Sapphy, a graduate teaching assistant

The instructors ranged from very experienced to very inexperienced in teaching Technical Writing. Andy, C.N., Jen, and Kathy have been in the Department of English for a number of years. Andy and Jen teach both Technical Writing and other courses in the Professional and Technical Writing (PTW) program. C.N. and Kathy, on the other hand, mostly teach Technical Writing. Kathy occasionally teaches first-year writing as well. C.N. only teaches the course face-to-face, whereas Kathy, Jen, and Andy have all taught the course online. More recently, Kathy seems to teach the course mostly online. Brooke, Kelly, and Sapphy are all graduate teaching assistants (GTAs) in the Rhetoric and Writing PhD Program with little experience teaching Technical Writing. When I interviewed them, Kelly and Sapphy had recently taught the course for the first time

online over the winter session. Unlike the other two GTAs, Brooke has taught the course face-to-face.

Writing Center Perceptions

Instructors, like students, revealed some slight misunderstandings or perhaps limited views about the writing center's mission. Two instructors, for instance, referred to non-native English speakers when I asked about if any of their students use the Writing Center. One instructor said she specifically referred students with "English language problems" to the Writing Center, while another said she thought non-native English speakers were especially likely to use it. Another instructor said that he did not think the Writing Center was especially necessary for juniors and seniors because "their writing skills aren't that bad." So while two instructors correlate the Writing Center with non-native English speakers, another instructor equates it with "bad writing." Writing Centers are certainly equipped to serve multilingual writers as well as those who need to improve their writing skills, but that association tends to relegate writing center work to the realm of remediation.

Other instructors had slightly different approaches. Brooke shared that she requires students in her face-to-face sections of the course to use the Writing Center. She also said that she would have required this of her online students if she hadn't taught the course in the winter session, when the Writing Center is closed. Although Andy does not require students to visit the Writing Center, he said that students do seem to use it if he refers them. However, he tries to be a first stop to provide them with the assistance that they need in the hopes that they come back in the future should they need help. In that way, it sounds as though Andy values developing a rapport with his students that includes

writing and design support. Yet another instructor, Kelly, voiced uncertainty about whether or not her students use the Writing Center because, "They don't tell me. I don't get told." She went on to explain that when she taught as an adjunct at another institution, she would get weekly updates from the Writing Center that showed which of the students she referred followed through with a visit. With the exception of Brooke, then, most of the Technical Writing instructors whom I interviewed did not seem to have a strong connection to or reliance on the Writing Center for supporting their students, unless those students did not seem to be native English speakers.

Tutors' Aptitude for Technical Writing Genres.

Besides whether or not their students used the Writing Center, I also asked instructors if they felt that Writing Center tutors were particularly prepared or unprepared to assist students with certain assignments or genres. Most of the instructors responded that they did not think the tutors were prepared to support various kinds of technical writing genres. Jen and Kathy both attributed tutors' lack of preparation to their presumed association with the Department of English. Kathy felt that Writing Center tutors were not prepared to help students with reports because "they're in 'essay mode' over there, just like they are in any English department. I don't know they're totally prepared for any of the genres we're having [students] do." I should note here that a good number of Writing Center tutors do come from the Department of English, especially graduate students because of their assistantships, but a scan of the tutor profiles in the online reservation system revealed undergraduates from a variety of majors: biological sciences, psychology, biological systems engineering, public and urban affairs, and professional and technical writing. During our interview, Jen looked at Writing Center tutors' majors

online, and even though there were a variety of majors, she did not think that undergraduates were prepared to teach technical writing concepts. Due to her experience and training at another university, she believes it is more appropriate for graduates and "even some professors" to serve in the writing center.

Whereas Jen and Kathy thought Writing Center tutors were unprepared for all technical writing genres, other instructors named specific genres. First, Kelly expressed that lab and scientific reports as well as engineering writing were outside of most tutors' wheelhouse. She commented, "I think anything not humanities-based might be something that coaches in general, not always, might be lacking." Kelly does not solely associate Writing Center coaches with the Department of English, as Jen and Kathy do, but she does connect them with humanities disciplines. Second, Brooke imparted, "I think the instructional manual assignment is probably a difficult one for tutors because I'm not sure that they're used to seeing that genre very often." Brooke also mentioned the memo genre. All of these technical genres that instructors listed are certainly ones that humanities majors may not be entirely familiar with.

Andy and C.N. responded with uncertainty to the question. According to Andy, some of his students expect Writing Center coaches to fix the writing for them, and others shared that they thought the Writing Center wasn't helpful. C.N. held a different view based upon the way that his class and assignments are structured. Because his course is scaffolded to build up to an end project, he admitted that it would be challenging for the Writing Center to know the context through only seeing an isolated example. This situation, he reasoned, might not produce usable advice.

Tutors' Aptitude for Other Genres.

Despite the fact that many instructors assumed Writing Center tutors were either wholly unfamiliar with the technical writing field or partially unfamiliar with certain genres, that did not mean that they all dismissed the tutors' abilities. Kelly thought tutors were prepared for a "large umbrella of research papers" including "critical analysis, synthesis of research, [and] informative papers." Along similar lines, Kathy thought tutors would be more familiar with the kind of writing done in composition courses. In other words, these two instructors differentiated between essay or academic writing and technical writing. By contrast, Brooke had the most confidence in tutors' aptitudes for job applications and proposals. She especially thought tutors could assist students with proposal writing because, "A proposal is making an argument, so they're prepared for that because they demonstrate a need with research." Brooke's observation returns somewhat to the difficulty instructors sensed students had with conducting research. If instructors and students can learn to regard the Writing Center as a place where students are supported with integrating research into their writing and building an argument for a proposal, this service can mitigate instructors' concerns by helping students strengthen their research writing and synthesis skills.

Most Beneficial Assignment or Activity

I asked instructors which assignment or activity was most beneficial to their students because, again, I wanted to match up student and instructor responses, but I also wanted to know what students connect to in the course. If they are connecting with a genre or activity that prepared them for future technical writing endeavors, then perhaps that is a good place to integrate consulting services because their motivations are higher.

At the same time, if they have difficulty connecting, that can also be a site for exploration.

Job Application Package.

Instructors were keenly aware of the fact that students find the job application package beneficial. In fact, six of the seven instructors (~85%) interviewed said some variation of the job package was the one they heard the most positive responses about from students. According to C.N., the letter and résumé he assigns, along with "identify[ing] where [job ads are] looking for the portable or soft skills," is to him "a must." Andy also said students found this assignment valuable because they are in a high-stakes environment. He assigns this at the beginning of the semester in order to prepare students for job fairs on campus. On a related note, Jen stated that her students get jobs and internships with the résumés and cover letters produced for her class. Sapphy noted that her students were quite engaged with the job package assignment, asking her if they could meet and ask questions—something she found notable in an online course. She also facilitated discussions with students which led to "good revisions." Kathy and Brooke also pronounced this assignment's importance to their students.

Other Assignments.

Kelly was the only instructor who replied that progress report memos were the most beneficial to her students. She thought this because it "helped them break their project down into steps." Besides the job package, Andy imparted his preference for a collaborative proposal assignment in which students look at a real RFP and pay close

attention to its criteria for decision-making. He hoped students would remember this assignment five years from now.

Immediate Application for Genres Learned.

In the student interviews, I found that they often sought an immediate application of the genres and concepts learned in Technical Writing. Some students were able to envision themselves using a genre in the future, whereas others were less capable of doing so. Instructors also were alert to their students' need for the purposefulness of their assignments. As Kathy pointed out, students have told her the job package assignment is useful because "it's what they're most concerned about at the moment." Similarly, Brooke observed, "Students see the most direct application of [the job package] assignment." Sapphy shared as well that her students seemed to know the benefit of a good job package but not so much of a report.

It is reassuring that instructors are in tune with how immediately the job application package affects students' lives, but at the same time, the high reliance on this assignment is somewhat disconcerting given that it is not a "true" technical writing genre. The Technical Writing course should indeed prepare students for the workplace, so while a job application package is the first step, it will be far from the most commonly used genre once students have jobs. This finding in the data shows congruence between the two stakeholder groups, which I consider positive, but it also could indicate a need to communicate to students the importance of other workplace genres. Connecting what students are currently doing in the course to what they will be doing in the future is a challenge to instructors, and perhaps connecting students to consultants familiar with technical writing genres could increase the value of the course. This argument is similar

to Johnson-Eilola's argument that symbolic-analytic work stands to increase the value of technical communication work (see Chapter 2). For instance, Johnson-Eilola contends:

> [T]he prevalent tendency for the general public to believe that complex rhetorical tasks such as résumé writing or Web page design can be easily automated by templates or software wizards illustrates how routine and repetitious some people consider technical communication to be. (p. 182)

While Technical Writing students seemed to highly value the job application assignment, thereby insinuating some value in the feedback they received from their instructors, there are other "complex rhetorical tasks" in the course that are perhaps not as highly valued by students as they should be. Students' understanding of the course's purpose relates back to the framing the advisors in their departments provide for the course, as well as the Department of English's communication with the variety of STEM disciplines which this course serves. For instance, the Department of Computer Science allows its majors to enroll in *any* course in the Professional and Technical Writing program in order to fulfill their professional writing elective ("Bachelor of Science in Computer Science Checksheet"). This kind of thinking about what the Technical Writing course does and how it is understood outside of the Department of English is therefore in need of some clarification.

Most Difficult Assignment or Activity

Instructors believed a variety of assignments and activities caused difficulty for their students. I asked this question in the interviews to get a sense of what consultants in the Digital Studio could assist students with more in-depth, especially given that online teaching can involve, in some ways, more time to set up the course and correspond with

students. Instructors reported that some concepts and skills were more difficult to teach in online settings, especially in the absence of visual cues from students.

Research.

Several instructors, as they also reported in the survey, discussed the problems their students encountered with research. C.N. noted that he requires his students to use APA formatting, which they have trouble with. Using a citation format correctly was, to him, part of a technical communicator's legal responsibility to back up what they are creating. As he put it, "SMEs [subject-matter experts] should check on sources." Similarly, Jen identified citations at the end of paragraphs as a common mistake her students often made. She believes this is partially the result of students either not taking ENGL 1105 or 1106 or their memory of what they learned in those courses fading. Indeed, there is evidence from the survey to support Jen's belief. Overall, she felt, "Research is a real hurdle." While Kathy did not explicitly say research presented difficulty to her students, she did mention referencing sources with citations. Not only do Kathy's students need to summarize and paraphrase their sources, but they also have to "change it into something the public can understand." Therefore, students must contend with two demands for what she calls "an article assignment": synthesis and presentation of research *and* transforming information from a technical source into less technical wording. The latter challenge is of course representative of the entire purpose of the field of technical writing. Lastly, Andy's students encountered the most frustration with what he referred to as a "majorish report" of approximately 2500 words in IMRAD (introduction, methods, results, and discussion) format that begins with a research question. Again, Andy did not explicitly say the word "research," but a report in IMRAD

format of this length would almost certainly require some kind of research for the introduction and perhaps methods sections. All of the students' research-related strains that instructors detailed could be traced back to their limited or even absent experience with college-level or writing-intensive courses, as found in the student survey results.

Instruction Manual.

Sapphy's students had trouble with the instruction manual assignment, explaining that they "struggled with visuals" and how writing should sound. She felt students needed more guidance at the beginning of the assignment to check its scope and make sure it was doable; she also thought she should have been "more directive." However, she was teaching the course for the first time as a GTA over the winter session. As someone with an emerging familiarity with the technical writing field, Sapphy seemed to find her own knowledge to be a limitation for teaching this course. I will discuss how the Digital Studio and its services are positioned to support GTAs more in the conclusion.

Group Project.

Both Kelly and Brooke remarked on the adversity students faced with the group project. While Kelly had only taught the course online in the winter session, Brooke taught it in the same semester as well as face-to-face in the full 15-week semester. In other words, instructors in both settings notice their students find the group project to be an obstacle. Kelly's students "had a hard time understanding what a proposal was," in addition to working in virtual groups "on a project they didn't understand." The students' difficulty with this assignment resulted from both the genre and the fact that they had to work collaboratively. From Brooke's perspective, the students' "resent" was mostly

related to their desire to "just want to work solo." Nevertheless, she assigns the project because the hardships they experience, such as having a deadline or a group member who did not write their section, are "real life situation[s] that will probably happen." In that regard, Brooke sounds like she is trying to prepare her students for these kinds of situations through the group project. She did note that when she teaches the course face-to-face, having time in class for students to work is a "huge advantage." On the flip side, she observed that her workload in the online course is lessened when students are doing the group project.

Course and Teaching Preparation

Because Virginia Tech's Writing Center does not offer online tutoring to students enrolled at the Blacksburg campus, I was curious to find out more about instructors' online teaching experiences. What is their course preparation like? What kinds of drawbacks or advantages are there in teaching online or face-to-face? And how do these experiences affect the instructors' ability to provide online support to their students? In a way, I wanted to know if there was anything in their experiences that might warrant online support from a website or tutoring service.

Face-to-Face.

Instructors mostly fell into one of two camps: teaching online was preferable or less stressful than teaching face-to-face, or teaching online required more preparation than face-to-face teaching and is accompanied by uncertainty. Jen and Kelly both felt that teaching online was less stressful. For Jen, the traditional face-to-face class is "more exhausting" because she is "performing." She disclosed that preparing for the online

course is easier because she does not have to be "up" and can grade in her pajamas. Like Jen, Kelly feels "less anxious" in the online course and that, "Teaching online wasn't as stressful for preparation." In her face-to-face courses (not Technical Writing, but other courses she has taught), Kelly prepares far more in advance because this setting "causes nerves" and she "couldn't remember things." However, she commented that she "built the Canvas course weeks in advance before [the online] class started, which was helpful." Jen also noted having her Canvas course fully in place before the semester started for both online and face-to-face sections. For some instructors, the ability to have the Canvas course shell set up in advance alleviated their stress about teaching.

Online.

More instructors believed teaching online created a heavier workload as well as uncertainties they did not experience in face-to-face courses. Andy felt that preparing for face-to-face courses was easier than online courses. Akin to Andy's view, Kathy went so far as to say that online teaching is "double work," a phenomenon which she attributes to the progression of the LMS while she has been teaching. Kathy shared, "[T]he *work* for teachers has actually doubled 'cause I'm not only talking to you in the classroom, I am putting every single thing on this learning management system. So I am double teaching you." Sapphy and Kelly also reported that preparing the online course required a lot of work in advance. For instance, Sapphy conveyed that she constructed the whole course before it started.

Despite building her course in a "user-friendly way" that allowed it to "run smoothly" online, Sapphy pronounced, "What makes me a good teacher is my face-to-face interaction, and I missed that. [...] I really honed my teacher persona over my six

years of teaching [high school], but I didn't get to do that online." This disconnect that Sapphy felt from her teacher identity was expressed by other instructors in a somewhat similar fashion. As Kathy put it, "[T]here's a lot that we don't get to say online that we would in a classroom. Well one thing, you can't think of it all at the moment. It's kind of a thing that happens at the moment, you know?" Here Kathy's comment is directly reminiscent of Julia's thoughts about her smaller classes that require discussion-based learning activities. They both relate synchronicity or spontaneity with learning and teaching. Complementary to interviewees' views about dialog was Brooke's answer: "I don't often ask [students] to reply back to me in the online course. I do that through comments in Canvas, but who knows if they read them? That's pretty much how a lot of our dialog happens."

In fact, several instructors recounted uncertainty about students' reactions, which bothered them. When I asked Kelly about skills related to technical writing that were difficult to teach, she spoke to the limitations of email conversations and the lack of visual input. She said she could not read faces, does not have body language, and cannot rely upon responses to see where students are getting confused and showing "glazed eyes." In Sapphy's face-to-face teaching, she pointed out, "you assess in the moment, which you can't do online." This inability to assess was the result of not being able to see her students. She went on to note that so much of the teaching relationship is "based upon proximity and time." Overall, I got the sense from instructors that not only was teaching online a challenge, but also an environment that made them feel disconnected from their students in a variety of ways. This finding is quite similar to what students wrote in their survey responses and shared during interviews.

Instructors' Suggested Resources for Pilot Study

Because my research question focused on the needs of both students and instructors of Technical Writing, I asked if there was a resource or service that they wish existed which currently does not. I also asked what kinds of resources (services, tools, or supplies) instructors thought would be best in an online or face-to-face setting.

Non-Existent Services.

Brooke and Sapphy articulated a need for online university services during the winter session. Both pointed out that the Writing Center is not open during that time. Not having Writing Center services is a big contrast to what Brooke does with her class during the full 15-week semester. Brooke recounted many hyperlinked resources in her course such as Lynda.com videos and the Purdue OWL, but she voiced adamantly that the "writing center is crucial." Kelly also expressed a desire for an online writing center and specific tutors. She said she could not find anything like this when she looked up resources for the winter session course. In particular, Kelly thought an ESL tutor system "where they can work on mechanics" would be beneficial. She added this could be for all students, not just ESL students. Furthermore, Kelly responded that "specialized people within a writing center" were needed "because people who take tech writing are coming from all sorts of backgrounds. They have their career in mind, such as business, so it would be helpful to have people in [...] specialized areas to help with certain students." Jen, Kathy, and Andy also supported the idea of the Digital Studio's online services, which knew about because I interviewed them in August of 2018.

Kathy could not think of a service, explaining that she thought services already existed but, "I just don't have time to use them." Coinciding with Kathy's view, Sapphy

commented that there is “so little time during the winter to help when a student is struggling.” Sapphy observed that teachers who have taught the course before have resources, but that graduate students often do not. Her point about resources and examples leads to another desire which instructors expressed.

Sapphy, C.N., and Jen answered that different repositories could be useful to Technical Writing. C.N. wished a repository of open source technologies, such as Linux, existed. He offered that an open source text editor for HTML and CSS would be useful, and went on to say that a department could have a library of resources. Although he receives free software as a teacher, he was not certain that students have the same access, and felt it was important they did. Whereas what C.N. imagined could be student- or instructor-facing, Sapphy desired a repository of assignments for teacher though which they could scaffold their own courses and assignments. For instance, she was interested in seeing how other instructors creatively teach to the course outcomes. Again, this finding relates back to the examples and course-related website that students demonstrated a need for in both their survey and interview results.

Resources, Tools, and Supplies.

Instructors thought a variety of resources could be supplied to students in either a physical or online space. In a physical space, instructors saw a need for software and space. Because she regarded document design as a difficult concept to teach, Brooke thought students should have access to the Adobe Suite for “creating documents that look nice and are professional” and overcoming the limitations of Microsoft Word. Andy also wanted students to have access to the Adobe Creative Suite and an XML editor, although he admitted the latter was more applicable to Professional and Technical Writing majors.

Kelly believed students would benefit from access to programs that "facilitate collaboration because this is important in technical writing." Drawing upon her experience as a technical editor for the Department of Energy, Kelly gave SharePoint as an example of a program which streamlines the editing of a technical document and trace the revision history, much like Google Docs. She also mentioned software such as a word processor and citation managers.

Another resource suggested by C.N. were instructions, exercises, and responses to challenge exercises that are similar to what Lynda.com provides. Though the website has a good repository of tutorial videos, C.N. found a need for more content that relates to technical writing.

In a physical space, Kathy and Jen thought that if students could work in groups, then the Digital Studio classroom could be a good resource. Brooke suggested that document design could be supported in a physical space because "The nitty gritty of teaching that stuff [online] is tricky." She also thought this would give students the ability to print assignments such as the instruction manual and then see it in the format they wanted or intended. Seeing the manual digitally sounded like it was inadequate for some of her students. C.N. agreed with this view because finding the nearest printing lab for his students is difficult and printing is often pricey.

Summarizing Instructor Results

In this chapter, I have reported the results of a survey and 7 interviews with instructors to answer the research question, *What are the needs of technical writing students and instructors that services in an online interactive space can address?* While

there are far fewer instructors than students of Technical Writing, instructors' participation was imperative to assessing the feasibility of creating online writing services. Without instructor support of online writing services, those services could be overlooked entirely by students.

Many of the findings from the student survey and interviews correlated to findings in the instructor data. For instance, instructors recognize the high value that students place on the job application package. By using the assignment to prepare students for job fairs and reporting that Technical Writing students indeed end up with jobs as a result of the résumés they prepare for class, instructors are supporting students' professionalization through this course. However, as a genre whose purpose is not to convey technical information to a wider audience, the job application package might not be congruent with the course's purpose. Can there be a way to include this assignment in the course that fulfills learning objectives, perhaps by teaching students to convey technical information about their discipline to potential employers? One aspect of this assignment that we have been exploring in the Digital Studio is a résumé redesign workshop in which we show students how to take a text-based résumé and turn it into a "high design" résumé.

Instructors' views of the Writing Center also mirrored students' views in many ways. Both participant groups did not seem to rely heavily on the Writing Center as a resource for the course. For several instructors, this was directly related to the fact that the Writing Center is closed during the winter session when they taught the class. Keeping the Writing Center open during this time would certainly be costly and logistically complicated. A course-specific website with resources and examples, could,

however, be one way of providing online writing support to students enrolled in these sections. After all, a course-specific website and how-to videos were the two potential resources that both students and instructors reported being most likely to use.

Instructors were highly concerned about their students' ability to write about and synthesize research. This finding is most likely compounded or affected by students' 50-50 likelihood to have taken first-year writing courses. In some ways, it seemed as though research writing was a skill that instructors presumed students had upon entering the course. For many students, though, the Technical Writing course may be their first exposure to technical genres such as reports, which the majority of instructors indicated their students found difficult. Equally difficult, instructors estimated, was the collaborative project because collaborative writing may not be taught in first-year writing courses or students' disciplinary courses. Despite that students and instructors reported little likelihood to use online tutoring and a physical space for collaboration, these services seem highly relevant to students engaging in these tasks with little to no prior experience.

Like students, many instructors also preferred face-to-face courses. Virginia Tech is mostly a residential university, after all. This preference offers another explanation for why students and instructors do not see much need for online tutoring services. Nevertheless, more and more courses at Virginia Tech are moving online, including the Technical Writing course. With technologies in place such as Zoom and Canvas, it is feasible to provide students and instructors with the more personal and immediate dialog and interaction that both stakeholder groups seem to desire. Some instructors felt they did not have enough time to properly take advantage of these and other technologies, so in

that way, online writing services can provide just as much a support to students as they do to instructors.

Finally, an equal number of survey participants (38.46%) had either very little (1-5 sections) or quite a lot (16+ sections) of experience teaching the course. Additionally, 46.15% of instructors have only ever taught the course online. While Virginia Tech requires online instructors to get a certification through Networked Learning Initiatives, one brief certification course will likely not provide enough training to become a fully effective online teacher. This is by no means a criticism of newer instructors; I myself am one of them. I would argue once again that offering online writing services is a way of supporting newer Technical Writing instructors and even invigorating or broadening more experienced instructors' teaching.

In the next and final chapter of this dissertation, I will put these findings about students and instructors of Technical Writing in conversation with one another by constructing visualizations of the people, props, and processes that are part of this course and the feasibility of offering online writing services. My goal is to use service design methodology to envision, both literally and figuratively, the kinds of services and interactions that students and instructors might experience with online writing services.

Chapter 6: Discussion & Conclusion

Introduction

In Chapter 5, I shared the instructor survey and interview data which offers insights about how much experience instructors have teaching the course, who has more experience teaching it online or face-to-face, and what the biggest challenges and resources are for students. From the instructor data, it became evident that those with less experience teaching the Technical Writing course—who are mostly likely graduate teaching assistants—tend to teach online. Instructors who have more teaching experience with the course have taught it both face-to-face and online. This disparity in experience, I argue, has certain implications for the Digital Studio's services.

Additionally, there were several areas of agreement amongst the instructor and student data, described in more depth in the following section. For instance, both the instructor and student data revealed agreement about the two most challenging assignments: progress or informational reports and the collaborative project. However, when it came to course activities, students selected detail-oriented tasks such as designing graphics and/or visuals and selecting a topic for an assignment more frequently, whereas instructors were more concerned about their students' ability to conduct research. Given that both instructors and students rated reports as one of the most difficult assignments in the course, it could be that the two groups perceive different kinds of challenges: instructors may be thinking in terms of genre because they believe research presents more of a challenge to students, while students may be thinking more about the individual steps

in completing an assignment. Without talking to a student in a one-on-one setting, their thinking about the assignment and the course is difficult to ascertain, and this is where online and/or or specialized tutoring from the Digital Studio is poised to intervene.

Discussion

Service design consultants Polaine, Løvlie, & Reason (2013) suggest several ways of presenting research findings to clients, including insights blogs, insights boards, and client workshops (pp. 73-76). Polaine et al. also point out three levels of research methods and findings:

- low being what a researcher heard,
- medium being what a researcher saw, and
- high being what a researcher thinks the data means (pp. 48-49).

Because this is a feasibility study, my methods mostly concentrated on what I heard as a researcher by conducting surveys of and interviews with two participant groups: former students and instructors of ENGL 3764: Technical Writing. For this dissertation study, I imagine my primary audience as the Virginia Tech Department of English because it is the entity that will ultimately decide whether or not to continue supporting the Digital Studio after its pilot period ends. Therefore, I first offer my recommendations to the Department of English based upon the shared findings between both participant groups. Because this study is highly connected to the Technical Writing service course, these findings have implications not only for the Digital Studio pilot project but also the curriculum.

Overlaps in Student and Instructor Data

When placing students' and instructors' survey and interview responses side by side, a few of the findings overlap. These places of agreement between students and instructors are an asset to service design because they show where services can potentially be integrated and more likely to be used. This agreement also explains why there is little interest in an online tutoring service.

Finding 1: Students and Instructors Prefer Face-to-Face Courses.

In both the student and instructor surveys, I asked participants about their preference for online or face-to-face courses. As this question required write-in responses, not every survey participant answered the question. However, those who did respond indicated a higher preference for face-to-face courses. Although this data was presented in Chapters 4 and 5, I placed students' and instructors' alongside one another in Table 1 to demonstrate both stakeholder group's preference for face-to-face courses. Many students who said it depends on which setting they prefer reasoned that this was due to their perception of the course's difficulty. Students thought harder, more technical courses were better in face-to-face settings, whereas easier courses could be taken online. Multiple students indicated that they thought Technical Writing in particular was suited to an online setting. Whether or not they thought this was because they considered the course easy is a little less clear, but the responses to assignments and activities they perceived as difficult can provide some support to the idea that students regard Technical Writing as an "easy" course. That both instructors and students prefer face-to-face settings is not surprising given that the main Virginia Tech campus in Blacksburg is mostly residential. As one student put it in their survey response, "[I]f I wanted to take an

online class, I'd go somewhere like Phoenix University for a lot cheaper." In both student and instructor interviews, participants mentioned difficulty connecting with one another and the course material in an online setting.

Table 21: If you have taken / taught courses both online and face-to-face, which setting do you prefer?

	Students' Preference (n = 126/276)	**Instructors' Preference** (n = 7/13)
Online	10.51%	7.69%
Face-to-face	27.17%	30.77%
Depends/both settings	7.97%	15.38%
Unknown/no answer	54.35%	46.15%

Despite this preference, some students and one instructor prefer the online setting. Additionally, offering more Technical Writing courses in a face-to-face setting is unlikely, so the online course will be a mainstay in the Department of English. As a result, the Digital Studio and its website can provide useful resources to both students and instructors. Students who prefer to take courses face-to-face could be encouraged to take advantage of the Digital Studio's services as a way of remaining connected to other people, which is one of the reasons students expressed as a preference for this course setting. The Digital Studio's website also provides a variety of resources on technical genres such as reports and proposals, as well as advice on collaborating with teammates online. Students and instructors, however, do not tend to rely much on the Writing Center, which may explain their low likelihood to use online tutoring, and that brings me to Finding 2.

Finding 2: Students' and Instructors' Perception of the Writing Center.

Students in the survey reported little likelihood of using online tutoring services, and in interviews, they reported little use of the Writing Center. Some students had not

used the Writing Center at all, and those who did only did so in their freshman year. Therefore, the Writing Center seems to fall out of use for the students that I interviewed as they progress through their degrees and into the Technical Writing course. In addition, some students shared views that the Writing Center was for those who were "really struggling," lacking in preparation from a good English course in high school, procrastinating their work, or getting a bad grade in a writing course.

Similarly, in the instructor survey, students were not considered likely to use online tutoring services. Rather, in both surveys, participants reported greater likelihood of using a course-specific website and how-to videos. Instructors mainly regarded the Writing Center as a resource for non-native English speakers and those with especially "bad writing." These associations hearken back to North's attempt over 30 years ago to outline for his colleagues in the English department what it is that a writing center does. The idea that North was railing against was, "that a writing center can only be some sort of skills center, a fix-it shop" (p. 435). That instructors in the Department of English and students enrolled in Technical Writing at Virginia Tech still perpetuate an understanding of the writing center that the field has since sought to dispel means that the Virginia Tech Writing Center may need to revamp education efforts about its mission and purpose.

Nevertheless, some instructors lamented the fact that the Writing Center was closed during the winter session when they taught the course. One instructor required students to use the Writing Center during the full 15-week semester and would have instated the same requirement if it was open during the winter session. In Arzt et al.'s study, students reported high satisfaction with asynchronous tutoring, which outnumbered the face-to-face tutoring sessions in their writing center. If Technical

Writing students at Virginia Tech had access to asynchronous online tutoring, especially during the winter when the Writing Center is closed, this method may have appealed to them. Unfortunately, I did not include asynchronous tutoring as a potential resource on the survey, which is another shortcoming of my study.

However, some instructors and one student during the interview portion of the study expressed the belief that specialized tutoring would be beneficial. As studies have found, a specialized approach to writing tutoring or advise leads to focusing more on global issues or higher order concerns (HOCs) than sentence-level or lower order concerns (LOCs) (Dinitz & Harrington; Mackiewicz). In some cases, the specialized approach leads to more accurate advice (Walker; Wolfe) and even higher satisfaction for the writer (Thompson et al.; Weissbach & Pflueger) and higher productivity in the session (Dinitz & Harrington). If I had made it clear in the surveys and interviews that the online writing tutoring (OWT) would be offered by specialist tutors, I wonder how or if that would have affected the study's findings.

A low level of likelihood to use OWT might negate any recommendation to continue offering this service after the pilot period ends. Since the pilot study began last semester, August 2018, Technical Writing students have not accessed online tutoring. Rather, all of the consultations that students signed up for have been face-to-face in the Digital Studio. It's possible this is because the courses they came from were also face-to-face.

Finding 3: High Value of Job Application Package.

Both stakeholder groups acknowledged that the job application package was a highly valuable assignment in the Technical Writing course. In the survey, 54% of

students rated this assignment as highly valuable, and it was the assignment they selected most often, as I disclosed in Chapter 4. Three of the students I interviewed also spoke about this assignment's relevance to them. Connor, for instance, found this assignment quite meaningful, but when I pressed him about whether other genres were as meaningful, he said, "I'm not sure if any of the other things are important as of right now. They're probably more important kind of after college, they'll be a lot more important." He seemed to place less importance on other technical writing genres that did not have an immediate impact or application to his life. Connor's stance on this assignment correlates to another finding, which is that several students placed greater emphasis on assignments whose genres they could envision themselves using in the future or that they had used recently.

In the instructor interviews, approximately 85% said that the job application package was the one their students found most beneficial. Therefore, instructors are keenly aware of the high amount of importance their students place on this assignment. As I shared in Chapter 5, the job application package is not exactly a "true" technical writing genre, in that its purpose is not to communicate technical information. This finding can be an indication to the Department of English that the Technical Writing service course curriculum, its objectives, and its assessment need some careful consideration. For instance, the question of whether or not job application materials should be included in the curriculum is worth asking. Pickett argued in 1997 that job application materials should be included in the technical writing service course. More recently, Francis found that in addition to the genres she included in the quantitative portion of her survey, many instructors also reported assigning a variety of employment

materials (p. 53). With students' and instructors' heavy reliance on this genre at Virginia Tech, perhaps it is worth investigating whether or not a specialized approach to these materials is beneficial. With the situation as it stands, the Digital Studio is positioned to respond to students' heightened attention to job application documents. Recall that in Griffin's business writing center, approximately 20% of visits were for job application and internship support, so these documents are not uncommon in specialized writing centers. Designing a résumé is also something that can help distinguish the Digital Studio from the main Writing Center: we can establish services that help students develop the functional and critical literacies necessary to design effective visuals and graphics. We've been testing multiliteracy support out by starting to offer workshops and web content on how to *design* a résumé, a service that combines students' ratings of the most valuable genre and the most difficult activity.

Finding 4: Work, Job, or Co-op Experience Correlates to Course Value.

The fact that students who have work experience—whether through a job, internship, or co-op—are statistically more likely to rate the course's value lower than students without work experience is, I believe, an important finding. This finding may have implications for the way the course is taught. For instance, instructors may want to ask or survey their students at the beginning of the semester to find out whether or not students have work experience. If students have work experience, instructors could make different variations of the assignments for those students, or at the very least ask them to bring their work experience into the classroom or discussion board/online interactions. Using the course objectives, instructors could perhaps offer students a choice in which assignments they complete in order to give students with work experience the opportunity

to write in genres they are unfamiliar with. As I said in Chapter 4, it's possible that students with work experience think that they have learned what they need to know about technical writing on the job and, as a result, place less value on the course. As an instructor of this course, I believe it is partially my responsibility to challenge and deepen my students' understanding of technical writing, so when I teach the course in the future, I will keep in mind this relationship between work and course value.

The implications of this finding are perhaps less clear insofar as what it means for the feasibility of offering online writing services. There are many websites that offer resources on writing cover letters and résumés, so replicating this content on the Digital Studio website does not seem worthwhile. However, it is important for students to be mindful of the writing and communication skills that are included in many job descriptions. As I mentioned in the previous section, the Digital Studio offered workshops on résumé design in the Fall 2018 semester. This semester, Spring 2019, the consultants and I are discussing the potential of offering workshops on personal website design and content, especially for students on the job market, as well as workshops preparing students for online job interviews using videochat platforms like Zoom and Skype. Going back to the concept of multiliteracies which I discussed in Chapter 2, I believe these kind of professionalization workshops are a way of 1) differentiating the Digital Studio's services from the Writing Center's and 2) encouraging students to think critically and rhetorically, not just functionally, about their computer literacies.

Visualizing Findings with Service Design

Using the findings mentioned in this chapter as well as data presented in Chapters 4 and 5, I considered what these insights might mean strategically for the Department of English. The overlaps and disparities between student and instructor data are presented as a Venn diagram in order to determine how feasible online writing services are. Figure 10 below shows some of these areas of overlap and disparity. To a certain extent, this visualization can be used to develop what are known as "personas" in service design. According to Felix (2018), personas are "driven by motivation, behavior, skills, and expectations to design services" (elliotfelix). Knowing where the two stakeholder groups' personas align informs my thinking about the design of the Digital Studio's services in that both students and instructors place value and emphasis on the job application package, but certain technical writing genres such as progress and informational reports and collaborative writing are challenging to students. Instructors also perceived these genres to be difficult for students, and that alignment indicates one way to target Digital Studio services. If students do not have much experience working collaboratively on a report or proposal document, consulting with someone in the Digital Studio could be a service that does not impede on the instructor's time, which they reported to have little of for developing online resources.

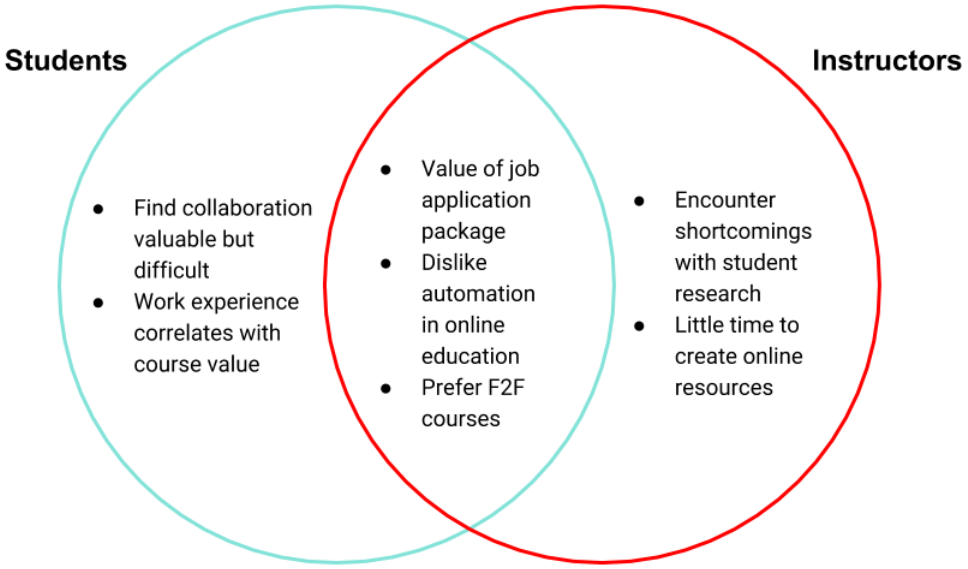


Figure 10: Venn Diagram of Student and Instructor Values

In addition to targeting services, service design also provides an understanding of the interaction for online consultation. Based upon the way in which I have been piloting the project so far, Figure 11 below is a visual representation of the process of this service, or what is known in service design as a service ecology or service map. The figure represents three levels of human interaction in the online consultation service (although other interactions are possible, such as the instructor who refers a student to the service): the Technical Writing student, the Digital Studio consultant (also a Professional and Technical Writing major), and the Digital Studio Coordinator (currently a candidate in the Rhetoric and Writing PhD Program).

In order to make an appointment and access consulting services, the student, consultant, and coordinator engage in the following process:

1. The student can either access the Digital Studio's website (360digitalstudio.org) or view the Digital Studio's module in the Canvas LMS. Both interfaces allow the

student to view the Digital Studio's appointment calendar (see Figure X in the following subsection on Implementation).

2. The student clicks on an appointment slot and saves it when prompted. This prompts Google to generate an automatic email and calendar event which both the student and coordinator receive.
3. When a consultant arrives to their shift, they can either check the appointment calendar to see if there are any appointments, or I may have forwarded them the automatically generated email. If there are any appointments scheduled, the consultant and the student log into Zoom, a synchronous online videochat platform.
4. This particular service ecology also accounts for a study or assessment to be attached to it, so the consultant could send a link to the student in Zoom for the study's consent form. (This step is important when taking limited-efficacy testing into consideration, a topic which I discuss in the next section as part of this study's feasibility.)
5. After the formalities and greetings take place, the student can decide to share their screen with the consultant to ask questions about the project or document that they are working on. If the student does not have a project or document to share yet, the student and consultant can simply continue to use the videochat feature in Zoom.

This service blueprint, which Polaine et al. define as a way of "Connecting together all of the different touchpoints in a service experience" (p. 91), allows the decision-makers in the Department of English to see how this service would be implemented. One advantage

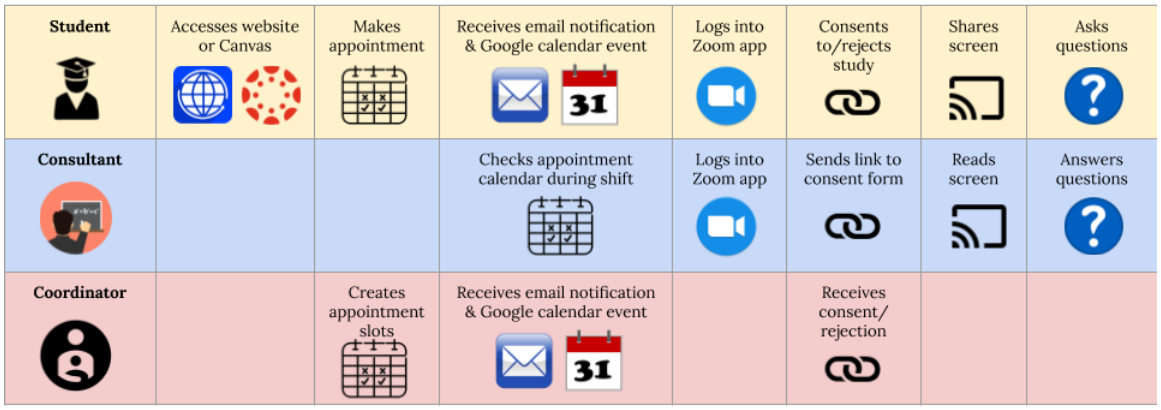


Figure 11: Service Blueprint of Online Consultation in the Digital Studio

of a service blueprint is that it allows writing center professionals (WCPs) to map out what happens both frontstage and backstage: "anything that the 'customer' experiences is frontstage […] and everything else that goes on behind the scenes to make that happen is backstage" (Polaine et al., p. 92). For instance, the coordinator creating appointment slots in Google Calendar goes on backstage; the Technical Writing students do not see this happen, but on the frontstage, they see the available appointments on the calendar embedded on the Digital Studio website and in Canvas. Including all or as many of these "touchpoints"—places of interaction between providers and users of a service—as possible can assist WCPs in the process of creating or redesigning tutoring services, which includes gathering buy-in from various stakeholders. Allowing stakeholders to "see" how the service will work is one small step in garnering their support for the tutoring service.

Feasibility Assessment of the Digital Studio Pilot Project

Using this visualization from Figure 10, as well as the data reported in Chapters 4 and 5, I address the eight areas of focus which Bowen et al. (2009, p. 453) outline for feasibility studies:

- Acceptability
- Demand
- Implementation
- Practicality
- Adaptation
- Integration
- Expansion
- Limited efficacy-testing

Acceptability

First, acceptability is a way of assessing "how the intended individual recipients—both targeted individuals and those involved in implementing programs—react to the intervention" (Bowen et al., p. 453). As I mentioned in Chapters 4 and 5, the survey asked both student and instructor stakeholder groups to consider their likelihood of using four potential resources: online tutoring sessions, how-to videos, a course-specific website, and a physical space for collaborative projects. Both students and instructors similarly reported a low likelihood of using online tutoring services and a physical space for collaborative projects. Both groups indicated that how-to videos and a course-specific website were more likely to be used. At the same time, I surveyed and interviewed both participant groups before the Digital Studio had officially been launched, which meant I did not provide a clear outline about what each of these services

would entail. Rather, I was interested in finding out how these services might be shaped based upon the participants' input. In the instructor interviews that I conducted closer to the beginning of the Fall 2018 semester, instructors expressed more interest in the Digital Studio because they had heard about its launch. When I described in more detail how the Digital Studio could support their students, the more interested they seemed to become. Knowing that both students and instructors tend to prefer face-to-face courses, for example, online tutoring sessions could be described instead as "live question support" or something similar. A different description that draws upon students' dislike of being unable to ask questions immediately and in person of their instructor might increase the acceptability of this kind of service.

Digital Studio Pilot.

Because how-to videos and a course-specific website were rated by both groups as a resource that was more likely to get some use, the Digital Studio consultants and I launched a website with resources on various technical writing genres. Although we have two how-to videos on the website so far, they are not related to technical writing but rather to how to make an appointment and get to the studio physically.

Demand

Second, demand relates to "gathering data on estimated use or by actually documenting the use of selected intervention activities in a defined intervention population or setting" (Bowen et al., p. 453). Similar to the acceptability of new services for the Technical Writing course, stakeholders indicated more demand for a course-specific website and how-to videos than they did for online tutoring and a physical space for collaborative projects. Students most often (63.5%) indicated finding examples from

the Internet, their textbook, or the LMS as a resource for taking the class, which seems to align with the demand for a course-specific website.

While students and instructors did not report a high demand for online tutoring in the survey, some instructors revealed during their interviews that 1) there was in fact good reason to offer specialized tutoring, and some instructors thought that 2) online tutoring should be available to students when the Writing Center was closed over the winter session. The former kind of demand arose from some instructors' belief that the main Writing Center's coaches were not adequately prepared to support technical writing genres. For GTAs, demand for an online tutoring service seemed to be related to the fact that teaching the course online, particularly in an abbreviated timeframe like summer or winter sessions, with no support from the Writing Center and limited support from the library imposed demands on their time and their students' ability to learn effectively. Virginia Tech requires instructors who teach online to become certified by taking a course with the Technology-enhanced Learning and Online Strategies, but that training is not specific to the Technical Writing course or the unique demands of online writing instruction (OWI). Therefore, I argued in Chapter 5 that the Digital Studio's online services could be just as important to GTAs with little experience teaching Technical Writing and, perhaps, with online teaching as well.

Digital Studio Pilot.

Regardless of students' and instructors' low reported likelihood to use online tutoring services, I piloted those services in the Digital Studio beginning in the Fall 2018 semester. One Technical Writing graduate teaching assistant (GTA) offered students extra credit on a collaborative white paper project if they attended a consultation

appointment with the Digital Studio. Interestingly, all of the students who signed up for consultations elected to come into the Studio in person rather than online via Zoom. Perhaps this is because the students from these two sections of Technical Writing were taking the course face-to-face. The course instructor emailed me to share that the students, "who have attended [Digital Studio consultations] have definitely taken a lot away from the sessions. It is reflected in their materials and how they are approaching their revisions." A total of 37 students visited the Digital Studio on 16 different occasions, 15 of which were group consultations for the white paper project. Despite that the demand here was somewhat fabricated by the instructor's offer of extra credit, visits nevertheless seemed to affect students positively. I distributed surveys to each of these students and received five responses, four of which were positive. For instance, the survey asked, "How successful do you think the consulting session was?" The students reported the following about their consultations:

- 3 - very successful,
- 1 - somewhat successful,
- 1 - neither successful nor unsuccessful.

As for whether or not students felt their consultant was knowledgeable about technical writing, they reported:

- 3 - strongly agree
- 1 - agree, and
- 1 - neutral.

Only one student wrote, “I felt as if they [the consultant] weren’t much more knowledgeable than I was.” These results from the pilot indicate that with instructor support, services might be used in a much higher volume.

Implementation

According to Bowen et al., implementation “concerns the extent, likelihood, and manner in which an intervention can be fully implemented as planned and proposed” (p. 453). The Digital Studio pilot project is now in its second semester, and so far, Technical Writing students have been able to locate it on campus and come in for face-to-face consulting sessions. They have not elected to use online tutoring. As for the website, I have some data from Google Analytics that show that the Studio had 55 online visitors in January 2019, compared to about 20 users in December 2018. Over a longer period of time, it would be possible to gain more in-depth insights about this data. While Google Analytics can tell website owners how much direct traffic the site received (when a user goes directly to the website’s URL), there is no way to know if these users were from Technical Writing courses or elsewhere.

I would not recommend the Digital Studio be implemented exactly as-is for intervening with the student experience in Technical Writing. As I mentioned above in the Acceptability section, the online synchronous tutoring would need some reconfiguring. For instance, the Professional and Technical Writing majors serving as tutors in the Digital Studio elected to call themselves “consultants.” We updated our website to describe these sessions as “Online Consultations” instead of online tutoring sessions (see Figure 12 below for a screen shot of the Digital Studio’s web page where students can make an appointment for an online consultation). The implementation of the

website has been more successful overall than the tutoring/consultation sessions in my estimation. The website has content on writing different types of reports, proposals, and emails; working collaboratively using Google Docs; and designing using C.R.A.P. (contrast, repetition, alignment, and proximity) principles. Continuing to seek Professional and Technical Writing majors as interns to further develop content for the website is quite feasible under the current conditions, but the Digital Studio's future is uncertain.

Practicality

Next, practicality investigates "the extent to which an intervention can be delivered when resources, time, commitment, or some combination thereof are constrained in some way" (Bowen et al., pm. 453). Following up on the point that I made about personnel changes in the Department of English, the practicality of implementing the Digital Studio as an intervention for students and instructors of Technical Writing remains tenuous. The resources that are needed are people: a graduate student or two to act as coordinator and assistant coordinator, and undergraduates to act as interns—at the very least. Their time can be compensated as part of their assistantship, as is currently the case for me and the two other graduate students who have worked with me. Undergraduates, however, are only compensated with credit for the internship course; they are otherwise uncompensated and unpaid. This is not a model whose practicality I would advocate for in the long run. If the Department of English, and perhaps Virginia Tech more widely, is interested in improving students' and instructors' experiences with online courses, then resources must be allocated for projects such as the Digital Studio.

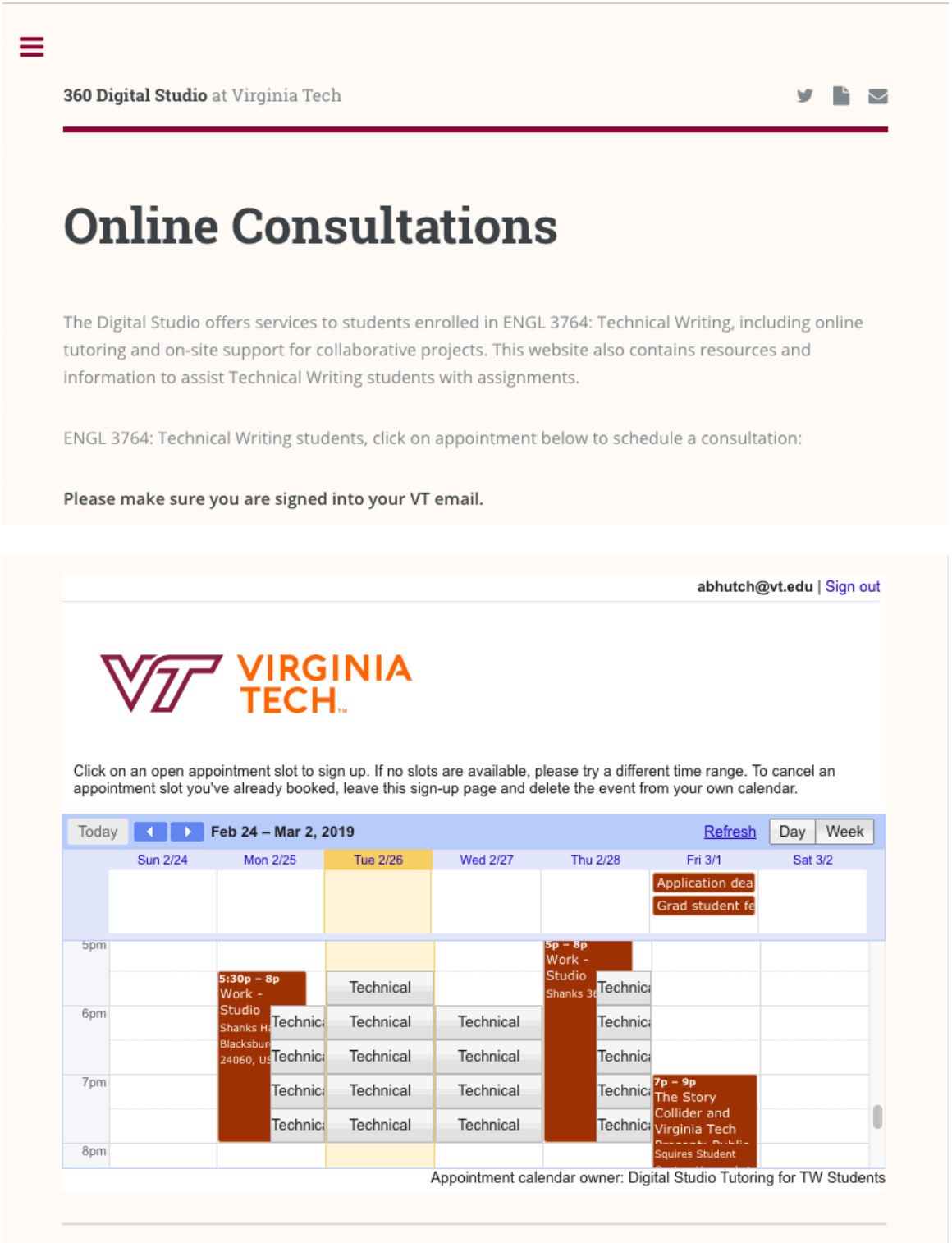


Figure 12: Screen Shot of Digital Studio Online Consultations Page

Commitment is also an integral part of the Digital Studio's practicality. As the founding coordinator and designer of the Digital Studio, I am obviously highly committed to its success. One of the interns who worked with me last semester decided to apply again this semester, so she is also highly committed. Whether or not the Department of English will continue to be committed to this project is yet unknown. Because the Digital Studio serves more than just the Technical Writing student population but also students from English majors and/or enrolled in any English course, perhaps there is some hope. However, as the services offered to students other than Technical Writing students are not part of this dissertation study, I cannot speak to those students' opinions and needs with the same level of certainty and depth.

Adaptation

According to Bowen et al., "Adaptation focuses on changing program contents or procedures to be appropriate in a new situation" (p. 453). I believe the service design model I have implemented in this study and the results it produced from stakeholders could be adapted to just about any program or department in the university. Asking students their opinions about what is most important to their learning, how valuable a course is, what resources they sought, what resources they might need, and what challenged them along the way can offer great insights about a program's curriculum and how it is benefitting or disadvantaging them. This dissertation focused on a relatively small population of students concentrated in one course, but I would argue that other online courses at Virginia Tech likely have similar difficulties for both students and instructors. The Digital Studio model could be adapted to fit other departments and

programs in order support students taking online classes, especially online writing-intensive courses which are not currently served by the Writing Center.

Integration

While adaptation focuses on how a service intervention appropriately affects a program, integration is about "the level of system change needed to integrate a new program or process into an existing infrastructure or program" (Bowen et al., p. 453). Thinking about integration of the Digital Studio in the Technical Writing course brings me back to a point I made in Chapter 3 about the online banking services available on my smartphone app. Before moving to a remote area of southwest Virginia, I didn't imagine needing to deposit checks online, but this was a service I soon found invaluable when my living situation changed. As I argued in Chapter 1, the landscape of online higher education is changing, and it often forges ahead without adequately preparing students, instructors, and departments.

When I mentioned in Chapter 4 that I asked students what their wildest imaginations held for online education, they mostly talked about the ability to connect with others in a way that is similar to their face-to-face classes. Instead of regarding synchronous online tutoring as a service associated with remedial writers, writers who don't give themselves enough time, or non-native speakers of English, I propose the Digital Studio's online consultations could be regarded as part of connecting students who are taking online courses? Online courses have long been heralded for allowing students (and instructors) to work at their own pace and in their own time (see Blair & Monske, 2003), but I speculate that something is lost or changes in that educational model.

As I described at length in Chapter 2, the writing center and technical writing fields devote a large amount of attention to social cognitive learning theory, so much so that asynchronous tutoring has been rather denigrated in the writing center field. At the same time, I argue that synchronous online tutoring has the potential to benefit online students, and the students I interviewed voiced interest in similar kinds of interaction. However, students do not necessarily see class interaction and support interaction as related to one another, perhaps because of strong associations between the writing center or other tutoring centers and remediation or deficiencies. This association could partially explain why most students in the survey did not report a high likelihood of using online tutoring services. Changing this association and students' interpretation of writing support is certainly part of the pilot project connected to this feasibility study. Nevertheless, it is important to realize that changing opinions and attitudes about the writing center is not within the scope of a feasibility study but rather a much larger project within the scope of writing center studies, and even the writing studies field more broadly.

Expansion

The penultimate consideration for a feasibility study, in Bowen et al.'s estimation, involves "examin[ing] the potential success of an already-successful intervention with a different population or in a different setting" (p. 453). As I said before, the study described in this dissertation focused on a small segment of the population at Virginia Tech, concentrated in the Department of English. For that reason, I do not feel there is enough evidence to make claims about expanding a service such as the Digital Studio "with a different population or in a different setting." I mentioned that I thought this

could be a useful service for students taking other writing-intensive courses online, but as for students and instructors at institutions other than Virginia Tech, I cannot say. The population I studied here has a high regard for face-to-face courses and social cognitive learning pedagogies, which could be partially owed to the fact that Virginia Tech is a residential campus. Expanding this kind of work to a community college, for instance, where there is a higher commuter population might show completely different results. Students who drive long distances to come to campus might be much more highly inclined to attend synchronous online tutoring sessions, such as the kind that student interviewee Vince described at his community college in Chapter 4. Therefore, I believe the expansion for the Digital Studio's services is more applicable at Virginia Tech, and may be more accurately described as appropriate for adaptation instead of expansion.

Limited-efficacy testing

Lastly, as Bowen et al. note, "Many feasibility studies are designed to test an intervention in a limited way. Such tests may be conducted in a convenience sample, with intermediate rather than final outcomes, with shorter follow-up periods, or with limited statistical power" (p. 453). The Digital Studio is indeed an example of limited-efficacy testing in that synchronous online consulting and a course-specific website are currently being piloted in the Department of English for Technical Writing students. In the Demand section above, I quoted a Technical Writing instructor's positive comments about the consulting services his students received. I also surveyed students who used the consulting services. As the pilot project is still underway, and the purpose of this dissertation has been to focus on the feasibility of this services by surveying and interviewing students and instructors, I do not have much data to report in this area. If the

Digital Studio remained a resource in the Department of English, and if my tenure at Virginia Tech was longer, I might have more reliable information to report. However, at this point, my observations of the interns' work and the Technical Writing students' experience in the Digital Studio are positive. The interns are quite proud of the content they have developed for the website, and I believe that their content can prove useful to both Technical Writing students and instructors. We assisted Technical Writing students working collaboratively on a white paper project, and some students seemed to walk away from those consultations with strategies they could use for writing as a group.

Research Question

I began this research study with the question, *What are the needs of Technical Writing instructors and students that an online, interactive space (such as an OWL) can address?* Having gathered survey and interview data from these two participant groups, I find their needs overlap in some areas and diverge in others. For several instructors, teaching online is accompanied by uncertainty: uncertainty about whether students read the textbook, assignment directions, and feedback; uncertainty about their ability to be "a good teacher"; and uncertainty about their students' reactions to the material due to a lack of visual and emotional input garnered through body language and synchronous discussions. I interpret this as a need to know that their teaching is effective, and for some, a need to connect with their students.

Like instructors, many students also expressed a desire for interaction, whether with their instructor or their classmates. A small portion of students felt that Technical Writing was especially suited to the online environment, or that easier, less technical courses were best taken online, revealing that in some circumstances, interaction is less

desirable and potentially avoided. However, half of the students and all of the instructors surveyed indicated that email was a resource for this class, evidencing a need of some kind for human interaction. An interactive service like the Digital Studio is one way of fulfilling this need, especially when this course is taught online and during times of year when the main Writing Center is closed and students and instructors are off-campus. Online consultations can serve a need that instructors have due to the increased labor and "literacy load" of communicating digitally with students (Griffin & Minter, 2013).

Both students and instructors expressed a low level of need for online tutoring and a physical space for collaboration, but reported a higher likelihood of using a course-specific website and how-to videos. A website might not be considered an "interactive space," but an online writing lab or OWL as repository (cf. Breuch; Sheridan) can in fact receive a lot of use. Students reported using the Purdue OWL as a resource for Technical Writing in both the survey and interviews. In addition, students have a great need for examples as a resource, and a course-specific website can be a place to post assignments completed by previous Technical Writing students. A repository such as this can fulfill a need that both students and instructors possess.

Service Design's Contribution to Writing Center Research

Some of the methods used in service design, and the same methods employed in this study, aren't new to writing center research. Blending qualitative and quantitative methods also isn't new and is advocated by some writing center researchers (Driscoll & Perdue); other researchers even suggest using quasi-experimental methods (Wolfe & Griffin). However, as I stated in Chapter 1, service design provides writing center

researchers with a way to back up and think about how to design or redesign writing center services. As a subscriber to the WCenter listserv, I frequently see requests from WCPs who are looking for models from other institutions to implement or for guidance on how to implement new services. Recently, Jenelle Dembsey, co-coordinator of the Online Writing Centers Community, replied to a request for suggestions on how to offer online tutoring as follows: "It's difficult to answer these questions because online writing centers look very different based on the local context" (electronic mailing list communication, March 25, 2019). Lisa Bell, a well-known researcher of online writing centers, followed up by writing, "I join with others in noting how much context plays a part in these sorts of recommendations" (electronic mailing list communication, March 26, 2019). These kinds of conversations occur regularly on WCenter and at the regional and national writing center conferences that I've attended. If the question around writing center services often comes down to context—and by that I mean student body, institutional and departmental resources, staffing, hiring procedures, curriculum, and any other circumstances or material realities affective the writing center—then service design and its way of orienting a researcher toward methods is highly beneficial. As Polaine et al. put it, "The key to a seamless service experience is taking care to understand the contexts in which users interact with touchpoints and services" (p. 90).

For instance, through my research, I found out a great deal about the context of the Technical Writing curriculum, the students' levels of awareness of the curriculum and the technical writing field, and how the interplay of the two aligned in some ways but not in others. In the places where student and instructor perceptions didn't quite align, such as with the activities of research and designing graphics, the services offered through the

Digital Studio can intervene, especially when the staff are aware of instructors' concerns about student work and abilities. When students visited the Digital Studio for group consultation on their white paper projects, I suspected they would want to focus more on the texts they had written and the corresponding higher-order concerns (HOCs) and lower-order concerns (LOCs). Indeed, students asked questions about organization or citation for the reports. Taking into account what I learned from Coffey et al.'s article, what I know as a former professional tutor, and what I know as a Technical Writing instructor, I took a more directive approach and asked students what their plans were for writing collaboratively. Many groups were taking the "divide and conquer" method, which isn't surprising given the way group work often operates and is graded in higher education. Instead of using this method, I encouraged students to divide up the primary research they had conducted and use that as a way of writing the report. The student who conducted site inspections, for instance, would provide an overview of that method in the methods section, write about its results in another section, and offer some insights from that data in the recommendation or conclusion of the report. In other words, the students would write in and, therefore, read almost every section of the report collaboratively. This way, I reasoned, the reports would hopefully demonstrate a more unified tone and style then many of the collaborative reports I've read by my own and other students. My advice to these collaborative writing groups also reflects a disciplinary approach to writing tutoring.

Service Blueprints.

Writing center researchers can also use the service design method of creating a service blueprint to think through designing or redesigning writing center services.

Although the service blueprint in this dissertation (see Fig. 11) is rather straightforward and seemingly simplistic, I had to make several considerations before designing it. The process of designing the service blueprint and representing a process visually forced me to think about multiple aspects of online tutoring that I might not have otherwise. For example, I first had to determine what technology I could use to offer online consultations, leading me to have meetings and email threads with Technology-enhanced Learning and Online Strategies (TLOS) at Virginia Tech. When I found out VT had access to Zoom, I then had to practice using that platform and thinking through how to use it with students. The consultants and I tested the technology by holding mock tutoring sessions (and those actually turned out more like real tutoring sessions, partially because the technology became "backstage" (Polaine et al., p. 92) as we became comfortable using it and focused instead on the texts). Based upon Zoom's technological affordances, the consultants and I also thought through how to obtain consent from participants to record online sessions as well as how to interact with a student's text such as by using Zoom's highlighting feature. We also learned through this process that Zoom has different features for Macintosh and PC users. Given that the Digital Studio classroom contains all Macs, but consultants and students own both Macs and PCs, consultants need to be aware of these differences in features.

Creating a service blueprint in preparation for a meeting with an administrator or donor responsible for the writing center's funding is also a good way of helping these stakeholders understand the writing center's context and the proposed service(s). Having concrete evidence to back up decisions for the services, such as through survey and interview data, can also complement the visual representation of the service blueprint.

Through my survey and interview data, I discovered that students were extremely unlikely and instructors predicted students would be extremely unlikely to use online tutoring; I also found that students didn't seem to use the writing center much if at all after their freshman year. Therefore, including Canvas in the service blueprint was important because it represents the fact that there is a page in Canvas dedicated to the Digital Studio's services and purpose.

One final use of service blueprinting for WCPs is to perform an analysis of current services (Polaine et al., p. 102). By placing all the touchpoints of an existing tutoring service onto a blueprint, tutors and WCPs can analyze and discuss the way the service works and identify potential "points of failure in the service (known in service design jargon simply as 'fail points') and opportunities for enhancing the experience" (Polaine et al., p. 41). A quick and easy way to draft a "low fidelity" service blueprint is by using sticky notes and a whiteboard or even a wall (Polaine et al., p. 106). This could make a fun and engaging activity for tutor training or at a regular writing center meeting. Tutors and WCPs could write or sketch touchpoints onto sticky notes and organize them onto a blueprint organized according to the five areas of "journey phases":

- **Aware:** The point when the user first learns about the service
- **Join:** The sign-up or registration phase
- **Use:** The usual usage period of the service
- **Develop:** The user's expanding usage of the service
- **Leave:** The point when the user finishes using the service, either for a single session or forever (Polaine et al., p. 98)

To illustrate one example, a touchpoint for the "aware" journey phase could be a website, an instructor, or a flyer. Each of these touchpoints would be written or sketched on a separate sticky note and placed on the temporary blueprint. If awareness is a fail point in the service, tutors and WCPs can brainstorm ideas for reaching new clients/students by considering other touchpoints with high levels of interaction, such as a library, student center, or LMS.

Service Prototype.

Along with the service blueprint, a writing center director or professional could also design a service prototype to present to students or administrators. An experience prototype is "something tangible that contains the key elements of the touchpoints and flow of the service interactions" (p. 140). This is a step I did not complete in this research study, and in retrospect, is a shortcoming of this study. As Polaine et al. point out, "People need to experience a service or touchpoint before they can tell you what does not work and what really makes a difference" (p. 140). The fact that I did not supply participants with a fuller description of the proposed services (online tutoring, how-to videos, course-specific website, or physical space for collaboration) could have negatively affected their understanding of what the service would actually do for them and, therefore, make them less likely to think such services were necessary. Particularly in the interviews, describing and prototyping the potential services and asking students and instructors for their input and advice would have been a beneficial step in this research. As the saying goes, hindsight is 20/20, and if I were to continue this project or perform a similar project at another institution, I would not overlook this step, nor would I recommend other writing center researchers do so.

The most cost-effective way of gathering stakeholder feedback about an experience prototype is through a discussion prototype (Polaine et al., p. 141). Using this method, a service design researcher:

> can bring a series of touchpoint mock-ups to a one-hour interview and discuss them according to your planned user journey. The role of the people you are interviewing is to be themselves, react to the touchpoints, and offer feedback as if the interactions were real. (Polaine et al., p. 141)

Since I designed my research methodology to include interviews, I could have prototyped online tutoring sessions since that was the main service I saw as necessary due to the CCCC Position Statement of Principles and Effective Practices of Online Writing Instruction and the lack of OWT at Virginia Tech. However, I believe an incentive or compensation for a one-hour interview would have been necessary because most of the student interviews I conducted lasted about 30 minutes. One hour is a lot to ask of a student's time.

Creating OWLs with Service Design.

In Table 1 presented in Chapter 2, I collocated four sources of information about the presence of asynchronous and synchronous online tutoring in higher education. According to Prince et al., there is some evidence that online writing tutoring (OWT) has been increasing since 2006 (p. 12). In the four studies that I cited, anywhere from 38.1% to 91% of higher education institutions offer asynchronous online tutoring (Hewett et al.; National Census of Writing; Neaderhiser & Wolfe), whereas anywhere from 23% to 58.1% of institutions offer either synchronous or asynchronous tutoring (Bemer; National Census of Writing; Neaderhiser & Wolfe). Some of this data is roughly 10 years old.

Nevertheless, the trend seems to remain that asynchronous tutoring occupies a larger percentage of the available OWT at various institutions. Additionally, the amount of research on creating OWLs which offer OWT is scant. As I argued earlier, much of this scholarship takes the form of practitioner research, which indeed has its value and place in the literature. However, this kind of scholarship leaves WCPs and researchers in a situation where they must peruse the literature to find an approach that seems to make the most sense for their own institution, or they cobble together several approaches in order to move forward with services or respond to requests from administrators. Of course, one reason there is so little research of this kind is owed to "The heavy workload, limited prestige, training gap, and methodological uneasiness" of WCPs that "can result in what Jeanette Harris deems 'this-is-what-we-do-at my writing center' scholarship" (Driscoll & Perdue, p. 16). If writing center researchers had the time and opportunity to conduct research, service design methodology offers a fruitful and systematic approach to data collection, from which insights about users can be developed in order to design and pilot services.

One rich site of potential to exercise service design methods is a tutor training or writing center theory and pedagogy course, whether at the undergraduate or graduate level. As I said above, asking an hour of a student's time for a discussion-based prototype is a somewhat hefty and perhaps unreasonable demand. For the students at my former community college who often worked full time and commuted to campus, an uncompensated hour of their time would have likely yielded few participants. In a class setting, however, teams of students could prototype OWT services and test them out on one another or perhaps even writing center clients with appropriate notification and

consent. Going through the service design process by mapping the service ecology, gathering data from stakeholders, and creating a service blueprint could make an excellent group project that would simultaneously highlight the writing center field's emphasis on collaborative pedagogy. Students might also innately have a better sense of their peers' needs and orientations toward an OWT service. The final project for the course could involve testing each team's OWT prototype and evaluating which service worked best given the stakeholders' needs, the curriculum, and the institutional context.

Applying Service Design in Writing Center and Higher Education Settings.

Because service design is not only a new method for conducting research but also new to the field of higher education, its application must be explored in more depth. While I agree with Curedale that education is an intangible service that is rendered tangible through human interactions, and while some designers have used service design in educational settings such as "a peer-to-peer learning platform that helps people become teachers" (Polaine et al., p. 42), there is not much research published yet on service design's application to higher education. In Chapter 3, I mentioned Felix's work in applying service design to learning spaces on university campuses, and this is the only scholarship I have encountered so far that combines these two areas. Felix argues that, "the service offering has been intentionally designed to create a better user experience—one that is integral to the space and designed from the user perspective" (p. 5). Felix posits that in order to make this shift requires, "New roles [to] be created, such as roving staff that proactively deliver services rather than waiting for people to approach a desk" (p. 6). Indeed, as I pointed out at the beginning of this dissertation, students pass the

Technical Writing course by and large, but this does not mean they are necessarily completing the course with the competencies and multiliteracies that instructors and future employers expect them to have. Like Felix, I believe that learning services such as OWT can be proactively delivered to students in order to improve their course experience and possibly even their retention of learning objectives.

Felix advocates for an understanding of service design as "a mindset or way of thinking that includes approaching services from the user perspective, thinking holistically in terms of systems, and considering sequencing and time" (pp. 2-3). One such system in higher education is the LMS and its asynchronous method of delivering courses online in order to appeal to students with busy schedules. Initially, I had planned to use Zoom with Canvas, thinking that the two were integrated so that students could access OWT directly from Canvas. I found ease of access to OWT important given M'hammed Abdous's (2013) research on a learning environment interface (LEI). Abdous proposes using an LEI instead of an LMS in order "to remediate the fragmented interface offered by most Learning Management Systems" (p. 5) by "eliminate[ing] the need for students to switch between various windows and plug-ins" (p. 16). In other words, I thought the potential to integrate Zoom with Canvas would allow the Digital Studio to more proactively deliver OWT to Technical Writing students while simultaneously embracing good instructional technology and design practices. Because accessing Zoom requires exiting Canvas, the technologies did not operate in the way I thought they did initially; instead, students would need to launch the Zoom meeting either from the confirmation email after making an appointment or from the link in Google Calendar. Polaine et al. make the point that "even small irritations can be enough of a barrier to

prevent people from bothering to switch from their old way of doing things to using a new service" (pp. 139-140). Although students can book consultation appointments through Canvas or the Digital Studio's website, any hiccups in the service journey can discourage students from seeking OWT. If I were to continue piloting this service, I would try integrating a pop-up chat window with the website, which was one of the suggestions the consultants made in the Fall 2018 semester. I offer this example as a way to demonstrate how to proactively offer a service while operating within a specific system of online education at Virginia Tech.

Future Research Area

One of the driving factors of my research in this dissertation is how to appropriately support students learning about technical writing in an online environment. I began teaching online in 2011, and prior to that, I completed my MFA in a low residency program in 2008. In my MFA courses, I remember distinctly disliking some of my classmates because of the comments they made in our online discussion forum. When I met my classmates in person during the residency portion of my program, many of them became my friends. They seemed like different people online than they were in person. The whole notion of interacting with other people in an online educational environment is integral, I believe, to successfully learn about writing. Writing *is* a form of interaction, one that especially takes place without the need for someone else's physical presence. (This form of interaction without physical presence seemed to trouble Socrates greatly.) In the course of talking to technical writing students and instructors, I frequently thought

about how technology can be used to benefit OWI and learning. Some questions I would like to consider in light of distance education and online classes are:

1. *What happens to social cognitive learning when students and instructors do not share a physical space? Is learning still social when people interact asynchronously?*
2. *How does learning about writing change when people interact asynchronously?*

Alex Reid's (2007) notion of distributed cognition, for example, comes to mind. In Reid's estimation, human thought processes don't just happen in the body but also in what he refers to as a cybernetic network. As I understand Reid's theory of distributed cognition, a computer becomes a device by which humans can access their own consciousness. Reid explains, "the computer does not present a simulation of an interiorized consciousness, but rather presents consciousness itself as a simulation, as an interface with smart systems" (p. 83). Putting the rather mind-blowing concept of consciousness as an interface aside, if Reid's argument about distributed cognition is true, how does that play out in an online learning environment where social cognitive theories of learning form the basis of both student and instructor understandings of what constitutes learning and educational interactions? If we believe our cognition can be distributed in a cybernetic network such as a learning management system, but these systems predominantly allow for asynchronous, textual interactions, does social cognitive theory hold up, or do we need to migrate towards a distributed cognitive theory for a more accurate understanding of what takes place in OWI and OWT? Although I am as of yet unsure about specific methods that would accompany such an inquiry, I am

nevertheless interested in further investigating the nature of learning to write and learning about writing in online environments.

Conclusion

In this dissertation, I sought to address a problem that I saw with the Technical Writing service course at Virginia Tech: students were not eligible to receive synchronous online tutoring from the Writing Center. Especially for students enrolled in online sections of the course, this lack of service puts Virginia Tech somewhat out of alignment with the CCCC Position Statement of Principles and Example Effective Practices for Online Writing Instruction (OWI). In particular, OWI Principle 13 is applicable to this situation because it essentially states that students must be able to receive writing support in the same environment in which they take the course. These circumstances led me to develop the research question, *What are the needs of Technical Writing instructors and students that an online, interactive space (such as an OWL) can address?*

From there, I reviewed literature from the writing center field in order to ascertain how online writing tutoring (OWT) and online writing labs (OWLs) have historically and more recently supported students. Despite that asynchronous tutoring tends to be denigrated in the field and is the oldest method of online tutoring, it persists as a relatively common practice according to the limited available research. Synchronous online tutoring tends to receive higher regard but remains relatively under-studied. In the technical writing field, scholarship has addressed online and distance education courses since at least 1995, but there has been little in the way of acknowledging support for

students enrolled in these courses beyond the interactions they have with their instructors, one another, and the LMS. Pedagogies and theories of OWI in both writing centers and technical writing fields are largely underdeveloped and are in dire need of additional empirical research.

In order to approach the problem of offering online writing support to Technical Writing students at Virginia Tech, I turned to service design, a methodology born out of the service industry and social science disciplines. As its goal, service design concentrates on improving service interactions between people. Although "service" in an educational setting might seem uncommon, teaching and learning are actually considered services and are especially dependent upon human interactions. I discussed the appropriateness of importing service design methodology to a specialized writing support approach because of the writing center field's focus on people and improving their interactions with writing.

With an orientation toward designing a service *with* stakeholders, I surveyed and interviewed two participant groups: instructors and former students of Technical Writing. Their responses revealed several areas of overlapping attitudes toward course assignments, potential services, and learning environment preferences. As I shared in this chapter, both students and instructors reported low likelihood to use online tutoring. At the same time, students and instructors tend to prefer face-to-face courses, students get frustrated when they cannot ask questions and get relatively immediate responses from instructors, and instructors feel the work in teaching an online course and creating resources for students is time-consuming.

These findings have led me in this chapter to argue that a service such as the Digital Studio could be considered a resource to both teachers and students in an online course such as Technical Writing. The Digital Studio is feasible in many ways as long as it has support and resources from the Department of English and its stakeholders. I encourage scholars in both the writing center and technical writing fields to think about how a service like the Digital Studio can be a resource for online writing-intensive courses as a way of improving both the student and instructor experience. If instructors lack time to develop online resources, students such as the Digital Studio interns can create content that relates to Technical Writing genres. If students are feeling disconnected from their learning and classmates, an online consultation could provide them with a conversation about a technical writing genre or a collaborative writing project. In short, the Digital Studio potentially carries the ability to efficiently serve students and instructors of Technical Writing.

Appendix A: Student Survey Questions

1. When did you take ENGL 3764: Technical Writing?
   [Multiple Choice]
   Fall 2017
   Winter 2018
   Spring 2018 (currently enrolled)
   Other [fill-in-the-blank]

2. In what setting did you take the course?
   [Multiple Choice]
   Online
   Face-to-face

3. If you have taken both online and face-to-face courses, which setting do you prefer and why?
   [short answer]

4. Did you take ENGL 1105 and/or 1106 at Virginia Tech?
   [Checkboxes]
   ENGL 1105: First-Year Writing
   ENGL 1106: Writing from Research
   Received transfer or AP credit for the course(s)
   Other [fill-in-the-blank]

5. Have you had an internship, co-op, or job during your time at Virginia Tech that required workplace writing?
   [Multiple Choice]
   Yes
   No

6. How valuable was this course in teaching you genres and skills you can use in your work?
   [Multiple Choice; Likert scale: Highly unvaluable to highly valuable]

7. What genres did you learn in this course that will be most valuable or applicable to your future workplace writing?
   [Multiple Choice; Likert scale: Highly inapplicable, somewhat inapplicable, somewhat applicable, highly applicable, N/A]
   Email or other professional correspondence
   Instructions, user document, how-to
   Job application materials
   Memos/short reports
   Presentations
   Proposals

Reports (progress, informational)
Web sites

8. What skills did you learn in this course that will be most applicable to your future work?
[Multiple Choice; Likert scale: Highly inapplicable, somewhat inapplicable, somewhat applicable, highly applicable, N/A]
Audience analysis
Collaboration
Designing a document (typography, headings, accessing aids)
Design principles (contrast, repetition, arrangement, proximity)
Editing grammar and mechanics

9. What **activities** did you find difficult in this course?
[Checkboxes]
Analyzing an audience
Designing a document
Designing graphics and/or visuals
Editing grammar and mechanics
Organizing information to write an assignment
Conducting research for a written assignment
Selecting a topic for an assignment
Reading textbook
Taking quizzes

10. What **assignments** did you find difficult in this course?
[Checkboxes]
Collaborative project
Email or other professional correspondence
Instructions, user document, how-to
Job application materials
Memos/short reports
Presentations
Proposals
Reports (progress, informational)
Web sites
Other (please describe)

11. What kind of resources did you seek while taking the course?
[Checkboxes]
Emailing your professor
Going to professor's office hours (if available)
Asking a friend/family member for help
Viewing the Purdue OWL website
Visiting the Writing Center
Visiting and/or contacting the library

Watching how-to videos (YouTube, Lynda.com, etc.)
Looking for examples (on the web, in textbook, on Canvas)
Looking in the textbook index
Other (please describe)

12. How likely would you have been to use the following resources if they had been offered?
[Multiple Choice; Likert scale]
Online tutoring session
How-to videos
Website specifically for ENGL 3764: Technical Writing
Physical space for collaborative projects

13. What kind of resources or support would you have liked to see in this course that were not mentioned above?
[short answer]

14. What kinds of technology for doing classwork do you own or have access to?
[Checkboxes]
Laptop and/or tablet
Smartphone
Google Suite
Canvas
Microsoft Office
Other (open-ended)

15. What kinds of technology for doing classwork are you likely to use?
[Checkboxes]
Laptop and/or tablet
Smartphone
Google Suite
Canvas
Microsoft Office
Other (open-ended)

16. Would you be willing to participate in a brief follow-up interview about your experience in this course?
[Multiple Choice]
Yes
No
Maybe

17. If you answered yes or maybe, could you provide your preferred contact information? To maintain anonymity, I will not link identifying information to your comments.
[short answer]

Optional Demographic Questions: Demographic information will be helpful for me to analyze potential disparities among groups. To maintain anonymity, I will not link identifying information to your comments.

18. What is your racial identity?
    [short answer]

19. What is your gender identity?
    [short answer]

20. What is your disability identity?
    [short answer]

21. What is your major?*
    [short answer]

22. What is your minor?*
    [short answer]

23. What is your age in years?
    [short answer]

24. Are you a first-generation student (either your parents didn't attend college or attended college in another country)?
    [MC]
    Yes
    No
    Not sure

*indicates required question

Appendix B: Instructor Survey Questions

1. How many total sections of ENGL 3764: Technical Writing have you taught at Virginia Tech?
   [Multiple Choice]
   1-5 sections
   6-10 sections
   11-15 sections
   16+ sections

2. In what setting(s) have you taught the course? (check all that apply)
   [Checkboxes]
   Online
   Face-to-face

3. If you have taught both online and face-to-face, which setting do you prefer and why?
   [short answer]

For the following questions, please answer according to your experience teaching online and/or face-to-face sections of this course.

4. What **activities** do your students find difficult?
   [Checkboxes]
   Audience analysis
   Designing a document
   Designing graphics and/or visuals
   Formatting a document
   Organizing information to write an assignment
   Conducting research for a written assignment
   Quizzes
   Selecting a topic for an assignment
   Textbook readings
   Other (please describe)

4a. What **assignments** do your students find difficult?
   [Checkboxes]
   Collaborative project
   Email or other professional correspondence
   Instructions, user document, how-to
   Job application materials
   Memos/short reports
   Presentations
   Proposals
   Reports (progress, informational)

Web sites
Other (please describe)

5. What kind(s) of resources do you offer or inform your students about?
[Checkboxes]
Email address
Office hours (either online or face-to-face)
Feedback on drafts
Writing Center
Library
How-to videos (YouTube, Lynda.com, etc.)
Sample documents (on the web, in textbook, on Canvas)
Purdue OWL
Textbook index
Textbook support site
Other (please describe)

6. Which resources do your students use most frequently?
[Checkboxes]
Email address
Office hours (either online or face-to-face)
Textbook index and/or glossary to find the information they're looking for
Feedback on drafts
Writing Center
Library
How-to videos (YouTube, Lynda.com, etc.)
Examples (on the web, in textbook, on Canvas)
Purdue OWL
Other (please describe)

7. How likely do you think your students would be to use the following resources if they were offered?
[MC; Likert scale]
Online tutoring session
How-to videos
Website specifically for ENGL 3764: Technical Writing
Physical space for collaborative projects

8. What kind of resources or support would you like to see in this course that were not mentioned above?
[short answer]

9. What kinds of technology do you have or have access to for teaching?
[Checkboxes]
Laptop and/or tablet
Smartphone

Google Suite
Canvas
Microsoft Office
Other (open-ended)

10. What kinds of technology are you likely to use for teaching?
[Checkboxes]
Laptop and/or tablet
Smartphone
Google Suite
Canvas
Microsoft Office
Other (open-ended)

11. Would you be willing to participate in a brief follow-up interview about your experience in this course?
[Multiple Choice]
Yes
No
Maybe

12. If you answered yes or maybe, could you provide your preferred contact information?
[short answer]

Demographic Questions: Demographic information will be helpful for me to analyze disparities among groups. To maintain anonymity, we will not link identifying information to your comments.

13. What is your racial identity?
[short answer]

14. What is your gender identity?
[short answer]

15. What is your disability identity?
[short answer]

Appendix C: Student Interview Questions

1. Did you have any experience with technical writing, either at work, in school, or elsewhere, before taking the course?
2. What is technical writing to you?
3. Did you take the course online or face-to-face?
    a. If taken online, did you prepare to take this course the same as or differently than you would for a face-to-face course?
    b. If taken face-to-face, did you make any preparations for taking the course?
4. Have you taken any online classes?
    a. If yes, what kinds of course materials or resources did you like using best? Why?
    b. Do certain kinds of course materials or resources help make the course better?
    c. Was there anything about taking the class online that was easier or more difficult than taking a face-to-face class?
5. Was there an assignment or activity in this class you found valuable for preparing you for the workplace?
    a. If yes, how was it valuable?
    b. If no, what kind of assignment or activity would you have found valuable?
6. Imagine you're taking an online course. If money, time, and technology were no object, what would you be able to do in that course? Be as creative as you like.
7. To what extent do you use Canvas for taking your course?
    a. Are there any features that you find particularly useful?
    b. Are there any features you wish it had to make taking this course better?
8. If the Department of English had a physical space in which you could receive services, what services do you imagine would be most useful? Would you be likely to use that service? Why or why not?
9. Have you ever used the Writing Center for this course? Why or why not? What about for other courses?
10. Are there any tools or resources you'd like to have available in a physical space for Technical Writing students? What about in an online space?

Appendix D: Instructor Interview Questions

1. Can you tell me a little bit about your background and how that prepared you to teach technical writing?
2. Have you taught the course online before?
    a. If yes, did you prepare any differently than you would have if you were teaching the course face-to-face?
3. If you've taught the course both online and face-to-face, do you feel preparing for one setting is any more easy or difficult than the other? If so, in what way?
4. What activity or assignment do you notice your students benefit most from? Why?
5. What activity or assignment do you notice your students experience most difficulty with? Why?
6. Is there a skill related to tech communication you think students should have after taking this course but that is difficult to teach (possibly because of time, space, or medium constraints)?
7. What kind of resources or services do you refer your students to for completing their coursework? Why?
8. Is there a resource or service you wish existed that does not currently?
    a. If yes, what would that resource or service look like? How would it serve students taking the course? Be as creative as you like.
9. To what extent do you use Canvas for teaching your course?
    a. Are there any features that you find particularly useful?
    b. Are there any features you wish it had to make teaching your course better?
10. If the Department of English had a physical space in which your students could receive services, what services do you imagine would be most useful?
11. Do any of your students use the Writing Center?
12. Regardless of whether or not you are aware of your students using the Writing Center, do you think there are assignments or genres which coaches are particularly prepared or unprepared to assist students with?
13. Are there any tools or supplies that should be available to students in a physical space for technical writing students? What about in an online space?

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