Designing Collaborative Learning Spaces

Where Material Culture Meets Mobile Writing Processes

Amanda Metz Bemer
Utah State University

Ryan M. Moeller
Utah State University

Cheryl E. Ball
Illinois State University

ABSTRACT. In May 2007, the Department of English at Utah State University (USU) redesigned its computer lab to increase mobility and collaboration during writing projects. Our study shows that despite the Professional and Technical Communication (PTC) field's efforts to promote writing as a socially active, collaborative practice, many students view computer labs as spaces for conducting isolated, single-authored work. In this article, we discuss how a combination of movable furniture and mobile technology, including wireless access and laptops, can enhance student collaboration in group-based writing assignments. The lab included both desktop and laptop seating areas, so the authors created a modified worksite analysis designed to evaluate team collaboration in this new layout. These material changes in the lab allow students to configure the space according to their needs, offering them some measure of control over three crucial elements of successful collaboration: formality, presence, and confidentiality.

KEYWORDS. collaboration, group work, lab design, materiality, mobility, space, writing

In writing studies, it is widely accepted that writing is a social, collaborative activity (Bruffee, 1984; J. Harris, 1994; Howard, 2001; Sullivan, 1994; Thralls, 1992; Winsor, 1990). Research in the area of collaboration covers topics from conflict among writers in collaborative situations (Burnett, 1993) to the benefits of conferences in planning a collaborative text (Bowen, 1993). Collaboration can be seen as "making thinking visible" (Flower, Wallace, Norris, & Burnett, 1994) when writers talk to one another about their writing, particularly about decisions made during their writing

Programmatic Perspectives, 1(2), September 2009: 139–166. Contact authors: ‹cball@ilstu.edu›, ‹rylish.moeller@usu.edu›, and ‹amanda.bemer@usu.edu›.

process. Much scholarly research related to collaborative writing discusses *how* writers collaborate (e.g., Burnett, 1991; Duin, 1986; Howard, 2001; Lunsford & Ede, 1990). This article—like many studies of collaboration in writing center sites (e.g., Bruffee, 1994; Clark & Healy, 1996; M. Harris, 1992; Lunsford, 1991)—addresses the *how* and *where* of collaboration. In particular, this study focuses on how student-writers collaborate given the material conditions of computer labs. In mobile labs, these conditions may be seen as affordances to collaboration, where in traditional labs, such conditions may act more like constraints.

Talk, Please! Creating Collaborative Computer Labs

Since computers were first introduced into the writing classroom, writing teachers have discussed the pedagogical implications of these machines and the rooms they inhabit. Instructors of writing have long realized that student interaction is affected by the physical space of a room just as much as it is influenced by the presence of a teacher or the technology. The unfortunate consequence of this realization is that the physical space is an aspect of the classroom that teachers often have little control over (see Mirtz, 2004; Nagelhout & Blalock, 2004; Palmquist, Kiefer, Hartvigsen, & Godlew, 1998). Thus, writing instructors have a rich tradition of subverting classroom design by asking students to meet outside classroom spaces, by arranging desks in circles or groups, or by extending conversations about writing online. According to Gail E. Hawisher, Paul LeBlanc, Charles Moran, and Cynthia L. Selfe (1996), the writing lab was born during a paradigm shift through which teachers of writing became more focused on process than on product. Prior to this shift, most students sat in individual desks so they could work alone, but those desks could be rearranged into small circles for group work and activities such as peer review (pp. 28–29). Hawisher and her co-authors noted that this style of classroom resembles the newspaper bullpen, where students have individual workspaces, but may confer with others when appropriate. However, this classroom design remains teacher-centered.

Since Hawisher et al.'s (1996) book came out, writing teachers have continued to be proactive in their studies of technological learning spaces. For instance, in *Sustainable Computer Environments*, Richard J. Selfe (2005) discussed how computer labs serve as community-building areas and social-networking sites for students. They constitute technologically rich spaces accessible to students to use as workspaces as well as to build friendships and collaborations that help them achieve their goals. Like much of the previous scholarship on writing labs, we posit that the physi-

cal spaces of the labs—the layout as well as the furniture and hardware—affect the relationships and work scenarios that take place within them.

This article documents some ways the physical and material space of the Department of English's computer lab at Utah State University (USU) changed over 15+ years, and how these change affected student collaboration, especially when ways of collaborating changed after the May 2007 remodel. Although many of us in the department had been teaching writing as a collaborative activity for some time, we were not supporting student collaborations outside the classroom in the technological space within the department's control, in part because that space had no pedagogical or administrative leadership. Our open-access computer lab was designed in a way that reinforced many students' perceptions that writing is an isolated, solitary event. The lab used individual desktop writing stations and discouraged talking through signage and lab consultants' policing. Most students would work hunched over their computers in uncomfortable chairs, speak to no one, and make as little noise as possible. Even lab consultants—student workers paid to interact with and help users of the lab—were themselves role models of isolation: They separated themselves through the use of headphones, mobile phones, and an isolated computer station.

Yet we knew that creating a space that reflects USU's philosophy of writing is critical, especially if users of the space are able to be mobile and transient (Harrison, Wheeler, & Whitehead, 2004, p. 23). Many computer lab users may enter the lab only a few times during the one semester of their college careers when they take a mandatory English course. These sporadic computer lab encounters can shape students' perceptions of writing for the rest of their lives. As often as we tell students that good writing is collaborative, they will likely believe it more when they see it reinforced in the thoughtful design of the workspaces we have under our control.[1] All areas of English Studies can potentially benefit from such carefully designed computer labs, particularly as teachers across the discipline incorporate more digital and multimodal assignments.[2] Although these areas have different foci and, at times, different pedagogical

[1] We understand that we speak from a privileged position when we refer to the classrooms under our control. Many English departments do not retain control of the technological spaces in which students work. We address this situation later.

[2] USU's Department of English, for example, houses multiple areas under the umbrella of undergraduate English (the primary user-population of the open lab), including American studies, British & commonwealth studies, creative writing, English education, folklore, literary studies, professional & technical writing, and medieval and early modern studies. In addition, graduate students take classes in literature, professional communication, folklore, and American studies.

goals, one commonality remains: collaboration. For example, creative writing incorporates a great deal of workshopping into their classes, and literature classes involve a great deal of discussion and peer review of their analyses. Hence, creating a lab that supports collaboration is an attempt to support each area of English Studies as well as to spread the idea across campus (via first-year composition students) that writing is social.

As technology becomes more ubiquitous and less expensive, it becomes even more critical that we make knowledgeable decisions instead of educated guesses about pedagogical needs in lab settings. For instance, in "The Inertia of Classroom Furniture," Ruth Mirtz (2004) discussed how the design of classroom furniture affected students during peer review sessions in first-year composition classes. She made three recommendations for designing classroom spaces:

- The physical environment should not determine the relationships among teachers and students or among ideas and reality;
- Relationships should remain in flux and nimble, able to reflect more than the will of the teacher or the will of a few students; and
- Teachers and students should be pushed to think past the traditional or the nontraditional, to get away from static arrangements and static learning, and to rethink classroom space as more than mental space. (p. 26)

Simply put, Mirtz urged us to take control over the classroom space by being conscious of it and how we relate to it. Moreover, as Richard Lanham (2006) suggested, these spaces are the material manifestations of how we think about the writing that they will do within them (p. 18). That is, the physical spaces we design for students to work in say a lot about what we think of the activities that take place within them. That being said, we want to call attention to the reality that most English departments do not have control over the ultimate design of most spaces in which we teach. In these instances, we do what we can to better approximate pedagogical choices through classroom design and through negotiation with those who do control those spaces.

With these ideas in mind, we conducted a small-scale research study of an open-access computer lab, designed over the 2006–2007 academic year and remodeled in May 2007. Our goal in the redesign was to create an environment intended to support and encourage collaboration. In this study, we wanted to observe how students would collaborate differently when using laptops versus desktops and when working in different seating

configurations. We analyzed students' perceptions of the lab according to three characteristics of collaboration as posited by Harrison, Wheeler, and Whitehead (2004): formality, presence, and confidentiality. We hoped to discover whether the lab spaces we designed would support these different configurations of student collaboration. Our findings, while limited in generalizability, indicate that the newly remodeled space is easier for students to use in collaborative ways such as working in collocated groups. In addition, students agreed that the material affordances of the room (Barnum, 2002, p. 109) facilitated collaboration well. In this case, these affordances include the layout of the furniture, the available equipment, the mobility of that equipment, the ambiance of the space, and the activities those items allow.

In an effort to explain the lab's history and the rationale behind the redesign that prompted this study, we first discuss the lab's history as an example of *praxis* supported by the literature on networked writing classrooms and workspace design. Next, we discuss the methodology, findings, and implications of this study with regard to the design and use of technologically enhanced instructional spaces in which collaboration is encouraged. In the end, we suggest that mobile, reconfigurable models for writing labs might better support collaboration than do the more traditional models that include static, individual workstations.

A Historic Look at Lab Designs and the USU Department of English Lab

The paradigm shift from product- to process-oriented theories of writing happily coincided with the distribution of an affordable microcomputer by Macintosh and was soon followed by a plethora of personal computing platform choices for the consumer (Hawisher, et al., 1996, p. 74). For the most part, composition instructors were enthusiastic about the inclusion of computers in the writing process and research in the area mirrored this enthusiasm, evolving into special interest groups and journals. During the introduction of computers into the writing classroom, teachers often chose the specific technologies they used in their teaching according to their individual preferences and goals. Scholarly articles at the time produced many widely differing, yet pedagogically based, arguments for particular software or technologies (Hawisher et al., 1996, p. 110). By 1989, these scholarly discussions began to examine the economics of computer use; specifically, these discussions question the investments in the time and money needed for teachers to learn each technology and to teach these technologies to students, investments that often interfered with the

actual pedagogical goals of a writing course (p. 200). According to Hawisher et al. (1996), computers were often introduced into classrooms without first considering the pedagogical implications of the technology or the design of the space, providing teachers with classrooms that were more of a hindrance than an aid (p. 202). However, one noticeable way teachers began to gain pedagogical control over these spaces could be seen in shifting furniture layouts. What follows is a discussion of the three primary layouts—rows, pods, and circles—used and modified since computers were introduced to writing classrooms.

Networked Writing in Rows, Pods, and Circles

Carolyn Handa (1993) discussed two layouts—rows and pods—as demonstrating elements of both teacher-centered ideologies and student-centered ideologies. Rows exhibit slightly more teacher-centered elements, involving a fixed teacher station (usually at the front of the room) and computers lined up in rows, whether facing the teacher station or perpendicular to it. This type of layout favors hierarchical teaching styles (p. 106) and reinforces the "sage on the stage" style of teaching in which professors stand at a lectern and transmit knowledge of a topic to students. Gordon Thomas (1993) referred to this teacher-centered design as a lab design—a statement that carries with it the implication of medical experimentation and that invokes the visual for writing scholars of rows of computers—instead of a classroom design. Meredith Zoetewey (2004) indicated that the name of a room serves as a metaphor for the room's function (i.e., lab versus classroom). Even something as seemingly benign as the arrangement of the room or its name can affect student perceptions of the activities that take place in the space.

The pod layout demonstrates slightly more student-centered elements by locating the instructor station among the students' stations, serving to dissipate some of the hierarchy between teacher and student. The student computers are arranged in pods (desks arranged in multiple, small inward-facing circles) around the room, similar to the bullpen style discussed by Boiarsky (1990) and Hawisher and Pemberton (1993). Handa (1993) argued that pods encourage student interaction and a teacher-as-writer atmosphere. The logic goes something like this: Because students face one another, a greater chance exists that they will confer with one another throughout the class time, and because teachers do not have a physically separated station, the pod design places them quite literally at the same level as students. Of course, the pod layout is not a utopian ideal. The computers, unless they are mounted low enough in the pods for users to see over, can create line-of-sight problems during large-group

discussions (Handa, 1993). Depending on the configuration, teachers can have students move their chairs into the center of the room for discussion, the unintended result of which would be to render the computers useless during discussion.

In addition to rows and pods, the circle is another common networked-classroom layout. The circle layout arranges computers around the perimeter of the room facing the outside walls. This layout leaves the center of the room open for a large conference table or space for class discussion. The circle layout incorporates elements of both teacher-centered pedagogies and student-centered pedagogies: The teacher may still command students' attention from an instructor's station, but class discussion is also easily facilitated by bringing students together in the center of the room. However, when working on the computers, students face a wall as they write and might easily interact only with the one or two people beside them. The net effect of turning away from the rest of the class to write is that students essentially cut themselves off from the rest of the class (Palmquist, Kiefer, Hartvigsen, & Godlew, 1998).

USU Department of English Lab Designs

The Department of English at USU has independently supported at least one computer lab since the early 1990s, when it was established through state funding and student fees. Since then, faculty members who teach in the lab have held periodic discussions to reevaluate how the material affordances of the lab affect the teaching and learning taking place within it. The first few layouts were, like many early university writing labs, designed to protect the computers. The Department of English computer lab first used a layout that included rows with computers facing the front of the room. This layout did not last long, however. Facilitators became concerned that students' backpacks would snag wires on the back of the computers (which were open to the front of the room) and pull the computers off the desks. They moved the computers into a U-shape around the outside of the room (a circle layout), so that the wires were more contained. These decisions were based mainly on a need to secure and protect the technology, not on student needs or the pedagogical goals of the instructors who taught in the lab. Later, the lab was moved from the top floor of the department's building into the basement and divided into two rooms, a networked classroom and an open-access lab. Because both rooms were smaller than the original space, the computer workstations were arranged in peninsulas, a variation that combined rows and pods. The desks were arranged in rows with a pod at the end of each row. The pods jutted out into the room, creating little islands of students. Although collaboration was possible in this peninsular layout, it was often impossible for teachers to work their way

to students in secluded parts of the room. By fall 2004, when two of us were hired, these space and layout problems manifested in gymnastic maneuvers over book bags and around occupied chairs to reach students. The problems also manifested in student evaluations, which noted that the teacher ignored certain groups of students—an accurate perception regardless that it was the layout that prevented the teacher from reaching them, not the teacher's willful ignorance of them. There were simply too many computers in either room with too little space, despite small class sizes.

During the 2004–2005 winter break, the furniture in the classroom was rearranged once again into a circular arrangement. Still in close quarters, the circle was better than tripping over students or, as often happened, invading their personal space to help them or the person next to them. The open lab used a circle layout with one large peninsula in the middle, arranged around a long-defunct partition closet. The lab consultants would sit at this peninsula, positioning themselves in the center of the lab. The classroom was not the focus of our lab redesign nor is it the focus of this usability study. We mention it here because its small size, limited software,[3] and limited availability outside scheduled class times prompted two of us to write a university grant (discussed later) to redesign the open lab into a collaborative, mobile working environment. This redesign would provide students with better access to the technologies they needed to complete writing assignments and an environment that would better support the collaborative projects. For example, students from the undergraduate program in professional and technical writing are assessed, in part, on their ability to demonstrate successful collaboration across several projects in their professional portfolios (see Cargile Cook, 2002).

The open lab is significantly larger than the classroom. At the start of 2006, it contained 28 six-year-old desktop computers with small CRT monitors—machines woefully inadequate to handle software upgrades to match the software teachers were using in the accompanying classroom space (e.g., Adobe CREATIVE SUITE). Although professional writing students were at the high-end of the technological spectrum among student users, both the classroom and the open lab had to attend to *all* students who enrolled in computer-fee-bearing courses, including approximately 75 sections of first-year composition, nine sections of professional and technical writing, two sections of grammar, and the occasional literature course, and a few creative writing and English as a Second Language courses. Between the

[3] Prior to 2005, only half the machines in the classroom had the software required for classes that met in it, and the open lab had incompatibly old versions of the same or, in some cases, similar software on the computers.

classroom and the open lab, the departmental computer suite serves over 1,900 students a semester.

During spring 2006, the department secured 25 two-year-old computers with flat-panel monitors and 50 ergonomic chairs from another lab on campus.[4] We moved the four-year-old machines, which also had flat-panel monitors, from the classroom to the open lab (replacing the six-year-old machines, which went to grad students and to surplus) and used the newer machines in the classroom. The flat-panel monitors took up less desk space than the CRTs, which helped us better accommodate the circle-and-peninsula arrangement in the open lab while retaining the same number of machines to accommodate the larger classes that occasionally met there (see Figure 1). Although this technology upgrade proved effective enough for basic writing tasks, it did not promote the best practices of collaboration or writing pedagogy in a more general sense. As a result of the various constraints,[5] the lab was not designed with teachers' or students' best practices in mind. In fact, students primarily used the lab to print the writing they drafted in other labs across campus. (A $30 lab fee covered printing.)

The Suite Lab

During summer 2006, department and college administrators asked two of us to write an internal grant proposal that would secure monies to support teaching in the department. We wrote the grant proposal with a complete redesign of the open-access lab in mind, hoping that such a redesign would prompt more collaboration among students and faculty across the department. We hoped that we would be able to argue for more money to redesign the teaching space as well. When we received $83,500 to redesign the Suite Lab,[6] we focused our attention on creating a mobile, reconfigurable space—

[4] Readers may notice that we are glossing over how we acquired more equipment, furniture, and better software between fall 2004 and the beginning of the remodel in fall 2006. This influx was due, in large part, to the changing technological ecology of the department, as evidenced by the hiring of two of the authors, both computers-and-writing scholars. For more discussion about these changes and how we were able to bring them about in a department that had been rather technologically static for many years, please see Moeller, Cargile Cook, and Ball (2009) in *Technological Ecologies and Sustainability*.

[5] Various constraints that affect any person tasked to maintain or upgrade a lab randomly include square footage, facilities issues (e.g., locations of doors, windows, electrical outlets, partition closets, and network ports), class scheduling, enrollment, and of course, financial considerations, which necessitated the use of nonergonomic tables and chairs purchased through university surplus until the open lab was remodeled in 2007.

[6] The original name for the lab was *The Learning Suite* because our plan was to include a suite of rooms—both large and small—where students could work. The small rooms would serve as studio spaces where students could work on extended projects throughout a semester. We quickly realized that to get the internal grant, we had to make do with the space we had in the open lab in which the studio space became a single workstation (with the MacPro)

Figure 1. Before image of the open computer lab. Notice the industrial aesthetic. The proximity and orientation of computers (not to mention the towers) encouraged users to construct personal boundaries around their workspaces.

aspects lacking in prior layouts of the room. We also secured money for a PhD student—our third author—to serve as the assistant director of the lab, tasked with many responsibilities, primarily training the lab consultants, assessing the redesign outcomes, and seeking additional funding opportunities.

The lab redesign is mobile insofar as it facilitates impromptu rearrangements of laptop computers and furniture for collaborative group work and easier group discussions where students can face one another and customize the workspaces according to needs. When writing scholars talk about the design of computer writing labs, lab mobility is often discussed, but generally and mainly in terms of teachers' ability to physically reach students or students' ability to "get up and confer with others easily" (Hawisher & Pemberton, 1993, p. 47). In our idealized mobile environment, we wanted students to be able to work in various places and ways and to position workstations in multiple ways to maintain proximity to their collaborators as well as to

until we could get more money and more space. The Suite name became somewhat metonymic, signifying the global plan, and we liked the nod to Adobe's CREATIVE SUITE, because it was also our intention that the lab would provide a space for teachers to infuse more multimedia into their curricula through access to the software. We also liked the cool factor in the connotation that the lab was a *sweet* place to work.

ensure personal comfort. This mobility would also allow for varying pedagogical needs of numerous instructors. We chose a combination of 15 laptop computers and 11 desktop computers to facilitate face-to-face collaborations as well as individual work and distributed collaborations. Our lab redesign, overall, is based on the theory that giving students the ability to create and adapt their technological spaces will help them work collaboratively in ways that meet their needs, including when they are meeting in the lab outside class time. In terms of pedagogy, instructors can reinvent the layout of the room according to their teaching styles and class needs. Considering the myriad constituencies and pedagogies in English Studies, such flexibility in technology and learning is crucial. For example, instructors who favor class discussions can move furniture into a central conference area. Instructors who want students to work on a project individually can offer them separate work areas through different furniture configurations. In short, by combining mobile laptop technologies, desktop computer pods, and mobile furniture, we hoped to facilitate greater collaboration among writing students as well as allow for multiple pedagogical goals.

The redesign of the Suite Lab included the following design considerations:

- 26 brand new computers: 15 wireless laptops (13.3" MacBooks), 10 midrange desktops (24" iMacs), and 1 high-end desktop (MacPro with 23" monitor)[7];
- mobile chair and couch combinations with small side tables for laptop use (see Figures 2 & 3);
- two pods of desktops with ergonomic task chairs (see Figure 4);
- two individual, stand-up stations, each with a desktop, positioned by the door for quick print-and-go functionality; and
- one open-backed cubicle for high-end multimedia work.

Because the print-and-go stations and the multimedia workstations were not designed with collaborative use as their primary function, we will focus the rest of this article on the laptop and pod desktop areas.

[7] We discussed the platform decision with various lab stakeholders including teachers, professional writing students, systems administrators, and computer sales representatives for *many* months. We chose Macs for the following reasons: (a) They would operate on either Windows or Mac operating systems, accommodating most of our stakeholders' preferences at the time; (b) our college systems administrator had recently hired a Mac support person, meaning that knowledgeable technical personnel were already in place; (c) Macs did not required any additional hardware (i.e., servers or network cabling) because they could run on the Windows servers the college had and could use the wireless networks already in place; and (d) Apple had the best bid proposal and most helpful and responsive sales representative.

Figure 2. One of the study-participant groups working in a mobile seating area with laptops.

Using wireless laptops reduced the number of stationary desktops and desks we needed to facilitate a more flexible and collaborative workspace environment. Students would be free to position the laptops and armless chairs in any way they chose, allowing them to see their group members better and for their group members to see each others' work better. In addition, we attempted to design a comfortable space where students would want to work, and as more students began to work in the space, we hoped more collabora-

Figure 3. Desktop group (foreground) and second laptop group (background) during the usability-collaboration study.

tion—both *ad hoc* and planned—would result. In the two years since the lab was redesigned, we have seen some positive results. Instructors have asked to be reassigned to the Suite Lab to teach instead of the computer classroom. Additionally, many students have begun to check out the laptops for use in their classes next door.

We have begun to think of the redesign as a success, at least in terms of the feedback we received from users. However, this article is our first step at formally studying the mobile aspects of the lab, which turned out to be quite a surprise for students. They did not expect to be allowed to reconfigure furniture or to talk and work together in the lab. The next section outlines the collaborative-usability study we performed by observing students working on a group project in the lab to determine the extent to which the material features of the lab afforded or constrained their collaborative efforts. Ultimately, our research points to the use of laptops as particularly conducive to collaborative activities, especially of their mobility.

Methods Used for Studying Collaboration between Laptop and Desktop Users

At the time of this writing, students have been using the Suite Lab for four semesters. To determine how well the lab space fulfills its collaborative mission, we conducted a usability study of the space during the 2007–2008 academic year, in effect, gauging students' ability to use the space collaboratively. In this study, we observed three groups of students—two working with laptop computers and one with desktops. The participants of the study worked on a collaborative document design assignment typical for introductory professional and technical writing majors. Participants were selected from an undergraduate introductory technical communication course taught by one of us. Participants volunteered to be a part of the study, and no penalty was given for those who chose not to participate. Ten students participated in the study: three males and seven females.[8] On the day of the study, students were randomly placed in groups as they entered the lab—the first student was in the first group, the second was in the second group, and so on, until the three groups were formed. We formed the groups in this way so students would not form groups with students they were familiar with, which might in turn affect the way they collaborate. (For example, many students in first-year composition do not know their classmates well. We hoped to mimic that environment in this way.) Our study included a pretest questionnaire, a task scenario, and a posttest questionnaire (included in the Appendix). We collected data for analysis by videotaping the test and analyzing the posttest questionnaires.

[8] This ratio reflects the typical enrollment by gender in our professional writing courses.

The pretest questionnaires collected demographic data as well as data about participants' computer experience. Participant groups contained both traditional and nontraditional students, an inclusion we felt important because it included two substantial student groups as representative of USU's student body. The task-scenario consisted of a typical class assignment for third-year professional and technical writing classes at USU. Students were allowed 50 minutes (equivalent to one MWF class period) to complete it. The assignment asked students to work in groups of three or four to collaborate on an effective document design for a fictional tourist company's billboard. The students were required to research images and use Adobe INDESIGN and PHOTOSHOP to create their designs. Immediately following the test, students were given a posttest questionnaire in which they reported on their experiences during the task. The questionnaire asked students how they felt about the experience in general, how they used the space, and how they would improve the space to make it more usable for group work. To measure the collaborative usability of the space, we analyzed students' use of the space on videotape in conjunction with responses from the posttest questionnaire.

Our analysis largely focused on how participants physically used the space during the test. We wanted to see them move furniture around, share documents and computers, and use the space for collaborating comfortably and productively. We focused our analysis of the videotaped data on what participants mentioned in the posttest questionnaires. For example, some participants noted that they had to crane their necks to share a desktop computer. Hence, we reviewed the data to see how many students in a group used computers, how close students sat to one another, and who appeared to do most of the work on the computer.

Findings: Usability of the Space to Support Collaboration

Our major findings tend to support our theory that giving students the ability to create and adapt their technological spaces will help them work in collaborative ways in a typical classroom writing scenario. The participants who used the laptop computers reported successful collaboration. Despite their positive reports, we were disappointed that none of the participants who used the laptop computers moved any of the furniture to accommodate their group work. Participants working at the desktop computers moved their chairs around to all work on one computer, but none of the groups used a course management system or a network drive to share documents. Each group worked on a single document either together or they passed it around by emailing it to one another. Later, we discuss participants' responses to how the physical layout of

the lab and the technology supported their work. Then, we discuss the mobility constraints of the space and participant reactions to those constraints. Finally, we discuss how participants perceived the atmosphere of the room and their ability to collaborate in a public lab space.

Students' Responses to the Redesign

The primary issues uncovered in this usability test involved inefficient furniture configuration and insufficient desk space. Although 7 of the 10 participants indicated that the workspace was adequate, the same number said that a change in physical layout of the furniture would help improve collaboration in the space. Our observations revealed that users never attempted to change the configuration of seating during the testing and that several participants felt a little uncomfortable collaborating in the space. We interpreted this discomfort as students' acceptance of computer lab ideologies presented by labs that discourage talking, working together, moving furniture, or making any changes to the atmosphere of the space.

Immediately after opening the redesigned lab, we realized the extent to which students had adopted this computer lab ideology that conflicted with the Suite Lab. Most obviously, we saw evidence of this ideology as students would enter the lab, look around with confused looks, only to leave a moment later. When we were able to catch them before they left, they would most commonly say that they were not sure that the Suite Lab was a computer lab—despite the 11 desktop computers scattered around the room—because it did not look or feel like a lab. We have tried to remedy this situation with more obvious placement of signs, particularly signs indicating how to check out laptops. Additionally, we trained lab consultants to approach everyone who enters the room, according to best practices in consumer relations, if not security protocol.

Other student concerns focused on the proximity of desktop computers to one another; students wanted more personal space on the tables for their books and papers. We largely resolved this issue by placing two computers across from each other on each table instead of placing four computers on each table. We purchased additional desks to place around the perimeter of the room, creating more spaces for students to work. With more desk space, students can sit together at desktop computers to work.

We were surprised to find that many students resisted the lab redesign altogether. These students bypassed talking to us and instead wrote letters to the university president, dean, and department head (all of whom referred the students back to us with their support). They also initiated student newspaper investigations into our use of student monies to remodel the space. We were stunned by this response, having surveyed student lab

users before the remodel for their feedback, meeting with several of these students to alleviate their concerns. The most common concern was that "students do not want expensive, comfortable places to work. They just want computers to work on and lower tuition and fees" (author Amanda Bemer's recollection of personal correspondence). Because the monies for the remodel came from internal research funds, we were able to alleviate their concerns regarding increased tuition and fees; however, we were reminded that students will keep us accountable for our designs of the spaces they use.

Study Participants' Responses to Collaborating in the Redesigned Space

In our test, half the laptop users indicated that the laptops with wireless connections were helpful for collaboration. Other laptop users felt that the laptops were, at times, a distraction for collaboration and even promoted individual work instead. Laptop users commented, "I think all three of us were doing our own thing because we had laptops"; "We all sort of did our own thing, so it didn't really contribute to the team effort"; and "Sometimes the laptops were a distraction." Laptop users did not synchronously share documents; they divided up the work into individual chunks they could share over email. Although collaborating, they resisted referring to their work as collaborative because they were not looking over each other's shoulders. These comments might be more indicative of how students think about collaboration than how they actually collaborate. Despite their lack of enthusiasm toward the laptops themselves, all participants using laptops either "strongly agreed" or "agreed" that the lab space was "a good space for collaboration." One student found the laptops particularly helpful, noting that "we were all able to see each other and share our work without having to move around." Another stated that "just using the laptops and sitting on the chairs made it easy to discuss." Yet another mentioned that there was "lots of space" and it was "comfy" in the lab. One noted that the mobility of the computers allowed them to "sit closely and easily see one computer." Overall, the laptop groups completed more of the project than the desktop group. One individual from the desktop group asked for more time to complete their project. Although the laptop groups might have achieved more efficient collaboration, we hesitate to say their collaboration was more effective because the quality of work completed by all three groups was comparable at the end of the test. It is interesting to note, however, that the desktop group felt that their project was less finished than the other groups did.

Despite concerns about the physical configuration of the space, all participants indicated that the Suite Lab was a pleasant place to collaborate. Some

users were concerned that their talking might disturb others using the space. When asked whether they were likely bring a group of students to the lab to collaborate on a project," one participant responded, "I worry that I am disturbing other students by talking." This response could indicate several different perceptions about working in a computer lab: (a) this participant has internalized the computer lab ideology that computer labs are designed for independent, solitary work; (b) the Suite Lab does not afford its users the perception that conversations are productive; or (c) this participant is simply concerned about bothering those hard at work around her. Interestingly, none of the participants used the networked capabilities of the computers to work on the project silently. Participants might have shared a Google Document, worked on a document in the course management system (Blackboard Vista), or used a network drive or external hard drive to share the document. This choice is an interesting issue of perception that we discuss later. No other issues were voiced concerning lighting, temperature, color, or other environmental elements. Overall, participants felt the Suite Lab was a pleasant place to work.

Finally, we worried that the large size of the desktop monitors (24") might make it difficult for desktop users using multiple desktop stations to collaborate with one another face-to-face. But the test results revealed quite the opposite problem. Several users indicated that collaboration was physically difficult for group members to crowd around a single desktop at the same time. User comments included, "We were very crammed around one computer" and "You can't see each others' computer screen very easily and have to move to see what the others are working on." Users did not have issue with seeing or hearing one another, not because they could see over the monitors, but because they did not need to see over the monitors at all. The entire group of four participants used one computer.

We discovered that participants determined the success of their collaborative experiences along a scale similar to that proposed by Harrison, Wheeler, and Whitehead (2004) in their book, *The Distributed Workplace: Sustainable Work Environments*. In that book, the authors discussed workplace configurations and how those spaces facilitate certain types of activities while simultaneously constraining others. Specifically, the participants in our study required a balance of three key factors that determined the success of their collaboration: formality, presence, and confidentiality. Next, we discuss our findings in more detail using these three points of collaboration.

Formality

Formality describes the relationships and sets of established behaviors that students (or coworkers) share with one another. Greater formality is

often employed in a workspace when group or team members see one another as acquaintances or coworkers rather than good friends, that is, when their relationship is less than intimate (Harrison, Wheeler, & Whitehead, 2004, p. 68). In a sense, formality refers to the unwritten rules of behavior that guide people's actions in a group or workplace environment. A good example of formality is evidenced when people establish boundaries or personal spaces for themselves. Formal salutations and names establish distance and formality while first names or nicknames and touching lessen formality significantly. Participants were pleased with the level of formality afforded by the spaces designed for collaborating via laptop computers. When working synchronously or face-to-face, the laptops and couch-seating area allowed participants to control their boundaries, therefore offering them control over the level of formality within their groups to a similar degree. This control is possible because each student had an individual screen and could sit as far apart (or close together, as one participant noted) as they chose. Participants did not experience this level of control over formality and space while working at the pod-desktop space, however.

One obvious difference in boundaries between the desktop and laptop groups concerns personal space or touching. In the laptop groups, students seemed very careful not to touch one another during the task. In the desktop group, participants were not as careful. During the task, one student leaned forward to gesture toward the screen and the student in front of him visibly recoiled, indicating an invasion of personal space or unexpected touching. Besides physical reactions, we noticed participants' dislike of the lack of formality in the desktop space through their use of negative language about its boundaries. One participant noted that "we were very crammed around one computer otherwise there would be no way for all of us to see what we were creating." The limited desktop space combined with the fairly tall and obtrusive desktop computers forced participants to invade what they felt to be one another's boundaries to collaborate around one computer. However, further review of the video data shows that desktop group participants were not sitting any closer to one another than the laptop participants were. Because the desktop group could not choose how closely they sat from each other, they felt as if they were sitting closer than they actually were, demonstrating an interesting twist of perception. The desktop group decided to drop their level of formality and share the space around one computer even though four desktop computers were arranged around one pod, and participants could have shared their work electronically over email, network drives, or other means. Participants discussed the desktop computer as an individualized workspace. After working in the desktop group, one student explained that while returning to the lab

for collaborative work wasn't likely. However, the students liked the space for "individual work," noting that "the computers were arranged in a way that was more conducive to individual work."

In contrast, because the laptop groups perceived that they had more control over physical boundaries, participants maintained a higher level of formality over the space and work. Participants in the laptop groups tended to use one laptop per participant and did not have to crowd one another for screen viewing, an act that allowed them to maintain spatial boundaries. In fact, as we mentioned previously, one user noted the ability to sit closely with her group as a positive attribute, in direct contrast to the feelings of boundaries associated with the desktop-pod group. Also, laptops allowed for documents to be more technologically mobile. Because each participant was working on a different computer at the same time, they chose to share their work digitally by emailing documents back and forth. The act of email, because it creates a tangible record of an exchange of information, is more formal than sharing documents in other ways such as with a flash drive. During our study, participants who collaborated via laptop computers contributed more often to the creation and revision of the documents on which they were working; they searched for images and made adaptations to design instead of merely suggesting changes, as most members of the desktop group did. Although suggesting changes is certainly a valid part of collaborative activity, students in the desktop group stated that they had trouble physically seeing one another, though they remedied this somewhat by "cramming" themselves around one computer. Hence, they felt that others were not participating as much because they could not physically see this participation. In the laptop groups, the formal record of communication (email) created a tangible method with which to define presence.

Presence

Presence refers to group members' recognition that other group members are actively contributing to the work at hand (Harrison, Wheeler, & Whitehead, 2004, p. 68). Because the participants in our study were collocated, they defined presence by actual, physical contributions made to the document. Because of this dynamic, the desktop group was hesitant to recognize vocal contributions made while everyone was looking at the same computer as actual contributions. So despite their obvious physical presence to one another, they measured presence through tangible, material input to the document. The laptop groups did not have this problem because they divided up the work, taking advantage of their collocation,

and they knew every group member was going to contribute to the actual document. Additionally, because the desktop group was working in such close proximity to one another, when one participant removed herself from the group to work on the document individually for a short time, she was seen as removing herself from the group's presence.

In comparison, laptop participants in our study reported being able to easily see and converse within their group. This presence was demonstrable by tangible contributions that participants using laptops made to the shared document (e.g., searching for and finding image files online to use in a document). This participation was easily observable on the video of the task. Participants using the desktop computers were forced to physically remove themselves from the group and walk to a different computer to effect the same contributions. Participants discussed such a removal as a barrier to successful collaboration, stating that "[we couldn't] see each other's computer screens very easily and [had] to move to see what the others [were] working on." Because the participants who worked on the desktops elected to have one primary contributor with several supporting collaborators, defined by who controlled input at the computer, some group members felt that the other group members contributed less to the overall results of the document, though they added input vocally. This vocal input is somewhat intangible in comparison to the physical input of the person sitting at the computer. This lack of tangibility might be the reason some students felt that those who were not sitting at the computer physically were participating less, although they were certainly active participants in the group through their vocal input. As writing teachers, we valued this type of input and saw it as demonstrating presence, although the participants did not.

Confidentiality

Confidentiality refers to the sense that one can keep one's work private and has a choice as to when to reveal it (Harrison, Wheeler, & Whitehead, 2004, p. 68). Participants using the laptop computers had more control over when to reveal their work to their group members. Instead of sharing their entire search process for an appropriate image, for example, they only shared the results of their search with the rest of the group. We did not observe this same level of control among the desktop users, who crowded around one another and were constantly aware of the work the primary contributor was doing. For example, members of the desktop group all went through each image that came up in a search, an act that may explain why they, according to their self-assessment, did not complete

as much of the assignment as the laptop groups. In the desktop group, because of the sheer number of eyes looking at each image, students were more likely to comment on particular images they found amusing or interesting, whether relevant or not (mostly not); this commenting process, although it appeared enjoyable, caused the desktop group to take more time to complete the task than the laptop groups. Of course, the laptop groups also participated in this playful activity, but less so, perhaps because they each had their own images to look at.

Confidentiality is particularly important to the writing process because students often feel insecure about revealing work they do not feel is perfect or finished, particularly when they find themselves in a fairly unfamiliar space at the beginning of a writing class and do not know other students enough to feel comfortable sharing unfinished work. This insecurity can be seen in the way that, as observed in the video, no one in the desktop group seemed overly eager to take on the role of group leader (e.g., the person in charge of creating the document itself on the computer). The desktop group took several more minutes to get started than the laptop groups did. This delay and lack of desire may be due to insecurities about others watching group members work as the active person in charge of input on the computer.

Findings Summary

We found that a level of formality, presence, and confidentiality was afforded by the laptop computers. Students seemed to appreciate this affordance because it helped them feel more comfortable with their collaboration. However, the inclusion of desktop computers is still necessary in a computer lab because students often work individually and collaborate virtually. To be successful collaborators, participants needed to control several aspects of their group work, specifically the formality or the level of familiarity, or rituals shared among themselves and their collaborators. They needed to physically contribute to the document to be seen by group members as contributing productively to the group effort. They also needed to maintain a certain amount of confidentiality over their work. These areas of control are all elements of successful collaborative workplaces that can be supported in key ways by the design of workspaces. Students desire familiarity, confidentiality, and presence, and they will take the affordances of a technology (such as a laptop) and shape it into the closest approximation of a boundary. By designing mobile, collaborative learning spaces, we can better accommodate students' individual and group writing processes in order to make those processes more visible and learnable for students in ways that support the disciplinary philoso-

phies that writing is not a solitary endeavor. Using laptops to help groups establish appropriate levels of formality and presence might help dissolve the perception of a group leader (i.e., the one sitting at the computer) who does the majority of the group's physical work. Giving students the authority to decide when to share their writing with their group or the class might give them a greater sense of ownership tied to their work. It makes sense that student writers would want to have control over their work by being able to perform it themselves and decide who sees it and when. Our study suggests that the layout and technologies of any workspace will determine, to a certain degree, how students will or will not collaborate successfully within it.

Although we found that the laptop computers and the comfortable, couch-like environment better facilitate collaborative activities, the inclusion of desktops in a computer lab is still important. Because collaboration does not always occur when students are physically together, the desktops allow an individualized space for students to write or collaborate digitally. Computer lab users are notably transient and unpredictable; not everyone in the lab at a given time is collaborating on a project. Some users may be researching topics for papers, other students might be writing drafts, and still others might be using email or other communication tools. Designing a space that can be reconfigured for individual and collaborative work seems ideal.

Finally, as an important aside in our study, some participants noted and appreciated the larger size of desktop monitors during collaboration. A large monitor is useful in many situations—when several people need to view a screen at once, when users need to view the screen from a distance, when accommodating low-vision users, or when users are working in multimedia programs that require a large amount of screen real estate. Although our study showed the laptop computers to be slightly more usable for collaborative work, the desktop computers (especially with large monitors) still have a place in computer labs and classrooms.

Although the Suite Lab is designed with mobility in mind, participants did not use the mobile aspects of most furniture. Based on comments from post-test surveys, users were unaware they were allowed to reconfigure furniture in the room to aid their group collaboration. For example, one student noted plainly that "if one chair was facing the others instead of being in a straight line," group work would have been easier. Seven out of the 10 participants expressed a desire to see specific furniture reconfigurations, but based on our observations and video footage, they made no efforts to enact these changes. After discussing this observation with the participants, we discovered students were unaware that they were allowed to move the furniture to suit their needs. As

we mentioned previously, the ideology of what constitutes a computer lab is at play here: (a) computer labs are for solitary writing; (b) you do not move the furniture in computer labs; and (c) the furniture is heavy and unmovable. We are attempting to solve these myths by making furniture easier to move by purchasing casters with wheels for the couch-like chairs. Also, we are hoping the inclusion of signs suggesting different configurations as well as periodically repositioning furniture in the room may dispel these perceptions. In addition, in the months after the study, as students used the space more, we have observed them moving furniture more often. Increased familiarity with the space has led to a sense of ownership of the space; familiarity has somewhat solved this problem and allowed students to embrace the mobility of the space.

Conclusion

This study revealed that the Suite Lab remodel was a success with respect to some material affordances of mobility in relation to collaboration—that is, laptops were more successful than desktops in collaborative group work. We are still battling some perceptions of what a computer lab is: Participants articulated the ideology that computer labs are institutional, solitary writing spaces, and this perception is difficult to dispel, no matter how dramatic our remodel may have been. This perception was demonstrated by the study participants' perceived lack of ownership of the space and fear that they might disturb the work of others by collaborating in the space. In the Suite Lab, we are working to dispel this myth. Since the study, users who come to the lab frequently, by two authors' observations, are much more likely to collaborate and speak freely in the Suite Lab. First-time users, who can sometimes be identified by their difficulty logging on to the lab computers, are much more likely to visit the lab alone. Future lab surveys may help us determine who is using the lab and for what purpose, particularly if they are using the lab collaboratively and without fear of disturbing others. This research will help us gauge how perceptions are changing and whether the perception shift is due to familiarity.

It is easy for us, as writing instructors, to teach students that writing is a collaborative process—we incorporate group work and peer review into our classes. It becomes much more difficult for us to show them that the writing process is collaborative by supporting it with specific technologies (i.e., laptop computers) and spaces (i.e., the Suite Lab). This material support requires money and control over a lab to design and outfit. The Suite Lab is an example of an attempt to show students that the Department of English at USU views writing as a collaborative process. Our study indicates students may have preconceived notions of computer labs that conflict directly with the idea that writing is a collaborative process. For the writing process, students like formality, presence,

and confidentiality in their workplaces. These three characteristics require that students have a level of control over their workspaces—they need to control their physical boundaries to be comfortable with their situation (formality); they need to be able to see other group members easily and see their active contributions (presence); and they need to be able to control when others see their work (confidentiality). Of course, in the open-access lab environment elements of informality come into play as well. During our study, students often bonded by sharing funny pictures they found while searching the Internet for project-specific images. The combination of the mobility of the laptops with the collocation of the research participants aided this informal sharing (students just moved their screen so others could see it); and, of course, students with desktops could also share these elements, although they came across images all at once as a group. These more playful elements of collaboration, according to feedback from participants, seem necessary for a collaborative experience that students will want to experience again. The Suite Lab design allows for these three characteristics with the use of laptops and movable furniture. The users of the lab, however, have had to become comfortable with the lab and learn the space to feel comfortable employing the movable aspects that make it suitable for collaboration. They've also had to decide that the lab is not necessarily a quiet space that denies speaking at levels required for conversation.

Pedagogically, we hope that the mobility of our lab environment helps to support numerous members of our department—each of whom teaches courses with somewhat different goals. The inclusion of desktops and laptops has allowed some of this freedom in a way we did not fully expect. This study has provided quantitative and qualitative data that shows students can use laptops well for collaboration, but they also have a strong appreciation for desktop computers. Understanding how students desire formality, presence, and confidentiality in their writing environments can help us to further incorporate these aspects into spaces—perhaps through creating a space with different spaces within it, as we have done with the Suite Lab's separate desktop and laptop areas.

References

Barnum, Carol M. (2002). *Usability testing and research*. New York: Longman.

Boiarsky, Carolyn. (1990). Computers in the classroom: The instruction, the mess, the noise, the writing. In Carolyn Handa (Ed.), *Computers and community: Teaching composition in the twenty-first century* (pp. 47–67). Portsmouth, NH: Boynton/Cook.

Bowen, Betsy A. (1993). Using conferences to support the writing process. In Ann M. Penrose & Barbara M. Sitko (Eds.), *Hearing ourselves think: Cognitive research in the college writing classroom* (pp. 188–200). Oxford: Oxford University Press.

Bruffee, Kenneth A. (1984). Collaborative learning and the "conversation of mankind." *College English, 46*(7), 635–652.

Bruffee, Kenneth A. (1994). The art of collaborative learning: Making the most of knowledgeable peers. *Change, 26*(3), 39–44.

Burnett, Rebecca E. (1991). Substantive conflict in a cooperative context: A way to improve the collaborative planning of workplace documents. *Technical Communication, 38*(4), 532–539.

Burnett, Rebecca E. (1993). Decision-making during the collaborative planning of coauthors. In Ann M. Penrose & Barbara M. Sitko (Eds.), *Hearing ourselves think: Cognitive research in the college writing classroom* (pp. 125–146). Oxford: Oxford University Press.

Cargile Cook, Kelli. (2002). Layered literacies: A theoretical frame for technical communication pedagogy. *Technical Communication Quarterly, 11*(1), 5–29.

Clark, Irene L., & Healy, Dave. (1996). Are writing centers ethical? *WPA: Writing Program Administration, 20*(1–2), 32–48.

Duin, Ann Hill. (1986). Implementing cooperative learning groups in the writing curriculum. *Journal of Teaching Writing, 5*, 315–324.

Flower, Linda; Wallace, David L.; Norris, Linda; & Burnett, Rebecca E. (Eds.). (1994). *Making thinking visible: Writing, collaborative planning, and classroom inquiry*. Urbana, IL: National Council of Teachers of English.

Handa, Carolyn. (1993). Designing a computer classroom: Pedagogy, nuts, and bolts. In Linda J. Myers (Ed.), *Approaches to computer writing classrooms: Learning from practical experience* (pp. 103–118). New York: SUNY Press.

Harris, Jeanette. (1994). Toward a working definition of collaborative writing. In James S. Leonard, Christine E. Wharton, Robert Murray Davis, & Jeanette Harris (Eds.), *Author-ity and textuality: Current views of collaborative writing* (pp. 77–84). West Cornwall, CT: Locust Hill Press.

Harris, Muriel. (1992). Collaboration is not collaboration is not collaboration: Writing center tutorials vs. peer-response groups. *College Composition and Communication, 43*(3), 369–383.

Harrison, Andrew; Wheeler, Paul; & Whitehead, Carolyn. (2004). *The distributed workplace: Sustainable work environments*. London: Spon Press.

Hawisher, Gail E.; LeBlanc, Paul; Moran, Charles; & Selfe, Cynthia L. (1996). *Computers and the teaching of writing in American higher education, 1979–1994: A history*. Norwood, NJ: Ablex.

Hawisher, Gail E., & Pemberton, Michael A. (1993). Integrating theory and ergonomics: Designing the electronic writing classroom. In Linda Myers (Ed.), *Approaches to computer writing classrooms: Learning from practical experience* (pp. 35–52). New York: SUNY Press.

Howard, Rebecca M. (2001). Collaborative pedagogy. In Gary Tate, Amy Rupiper, & Kurt Schick (Eds.), *A guide to composition pedagogies* (pp. 54–70). New York: Oxford University Press.

Lanham, Richard. (2006). *The economics of attention: Style and substance in the age of information*. Chicago: University of Chicago Press.

Lunsford, Andrea. (1991). Collaboration, control, and the idea of a writing center. *The Writing Center Journal, 12*(1), 3–10.

Lunsford, Andrea, & Ede, Lisa S. (1990). *Singular texts/plural authors: Perspectives on collaborative writing.* Carbondale, IL: Southern Illinois University Press.

Mirtz, Ruth. (2004). The inertia of classroom furniture: Unsituating the classroom. In Ed Nagelhout & Carol Rutz (Eds.), *Classroom spaces and writing instruction* (pp. 13–28). Cresskill, NJ: Hampton.

Moeller, Ryan; Cargile Cook, Kelli; & Ball, Cheryl E. (2009). Political economy and sustaining the unstable: New faculty and research in English studies. In Dànielle DeVoss, Heidi McKee, & Richard J. Selfe (Eds.), *Technological Ecologies and Sustainability*. Retrieved August 9, 2009, from ‹http://ccdigitalpress.org/›

Nagelhout, Ed, & Blalock, Glenn. (2004). Spaces for the activity of writing instruction. In Ed Nagelhout & Carol Rutz (Eds.), *Classroom spaces and writing instruction* (pp. 133–151). Cresskill, NJ: Hampton.

Palmquist, Michael; Kiefer, Kate; Hartvigsen, Jake; & Godlew, Barbara. (1998). *Transitions: Teaching writing in computer-supported and traditional classrooms*. Greenwich, CT: Ablex.

Selfe, Richard J. (2005). *Sustainable computer environments: Cultures of support for teachers of English and language arts*. Cresskill, NJ: Hampton Press.

Sullivan, Patricia A. (1994). Revising the myth of the independent scholar. In Sally Barr Reagan, Thomas Fox, & David Bleich (Eds.), *Writing with: New directions in collaborative teaching, learning, and research* (pp. 11–30). Albany, NY: SUNY Press.

Thomas, Gordon. (1993). Students, teachers, computers, and architects: Designing an open computer writing laboratory. In Linda Myers (Ed.), *Approaches to computer writing classrooms: Learning from practical experience* (pp. 181–198). New York: SUNY Press.

Thralls, Charlotte. (1992). Bakhtin, collaborative partners, and published discourse: A collaborative view of composing. In Janis Forman (Ed.), *New visions of collaborative writing* (pp. 19–36). Portsmouth, NH: Boynton/Cook.

Winsor, Dorothy A. (1990). Engineering writing/writing engineering. *College Composition and Communication, 41*(1), 58–70.

Zoetewey, Meredith. (2004). Disrupting the computer lab(oratory): Names, metaphors, and the wireless writing classroom. *Kairos: A Journal of Rhetoric, Technology, and Pedagogy, 9*(1). Retrieved January 25, 2009, from ‹http://kairos.technorhetoric.net/9.1/binder2.html?coverweb/zoetewey/index.html›

Appendix

Posttest Questionnaire

Question	Answer
1. How many people were in your group?	Number of members in your group _____
2. Did your group collaborate around the computers or the couches?	Computers_____ Couches _____ This space was a good space for collaboration (Circle one): 1. Strongly Agree 2. Agree 3. No opinion 4. Disagree 5. Strongly Disagree Why? _____
3. Was there anyone in your group who had a laptop with them?	Yes_____ No_____ If Yes, How many of your group members had laptops?_____ How do you feel this helped or detracted from your group collaboration? _____
4. Where did your group sit?	Couches _____ Computers_____ Other_____
5. Was there someone in your group who led the collaboration?	Yes_____ No_____ If yes, where did they sit? _____
6. Do you feel there was enough space in the room for everyone in your group to collaborate?	Yes_____ No_____
7. Would you likely bring a group of students again to the lab to collaborate on a project?	Yes_____ No_____ Why? _____
8. Would a change in the setup of the room enhance collaboration for your group?	Yes _____ No_____ If yes, what would you change? _____
9. Would a change in the setup of the room detract from the collaboration for your group?	Yes_____ No_____ If yes, what change? _____
10. Was the English lab a pleasant place to collaborate? How was the lighting in the room? How comfortable was the environment in the lab?	Yes_____ No_____ Would you add or remove anything to make the room a more pleasant place to collaborate? _____

Author Information

Amanda Metz Bemer is a PhD candidate in Professional Communication at Utah State University. She received her MA in Rhetoric, Composition, and Professional Communication from Iowa State University. Her research interests include the rhetoric of space, visual rhetoric, and technical communication. She has spent the last two and a half years as assistant director of the Suite Lab in USU's Department of English.

Ryan M. "Rylish" Moeller teaches rhetorical theory, professional writing, and computer game culture at Utah State University. He has published two educational computer games: PeerFactor, with Bedford/St. Martin's Press, teaches first- and second-year college students the best practices of peer review, and Aristotle's Assassins, with the international game research consortium the Learning Games Initiative, teaches players rhetorical theory and politics through a role-playing game set in Ancient Greece. Rylish's work has also appeared in *Technical Communication Quarterly*, *Kairos*, *fibreculture*, *Computers and Composition Online*, *Works and Days*, and in edited collections.

Cheryl E. Ball teaches and studies new media reading, composing and evaluation strategies, especially as they relate to digital scholarship. She has a PhD in Rhetoric and Technical Communication from Michigan Tech and an MFA in Poetry from Virginia Commonwealth University. She's published in Computers and Composition, Composition Studies, Convergence, Fibreculture, and C&C Online. She is editor of *Kairos: A Journal of Rhetoric, Technology, and Pedagogy*. Her online portfolio can be found at ‹http://www.ceball.com›.