Determining effective distance learning designs through usability testing

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Abstract

To add to the developing understanding of Web-based writing instruction, we conducted usability testing to assess the design of our online first-year composition courses at a large community college in the Southwest. Beyond the course-specific results, this study offers two primary contributions. First, it offers a model for conducting usability testing of Web-based writing classes to diagnose potential design problems in a course. This includes providing an indication of what kinds of results and data teachers should expect to gather, how to interpret that data, where to go for assistance, whom to involve in the testing process, and what to do with the results. Second, this study provides an initial understanding of guidelines for course design using Web-based technologies. These guidelines were developed by examining writing classes in the study and then comparing the results with already established principles of design from usability engineering.

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1. Introduction

Distance learning is expanding rapidly in higher education, and this growth is encouraging further investigation of effective design and delivery of individual Web-based distance learning courses. While distance learning can offer several exciting educational opportunities, any innovative use of technology should be thoughtfully implemented, and teacher/scholars have begun acknowledging the need for more thoughtful inquiry into the use of distance learning technologies. In the field of English studies, specifically in the area of writing instruction, scholars have called for increased inquiry into the use of technology in writing instruction for several years, and this need is critical for writing instruction that uses Web-based distance learning technology. In 1999, Chris Anson and Cynthia Selfe separately articulated this call,

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which was implicitly repeated in the December 2001 issue of Computers and Composition (see Miller, 2001).

Thoughtful implementation of Web-based technologies for writing instruction provides multiple design and delivery options for distance learning that provide optimal opportunities for student success. Likewise, such implementation and understanding would encourage an assessment of how teachers of writing can add to the already established distance learning discussion with context-specific research in the area of writing. This approach to development is critical development (Hawisher & Selfe, 1991) based on empirical research that considers impacts on student learning and that looks at the context of instruction, situating the use of technology in a particular setting for observation (Sullivan & Porter, 1997). One way to empirically study the design of Web-based writing courses is to implement usability testing methodologies.

To add to the critical development of Web-based writing instruction, we conducted a research project to assess the design of our online writing courses at a large community college in the Southwest. The purpose of the study was to “usability test” one of our online second semester first-year composition classes, based on the usability engineering principles of Jakob Nielsen (1993), Jakob Nielsen and Robert Mack (1994), Jeffrey Rubin (1994), Deborah J. Mayhew (1999), and Joseph S. Dumas and Janice C. Redish (1999). Conducting this study and reviewing the results has given us the opportunity to reflect on our own teaching practices while developing a methodology that could be adapted by other instructors interested in assessing their own online course designs. The results of our study discuss not only specific principles tested in our course design but also what we learned about our specific courses, about the design of distance learning courses in general, and about usability testing for Web-based distance learning.

The idea for the project came from the realization that summative assessments of our courses at the end of the semester are generally limited to the students who were successful in completing the course. This is especially problematic in distance learning classes where the retention rates tend to be lower than in face-to-face classes. In a summative course evaluation, one of us received the following comments from a student who had successfully completed the course: “The [course] site was . . . incredibly easy to maneuver.” Another student wrote, “I am glad that you as a teacher took the time to organize the class well, so that we were able to just concentrate on our writing abilities and research.” While such comments are encouraging to read, they are not representative of all of the students enrolled in the course. We were interested in the responses of students who might not complete the course successfully, specifically because of problems with the course design. We wondered what all of the students enrolled at the beginning of a course might have to say about the design of the class, and we wondered why some elements of the design seem to work well for some students while other elements don’t.

Because so many Web-based writing courses are offered in the English department at our college (forty-four sections were offered in the Fall 2005 semester), conclusions drawn from usability testing could immediately impact the learning community at the college by encouraging better design and delivery of Web-based writing courses that could help students achieve success in distance learning environments. Each teacher at the college has the freedom to design his or her own distance learning course, not only in terms of specific content but
also in terms of the technological interface, so there are often as many designs of a given writing course as there are teachers. Based on our research project, we are not arguing for the development of a template for Web-based courses. We do believe, however, that usability testing can offer general guidelines for the successful design of online courses that can be adapted by other online instructors. Research examining the usability of various Web-based writing course designs would add to the growing discussions of distance learning options in the discipline of writing instruction and also enhance research conducted on course usability in other disciplines.

This study offers two specific contributions. First, it offers a model for conducting usability testing of Web-based writing classes to diagnose potential design problems in a course. This includes providing an indication of what kinds of results and data teachers should expect to gather, how to interpret that data, where to go for assistance, whom to involve in the testing process, and what to do with the results. Second, this study provides an initial understanding of guidelines for course design using Web-based technologies. These guidelines can be developed by examining writing classes in the study and then comparing the results with already established principles of design from usability engineering.

2. Methodology

In addition to developing a replicable methodology, an immediate goal of the study is to test the usability of one of our first-year composition course designs so that we could revise it to better meet students’ needs in a Web-based learning environment. This study aims to respond to the following research questions:

- How well can students navigate and perform tasks in the course?
- What should be revised in the course to make it more usable for students?
- What aspects of the course design were helpful to students and why?
- What can teachers learn about the strengths and weaknesses of their own course design through conducting usability testing, and how can they use the results to revise their courses?
- What methodological options do teachers have for conducting usability testing and what should they consider as they design their own tests?
- What overall guidelines for online course design can be developed to address patterns revealed through conducting usability testing?

2.1. Usability testing methods

This study applies principles and methodologies of usability testing to Web-based writing classes taught at a community college. The objective of incorporating usability testing principles into an educational setting is to design classes that are easily navigable so that the technology facilitates learning instead of hindering it. However, the challenge of Web-based instruction is learning to apply those principles that were originally developed for use in industry in an educational setting. This study combines principles of usability testing designed for industry with principles of educational testing to develop a methodology of usability test-
ing that will work in a specific instructional content area. The goal is to make a course more “usable” for students while developing a methodology of usability testing that other instructors could use to evaluate their own courses.

A large number of usability inspection methods are available to an individual wishing to test his or her Web-based course design, but the educational context makes some methods more feasible than others. Instructors who wish to test their courses are confronted with various contextual issues compared to companies desiring to test their commercial web sites. Most instructors will have little to no money available for testing, different amounts of control over different elements of the online course and institutional framework, and a short lifecycle (usually only 16 weeks, or less) for their site. For instructors to adopt usability testing, especially if they want to continue to test their courses on a regular basis, they will need to select methods that can be easily adapted and replicated to specific locations on a school campus. For these reasons we believe that heuristic evaluation and pluralistic walkthrough are testing methods that could easily be conducted with the assistance and equipment generally available on a college or university campus.

According to Jakob Nielsen (1994), a test administrator watches and evaluates how an approximate user works through assigned tasks on a web site during heuristic evaluations. The test administrator uses heuristics developed specifically for the test or by other heuristic evaluation test administrators to help interpret the data. This testing method requires a small number of approximate users and a room with a computer and video equipment.

Randolph G. Bias (1994) describes a different method: pluralistic walkthroughs. This method attempts to incorporate more perspectives into the evaluation of the web site. The test administrator arranges for a number of people, including approximate users, site designers, and experts (in an educational setting these might include cognitive psychologists, instructional designers, etc.), to work through tasks in the web site as a group. A test facilitator presents the web site and gives a task, and then individuals decide what they would do next. Then, the group discusses their decisions and how/why they made them.

Both heuristic evaluations and pluralistic walkthroughs privilege qualitative data, but both methods can be designed to capture more quantitative data as well. Detailed notes, captured dialogue, and video recording of the testing session are all rich sources to cross-analyze both qualitative and quantitative results.

2.2. Design of the study

This study is based on several assumptions. First, principles of usability testing can be useful for understanding navigability of Web-based writing courses using Web-based technologies from a student’s perspective. While there are course design issues to consider in both Web-based and face-to-face environments, some design considerations are unique to Web-based instruction. In addition, different content areas are taught differently in Web-based environments. While some of the technology-based scenarios/tasks might work across disciplines, instructors conducting usability inspection in disciplines other than writing instruction might want to consider the unique aspects of their discipline and how the technology would be used in that context. Finally, it should be noted that this study assumes that teachers retain some control of course design within institutional and course management system limitations.
We used heuristic evaluation methods because they offer the richest understanding of what’s going on in the course through one-on-one observations. For our testing sessions, the test administrator and teacher developed several tasks/scenarios that participants would complete in the Web-based learning environment. While the participants completed the tasks, the test administrator observed and noted what aspects of the system (in this case the course) worked well, which were easy to navigate, which were confusing, and which caused problems for the participant. This method is the most popular method of usability testing, the most general method, one of the least expensive, and arguably the easiest to learn. However, interpretation of the results can be difficult—these skills develop for individual test administrators over time. Heuristic evaluation methods also offer the best opportunity to offer a workable usability testing methodology for other instructors to follow, one of the primary goals of this research. In addition, this methodology provides rich data that answer the remaining research questions about what teachers can learn through conducting usability testing, what data they can expect to collect, how to use that data, and what students’ preferences are in course design in Web-based learning environments.

We also used think-aloud protocol during the heuristic evaluation to collect additional data about how the participants were completing the tasks in the course. Think-aloud protocol requires the participants to explain what choices they are making and why they are making the choices while they complete the tasks. For example, if students click on a certain link from the homepage, they would explain why they chose that link and what information they were hoping to find.

Each session lasted approximately one hour. During that hour, the participants first completed a survey including demographic information and information about their experience with Web-based classes in the past. After completing the survey, the participant walked into the testing room with the test administrator. The test administrator explained the procedures of the testing session and then modeled think-aloud protocol for the student. After this modeling, the test administrator set up a video camera and microphone1 and then directed the participant to begin working through the seven tasks (see appendix A for a complete listing of the tasks). As the student participant completed the tasks, the test administrator only prompted the student when he/she was not explaining actions or when the student asked a question that would not affect the test results. At some points, the administrator would redirect the student if he/she had been working on a task for over eight minutes and could not complete it.2 The participant was also asked to rate each task on a Likert scale according to its difficulty. After the final (seventh) task, the test administrator asked the participant a series of concluding interview questions to help in the interpretation of the data.

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1 The video camera was focused specifically on the screen so that we could watch what the student was doing during the testing session. Screen capture software could be used to monitor the screen more closely.

2 We had originally scheduled one hour for each testing session, including the introductory survey, the completion of the testing tasks, and the exit interview. If we were designing the study again, we would allow for more time for each testing session.
2.3. Participants in the study

The two primary categories of participants in a usability testing study are test administrators and users. In this study, the test administrators are the teachers conducting the usability tests, and the “users” are the students who volunteer to participate in the usability testing.\(^3\) According to research conducted by Jakob Nielsen (2000), usability testing with five users is an appropriate number to determine the potential problem areas in a system because five users will find 75% of the usability problems in a given system. In addition, the small size of Web-based writing classes at our college (maximum of 20 students) lends itself well to using five users. Five student participants represent 25% of the total students enrolled in a given section of a Web-based writing course.

In addition, a teacher should not conduct usability testing with his/her own students due to the potential conflict of interests. Students might be uncomfortable responding to problems with the design of the course if they are simultaneously enrolled in the course with the teacher conducting the testing. Therefore, one of us conducted the usability testing sessions for the other’s Web-based ENG 102 course (second semester of first-year composition). The data and results reported in this study are the results of the five student participants from one of our sections of ENG 102, first-year composition.

When choosing students for participation in such a study, the researcher must consider several factors. First of all, students need an incentive to participate in usability testing (perhaps in the form of extra credit or even a financial incentive). Students should be new to the course and instructor (at least some of the students). They don’t necessarily have to be students enrolled in the class, but they should not have taken the class already because they would already be familiar with the structure of the course. The primary consideration is that participants must be representative of students who would take the course. In usability engineering, researchers must always “approximate” users.

For the purposes of this study, we chose to have students who were enrolled in the course participate before the class actually began. Because we were using students who were already enrolled, we conducted the usability testing sessions the week before classes began so that students had not already seen the course materials or completed any work in the course. A variety of issues arise if an instructor chooses to use his or her own students, besides the conflict of interests mentioned earlier. A major concern is time for revision. A key reason for conducting usability testing is to revise the course to better facilitate learning. If the instructor waits to use actual students enrolled in the course, he or she only has a short time frame to conduct the usability test, analyze the results, and revise the course. For this particular test, the teacher realized that she would have an extremely limited amount of time to revise the course and would need to wait until the semester was over for major revision.

We asked for student volunteers and offered extra credit for participation. The average age of the participants was 39.6 with a standard deviation of 10.9. The youngest participant was 29 and the oldest was 54. Four females and one male participated, and four of the students

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\(^3\) Instructors can also function as users, especially if the instructor’s interface of the course is different from the student interface—like in most proprietary course management systems.
self-identified as white or Caucasian while one self-identified as Asian. Three of the students attend school part-time, while two attend full-time.

The students identified several different reasons for enrolling in this particular online section of ENG 102. Two mentioned the convenience of taking the course online, and two mentioned the length of the course, which was condensed into eight weeks (half of the regular semester). Two participants mentioned the need to complete ENG 102, and two mentioned previous experience with the instructor as an incentive for enrolling in this section.

Of the five students who participated in the usability testing session, only one indicated that he had never taken an online course before. Three of the participants had taken ENG 101 online with the instructor conducting the study, and one had taken ENG 101 online with a different instructor. While we would have preferred more participants who had not taken online classes with the same instructor, only five students offered to participate in the study, so we accepted all student volunteers. Additionally, students often enroll for more than one semester with the same instructor, so the students fulfilled the role of “approximate users” for the ENG 102 course.

When asked how comfortable they were with taking an online course (with 1 being very comfortable, 2 comfortable, 3 somewhat comfortable, and 4 not comfortable), two of the participants responded with a 1, and three responded with a 2. When asked a similar question about their comfort level with taking a writing course, four of the students responded with a 2, and one responded with a 3, indicating that the students’ overall comfort level with distance learning courses is higher than their comfort level with writing courses specifically.

2.4. **Equipment**

We used the following equipment in conducting the testing sessions:

- Two interconnected rooms; one set up with video and sound recording equipment
- Web-based writing courses with access for students and
- Participant instruction and test booklets

For each of the five student participants we collected:

- a video tape with 30–45 minutes of screen capture and think-aloud protocol results
- a release form and demographic information survey
- a student test packet with Likert scale ratings for each task, responses to questions about the course in general and the testing process, plus any notes the student may have decided to write down
- a duplicate test packet in which the test administrator wrote notes during the test

Careful cross-analysis of the results provided interesting insights for both course design and the usability testing process.

3. **Results and analysis**

The results of our study answered all of our original research questions and raised new questions that we could address in future research. To discuss the research results in detail,
we will divide our original research questions into three categories: course-specific results, guidelines for conducting usability testing, and guidelines for designing online courses.

3.1. Course-specific results

The first three research questions addressed course-specific concerns with the design of the Web-based writing class:

• How well can students navigate and perform tasks in the course?
• What should be revised in the course to make it more usable for students?
• What aspects of the course design were helpful to students and why?

We have answered these questions by searching for patterns in the data and identifying problems students encountered within each task, problems that spanned several tasks, and similarities in students’ responses and actions. The analysis is organized according to the patterns we found in the data, and we will address each of the questions previously described in our discussion of these patterns.

3.2. Problematic aspects of the course design

Several students had trouble initially accessing the course because they were required to log into the college portal to find a link to the course. If students did not recognize the term “WebCT Link” to direct them to the course, they could not find the course homepage. This is an issue that we are currently discussing with the college information technology office. In addition, some students had trouble identifying what the “starting point” was for the course. There was confusion about terminology in the course and on the text (homepage/web site/course), and some students would call the portal page the “homepage” for the course, while we were calling the “homepage” the first page students encountered when they actually logged into WebCT from the institutional portal.

We realized as we conducted the tests that we had assumed where students would go in the course when they first entered it. For example, one task required students to find the course syllabus. Students would see and identify the “syllabus” link, but they wouldn’t necessarily click on it to read the syllabus. We speculated that several of the students might have only “found” the syllabus because it was a task in the usability test, and they might not have looked for a syllabus under normal circumstances when beginning an online course. When designing the tasks, we assumed what students would do first, and completing the testing sessions helped us to realize when our assumptions were not completely accurate.

We also discovered that information repeated in several areas in the course could be confusing. Students didn’t always find the information we were asking them to locate in the place where we expected them to go, and that sometimes made it difficult for them to complete the next task. For example, writing assignment deadlines were repeated both under “Module 1 Deadlines” and under the overview of “Writing Projects and Assignments.” If a student went to “Writing Projects and Assignments,” he or she would find the due date for the final writing project, but not for the invention work and class discussions leading up to that final project. After analyzing the data, we realized that this might explain why some students turn in a final
paper several weeks into the course when they haven’t completed any of the other preliminary work for the course.

As students read through the deadlines for various assignments, we realized quickly that they missed important information if it was located in large text blocks. Using bold font or color could help students focus on the information most important in the text.

3.3. Helpful aspects of the course design

In addition to problematic elements of the course design that the students identified, they mentioned several aspects of the design that were helpful to them as they navigated the course. First, students mentioned that they were immediately drawn to an icon labeled “What Do I Do First?” on the course homepage, positioned on the upper left-hand side of the screen (see Figure 1). They commented that it was easy to get started in the course because the label on the link was clear, and they found step-by-step instructions on how to get started when they clicked on the link.

Students also commented that they liked the simplicity of the course design. The course homepage includes very few icons and very little additional text, and the students felt that the labels on the links were clear directives for navigation. In addition, students liked the navigation sidebar but noted that not all icons on the homepage were listed on the sidebar. In WebCT, designers have the option of including links on the sidebar when they create new icons on the homepage, and the teacher had chosen to include only links that were areas she

![Fig. 1. Course homepage within WebCT.](image-url)
felt students would return to often. The lack of some links on the sidebar created confusion for some students who relied on the sidebar for navigation instead of returning to the homepage. Again, we found that we had assumed how students would navigate the course but realized that we needed to allow for multiple methods of navigation.

3.4. Other patterns in student responses

As the students completed the testing sessions, we recognized other patterns in their responses that were neither positive nor negative comments on the specific design of the course. For example, we observed that several students checked their email first after logging into the portal (instead of going directly to the course) because, as they noted, sometimes they receive important course information in email.

In addition, we found that the students “played around” in the course for familiarity, looking at different areas of the course in no particular order. The nature of hypertext allowed them to structure their own experience in the course in the order that they choose. However, the various ways in which different students approached familiarizing themselves with the course often gave them different starting points for the tasks; this was an issue that we had not anticipated in designing the tasks. For example, some students were already in “What Do I Do First?” (see Figure 2) when they were asked to complete the next task, finding the syllabus.

Fig. 2. “What Do I Do First?” section with the syllabus link.
As demonstrated in Figure 2, the syllabus link was included in the area “What Do I Do First?” The students who were already in the “What Do I Do First?” section when told to find the syllabus had no trouble finding it. If a student had completed the first task without going to “What Do I Do First?” though, he or she might have had more difficulty finding the syllabus. For example, if the student was only at the WebCT course homepage, there is no direct link to the syllabus (see Figure 1).

We assumed where the students would be in the course when they started each task, so we were leading them to specific links instead of allowing for variation in the places where students might find information. For example, they wouldn’t necessarily return to the homepage to find a link when we were expecting them to; instead, they might just look on the sidebar and miss the link we were hoping they would find. If the link was not on the sidebar, they might assume it was not on the homepage either.

We also observed that students often rely on their past experiences in online courses (and on the internet), but those experiences vary. Designing a course for an “average user” becomes very difficult when the students’ experiences differ greatly. For example, some students had taken online courses before and had even used WebCT, and those students had little difficulty finding the course and getting started. One student, however, never found the course on her own and had to be redirected so she could complete the rest of the tasks. Even though this student had successfully completed another online course with the same instructor the semester before, she explained that she had “bookmarked” the link to the course homepage and couldn’t remember how she had originally accessed the course through the college’s portal.

Finally, we recognized two other patterns that affect the way usability tests should be designed for distance learning courses. First, students need plenty of time to skim material comfortably. We tried to approximate the environment they would have if they were starting the class on their own, but we often felt that the students did not have quite enough time to read through material that they wanted to read in order to feel comfortable in the class. In addition, we found that several course management system and institutional design issues had the potential to conflate the results of our usability testing. It is difficult to separate design issues on the institutional level and design issues at the instructor’s level. For example, the difficulty of logging into and finding the course is one that teachers have little control over at our college, but it has a tremendous impact on a student’s performance in and completion of an online course. We found that we needed to brainstorm ways to work around the inevitable usability problems that our students encounter that are beyond our control.

3.5. Guidelines for conducting usability testing

Although the methodology we used for this study was empirically controlled and might be more complex than what an instructor would want to use on a consistent basis, we outlined a streamlined description for how other instructors could conduct usability testing on their own courses. In our original research questions, we asked several questions about usability testing in general and the usefulness of conducting such tests for distance learning courses:

- What can teachers learn about the strengths and weaknesses of their own course design through conducting usability testing, and how can they use the results to revise their courses?
What methodological options do teachers have for conducting usability testing and what should they consider as they design their own tests?

The data that we collected in response to these questions helped us to develop guidelines for other instructors who want to prepare and administer usability tests for their own Web-based courses (see Figure 3).

Fig. 3. Guidelines for preparing and administering a usability test for a Web-based course.

The data we collected during the testing sessions revealed several principles to keep in mind when conducting usability tests for Web-based courses. Instructors should start by identifying their specific goals for the usability test and then selecting a testing method (i.e., heuristic evaluation, pluralistic walkthrough) most appropriate for those goals. Similarly, based on the goals, instructors should choose tasks that are things that students would need to do to succeed in the course:

- tasks they would need to be able to do in any online course (i.e., find assignment prompts, deadlines, syllabus)
- tasks they must do repeatedly in this specific course (i.e., take quizzes, post to discussion boards, upload to a course drop box) and
- tasks students have had trouble with in the past

These tasks should address the specific goals for the test and design concerns that the teacher has about the course being assessed. When designing test tasks, the instructor will want to be sure to choose tasks that test his or her course separately from the institutional system. Knowing what things can be revised and what things the instructor has no control over can be important, but it can still be useful to know what problems there are in the institutional system and then see if there are ways to work around them.

While designing the actual tasks, the instructor could ask questions that might be inherent in any course (i.e., what is the first deadline?). As mentioned earlier, the way in which several of the tasks in our test were structured affected the overall results because we tended to give information away through the questions themselves. If there are multiple tasks, students can start over from the beginning for each one, or they can begin where the instructor thinks they would generally be when they started that task. The instructor might even consider assigning a start point for each task, being careful not to prompt the student/user too much. The language used to present the tasks is important; by paying attention to terms used in the test and the course instructors can avoid terms that might be ambiguous to students and acknowledge that different students might use different terms for the same thing (i.e., course, class, web site, web page).
Once the test is designed and instructors are ready to conduct the actual test with live participants, they should select participants that will approximate “real users” of the course website. Most importantly, the participants should represent a cross-section of abilities (technological and disciplinary), and they should provide contextual information so that the instructor can interpret the results (i.e., technology expertise, previous education, previous online learning).

As we mentioned in the design of our own usability study, we realized that we could not ethically test our own students due to the potential conflict of interests. Therefore, we recommend that instructors have a colleague help by conducting the actual testing sessions. Students need to feel comfortable being honest about their experience navigating the course, and they might not be honest if they are concerned about their grade in the class. Students should be assured that they are not being assessed and that the results will not affect them or their grades in any way.

During the actual test, the testing environment should be flexible enough to modify for each student—it should be as close as possible to what they would normally use/have/do (i.e., Mac/PC, printer available). Plenty of time should be allotted for giving students a chance to read directions/information; we realized in our own testing sessions that some students felt rushed through the process.

3.6. Guidelines for designing online courses

Our final research question addressed general principles for online course design:

• What overall guidelines for online course design can be developed to address patterns revealed through conducting usability testing?

Most of the guidelines that we developed from our study reveal three major premises: simplifying design, directing learning, and facilitating multiple access to the course. These three major principles all stem from the idea that the Web is a multifaceted environment that allows students to slip in and out of the class, sometimes without even realizing it.

3.7. Simplify, simplify, simplify

Course designs should be simple, and information should not be repeated in several different areas of the course. For example, deadlines/due dates should all be in one place with information about assignments, so when the students find that information, they’ve found everything they need. Links on the main course homepage should only be ones that students would access multiple times at different points in the course. If they would only access a link at a certain point in the semester, the instructor might consider time releasing it. If students would only access it during work on a particular assignment, then it might be put under that assignment (in a path, module, etc.).

We also found that students expect a navigation bar/sidebar, and any navigation tool should include links to all major information in the course and always be visible. Students tended not to closely read big chunks of text; it is cumbersome for students to read on the computer screen, so the likelihood is that they won’t. The language used to explain and give assignments in the course could also be tested to avoid using abbreviations and terms students might not know.
A final reason for keeping the design of the course simple is to make it easier to revise and update in subsequent terms. If the instructor keeps a master list of what will need to be updated and revised each semester, then the workload will be kept to a minimum. For example, deadlines and due dates can be kept in one location (not in the syllabus and in a calendar) so that updating occurs only in one place.

3.8. Construct a flow, or direction, to the course

Because of the nonlinear nature of hypertext and students’ frequent familiarity with navigating the Internet on their own, they might not go to areas of the course in the order the instructor expects them to unless it is made completely explicit (i.e., they might complete assignments in a different order than expected). This might not be an issue in some courses; however, at the start of the course a certain order might be preferred. If the instructor incorporates a link called “Getting Started” or “What Do I Do First?” to help students know exactly where to go and what to do first, then students will be directed to a place where they can get all important course information before beginning work in the course.

Instructors might consider overtly explaining the organization of their courses at some point, preferably in the “Getting Started” section. This might be accomplished with a sample week/module/assignment/flow chart, so students know what to expect. Instead of an FAQ page and repeating information again, instructors might provide a “Getting Started” quiz or other introductory assignment(s) that asks students to interpret course information, directions, and technologies.

3.9. Acknowledge that students will access information in a variety of ways

Because students will find the online course from a variety of paths, the instructor’s name and the course title should be prominent so students can identify that they are in the right place, especially when they are getting started in the course. Students might access the course in a variety of ways and from a variety of sources, so instructors should be certain that there are clear links to the course (i.e., from college/department/personal web site, a college portal, a college distance learning web site, or instructor’s personal homepage). If the course information and links are located on the instructor’s personal web page, the information should be updated regularly or clearly labeled as an example/demo. Finally, if the instructors are using a course management system like BlackBoard or WebCT, instructors will want to make sure that they view the course from the students’ perspective to determine whether it looks and functions as they expected.

4. Conclusions

Our initial goals for the study were to discover what needed to be revised in our own courses as well as to develop guidelines for usability testing and course design that we could share with other teachers. We realized that by conducting usability testing, we were able to reflect on our own teaching, not only online but also in face-to-face classrooms. We found that we were considering the clarity of our instructions in multiple environments as well as the impact
of hypertext and the nonlinearity of the Internet on our students and how they construct their own learning experiences. In addition, we started to look at and experiment with a variety of course designs, and we were able to analyze those designs critically in a way that would have been difficult before collecting and analyzing the data in this study.

Of course, there are limitations to this research; we were studying one class designed in a specific course management system with only five users and therefore cannot extend the results of this study to all online courses. Some of the principles students discussed during the testing sessions, however, are applicable beyond the immediate class and resonate with online design principles from both the fields of web design and instructional technology. Although we were careful (and even somewhat skeptical) about applying usability guidelines developed for industry in an educational environment, we were repeatedly reminded by student comments that many of these guidelines are applicable to Web-based learning environments.

As we conducted this study, we found that we needed more time than we had planned for the analysis of results. We underestimated the amount of time we would need for cross-analysis of the data because we underestimated the amount of data we would have from five participants. At the beginning of the study, five participants seemed like a manageable number, and we imagined that we would have a limited amount of data to analyze. However, five plus hours of screen captured video, think aloud protocol audio, along with both student and test facilitator survey booklets and notes gave us much more material to work with than we had originally imagined. While interpreting the data, we tried to allow trends and themes to emerge versus using a predetermined method of coding. Especially if future studies include more participants and collect similar amounts of data, it may be easier to code with operationalized theories and guidelines.

As so often happens, conducting this study raised more questions that we would like to address in the future. Some of these include:

- Is there a correlation between usability of online courses and retention of students in the courses?
- Is there a relationship between usability of an online course and other measures of student success?
- Do the results of a study conducted with students enrolled in the course correspond with the results of a study conducted with students outside the course?
- What complications are introduced into usability testing with students who speak and write English as a second language?

We hope the results of this study will provide fellow scholars with a starting place to reflect on their own teaching, conduct their own usability tests, and continue to develop this line of scholarship. We also feel that general research on usability theories and methodologies has made us rethink some theories and issues in the overall field of rhetoric and composition. Indeed, several scholars in the field of rhetoric and composition are beginning to look at connections between the theories of rhetoric and composition and those of usability and human-computer interaction (for example, see Grabill, 2003; Spinuzzi, 2001; Sullivan, 1989). We believe as more rhetoric and composition scholars, especially those in the field of computers and writing and technical communication, apply usability studies, theories, and methodologies to their research, reading, and writing, we will further expand our understanding of rhetoric and communicative acts.
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Appendix A

We designed the usability test to include seven tasks for the student users to complete during the testing period. The tasks focused on location of materials and common activities the students would complete during the course as well as tasks students had difficulty with in past semesters. The student directions also included a list of questions for them to consider; however, the following are the key tasks asked of the students:

1. Find the section of ENG 102 in which you are registered, and login using your student username and password.
2. Show and explain to the administrator what you would do to get started in the course once you have found it. Start at the homepage right after logging into the course.
3. Find the syllabus for the course.
4. Find the first module in the course.
5. Imagine you have completed your first draft of the first writing assignment (Writing Project 1). You will be asked to respond to the following questions:
   - When is the draft of Writing Project 1 due?
   - When is the final version of Writing Project 1 due?
   - How would you submit your draft of Writing Project 1?
   - How would you submit your final version of Writing Project 1?
6. Take a quiz.
7. Inquire about your grades in the course.

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