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This study is an evaluation of the overall usability of the UNC Distance Education website. This study focuses on the following aspects of website usability: 1) the users' impressions of and satisfaction with the site in terms of appearance, content, information organization, and navigation; and 2) the efficiency of site navigation. The study involved 10 participants, 4 prospective students and 6 current students, corresponding to the two user groups of the site. In this study, each participant responded to two questionnaires and two interviews, and carried out eight tasks with the site. Data were collected from participants' feedback and the tester's observations, and analyzed both quantitatively and qualitatively to identify usability problems. Recommendations are made for improvement of the site.

Headings:

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An Evaluation of the UNC Distance Education Website

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An Evaluation of the UNC Distance Education Website

Introduction

Distance education (DE) originally took the form of correspondence courses through the mail. With changes in technology, distance education has experienced instructional radio, cable and satellite television. However, it didn't start booming until the arrival of the computer age with the development of networking techniques and the popularity of Internet use. A survey conducted by the U.S. Department of Education's National Center for Education Statistics (NCES) showed a 72 percent growth in distance education programs from 1994-95 to 1997-98. The survey further showed more than 1.6 million students enrolled in distance education courses by 1997-98 (Lewis, 1999). By now, it is estimated that the population of distance education students is even larger.

At the University of North Carolina at Chapel Hill (UNC-CH), as stated in a previous UNC-CH DE project study, "Distance Education has become an important mode for several programs and promises to continue expanding in the number and complexity of courses offered" (Potenziani, Nicolet, and Calleson, 2003). As UNC-Chapel Hill seeks to serve a growing population of students enrolled in distance education programs, its distance education website serves as an important link between the university and students. The aim of the UNC-CH Distance Education Website is "to provide services for

distance education students that are at least as robust as those currently provided for residential students” (Potenziani, Nicolet, and Calleson, 2003). In order to achieve this goal, the Distance Education Website Policy Committee determined what services are most critical to support current and planned distance education programs. Based on the recommendations from the committee, a newly designed Distance Education Website (<http://distance.unc.edu>) has been created and put to use.

Like any other product, a new website should be subjected to usability testing to assess its potential for acceptance by the intended users. Usability testing provides researchers and web designers with an important means to evaluate whether the users’ needs are met. Usability test, to a certain extent, is the interaction between the researchers and the users to exchange ideas of what is provided and what is needed. Through usability tests, users’ feedback can be gathered and used as a guide to further improve or redesign the website to provide the intended users with a more satisfactory information resource.

There are many techniques available to assess and to test usability. Unlike analytical methods where evaluation is from experts or theory-based, empirical usability testing involves the users and emphasizes observing real users performing pre-defined tasks. Through testing methods such as collecting users’ opinions, observing and monitoring use, performing experiments, and conducting interpretive evaluation, usability problems can be identified. Empirical usability testing data reflect the users’ needs and evaluation of the website and, consequently, can be used to guide further improvements or redesign.

This study focused on the usability of the UNC-Chapel Hill's Distance Education Website. Empirical evaluation methods were employed to assess the usability of this website.

Literature Review

In this section, general guidelines and methodologies for usability studies are reviewed. Furthermore, the special needs of distance education students are reviewed as a preamble to the design of this usability study.

Usability Testing

Dumas and Redish (1999) argued that a product is useful if “people who use the product can do so quickly and easily to accomplish their own tasks” (p.4). This definition is also applicable to website usability: users should be able to quickly and easily find information they need with a website. The duty of website usability specialists, then, is “to seek out the problems in web sites that cause them to be frustrating, confusing, and generally useless” (Pearrow, 2000, p.2). He further pointed out that usability specialists are different from general nitpickers, because “they attain their goal through scientific methods; furthermore, they seek to turn their findings into recommendations for change” (p.3).

This study uses the approach known as empirical usability testing. The prevailing methodology of empirical website usability testing is to have real users interact with the website, observe and audio/video tape both users’ performance and comments, and analyze data for improvements to the site. Dumas and Redish (1999) identified five

universal characteristics of empirical usability testing, discussed below.

First, “the primary goal is to improve the usability of a product. For each test, you [usability testers] also have more specific goals and concerns that you articulate when planning the test” (p.22). This characteristic played a significant role in the design of this study; that is, after determining two main inspectional aspects, users’ satisfaction and navigation of the site, more specific concerns were determined and served as the basis of the task and question design of the study. In addition, Dumas and Redish (1999) encouraged the testers to focus attention on those areas likely causing usability problems. In other words, a good usability test is intended to find as many usability problems as possible, differing from a quality assurance or function test that is intended to assess whether the product works according to its specifications.

Second, “the participants represent real users” (Dumas and Redish, 1999, p.22). This characteristic was taken as the goal for recruiting participants for this study. Dumas and Redish (1999) explained, “If the participants are more experienced than actual users, you may miss problems that will cause the product to fail in the marketplace. If the participants are less experienced than actual users, you may be led to make changes that are not improvements for the real users” (p.23).

Third, “the participants do real tasks” (p.23). In other words, the tasks included in a usability test should be ones that the users will do in the real world. For this study, this characteristic requires the tester to understand what tasks the users usually do with the

website. In addition to being realistic and relevant for the users, the tasks should “related to the study concerns and have a high probability of uncovering a usability problem” (p.24). This was not a problem in this study since the determination of the tasks was based on the definition of the specific study concerns.

Fourth, “you observe and record what participants do and say” (p.24). By gathering data and evaluation directly from users, the site could be improved toward more user-centered design. One reason that testers should listen to users’ opinions and suggestions is that a system is more likely to succeed if users say they like it (DeLone & McLean, 1992). This characteristic also distinguishes a usability test from focus groups or surveys, which collect users’ attitudes and opinions, but do not usually let testers see how users actually behave with the product.

Finally, “you analyze the data, diagnose the real problems, and recommend changes to fix those problems” (p.24). After collecting data from the test itself, the testers diagnose problems by analyzing the data from the participants together with the testers’ own observations and users’ comments.

Dumas and Redish (1999) pointed out that the testers should “think of usability testing as one among a set of techniques for assuring usability” (p.40). It is important for testers not to isolate the testing from the design process. It was particularly important for this study, because the usability testers of this study were not involved in the earlier website design and development process. Therefore, it was necessary for the testers to understand

previous studies of the project (including the previous determination of essential tasks conducted by Potenziani, Nicolet, and Calleson (2003) and heuristic evaluation conducted by Bell et al. (2004)). Even though extra effort is required to catch up on previous design and evaluation work, having the testers separate from the designers has the advantage of reducing the potential for bias in the testing results.

DE Students' Special Needs

Previous studies of the UNC-CH DE website mainly focused on identifying current available services for on-site students, and then designed the site “to provide services for distance education students that are at least as robust as those currently provided for residential students” (Potenziani, Nicolet, & Calleson, 2003, p.4). However, analyzing distance students’ special needs would be instructive in terms of the contents DE students may need but this site does not have. Although participants’ opinions on site content may be asked during the test, users don’t always know what they want. Pearrow (2000) believes that the job of a usability specialist is to “present choices in a scientific fashion to the users to best determine what the users ‘really’ want” (p.36). Hence, reports from existing studies regarding UNC DE students’ special needs were used to help design the questionnaires and interviews for the current study.

In addition to studies conducted at UNC, many studies have focused on the individual barriers which keep prospective students from joining DE programs, or keep current DE students from being a successful student. The literature review for this study will spotlight only the barriers that could be relevant with the UNC DE website.

For prospective students, one type of barrier to participating in educational activities was dispositional barriers, such as attitudes towards self and learning (Cross,1981).

Darkenwald and Merriam's (1992) research renamed dispositional barriers as psychological barriers and defined them as including beliefs, values, attitudes, or perceptions that inhibited participation in organized learning activities. For example, adults who cited as barriers "I'm too old to learn," or "I'm tired of school," were expressing beliefs and attitudes that strongly influence participation. For that reason, helping prospective students overcome their psychological barriers could be a goal of a DE site. On the UNC-CH DE site, information about GRE preparation and alumni video interviews are intended to help prospective students build up confidence. The effect of these efforts was tested in this study.

On the other hand, DE also has attributes that draw prospective students to distance education courses. Galusha (1996) stated, "The most important attractions are related to control of the time, place, and pace of learning." Leach and Webb (1993) found that reasons such as "prefer to study in own time," "prefer to study at own pace," and "prefer to study at home" were among the top reasons cited for enrolling in a distance course. These studies suggest that individuals may be drawn to distance education courses because such courses better fit their learning style or preference.

After all, the marketing role of a DE website is to turn prospective students into enrolled students. Therefore, it is important to make the advantages, benefits and outcomes of DE study immediately apparent to users; while, at the same time, informing prospective students of the workload, characteristics a successful DE student should possess, and

delivery methods of DE programs. Such information would help prospective students decide whether such courses fit his/her learning style or preference.

Studies regarding barriers keeping current students from being successful distance learners have also been conducted. Galusha (1996) pointed out that “one barrier is loss of student motivation due to the lack of face-to-face contact with teachers and peers.”

Interactivity is also an important factor when it comes to student satisfaction in the online environment (Bolliger and Martindale, 2004). Still, Moore and Kearsley (1996) warned that “student satisfaction is not correlated with actual student achievement. However, satisfaction contributes to motivation, and motivation is a predicting factor of student success.” In addition, a previous needs survey conducted by the UNC-CH Online Instruction Group ranked “community” (the opportunity to communicate with other distance learners and students in the program) as the most important service. Although the authors of the survey mentioned the constraints of the sample selection (sample students were those who had already demonstrated their high level of engagement), it proved, at least for some DE students, interaction with other distance learners in the program is considered very important. Thus, it is important to provide students with plenty of opportunities to participate in discussion and interact with teachers and peers, in order to keep DE students feeling involved, staying engaged in on-line courses/programs, and having a sense of community. To increase interactivity, information tools such as a listserv and discussion board might be the appropriate media provided at both a general information level and the program level of the site.

In general, responding to the studies about DE students’ special needs above, certain information or information tools could be added to the current site. Whether they are

necessary for the site should be decided by users. Therefore, the tester presented choices in the interview questions and asked for participants' opinions.

This study examined whether the needs of each user group, prospective students and current students, are met through the UNC-CH DE website. In addition to asking users' subjective opinions about website content, this study also investigated users' subjective opinions in terms of the website's appearance, information organization, and navigation structures. Furthermore, it gathered objective data on whether users can easily navigate to find the resources and services the site intends to support. Hence, the general concerns addressed through this usability test can be briefly stated as follows:

- 1) What are the users' impressions of and satisfaction with the site in terms of appearance, content, information organization, and navigation?
- 2) Can both prospective students and current students easily navigate to accomplish their tasks?

Research Methodology

The study procedures began with measurement of participants' first impressions of and satisfaction with the website. Participants were asked to explore the site for 15 minutes and were encouraged to "think aloud" while interacting with the site. Qualitative data were assembled from the "think aloud" protocols and interviews, while quantitative data were gathered from a first impression and satisfaction questionnaire.

Next, the study measured the efficiency of site navigation. Participants were asked to carry out 8 tasks using the website. Qualitative data were collected by observing and recording participants' search patterns and reactions, "think aloud" protocols, and responses to interviews. Quantitative data were gathered from a post-test questionnaire and by counting the number of participants who "went wrong" at certain points when they carried out a task.

These procedures are described in more detail in this section.

Participants

The sample size was decided based on Nielsen's suggestion of 3 to 5 participants in each subgroup. According to Nielsen, with 3 to 5 people in each subgroup, testers would feel comfortable enough with the conclusions that they reach. "As you add more and more

users, you learn less and less because you will keep seeing the same things again and again. After the fifth user, you are wasting your time by observing the same findings repeatedly but not learning much new” (Nielsen, 2000). Using Nielsen’s result as a guide, sample size for each of the two subgroups was determined. In this study, four prospective students and six current students (2 current DE students, 2 Friday Center students, and 2 on-site students) were recruited.

The two on-site students were originally recruited as current DE students, but later found as regular on-site students during their participation in this study. However, the data collected from them were not dropped due to the following two reasons: First, on-site students have similar experiences to those of current DE students with the on-line services and supports. Second, as stated in the previous UNC-CH DE project study, “Although this report focuses on access to services for students involved in distance learning programs, it also acknowledges that the needs of distance users are not separate and distinct from those of users on campus” (Potenziani, Nicolet, and Calleson, 2003, p.4). Moreover, the UNC DE website currently is the only available information center-point of the university that intends to introduce students to all kinds of essential on-line services and resources; therefore, the site might be useful for on-site students too. Thus, it is valuable to gather some basic opinions from on-site students, especially in this initial usability study of the site. During the study, these two students were asked whether they thought the site was useful for them as an on-site student.

Participants’ basic background information was collected with an Internet background

questionnaire (Appendix B). The study sample consisted of three male participants and seven female participants with an average age between 31 and 35. The education level of the participants varied from “Some College” to “Doctoral Degree”. English is the primary language of all participants. All participants use the Internet daily. Seven participants had been using the Internet for 7 years or more, while the remaining three participants had been using it for 4-6 years. All participants felt very comfortable with computers and the Internet, except two participants felt “somewhat” comfortable. Two Friday Center students and one current DE student had visited the DE site before the test; the others had never used the site before the test.

Evaluation Goals

As pointed out by Dumas and Redish(1999), “Even with a simple product, so much happens so quickly in a usability test that if you have not thought about what to focus on, you may miss important events” (p.110). Therefore, each usability test has to focus on certain concerns, which are “what you want to learn” (p.110). In order to decide what data the tester should collect and what tasks the participants should carry out, specific concerns were derived from testers’ and designers’ questions, a previous heuristic study conducted by Bell et al. (2004) for the UNC DE website project, and typical tasks users would undertake with the site. The specific concerns are related to each of the two research questions:

1) What are users' impressions of and satisfaction with the site in terms of appearance, content, information organization, and navigation?

Specific Concerns:

- Will users like the website's appearance?
- Will users clearly understand the purpose of the site? For whom is this site intended? What is the relationship between this site and UNC-CH?
- Will users find navigation feasible in a 10 minute exploration?
- Will users intuitively know where information is for prospective students and where information is for current students?
- Will users intuitively know where to start exploring in order to complete a specific task?
- Will users find the information they expect?
- Does this site provide enough general information for prospective DE students?
- Does this site provide enough general information for current DE students?
- Will users find any part of this web site confusing or counter-intuitive?
- Will users like the drop-down menu? Are any shortcuts (drop-down menu) to individual programs misleading?
- Does the site motivate users to further explore? Why or why not?
- Does information about the GRE or do the alumni interviews make users feel more confident and encouraged? Does the site, overall, increase users' confidence to be a DE student (their eligibility, DE teaching quality, etc.)?
- Will users accept the unavoidable inconsistency of the decentralized websites? How do they feel about the individual program websites?

2A) Can *prospective students* easily navigate to accomplish their tasks?

Specific Concerns:

- Will users easily find information regarding the nature of DE programs, the outcomes of a DE program (both benefits and constraints), workload and prerequisites and delivery methods for DE students?
- Will users easily find the eligibility requirements for DE programs and for each specific program?

- Will users easily find information about the difference between the Friday Center offerings and other programs?
- Will users easily find a program/course in which they are interested?
- Will users easily find information (e.g., cost, requirement, program details) if the program is suitable for them?
- Will users easily find how to apply for a program?

2B) Can *current students* easily navigate to accomplish their tasks?

Specific concerns:

- Will users be aware of the contents listed under orientation?
- Will users easily find information about on-line services (registration, drop and add, check grades and finance balances, buying textbooks, and so forth)?
- Will users easily find information about where and how to create an ONYEN?
- Will users easily find information on courses and programs?
- Does the site provide sufficient instructions on remotely accessing library and other electronic resource?
- Will users easily find information regarding university support services (IT service, writing centre, etc.)?
- Which on-line service websites do users prefer, my.unc.edu or studentcentral.unc.edu? Will users like My-UNC portal?

The special concerns above were then represented in various formats for data collection, including questionnaires (Appendices C and E), interview questions (Appendix F), and tasks (Appendix E). The rationale for selecting tasks was to use tasks that probe the potential usability problems within the website. In addition, as an initial usability test, this study intended to collect more overall feedback on the site; therefore, the basic intended services served as a basis for task identification.

Evaluation Procedure

The test took place in a lab environment. Each participant was scheduled one at a time to work with the site. Prior to the test, the goals of the study and the test procedure were explained to the participants. They were asked to sign a consent form (Appendix A) and to fill out a questionnaire regarding their background and Internet skills (Appendix B).

During the test, participants were audio and video taped for detailed analysis of how the site performs. Instructions were prepared in advance, and were read to participants before they carried out a relevant task. By doing so, each participant was assured to receive the same instructions.

Participants' first impressions of and satisfaction with the web site were measured first. The participants were then asked to browse the site up to 15 minutes. They were asked to return to the DE general information website if they went too far into individual program websites. During their exploration, they were encouraged to "think aloud". This technique requires people to say out loud everything that they are thinking and trying to do, so that their thought processes are externalized. The "think aloud" protocols were video recorded and audio recorded.

After finishing the browsing, participants were asked to fill out a questionnaire (Appendix C) regarding their first impressions and satisfaction in terms of site appearance, information delivery, and web navigation. In this questionnaire, the third part of the Questionnaire for User Interaction Satisfaction (QUIS) was used to assess users'

overall reaction. The QUIS was developed by the University of Maryland Human-Computer Interaction Laboratory and is one of the most widely used questionnaires for evaluating interfaces (Chin et al., 1988). It consists of 12 parts, the third part (which was used in this study) is often used on its own by other evaluators because it is short so people are likely to respond (Preece et al., 2002, p.402).

Then, the participants were asked 5 open-ended questions, below, which allowed them to express themselves in their own words.

- What is the site about?
- For whom is this site intended?
- What did you like best about the site?
- What did you like least about the site?
- Does the site motivate you to further explore? Why or why not?

Next, the efficiency of web navigation and the information organization structure was measured. Based on the familiarity participants gained from browsing the site, they were then asked to carry out 8 tasks using the site. Participants were told that each task might take up to 4 minutes. However, they were encouraged to work at a pace that was normal and comfortable for them; the tester stressed that it was the site, not the participant, to be evaluated.

The tasks (Appendix D) and post-test questions (Appendix F) were prepared in two separate sets in order to match the different needs of prospective students and current

students. Each participant responded to only one set, depending on which user group s/he belongs to.

After completing the tasks, each participant was asked to fill out a post-test satisfaction questionnaire (Appendix E). This questionnaire asked for participants' deeper opinions rather than their first impressions of the site. Participants were expected to encounter problems and difficulties while they were carrying out the 8 tasks, and therefore would have better insights and understanding of the site's weaknesses. Some questions are the same as those in the first questionnaire in order to measure changes in the participant's attitudes.

The last part of the study was a semi-structured interview, asking for more specific opinions and recommendations (Appendix F). This interview was designed to let users think from different perspectives about their needs, as well as their attitudes toward and recommendations for the site. Some design choices were presented to participants to better determine their real needs.

Data Analysis

Both qualitative and quantitative data were collected during the test.

Qualitative data were gathered through participants' Think Aloud protocols, comments, and search patterns when participants explored the site, carried out the tasks, and responded to interviews. The qualitative data were analyzed to identify the site's problem areas.

Quantitative data were assembled from questionnaires. All the questions in the two questionnaires were expressed in a positive tone. Therefore, ranking lower than the mid-point represents a negative attitude towards a specific issue represented by a certain question. A correlated t-test was performed to compare pre- and post- use questionnaire responses. Task performance was analyzed by counting the number of the participants who “went wrong” at certain points during their navigation process.

Results

Quantitative Data

The quantitative data collected from two questionnaires revealed the participants' overall reactions to the site became less positive after they tried to accomplish specific tasks.

Comparing the two sets of overall reaction data (the data collected before the tasks is shown in Table 1, the data collected after the tasks is shown in Table 2), the mean score of the overall reaction items in the post-task questionnaire decreased 0.62 on average but this difference was not statistically significant ($p > .05$ for all items).¹ Since the score of 5 (on a 9-point scale) represents a neutral attitude, the overall reactions are positive both before and after completing the assigned tasks.

Table 1: Pre-task questionnaire on overall reaction to the site

Survey Items	Mean	Standard Deviation	Min	Max
Terrible - Wonderful	6.7	0.949	5	8
Frustrating - Satisfying	6.4	1.713	4	9
Dull - Stimulating	5.7	1.636	2	8
Difficult - Easy	7.0	1.826	4	9
Rigid - Flexible	6.7	1.337	5	8

¹ The P-value of question two (Frustrating – Satisfying) is 0.052; therefore, the change is considered marginally significant.

Table 2: Post-Task questionnaire on overall reaction to the site

Survey Items	Mean	Standard Deviation	Min	Max
Terrible - Wonderful	6.1	1.37	4	8
Frustrating - Satisfying	5.4	0.966	4	7
Dull - Stimulating	5.6	1.897	2	8
Difficult - Easy	6.2	1.229	4	8
Rigid - Flexible	6.1	1.37	4	8

Tables 4 and 5 (on the next page) show the results of the remaining questionnaire items.

The score of **four** is the midpoint of the scale, which means the participants neither agree nor disagree with a statement. Only four items had a mean rating below four:

- Pre-task Q7: The purpose of the star in the background is clear. (Mean Rating: 1.9)
- Post-task Q13: Information about the cost for taking a course is easy to locate from the homepage. (Mean Rating: 2.8)
- Post-task Q14: Information about how to apply for a course is easy to locate from the homepage. (Mean Rating: 3.4)
- Post-task Q15: It is easy to distinguish between information that is intended for prospective students and information intended for current students. (Mean Rating: 3.8)

Among these four questions, only Pre-task Q7 and Post-task Q13 have a 95% confidence interval entirely below the mid-point of 4 (See Table 3); therefore, the two questions' responses were statistically significantly below the mid-point.

Table 3

Items	Mean	Standard Deviation	95% confidence interval	
			Low	High
Pre-task Q7	1.9	1.287	1.086	2.714
Post-task Q13	2.8	1.687	1.733	3.867
Post-task Q14	3.4	1.647	2.358	4.442
Post-task Q15	3.8	1.814	2.653	4.947

The ratings of Pre-task Q7, related to the star in the background of the page, were the lowest. However, although the participants thought they did not understand the purpose of the star, only one participant thought the star was confusing. Most participants were not distracted by the star; instead, two participants said they liked the star and described it as visually cute.

Table 4: Pre-task questionnaire results

Survey Items		Mean	Standard Deviation	Min	Max
Appearance:					
1	This site is visually appealing.	5.1	1.663	2	7
2	The screen layout of the site is attractive.	5.3	1.494	2	7
3	Colors used in the site are pleasant.	5.9	0.876	4	7
4	Text in headings is easy to read.	6.0	0.816	4	7
5	Text in paragraphs is easy to read.	6.2	0.422	6	7
6	Graphics, icons, photos and multimedia contribute to my understanding of the site's content.	5.1	1.595	2	7
7	The purpose of the star in the background is clear.	1.9	1.287	1	4
Information organization and navigation:					
8	This site is organized in a way that is easy for me to understand.	5.4	1.35	3	7
9	The labels on menu items are easy to understand.	5.4	0.966	4	7
10	I find it easy to navigate this site.	5.8	0.919	4	7
11	The amount of information displayed on a page is just right.	4.4	2.119	1	7
12	I always know where I am within this site.	5.6	1.506	3	7
Information delivery:					
13	The association of the DE website to the University becomes clear when I navigate through the site.	5.1	1.663	2	7
14	The overall purpose of the site, why it's there, who it serves, etc. is easy to understand.	5.0	1.633	2	7
15	It is easy to distinguish between information that is intended for prospective students and information intended for current students.	3.6	1.838	1	6

Table 5: Post-Task questionnaire results

Survey Items	Mean	Standard Deviation	Min	Max	
Appearance:					
1	Hyperlinks are clearly marked and distinct from other text.	5.4	1.838	2	7
2	Text in headings is easy to read.	6.0	0.667	5	7
3	Text in paragraphs is easy to read.	6.0	0.471	5	7
4	Graphics, icons, photos and multimedia contribute to my understanding of the site's content.	5.0	1.491	2	7
Information Organization and Navigation:					
5	This site is organized in a way that is easy for me to locate information I want.	4.2	1.317	2	6
6	The web site covered what I expected to be covered.	4.1	1.663	1	6
7	I find it easy to navigate this site.	4.7	1.059	3	6
8	It was always clear what would happen when I clicked a link.	4.3	1.494	2	6
9	The amount of information displayed on a page is just right.	4.3	1.829	1	6
10	The labels on menu items are easy to understand.	4.2	1.619	2	7
11	I always know where I am within this site.	5.4	1.578	2	7
12	No matter where I am in this site, I can easily return to the home page.	4.9	1.912	2	7
13	Information about <i>the cost</i> for taking a course is easy to locate from the homepage.	2.8	1.687	1	6
14	Information about <i>how to apply</i> for a course is easy to locate from the homepage	3.4	1.647	1	6
15	It is easy to distinguish between information that is intended for prospective students and information intended for current students.	3.8	1.814	1	6

In addition to the overall reaction questions, eight other questions were the same in both questionnaires in order to investigate the changes of users' opinions from before the tasks to after the tasks. Only one of the questions (Pre-task Q10 / Post-task Q7) had a difference in mean ranking that was statistically significant ($p=0.0032$). Before completing the assigned tasks, participants rated the site's ease of navigation 5.8; after the tasks, as 4.7.

The data suggest that information about “how to apply” and “program cost” should be more apparent, and the site should make it easier for users to distinguish between information intended for prospective students and information for current students. Some participants understood that information about how to apply and cost would be found in each program site, while some did not. Although the site structure is de-centralized, it would be helpful to point out that those pieces of information vary among programs and should be found in the individual program sites.

Qualitative Data

Qualitative data collected through participants’ reactions, comments, and search patterns will be discussed in relation to three sets of issues: navigation issues, information organization issues, and content issues.

Navigation issues

Overall, the participants commented positively on the navigational structure of the site. The participants thought the site itself was “clean, well-organized, and friendly,” “information is coherently thought out,” and “the fundamental site is easy to use, easy to see the relationship between each page.” During the first 15 minutes of exploration, most participants obtained a clear understanding of the whole site layout quickly. Seven of ten participants thought the clean and fairly straightforward layout was part of what they liked most about the site.

Nevertheless, the study participants identified usability problems relevant to the site's navigation system, such as with the navigation structure, flexibility of navigation, visual issues, and the menu names. Each of these types of navigation issue is described in this section.

Navigation structure

The participants had different attitudes towards the three sets of navigation bars - the one with the drop-down menus on the left, the one on the top, and the one at the bottom of the site (See Figure 1). Five participants thought they were redundant. One said, "A lot of redundant navigation on the front page, that made me wonder at first if it was new information, and found I was back to the same information every time." Another participant originally understood that the top bar and the left would lead to the different information. After 10 minutes of exploration, she finally found out that these navigation bars actually led to the same information. Another one said, "I can see the value of the bottom bar (keeping the users from scrolling all the way up), but do not know why both the left bar and the top bar are needed." However three participants thought the three sets of navigation bars provided flexibility and convenience.

Figure 1: The DE site has three sets of navigation bars.



Most participants used the left navigation bar during the tests. Three participants said they liked the mouse-over drop-down menu because “you can get a little bit more in detail and narrow down a little bit without clicking them.” One person kept clicking the mouse-over menus and expected that the three menus, “Programs and courses,” “Resources,” and “Meet our students,” were clickable. He complained “Why is it that the same menus on the top navigation bar are clickable, but not on the left navigation bar?” Another participant suggested that the designers should switch the pop-ups of the drop-down menus to the right side so that they would not cover the content part of the page. To demonstrate it, she gave an example site that has the same feature: The UNC-Chapel Hill School of Pharmacy home page (URL: <http://www.pharmacy.unc.edu/>). Another suggestion about the left bar was to change the ‘All student and faculty support’ menu under the resources section into ‘all resources’, because two participants thought the new word, “Support”, gave them an impression that there was some new information.

Flexibility of navigation

The participants' mean rating of the flexibility of the site was 6.7 (5 being neutral) on a scale of 9 after they explored the site for 15 minutes, but the average rating was 6.1 after the participants had carried out 8 assigned tasks with the site. While the difference was not statistically significant, the downward trend does suggest that the site is not as flexible as it looks. Some usability problems related to the rigidity of the site were identified during the test. First of all, the participants expected links wherever the site indicated them. In addition, participants suggested that any link that led to a place outside of the DE site (or a page that doesn't have the same navigation system as the DE site) should pop up in a new window. Otherwise, after the users explore that given site further, they have to click the "back" buttons all the way back to the DE site. Here are some additional comments:

"They asked me to contact my program. That would benefit from a link back to the program page. I am a lazy person. I want the link right under my finger." (See http://distance.unc.edu/de_orientation.html#financialaid)

"Oops, I closed it. I thought it is a separate window. What is the URL of the DE site again?"

"It asked me to fill out an application form but it doesn't provide me a link to it." (See http://distance.unc.edu/de_orientation.html#financialaid)

"It says: see the website www.ACMNC.com, but it is not clickable. This is a webpage, not a piece of paper." (See http://distance.unc.edu/gre_prep.html)

"Don't put the graphic, unless it will take me somewhere (e.g., the UNC icon and the DE website header)."

"The email I used is not the defaulted one on my computer. I would like the real email address, so I can copy and paste, rather than people's names and had email address hidden underneath." (See <http://distance.unc.edu/program.html>)

Visual issues of navigation system

The site does not change colors for the visited links and the in-use menu. Although only one participant raised the issue, it was observed during the study that the participants clicked on the menu and tried to get to the page that they were currently viewing. This could be due to the fact that the menu color did not change to identify the current page in use. Another advantage of changing the color of an in-use menu item is that it can help users learn the structure of the site while interacting with the site by clearly showing the relationship between the content and the menu.

The site uses green text to indicate links. Three participants did not like the color. One participant said that the green color was what she liked the least about the site, “The green is hard to skim through quickly. It makes me look at it a little longer.” Another said he simply did not like the green in combination with the blue text. Due to the use of different colors between links and normal text, the links seem immediately apparent on most pages of the site. However, it generated confusion when green became the most prevalent color on the “program” page. One participant did not understand “why green was used” and thought, “There is just contact information.” In addition, several other participants were observed trying to click on the school/department names, which do not have links.

One participant pointed out the redundancy between the graphic title and the text title. He thought getting rid of the unnecessary graphics (graphic title and the small star) would save space and therefore improve the level of efficiency in terms of space usage (See

example in Figure 2. The same words, “DE Orientation Materials”, are repeated). Moreover, colors and fonts used in those graphic and text titles throughout the site are not completely consistent. For example, the title “Featured student statements” is in a different color and font from other titles (See Figure 3).

Figure 2: Graphic titles and text titles are repeated.

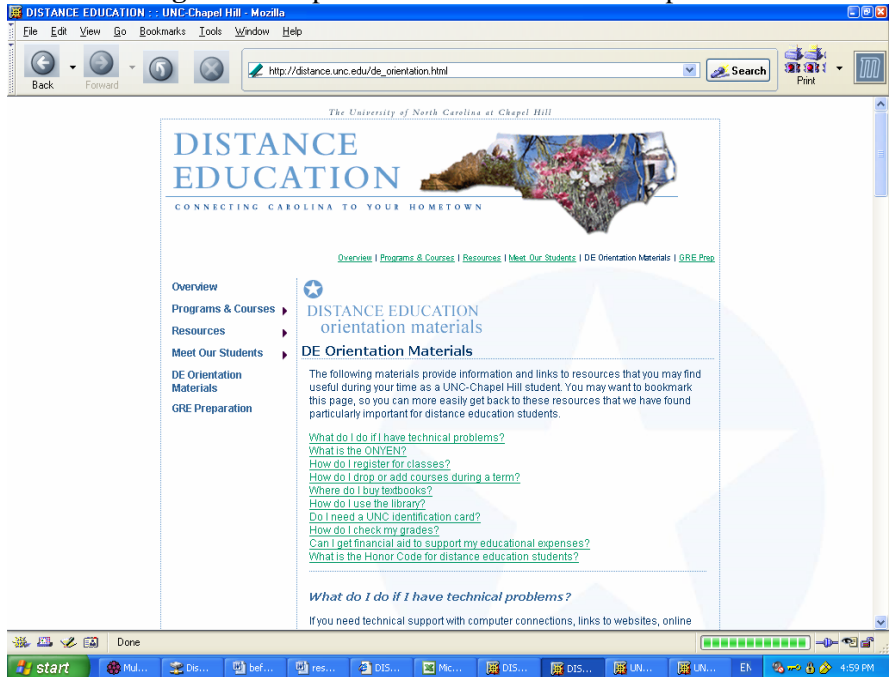


Figure 3: The title, “Featured Student Statements” is in a different color and font from other titles.



Murky labels

DE Orientation Materials. The participants thought the DE Orientation Materials page was the “most informative, helpful page” of the site. Interestingly, when asked to find relevant information related to that area, this menu seemed very unclear for almost all the users. Even participants who had explored the page before experienced difficulty in relocating it. One reason was that the menu label, “Orientation Materials,” was not straightforward enough. In addition, the menu name sounds like it is only for newly-enrolled students, while the information on the page was useful for all current students. Three participants suggested the label, “FAQ,” for this section. One said, “It really should be called frequently asked questions or something other than DE Orientation Materials, because this [financial aid] is helpful for people if they are deciding whether they will apply for a distance education program.” In other words, financial aid is important to prospective students who might consider “orientation” to be for admitted students only. Another participant said the word “Materials” reminded him of physical materials rather than information.

Skills Test. Both current DE students believed information under the “skills test” menu in the resource section was important for current DE students. Other participants who were asked to assess the skills test section thought the service was very useful too. However, no participants intuitively knew what it was about based on only the menu name.

Two participants stopped exploring further when they reached the sentence: “click here to create an online skills test for your course” (<http://oddjob.oit.unc.edu/skillstest/>). One

participant was thinking aloud: ““for your course?’ I don’t know if it is for teachers or students. It must be for teachers, I guess so...” She then turned back. Suggested menu names include “system capabilities,” “system checking,” and “Does my computer meet the technical requirements?”

Overview. The “Overview” label itself is self-explained, but some participants had trouble associating it with the homepage of the site. When asked to go back to the homepage after finishing each task, some did not know where to go and one had to re-enter the URL. Changing the label name into “About” might be a solution for users memorizing it easily, because “About” delivers the same information as “Overview”, but is more straightforward and popularly used as the label of homepage.

Subtitles. Subtitles (Distance-based degree programs, Certificates, and Management and Leadership Institutes) listed under the School of Public Health are very easily overlooked. The users could be very confused if they did not see those subtitles. One Participant said, “A lot of links under public health, these links seems like there is some sort of relationships with DE, but the relationship may not be immediately apparent.” Some participants thought the links of the management and leadership institutes were programs too. One participant was confused when she was linked to *The Southeast Public Health Leadership Institute* (<http://www.sph.unc.edu/sephli/>). She was thinking aloud, “I can’t tell if it is distance education. It looks like it is a program. It probably has distance education as a component, but I cannot tell why it came from where it was.”

Information Organization

Usability problems caused by the way the information is organized on the web site are discussed in this section.

Information for current students

Overall, information for current students is not immediately apparent. Although the site aims to provide DE students with on-line services and the support they need, the study suggested, from the current students' perspective, that information about on-line services and support is either deeply buried, absent, or too little to be helpful.

The stunning evidence is that 4 of 6 current students (all except for the two Friday Center students) could not find any information about on-line registration, one of the most critical services for DE students. Many other critical on-line services, identified prior to the design of this site, were not easily found on the site either. These services include technical support (information on hardware and software requirements, email accounts, access to courses, assistance with hardware and software), financial aid, and payment (paying for a registered course, checking an account balance). Furthermore, the MyUNC portal was defined in a previous study of the site as "the solution for providing a central point of access for online services and information." However, the link to the portal is deeply buried in the site, like under "How do I buy textbooks on-line?" in the "DE Orientation Materials" section.

Prospective students vs. current students vs. faculty

All participants thought the majority of the site was for prospective students. One said, “When I first come in the first page, it is already obvious because I got the sort of marketing bullet. That says to me this site is for prospective students. This is very clear it is marketing.”

When asked, all participants believed that the site should label the sections for prospective students and current students separately. In other words, they did not think the site made it easy enough to distinguish information between the two user groups. One current student participant felt very strongly about it. He said, “They are trying to sell me the idea, but I am sold on it already. I need to go right straight to where I want to go. I have to bookmark my page to avoid the redundancy. Let me login and go straight to my area.” When he looked at one video interview, he responded “I don’t care!” to each sentence from the first one the interviewee said until he totally lost his patience and turned it off. Once again, he said, “I am already sold on it.”

Interestingly, while current students showed no interest in the information intended for prospective students, prospective students showed a preference to having both. One prospective student suggested, “Prospective students and current students should be labeled, but they should all be available to each other. If they are totally two separate sections, I may never look at the other section, which I found useful too.” Another one said she was also interested in information for current students since she was curious about how things would go after enrolled. “These are all important information when you

compare the program with other schools.” She suggested a label, “Once enrolled,” under the prospective student label. Another one thought it was better if she was told what facilities would be accessible once registered, but too detailed information, such as “how to” is not necessary. Two students from the School of Pharmacy recommended the design of their school website, which had a separate “Prospective Student” label on the home page (See Figure 4).

Figure 4: A separate label (red) for information intended for prospective students on the top left corner of the page.



Some participants were not aware of information for faculty, while others felt like the resources for faculty and the resources for students were “kind of bump together.” “I found some of the resources are more getting toward teachers. I think definitely information for faculty should be separated from those for students. It is important to have resources for teachers being available to students, but you will hope the teacher

might know better where to go. I think really obvious information should be one for students.”

Overlap between DE orientation materials and resources

When asked to find information about textbooks, financial aid, and software, most participants looked at the resource page first, rather than the DE orientation materials page. It is understandable that information about financial aid is important in the DE orientation materials section. However, when a user comes to the site with those issues in mind, and skims through the options (menus), the “Resources” menu looks to them like the most appropriate one to have these pieces of information, “because, resources, you think, oh, financial resources.” Therefore, for those overlapping areas, information should be accessible from both sections.

Degree vs. certificate vs. courses

On the program page, it was not surprising that participants had trouble understanding the distinctiveness of the Friday Center, which only offers courses from other degree/certificate programs, because the Friday Center was listed among those degree/certificate programs without showing any difference. The participants who had never heard about the “Friday Center” or “Carolina Courses On-line” could not find a given course offered by the Friday Center. They did not even look there. One participant found the course requested in the assigned task, but she thought the list of courses on the Friday Center site included all the courses offered by all the programs. Another said, “I think people that are in public health or whatever, they can easily find program

information from this site, but people who might be interested in distance education in art and science, I don't know if it is immediately apparent, whether they can get a degree if they want to."

It was also unexpected that some participants would show confusion about what degrees/certificates the university offered and where to get more detailed information. Though some participants thought the list of programs was pretty straightforward, three participants said they liked the program page the least. One said, "I do not understand what the options are. If I knew the NR- BSN, and then I will look at it and know, 'Oh, this is what I am looking for,' but if I am somebody who is looking for distance education as a way to fulfill my personal career goal, and my goal is in one of these programs, I will find it is hard to use." Another participant indicated that "the contact information on the program page is too eye-catching, and I thought the page simply provides contact information." At least two participants thought for a moment that they had to contact a person to get more information about the programs.

Two participants were observed using the "Find" function of the IE browser, when asked to find a given program. This suggested that the program page can be sorted in a way that users can more easily locate a given program, a certificate, or a course. Three participants suggested an index for the program page.

Text information in paragraphs

Both the DE orientation materials and the GRE preparation sections contain relatively large amounts of text information. How to format the text content to make critical points more apparent is the key for these sections. Undoubtedly, the original designers worked on this issue and the existing format may be good enough for the printed material, but web users tend to avoid reading any un-highlighted words and they do not read through a whole paragraph before clicking on the links. For example, consider the paragraphs about “how to buy textbooks on-line” in the DE orientation materials section. There are two paragraphs: one starts from “If you are registered through the Friday Center ...,” and the other starts from “If you are enrolled in any other program or course of study at UNC-Chapel Hill ...”. However, the two categories were not immediately clear to some participants. One participant clicked the first link that was for Friday Center students and dug all the way into the site. When time was up, she was given a hint to re-read the paragraphs, then, she said, “Oh, I am supposed to belong to the program students,” and complained, “If they highlight those two sentences and indent the contents, I won’t miss it.” She then clicked on the first link of the second paragraph, UNC student stores, which did, finally, bring her to the MyUNC portal. However, since she hadn’t got a chance to read the third paragraph, she did not know she could buy a textbook through this portal. After clicking back and forth several times, she gave up. It was apparent during our tests that many participants tended to click the first available link in a paragraph, so it is better to put the most important information on the top and use bullets, bold face, indentation, or color to emphasize key points of a paragraph for easy browsing.

Connections between the general site and individual sites

The decentralized website structure relegates the DE website to the role of a portal pointing the users to individual program websites. Some participants complained about the loss of coherence when they were linked to other sites. One participant said, “I had that moment where I felt I have already done the narrowing. I found the certificate I am interested in, but suddenly it exploded out. This really turned me off.”

It was especially frustrating when the program was linked to a department or school website rather than the program itself. Two participants went to the School of Education homepage through the drop-down menu and felt completely lost. One participant explored the “Post-baccalaureate Certificate Program Molecular Diagnostic Science (MDS)” link, and was taken to the “Division of Clinical Laboratory Science” at <http://www.med.unc.edu/ahs/clinical/>. He described his feeling this way: “Where is my certificate? I have to dig into the department website and find my certificate again? Why should I do my search twice? If I have already come from the distance education portal, why don’t they just link me to the right place?”

Compared with the MDS certificate program mentioned above, “First Years - Certificate in Auditory Learning in Young Children with Hearing Loss” was linked to the program site directly; the participants usually continued their searches into the program website without having a very strong negative reaction. One said, “Who cares as long as I can get my degree. But I probably won’t come back to the DE site after 5 minutes.”

Content issues

The lack of content was the biggest problem of the site, both from prospective students' and current students' perspectives. Prospective students believed the site simply served as a portal pointing the users to individual program/resource sites, and generally thought the site itself did not have much information for them; instead, what they really needed to interact with was the program websites. Current students also thought the site did not have much for them. The major lack-of-content areas of the existing pages are the overview page, the program page, and the resource page. Participants expected these pages to be expanded to provide overview paragraphs and links for more detailed information.

General information needed

More general information will help prospective students get a better picture of the site and the UNC DE program. The participants thought the existing overview page was "actually very sparse," and said it "tells you nothing." Participants still had a lot of questions after they interacted with the site. They jumped to their own conclusions just by skimming through the website. One participant suggested, "The big, long paragraph may be annoying, but a short paragraph explaining the laying of the foundation will be very, very, very helpful."

One participant even gave an example of what he expected after he partly figured out how DE courses are delivered from watching the video interviews. "It will be much clearer if there is a paragraph on the program page saying, 'The UNC-CH offers a

number of different kinds of distance education programs. In some cases there are specific degrees and certificates set up to be done at a distance. You can also take individual courses either as a continuing study student, or after obtaining enrollment in a degree program. What is available depends on...”

Additional, comments, concerns, and suggestions about what the participants wanted to know but the site does not have in terms of general information are listed below:

“It is still not clear to me whether there is a distance education program at UNC or a bunch of different courses or programs that you can take from a distance. If there IS a distance education program, I don’t know who is in charge of it. I don’t know what role it will play, what role an individual program will play. That is very murky.”

“It doesn’t really give you much general information about UNC distance education. You have to follow the individual website? I think a little bit more general information will be helpful, about what is distance education, and give a contact phone number for general information.”

“It will be helpful if there is a list of useful phone numbers, such as registration office, university cashier, etc.)”

“Can I get the quality as the on-site program does? I want to really learn something. Are the faculty the same as for regular UNC programs?”

“The woman who did Carolina Course Online in the video was not pursuing an on-line degree. I imagine maybe you can do 1/3 or 2/3 of your degree distantly. The fact that you can do part of your degree at a distance in some of the programs is not listed here. That is not obvious at all. If I hadn’t looked at the video, I would have never been clear. This website looks like it is supposed to tell you everything, but it wouldn’t even tell me I could work out something like that.”

“Who runs your life when you are in one of the programs, who will be in charge of you, who tell you what to do? How to pay the university? How and when will they be billing me?”

“Carolina on line seems to be very similar to the distance education offered. But why it is a whole separate website?”

“I gathered from one guy’s video, they use Blackboard. How would I take the courses? How is distance education delivered at UNC? Is this course interactive or will it be finished on your own, like corresponding mail? Are there some particular days I have to log on? Is my computer good enough to handle this?”

Program overview information needed

Although the DE website was designed in a decentralized fashion, prospective students will benefit from short introductory paragraphs that “give a short overview, essential facts, and links for detailed information about each program.” Facing the long list of program names on the program page, one participant complained, “Right now, all I know is what the programs are called.” At this point, a brief introduction would encourage further exploration. Otherwise, like another participant said, “That is a kind of stop, which may deter me from doing anything.”

Participants expected to get some essential information quickly, such as, “Is it all on-line?”, “What is the cost?”, “What is the time limit to complete the program?”, and “Am I qualified?” One said, “It is clear that if I dig into the program website, and I have been willing to call people, after a period of time, I will have a good understanding of the requirements of a given program. But I am a busy person, I want information quickly.” Two participants mentioned “one-stop-shopping,” which they preferred, but which the site did not provide.

For a general program overview and individual program overviews, the format used in the DE orientation materials section can serve as a model: short paragraphs providing both introduction/explanation and links, with the links embedded into the paragraph.

Through this format, links are put into the context of the content of that paragraph, and the links are expected to be noticeable due to the difference in colors and underlines between the links and the other text in that paragraph. For the essential information part, a standard fact table is suggested for each program.

Resources overview information needed

The Resource section should be the “meat” for current students. Unfortunately, the section is neither informative nor comprehensive. Limited information is the main reason that five out of six current student participants thought the site did not have much for them as current students.

The participants thought the resources section “doesn’t explain itself well.” One said, “Frankly, it is just there, and it listed stuff.” One participant said, “It might be very helpful if that section has an introduction paragraph that explains why it was there, whom it was for, and so on.” Introductory information on the existing “All student and faculty support” page was far from informative, plus many participants overlooked this page and were linked to the individual resource sites directly from the resource drop-down menu.

Most participants thought sites like “IT-help” and “Technical Instructional Support” were too busy and overwhelming. Many participants showed a reluctance to explore the sites. Although many participants knew the IT-help site from previous experience, few really knew what was provided by the site. At least three said something like, “I never like the IT help site”; two participants said they were not clear about the difference between the

IT-help site and the technical instructional support site; and no participant figured out the purpose of the skills test site by themselves.

All those above suggested the site should provide more instructional information for each resource. One suggested, “It is a lot of information to present to someone in one page, but the first thing people may want to know is just an email address or something like that. It may be helpful to have a basic IT page for students rather than sending them to here.”

The library instruction page (<http://www.lib.unc.edu/distance.html>) can be used as a good example for creating such an instructional page. It sorts and explains all the special functions relevant to DE students, and gained very positive feedback from the participants.

In general, there are three reasons that it is necessary to add more instructional information for each resource. First, the program websites and the resources sites are more under the control of individual schools, departments, or university service units; it is impossible to call for an extensive improvement with all the individual sites. Second, oriented students knew the important resource sites by some means soon after they enrolled. Therefore, it seems unnecessary for them to have another site simply telling them, “There is an IT help site.” If they were reluctant to explore the sites, they would still be reluctant to do so. Furthermore, the feeling that “I already know this” was the biggest reason that the current students did not think the DE site was helpful. Third, users do not like to be led into an unfamiliar site with little explanation, but they usually will

not generate negative feelings when they had been given critical information and offered a resource for further exploration.

Other useful content needed

In addition to making the information currently included in the site more informative, the entire site could be more comprehensive. The current site mainly covers the on-line services, but users might expect to find all the information a DE student needs in the DE site. For example, academic policies such as research requests, transcripts, grading, and the honor code could also be useful to DE students. Other useful information could be information about disability services, parking, and so forth.

Furthermore, in order to guarantee equal access to information for the DE students in all the programs, the DE site should be more comprehensive than any individual program site in terms of general information. For example, information about CCI provided in the School of Nursing site could be valuable information for all the students (See <http://nursing.unc.edu/current/rn-bsn/orientation/cci.html>).

GRE section

The participants agreed that the GRE page was helpful and “It is encouraging as much as it can be.” Only one said, “It tries to tell me the GRE is not important, but it doesn’t tell me the percentage, so I don’t believe it.”

After reading the GRE section, one participant said, “They did not tell me whether I have to take the GRE.” Another two participants got a similar impression: “It gives me an impression that for all distance education programs, you have to have the GRE. I think for some programs the GRE is not a requirement at all. For example, Children hearing lose program, the certificate programs, they won’t need the GRE. I guess you don’t need the GRE to take a class for your own enrichment.”

Video interviews

All the prospective students thought the video interviews helped people to buy into the idea of distance education. But two participants thought the videos were too time-consuming. One suggested the site should indicate the total length of the video. One prospective student said, “The two I watched were very powerful and well-chosen.” He then recommended that first-visit users “watch the videos, particularly if you want to get a feel for people’s experience.” He also said, “Both of those videos are very effective at arousing a feeling of confidence in the program. Frankly, I am the sort of person who doubts the quality of distance learning, but here are some people, they are very real and very articulate, saying ‘no, no, it works, I am finding all this support; I really recommend it.’ I think the challenge is how to get people like me to look at the video, because I didn’t imagine them being that quality, I don’t mean polished, I mean genuinely saying something that impacts your feelings.”

In order to increase the chance that people look at the videos, one suggested a change of the label name, “... ‘Meet Our Students’. I don’t think in the official environment, I can

really meet any one. Maybe they can use ‘Student Testimonial’ or ‘Student Review’. The word ‘Review’ reminds me of Amazon reviews.” Two participants suggested that the relevant videos also be accessible from the individual program websites. One said, “I really want to be sold on the program first before I waste my time to meet any students.” The other said, “Distance education programs are so different in what they require. The testimonials are much more relevant to different programs, rather than just in general.” Another thought the chance of him looking at the videos would increase if the videos were available on the program site. Besides, “Interviews at a glance” is sorted by students’ names. It may be easier for the users to choose the relevant ones if the interviews were sorted by the program names.

Furthermore, two prospective students preferred to meet real students. One said, “The videos help, but the thing that would really make me confident is if I can ask questions to some alumni, without the official media.” The other said, “The site convinces me the teaching quality is probably high, but I would like to contact the students of the program in which I am interested, because I think the teaching quality will vary for each program. I have an impression this university is interested in the distance education program, but there is not a program for DE, so I guess the program quality really depends on the individual department.”

Surprisingly, the video streaming does not work very well even in the university network. The video and the audio are asynchronous. One said the freezing and skipping screen was “funny and distracting.” Another participant recommended, “I think they need to work on

the technical problems of the video, because I think it creates a negative impression. Especially when you look at the distance education program, you might have some kind of conference tool. Your video program will be an evidence; you want that make a good impression.”

MyUNC portal

Only 2 out of 10 participants had heard about the MyUNC portal before. None of them preferred MyUNC to StudentCentral although they agreed some features of the former (e.g., buying textbooks) were very nice. General comments on the MyUNC portal were that it was “too busy” and “confusing,” and “I don’t know where to start.” Most participants had a hard time finding the login button.

Other suggestions/comments from participants

In addition to the issues already discussed, participants noted several other usability problems:

- Three participants wanted a “search” function to search the whole site. All of them mentioned this when they could not find information they wanted.
- One participant thought that the university name on the top of the site should be bigger and let people know it is a part of the UNC system.
- One participant said that the site interface wasted too much space. Otherwise he would not have to scroll down on many of the pages.
- Two participants liked the colorful Carolina map on the top of the site.
- One participant thought that the site does not have enough color.

Summary of results

Among 10 participants of this study, six participants (two current DE students, two Friday Center students, and two UNC on-site students) responded to current student tasks and interviews; the other four participants responded to prospective student tasks and interviews.

Based on the study results, most participants thought this site was primarily for prospective students and that some newly enrolled UNC students (both distance and on-site students) might benefit from it. However, they did not believe the site was very useful for current students (both distance and on-site students) who were oriented already, due to the limited and basic information. This finding revealed the current site did not exactly match the design goal of the site, which is to serve both prospective DE students and all current DE students.

Overall, the participants reacted positively to the site's navigational structure, appearance, GRE section, and video interviews. However, the participants thought the MyUNC portal was not user-friendly and preferred StudentCentral to the MyUNC portal. Usability problems found in the study can be divided into three categories: navigation issues, information organization issues, and content issues.

The major usability problems in terms of navigation are the redundancy of navigation bars; the confusion caused when users navigate outside the site and the lack of links; visual issues of the navigation system caused by the green color of the links, failure to

change colors for the visited links and the in-use menu, as well as the redundancy and inconsistency of the graphic and text titles; and unclear label names such as “DE Orientation Materials” and “Skills Test.”

The major usability problems in terms of information organization are the mixture of information for prospective students, current students, and faculty; the overlap between the resource section and the DE orientation materials section; the mixture of the degrees, certificates, and the courses offered by the university; the way the text is organized in paragraphs; as well as the switching points between the general site and the individual program sites.

The biggest problem found on the site was the lack of content. The major lack-of-content areas of the existing site are the overview page, the program page, and the resource page. These pages are expected to provide introductory information about the UNC DE program in general, individual programs, and individual resources, respectively, rather than simply give a bunch of links. Most participants showed negative reactions when they were led to another site with little explanation, especially resource sites with an overwhelming amount of information (e.g., IT help, Center for Instructional Technology), or program sites which explode the searching scope (e.g., School of education, Post-baccalaureate Certificate Program Molecular Diagnostic Science). In addition to making the site more informative about the existing pages, the site is expected to be more comprehensive.

Recommendations

Based on the usability problems found in the study, recommendations are suggested for improving the usability of the UNC-Chapel Hill Distance Education website.

For navigational issues

Navigation bars

About half participants thought it was redundant to have three sets of navigation bars. It would be helpful to remove the top navigation bar. Meanwhile, instead of having the section overview buttons (the “All programs” button and the “All student and faculty support” button), along with individual program/resource buttons, it would improve efficiency to remove these two buttons, and make the main buttons clickable with links to the section overviews. By doing so, every main button will be clickable, so that the consistency of the buttons is increased; users can more intuitively find the section overview pages; and it will be quicker for users to switch from one section to the other.

Table 6 is a suggested left drop-down menu. Column 1 of the table is the main buttons (every button having a drop-down pop-up menu has a link to its section overview page on itself) and column 2 is the drop-down menu choices. This suggested navigation bar was partially adapted from the website of Harvard University Extension School in terms of format and content (See Figure 5). In addition, different colors should be used to

distinguish information for prospective students from that for current students. New contents (in bold face in table 6) will be discussed in the recommendations “For Content Issues” below.

Table 6: Proposal of the left navigation bar (Drop-down menus)

About	
Courses:	Friday Center
Degrees/Certificates:	Allied Health Sciences, Education, Journalism, Nursing, Public Health, School Library Media, Social Work, Trans-Atlantic Masters.
Sample Classes:	Blackboard Demo/Tutorial, Video Lecture Demo/Tutorial
Student Review:	Student Statement, Video Interview, Contact Former Students
GRE Preparation:	GRE Resource
New Students To Do:	ONYEN, One Card, UNC Email Account, Class Listserv...
Registration:	How to register, Registration schedule, Late registration, Drop and add courses, Payment
Academic Policy:	Student responsibility, Honor code, Conduct, Grades, Transcripts, Research requests, Regulations, ...
Resources:	Writing Center, Learning Center , IT help, Library, Textbooks, Disability service, Parking, Financial aid, ...
Discussion Board	
FAQ	

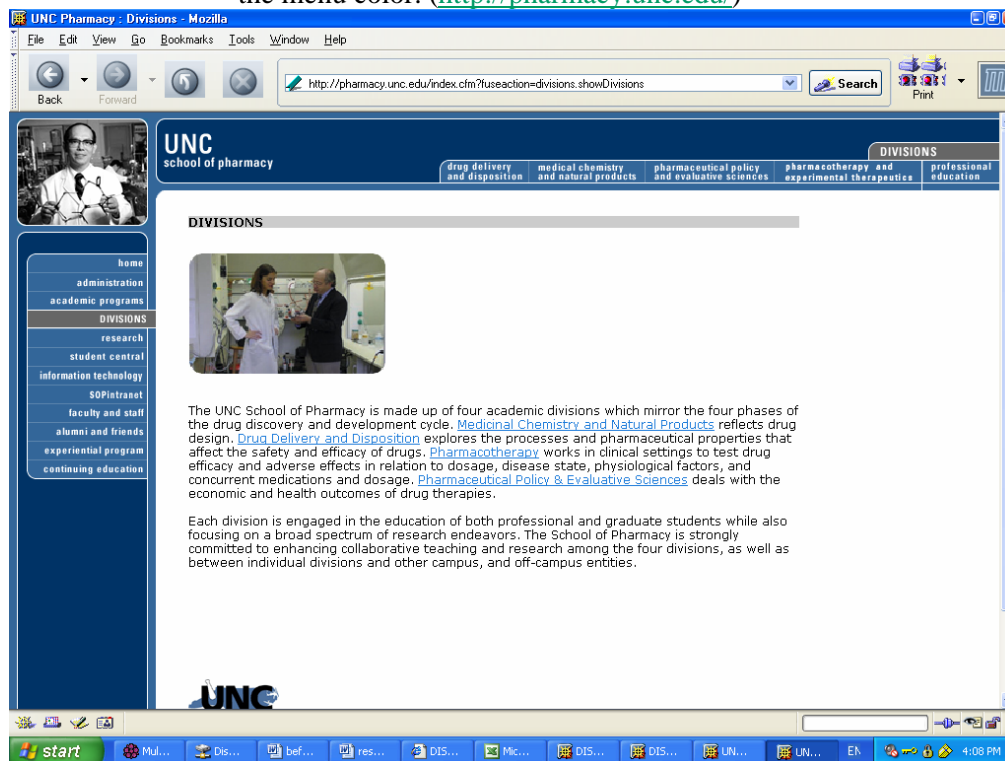
Figure 5: Available information can be easily found on the navigation bar of the website of Harvard extension school. (<http://www.extension.harvard.edu/>)



Other recommendations to address navigational issues

- New windows should be opened whenever the links lead the users out of the site; otherwise, after the users explore a given link, they have to repeatedly click the “Back” button on the browser to return to the DE site.
- The site should provide links to wherever it refers the users. In addition, add links on the header of the DE site and the university logo because some users are used to clicking the page header to go back to the homepage and the UNC logo to go to the university homepage.
- The color of the visited links and the in-use menu should change. Changing the color of the in-use menu will help users memorize the layout of the site (See Figure 6).

Figure 6: The website of the UNC School of Pharmacy indicates the in-used menu by changing the menu color. (<http://pharmacy.unc.edu/>)



- Three participants did not like the green color used on the links. Changing the green to a sharper color will make it easier for users to browse the site.
- Several murky label names should be changed. First, use “FAQ” to replace “DE Orientation Materials.” The participants reacted positively to the current index of questions on the “DE Orientation Materials” page. However, since more questions are expected to be added in this section if it is changed into “FAQ”, the index should be categorized. Second, no participant seemed intuitively to know the meaning of “Skills Test”; this label should be changed into something like “Test your computer.” Third, the label “Overview” can be changed into the more straightforward and more popular label name “About.”

- Critical links, such as Webmail and StudentCentral, should be accessible directly from the home page. Integrating the Login form of MyUNC on the DE homepage will help to avoid the “busy and confusing” homepage of the MyUNC portal.
- Users would benefit from a “search” bar which searches both the DE general site and the individual DE program sites.
- Make the interface wider so that most pages can be seen without scrolling down. This will especially benefit the users whose computer screens are small.

For information organization issues

Prospective students vs. current students vs. faculty

Information for faculty should not be included in this site. If the information can also benefit students, then the site should introduce how the resources work from the students’ standpoint. Obviously, marketing information is useless to the current students; therefore, it should be easy for the users to distinguish between information that is intended for prospective students and information intended for current students. Two design options are suggested. One is using the home page to mainly serve one user group, prospective students or current students, and label a link for the other user group separately. The other is to use colors to separate information for prospective students and information for current students (See Table 6).

Confusion between resources and DE orientation materials

The study suggested information about textbooks, financial aid, and free software should be put in the resources section because most participants started their searching from there.

Courses, degrees and certificates

The existing “programs and courses” menu should be split into two menus, the “courses” menu and the “degrees/certificates” menu, to indicate the two types of UNC DE programs. The difference between the Friday Center and other programs should be clearly declared on the homepage, the “courses” overview page, and the “degrees/certificates” overview page. However, all these pages should be cross referenced by each other.

Text organization

Web users tend to skim information rather than reading word by word. To improve the usability of text content, the most important information should be put on the top and bullets, bold face, indent, or colors should be used to emphasize key points of a paragraph and help users easily skim through the text.

Connections between the general site and individual sites

As previously discussed, the participants felt frustrated when the links caused the explosion of their searching scope. The dilemma is that some departments/schools provide important information for their DE students on the broader sites (e.g., the site of

the Division of Clinical Laboratory Science for the Post-baccalaureate Certificate Program Molecular Diagnostic Science); therefore, connecting users directly to the program site will cause the loss of some useful information. The suggestion is to link to a broader site from the drop-down menu if such a broader site has useful information to DE students. (However, linking to an entire School site is too broad to be acceptable; the link to School of Education on the drop-down menu should either be removed or pop-up a small window to explain that the program site is not available now.) Additionally, provide an explanation/introduction and links to both the broader sites and the program sites on the program overview page. This recommendation is made because the drop-down menu is more targeted to experienced users, while the overview page is targeted to naïve users.

For content issues

The site overview (currently on the “Overview” page) and section overviews (currently the “All programs” page and the “All students and faculty support” page) should be more informative. Every main menu that has a drop-down menu should have an overview page linked directly to itself.

The site overview, also serving as the homepage, should be able to answer users’ questions about the UNC DE program in general (Please see Page 41 for participants’ unanswered questions gathered from the study). The overview page for the degrees/certificates section can include a short paragraph introduction about this section and a compacted index of all the degrees and certificates. When clicking on each program,

users can see a brief introduction of the program, a fact table including critical information such as cost, contact information, delivery method, and important links. As for the resource section, instead of linking the drop-down menus to the individual resource site, an instructional page should be created for each resource. The existing library instructional page (<http://www.lib.unc.edu/distance.html>) is informative and was thought useful, but redesigning the interface of the page will help generate the same look and feel as other resources' instructional pages.

In addition to enriching the existing information, the site was expected to be more comprehensive. First, a demo of Blackboard, a sample video lecture, and other possible instructional formats will answer prospective students' concerns about DE program delivery methods and help them decide whether such a program would fit their learning style and preferences. Second, some participants would rather talk to former students in person than listen to the well-selected cases in the "Meet Our Students" section; therefore, posting volunteers' contact information will meet that kind of prospective students' needs. Third, since it was suggested that the orientation materials section be replaced by the "FAQ", in order to keep the function of orienting the new students, a "New Students To Do" section is suggested, to serve as a check list about things new students should do. Fourth, a discussion board will help bring DE students to the site, increase the interaction between students, and generate a sense of community. Fifth, information about registration should be immediately apparent, as a separate button on the navigation bar. Sixth, academic policy could be useful information also (including Honor code, Transcripts, Grading, etc.). Finally, other information in which students might be

interested should be included in the site too, such as disability services, parking, and so forth. (Please see table 6. The items in bold face are the new information suggested.)

For the GRE section

The GRE section should clearly state who should take the GRE. The participants were not clear about when the GRE was required and when it was not.

For the “Meet our Students” section

“Meet our Students” can be changed into “Student review” or “Student testimony.” The videos and statements should be sorted by program rather than student’s name so that prospective students can find a relevant one easily. In addition, the relevant videos and statements should be accessible from their program sites. The site should indicate the total length of the video. Finally, technical problems of displaying video should be fixed because the audio and video are not synchronized.

Conclusion

As discussed in the previous sections, this usability study revealed some usability issues in the current DE website. Suggestions were made based on the study results. In addition, some limitations or issues of the usability test design should also be taken into consideration.

First, the prospective student participants were not true “prospective students.” They did not have clear ideas about what programs they were interested in when they came to the study. These participants represent those prospective students who come to the site and look for a suitable distance education program as a way to fulfill their personal career goal. However, their perception of the programs might be slightly different from those who know the program they want to get into before they come to site and can easily find his/her program site for further exploration. Some argued that the real prospective students probably have heard of the programs before they come to the site because UNC currently provides a fairly limited set of programs. However, it is also important to let users quickly know there is not a right program for her/him. That could be a reason the “All programs” page should be changed.

Second, tasks chosen for prospective students involve several different programs.

Therefore, participants had to dig into different program sites for further information.

Because each program site has its own look, the prospective students had to figure out the navigation structure of each site. It is expected that participants might feel less strongly about the de-centralized structure of the DE site if each participant is only interested in one specific program. Even though many users might be interested in only one field, adapting participants' suggestions (alerting users to the fact that the site is de-centralized, and providing them with some guidance in exploring these de-centralized program sites) will help users find pertinent information quickly and easily.

Finally, it should be remembered that the sample size was small. Nevertheless, the sample size is sufficient for finding usability problems. According to Nielsen (2000), three to five participants are appropriate for a usability test. Nielsen (2000) believes, "The best results come from testing no more than 5 users and running as many small tests as you can afford". However, the small sample size and the usability test design overall may limit the scope of what is needed. Focus groups, surveys, and further literature review may help address the "small sample size" issue. In addition, as Nielsen (2000) stated, multiple tests will lead to the best results. Therefore, when an improved design is completed to address the usability issues found in this study, further testing needed to continue to improve the usability of the site.

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Appendix A: Participant Informed Consent Form



THE UNIVERSITY OF NORTH CAROLINA
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User Evaluation of UNC-CH Distance Education Website

Introduction to the Study:

You are invited to participate in a research study evaluating the UNC distance education website. Through user evaluation, we expect to identify the strengths and weaknesses of the website, and provide recommendations for improving its usability. The study is being conducted by two master's degree students, Helen Hawkins (ahawk@nc.rr.com) and Xiaohua Luan (xluan@email.unc.edu), from UNC's School of Information and Library Science, under the supervision of Dr. Barbara Wildemuth (wildem@ils.unc.edu).

Purpose:

The purpose of the evaluation is to determine whether the needs of users have been met in terms of user satisfaction, efficiency of navigation, and information organization. We will use what we learn from the evaluation to develop a plan for making the website easier to use.

What Will Happen During the Study:

During the study, you will be asked to do the following activities: fill out several questionnaires about your background and your impressions of the site; explore the site for 10-15 minutes while "thinking aloud"; complete several tasks using the site; and respond to several interview questions regarding your opinions of the site. Your interactions with the site and your comments will be recorded on audio- and videotape. Approximately 15 people will take part in this study.

Your Privacy is Important:

- Every effort will be made to protect your privacy.
- Your name will not be used in any of the information obtained from this study or in any of the research reports.
- The videotape will be viewed only by members of the research team, for the purposes of understanding usability problems that you experienced. The audiotape will be used for the same purposes.
- During the study, you have the right to ask that the audio and/or video recorders be turned off.

- At the end of the study, a videotape may be compiled of interactions representing the strengths and weaknesses of the surrogates being evaluated. This “highlights” tape may be viewed by others working on the development of the UNC Distance Education web site.
- The original audio- and videotapes will be destroyed at the end of the study. Even if you do not agree that your participation may be used in a “highlights” video, you can still be a research participant.
- If you have any questions or concerns about the study, please contact Xiaohua Luan (919-929-1890, xluan@email.unc.edu), Helen Hawkins (ahawk@nc.rr.com), or their advisor, Professor Dr. Barbara Wildemuth (919-962-8072, wildem@ils.unc.edu).

Risks and Discomforts:

We are unaware of any personal risk or discomfort you will have from being in this study.

Your Rights:

- You decide on your own whether or not you want to participate in this study.
- If you decide to participate, you will have the right to leave the study at any time.

Institutional Review Board Approval:

The Behavioral Institutional Review Board (Behavioral IRB) at the University of North Carolina at Chapel Hill has approved this study. If you have any questions about your rights as a research participant in this study, please contact the Behavioral IRB at 919-962-7761 or at aa-irb@unc.edu.

Summary:

I understand this is a research study to evaluate the performance of a website for the UNC-Chapel Hill Distance Education Program. If I agree to be in the study, I will respond to several questionnaires, interact with the web site while “thinking aloud,” respond to an interview. I will be observed by the researcher while I use the web site, and I will be audio recorded and video recorded.

Your Consent:

I have had the chance to ask any questions I have about this study, and they have been answered for me. There are two copies of this form. I will keep one copy and return the other to the investigator.

I have read the information in this consent form, and I agree to be in the study.

(Signature of Participant)

I also agree that portions of the videotape made during my participation may be used in a “highlights” tape that may be shown to people outside the research team.

(Signature of Participant)

(Date)

Appendix B
Demographic and Internet Background Questionnaire

Source: GVVU's WWW User Survey www.gvu.gatech.edu/user_surveys

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The recipient agrees to obey all U.S. Government restrictions governing redistribution or export of such information. These restrictions may apply to redistribution within an international organization.

Instructions: Please answer the following 11 questions truthfully. Your answers will be used to describe the background of the study participants as a group and will not be associated with you in any way.

Participant ID: _____

General Information

1. I am a...

- ___4___ prospective DE student.
- ___2___ Friday Center student.
- ___2___ currently enrolled in one of the UNC distance education program.
- ___2___ UNC on-site student.

2. Age:

- _____ 16-20
- ___4___ 21-25
- _____ 26-30
- ___2___ 31-35
- ___3___ 36-40
- _____ 41-45
- ___1___ 46-50
- _____ 51-55
- _____ 56-60

3. Gender:

- ___7___ Female
- ___3___ Male

4. What is your primary language?

- ___10___ English
- _____ Spanish
- _____ Other: _____

5. Please indicate the highest level of education completed:

- _____ Grammar School
- _____ High School or equivalent
- _____ Vocational/Technical School
- ___3___ Some College
- ___3___ College Graduate (4 year)
- ___3___ Master's Degree
- ___1___ Doctoral Degree

_____ Professional Degree (MD, JD)
 _____ Other _____

Experience with computers; Internet use

6. How often do you use Internet?
 _____ Never
 _____ Occasionally
 _____ Monthly
 _____ Weekly
 ___10___ Daily
7. How comfortable do you feel using computers, in general?
 ___8___ Very comfortable
 ___2___ Somewhat comfortable
 _____ Neither comfortable nor uncomfortable
 _____ Somewhat uncomfortable
 _____ Very uncomfortable
8. How comfortable do you feel using the Internet?
 ___8___ Very comfortable
 ___2___ Somewhat comfortable
 _____ Neither comfortable nor uncomfortable
 _____ Somewhat uncomfortable
 _____ Very uncomfortable]
9. How long have you been using the Internet (including using email, gopher, ftp, etc.)?
 _____ Less than 6 months
 _____ 6 to 12 months
 _____ 1 to 3 years
 ___3___ 4 to 6 years
 ___7___ 7 years or more
10. On the average, how much time do your spend per week on computers?
 _____ Less than one hour
 _____ One to less than 4 hours
 ___1___ 4 to less than 10 hours
 ___9___ Over 10 hours
11. How often do you visit the UNC Distance Education web site?
 ___7___ Never
 ___2___ Occasionally
 _____ Monthly
 ___1___ Weekly
 _____ Daily

For what reasons have you visited the UNC Distance Education Web site? If you answered "Never" to question 11, please leave this question blank.

Appendix C: First Impressions / Satisfaction Questionnaire

Instructions: Please circle the numbers that most appropriately reflect your impressions of using this web site. NA=Not Applicable. If you have any questions, please ask the researcher.[1]

Overall reactions to the site:	terrible											wonderful
		1	2	3	4	5	6	7	8	9	NA	
	frustrating											satisfying
		1	2	3	4	5	6	7	8	9	NA	
	dull											stimulating
		1	2	3	4	5	6	7	8	9	NA	
	difficult											easy
		1	2	3	4	5	6	7	8	9	NA	
	rigid											flexible
		1	2	3	4	5	6	7	8	9	NA	

Instructions for 1-15: For the following questions, please respond to the statements on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree). **Please mark any items that you want to talk more about.** [2]

Strongly Disagree ← Neutral → Strongly Agree

Appearance:

1. This site is visually appealing.	1	2	3	4	5	6	7	NA
2. The screen layout of the site is attractive.	1	2	3	4	5	6	7	NA
3. Colors used in the site are pleasant.	1	2	3	4	5	6	7	NA
4. Text in headings is easy to read.	1	2	3	4	5	6	7	NA
5. Text in paragraphs is easy to read.	1	2	3	4	5	6	7	NA
6. Graphics, icons, photos and multimedia contribute to my understanding of the site's content.	1	2	3	4	5	6	7	NA
7. The purpose of the star in the background is clear.	1	2	3	4	5	6	7	NA

Information organization and navigation:

Strongly Disagree ← Neutral → Strongly Agree

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 8. This site is organized in a way that is easy for me to understand. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 9. The labels on menu items are easy to understand. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 10. I find it easy to navigate this site. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 11. The amount of information displayed on a page is just right. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 12. I always know where I am within this site. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

Information delivery:

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 13. The association of the DE website to the University becomes clear when I navigate through the site. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 14. The overall purpose of the site, why it's there, who it serves, etc. is easy to understand. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 15. It is easy to distinguish between information that is intended for prospective students and information intended for current students. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

Source:

[1]: The Questionnaire for User Interaction Satisfaction. Human-Computer Interaction Lab, University of Maryland, College Park;

[2]: Question 2, 3, 6, 8, 9, 10, 11, 12. Ingrid A. Pohl (2003). Advocacy on the Web: An Evaluation of a Nonprofit Advocacy Organization's Use of The Web to Support Its Mission and Goals. SILS Master Paper

Appendix D: Scenarios / Tasks

For Prospective Students:

1. You discover that UNC provides distance education. You want to take one online course in the History of Western Art. Does the university offer it?
2. You are considering pursuing a nursing degree. Find the web page that provides information on expected cost.
3. You decided to apply for admission to the Executive MPH program in the school of public health. How would you apply for admission to this program?
4. You want to take a course in Introduction to African Civilization on the semester schedule via the Internet. You are told that Friday Center for Continuing Education provides it. Find out the enrollment form for this course.
5. You want to join FIRST YEARS - Certificate in Auditory Learning in Young Children with Hearing Loss in Allied Health Sciences. Find the technical requirements for this program.
6. You need financial aid. Find information about whether you can get financial aid to support your educational expenses.
7. You want to enroll in a UNC DE program, but you are nervous about taking the GRE test. Look at the information on preparing for the GRE. Does this information encourage you and make you more confident about becoming a DE student?
8. Listen to a couple of video interviews. Do the videos make prospective students more confident of the quality of the distance education programs?

For Current Students:

1. Your computer was infected with a virus. Find the telephone number for the IT Response Center to speak with a support person.
2. You have heard that you can buy textbooks through the DE website. How would you find this information? Keep going and find one of your textbooks.
3. You are writing a paper for a public health class. Your teacher asks you to find scholarly sources from the university library to support your arguments. You know the library provides electronic resources (e.g., electronic journal, magazine, or newspaper articles) which you can access remotely. Find a page that provides information about these resources.
4. School will start soon. You need to register for 2 classes. How would you register for them on-line?
5. You have been admitted to the MPH in Public Health Leadership. What courses will you be required to take?
6. You want somebody to help you with your writing. Check out the university's writing center. Can you submit a paper on-line for advice?
7. You need to download Norton Antivirus software. You know the school provides that software to students for free. Where would you download it?
8. You've been told you can use your ONYEN to access email, check grades, use the portal, and even access courses. How can you confirm that your ONYEN is setup and working? How would you change the password?

Appendix E: Post-Test Satisfaction Questionnaire

Note: Some questions in this questionnaire are the same as the First Impression Satisfaction Questionnaires you completed earlier. Please answer them based on your current feelings. The purpose is to **see if you have changed your mind after carrying out specific tasks.**

Instructions: Please circle the numbers that most appropriately reflect your impressions about using this web site. NA=Not Applicable. If you have any questions, please ask the researcher. [1]

Overall reactions to the site:	terrible	1	2	3	4	5	6	7	8	9	wonderful	NA
	frustrating	1	2	3	4	5	6	7	8	9	satisfying	NA
	dull	1	2	3	4	5	6	7	8	9	stimulating	NA
	difficult	1	2	3	4	5	6	7	8	9	easy	NA
	rigid	1	2	3	4	5	6	7	8	9	flexible	NA

Instructions for 1-14: For the following questions, please respond to the statements on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree). **Please mark any items that you want to talk more about.** [2]

Strongly Disagree ← Neutral → Strongly Agree

Appearance:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 1. Hyperlinks are clearly marked and distinct from other text. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 2. Text in headings is easy to read. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 3. Text in paragraphs is easy to read. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 4. Graphics, icons, photos and multimedia contribute to my understanding of the site's content. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

Information Organization and Navigation:

Strongly Disagree ← Neutral → Strongly Agree

5. This site is organized in a way that is easy for me to locate information I want.	1	2	3	4	5	6	7	NA
6. The web site covered what I expected to be covered.	1	2	3	4	5	6	7	NA
7. I find it easy to navigate this site.	1	2	3	4	5	6	7	NA
8. It was always clear what would happen when I clicked a link.	1	2	3	4	5	6	7	NA
9. The amount of information displayed on a page is just right.	1	2	3	4	5	6	7	NA
10. The labels on menu items are easy to understand.	1	2	3	4	5	6	7	NA
11. I always know where I am within this site.	1	2	3	4	5	6	7	NA
12. No matter where I am in this site, I can easily return to the home page.	1	2	3	4	5	6	7	NA
13. Information about <i>the cost</i> for taking a course is easy to locate from the homepage.	1	2	3	4	5	6	7	NA
14. Information about <i>how to apply</i> for a course is easy to locate from the homepage.	1	2	3	4	5	6	7	NA
15. It is easy to distinguish between information that is intended for prospective students and information intended for current students.	1	2	3	4	5	6	7	NA

Source:

[1]: The Questionnaire for User Interaction Satisfaction. Human-Computer Interaction Lab, University of Maryland, College Park;

[2]: Question 4, 7, 9, 10, 11, 12. Ingrid A. Pohl (2003). Advocacy on the Web: An Evaluation of a Nonprofit Advocacy Organization's Use of The Web to Support Its Mission and Goals. SILS Master Paper

Appendix F: Post-test Semi-Structured Questions

For prospective students:

- a) Does the site give you a clear understanding of the nature of distance education (DE) programs? Do you feel you understand the following:
 - i. The outcomes of a DE program (both benefits and constraints)?
 - ii. Prerequisites and workload?
 - iii. Delivery methods for DE courses?
- b) Does the site encourage you and make you more confident about becoming a DE student?
- c) Does the site convince you that the teaching quality of DE programs is satisfactory?
- d) Do you think information for current students should be labelled separately from information for prospective students and faculty?
- e) Do you think this site provides enough general information for prospective DE students? Did you look for any information there that you did not find? If so, what were you looking for?
- f) What two pieces of advice would you provide to a first-time user of the site?
- g) What did you like best about the site? What did you like least about the site?

For current students:

- a) Were you aware of the contents listed under orientation at the beginning? Was there anything there that surprised you? If so, what surprised you?
- b) Which on-line student services websites do you usually use? How do you like the My-UNC portal? What do you find most/least helpful about the My-UNC Portal?
- c) Do you think information for current students should be labelled separately from information for prospective students and faculty? Why or why not?

- d) Does this site provide enough general information for current DE students? Did you look for any information there that you did not find? If so, what were you looking for?
- e) What two pieces of advice would you provide to a first-time user of the site?
- f) What did you like best about the site? What did you like least about the site?