

# Selection Behavior on the World Wide Web for LIS Students

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## Abstract

We observed 30 students from the School of Library and Information Science of the University of Washington, as they interacted with Web pages created for this study. We found they were more likely to select the first link in a list of similar links. Given a Web page where one link was the optimal choice for their searching task, participants were equally likely to select that link whether it was visible on the initial screen or whether they had to scroll down to see it. Given a list of similar links where some of the links were longer than others, the participants showed no preference between the longer and the shorter links.

## Introduction

The increased use of the World Wide Web as a source for information and entertainment brings up new questions in query and retrieval. Traditionally, if a person were to seek organized information it would be through a catalog or database. The information found within these sources has been selected by various professionals in a variety of fields and as such will arguably be reliable, “good” information. Within a database or catalog, one is presented with a finite amount of choices. When a person conducts a search on the World Wide Web, she will more often be presented with an uncountable number of choices and there will really be no way to guarantee that one source will be better than another, or that the information on a website will even be true. The basic format for selection of sources from the World Wide Web is in the form of a list. It is users’ interaction with these lists that we address in this study.

Web search engines will often rank site matches in a list starting with the “best matches” first. The search engines indicate this through percentage rankings. The higher the percentage, the better the link is matched to the query terms. Given the sanction that rankings give to the first items in the list and given the easier accessibility of those links, the searcher may simply take the first link she sees. This type of action is a variance of Mooers’ Law. Mooers’ Law states that “an information retrieval system will tend not to be used whenever it is more painful and troublesome for a customer to have information than for him not to have it.”<sup>1</sup> Generally, the

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<sup>1</sup> Mooers, Calvin N. “Mooers’ Law or, Why Some Retrieval Systems Are Used and Others Are Not.” *American Documentation*, 11 (3): ii, July 1960.

first link in a list is visible when the search engine returns the results. Rather than taking the trouble to scroll down the page, a person might tend to simply click the first link he sees. Also following Mooers' Law, if a link has a very long title that sticks out beyond all other link titles, it may tend to be visited more often simply because it is easier to see and click. This study investigates the above conditions; it seeks to understand the ways in which users interact with lists and the design factors that affect their choice of links.

## **Methodology**

In this study, we observed the searching behavior of 30 library students in a selection of convenience from those in the University of Washington School of Library and Information Science computer lab. Rather than have the students simply search the Web in a disorganized fashion, we prepared three different sites, each having two versions, for them to explore with predetermined prompts. It was our belief in conducting this experiment that the location of an item within a list would affect how often it was selected.

### *Meg Ryan Page*

Each of the two versions of this page treated the concept of lists in a slightly different manner. For views of the pages, please see Appendix III. The first page was a list of links to websites about Meg Ryan. The list on the Meg Ryan page had no pictures and was relatively plain. All the links in the list were approximately the same length and names of the links did not give any particular insight as to how one website might be different from another. In Version A (Appendix III, Figure 3), the links were listed in alphabetical order. In Version B (Figure 4) the links were listed in reverse alphabetical order. The general premise behind the design of this page was to create a list in which any one link would be just as attractive as another. These pages tested the hypothesis that if there is a list of similar links, participants will simply choose the first link in the list.

### *Harvard Page*

The second page was a list of links pertaining to Harvard. There was a picture to the left of the page and the list of links ran down the right side of the picture. The two significant links in the list were the "News" link and the "Events" link. The page and the task associated with it were designed so that the "correct" choice would be the link to the Events page. On Version A of the Harvard page (Figure 5), the Events link is hidden until the participant scrolls down the

page. On Version B of the Harvard page (Figure 6), the Events link is in plain view directly beneath the News link. In both versions, the News link is second from the top of the list. This pair of pages let us investigate whether participants would tend to choose the first choice that was both relatively logical and readily available. On Version B it was expected that participants would first choose the Events link because it could be easily seen. On Version A it was expected that participants would tend to choose the News link first because they would see it first and then later go back and scroll down to see the Events link.

### *Madonna page*

The third page dealt with websites pertaining to Madonna. There was a picture of Madonna on the right side of the page and the links were down the left side of the page. The links on the Madonna page, like the Meg Ryan page, were intended to not reveal what might make one website better than another. The links in the list were alternately relatively long and relatively short. In Version A (Figure 7) there was a long link listed first, so that the second was short, the third long, etc. In Version B (Figure 8) a short link was listed first then alternating short, long, etc. The idea behind presenting long and short links was that longer links would be easier to click and thus the sites would be visited more often.

### *Questionnaire*

Participants also responded to several questions in order to supply background information that might affect searching habits (Appendix III, p. 14). The first two questions asked participants' age and gender. These questions allowed us to describe generally the population who made up our sample. Other questions allowed us to describe the level of computer experience of our participants. We asked how long they had used the Web and whether they had a computer at home to determine basic familiarity and ease with the computer environment. We asked each participant to rank himself or herself as a beginning, intermediate, or advanced Internet searcher. We also asked how many hours in the past week the participant spent on the Internet to supply another gauge of their computer experience.

We tried to keep the answers to these questions as uniform as possible. We didn't think there would be a problem with unexpected answers by asking age and gender. At the beginning of the mini survey we did remind the participant that they were not obligated to answer any questions they did not wish to. There was some concern to ask for age because we thought some participants might be uncomfortable sharing that information. When we asked when the participant first searched the Internet, we made certain to specify that we wanted the answer in

years. Whether the participant has a computer at home is a yes/no question. We asked the participants to “please circle” beginning, intermediate, or advanced to avoid too great a variety of answers. And finally, we specified hours in the past week they spent on the Internet, rather than asking “per day” which might pose some confusion (weekdays versus weekends) and rather than asking per month which would be too long a time for the participant to give a good estimation.

### *Procedures*

The study was made up of two parts: a series of Web navigation tasks, where the testers observed their choices of links on three web pages, and the questionnaire. In the first portion the experimenter wrote down which site participants visited first. In the second part the participants responded to a confidential, six-question, written portion of the survey. It was necessary to break it into these two parts so the participants would click through the websites naturally, rather than “thinking about what they would do.” The second part was written rather than oral so the participants would not feel pressure to respond to any questions that might make them uncomfortable. Also, since the survey was conducted in a computer lab, having the participants write down the more personal information would keep others from overhearing.

Participants were selected by convenience from students in the University of Washington School of Library and Information Science computer lab. A total of 30 surveys were performed. The instructions as followed by the experimenters can be found in Appendix I. If a student was chosen for the survey, the experimenter would approach the student and ask them if they would be willing to spend approximately ten minutes to participate in a survey. If the student consented, the experimenter would read the statement from the top of each survey:

We’re studying how people interact with the World Wide Web. Please look at the sites linked from this page for which I will give you some very simple instructions and then spend as little or as much time as you would like exploring. After you finish, I would like to ask you a few questions about your computer and Internet use. You are not obligated to participate in the survey, nor are you obligated to answer any questions you would not like to.

At that point, if the student was still agreeable to taking part in the survey, the experimenter would open up the web page listed at the top of the survey in the Internet Explorer browser. In order to maintain continuity in the look of the web pages among all participants, the experimenter would make sure that the tool bar was present with the standard buttons and text labels visible, the address bar was present, the status bar was present, and the Explorer bar was hidden. After the browser had been successfully opened the experimenter would go to the URL indicated at the top of the survey. There were two versions of the first portion of the survey

labeled “Version A” and “Version B” -- each had their own URL (Figures 1 and 2). Participants were randomly assigned one version or the other.

In each version, the participant would see a site with three links to “Site #1,” “Site #2,” and “Site #3.” The participant was asked to please click on “Site #1.” When the Meg Ryan page appeared, the experimenter would give the prompt, “Please explore the listed sites.” If the participant had not stopped exploring after approximately two minutes, the experimenter would indicate that it was time to continue to “Site #2.” Once the Harvard page appeared, the experimenter would give the prompt, “Please find the list of upcoming lectures within this website.” Again, if the participant was not finished exploring after approximately two minutes, the experimenter would indicate that it was time to move on to “Site #3.” Once the Madonna page appeared the experimenter would give the prompt, “Please explore the listed sites,” and again stop the participant after two minutes of exploring. During the time that the participant was exploring each of the three pages, the experimenter would write down the order in which the participant visited the sites. The researcher was also allowed to make informal notes on a separate sheet of paper to record any interesting search behavior for the purpose of identifying problems in the process and creating suggestions for future avenues of research.

After the participant had finished the first portion of the survey, the researcher would ask the participant to complete the written portion of the survey located on the back of the survey sheet. Before leaving the immediate vicinity, the researcher would ask the participant to please put the survey in a provided envelope when he or she was finished. Only the one experimenter who entered the results into SPSS was allowed to see the written portion of the surveys.

## **Results**

The results of our survey permit us to make a general description of the population we studied. Twenty-four of the participants who indicated their gender were female, five were male. Almost half of the respondents (14) fell into the 26-30 age range. The overwhelming majority (23) were 18-35. Twenty-six of the 30 respondents had a computer at home. On average, the participants have been searching the World Wide Web for three years. The majority of the respondents rated their Internet skills as intermediate. Almost half the respondents (13) indicated that they used the Internet 5-10 hours a week. The population was not randomly selected to accurately represent SLIS as a whole. However, the answers to these questions give us a picture of the population investigated: a young, largely female population, with a great deal of experience with computers and with searching the Internet.

### *Meg Ryan page*

If we discuss, in turn, the three web pages, we can see that this brief study gives us some insight into web page design. First, with the Meg Ryan page, we found that there is a clear tendency for users to select the first link on the page, when presented with a list of highly similar choices. Of the 14 participants given Version A of the page who selected any links (one participant explored the page without clicking through to any links), nine selected the first link (Meg Ryan Enhanced), three the second. With Version B, 14 out of the 15 selected the first link (Val's Meg Ryan Page). Therefore, overall 23 of the 29 people selected the link that appeared first. The effect in Version A is strong, but not as overwhelming as in Version B, perhaps because, as some participants stated, people were concerned that "Meg Ryan Enhanced" might have some sexual content and thus avoided it. A significant number of participants chose the second link as their second choice. Five of the nine people who made a second choice on Version A did this; eight of the 15 who made a second choice on Version B did this.

<b>Distribution of links chosen first and second on Meg Ryan test pages</b>						
	Version A			Version B		
Name of page	position on web page	number of times chosen first	number of times chosen second	position on web page	number of times chosen first	number of times chosen second
Meg Ryan Enhanced	1st	9		6th		2
Meg Ryan Homage	2nd	3	5	5th		1
Meg Ryan Picture Archive	3rd		2	4th		3
Raky's Meg Ryan Page	4th		2	3rd		
Tom's Meg Ryan Page	5th			2nd	1	8
Val's Meg Ryan Page	6th	2		1st	14	1
no choice		1	6			
total		15	15		15	15

### *Harvard page*

With this page, the participants engaged in a more directed search task. The results indicate that a sophisticated population of users will find the optimal link, whether it is visible on the initial screen or whether one has to scroll down to click on it. This page was designed with the assumption that when given the task “Please find the list of upcoming lectures within this website,” most users would see the “Events” link as the most promising selection. This supposition was confirmed by the fact that 27 of the 30 participants selected this link first. Surprisingly, it mattered little whether the “Events” link was visible on the initial screen. On Version B, where the “Events” link was prominent as the third link in the list, 13 out of 15 students selected “Events” first. But on Version A as well, where the user had to scroll down to reveal the “Events” link, 14 out of 15 students selected it first.

<b>Distribution of links chosen first on Harvard test pages</b>				
	Version A		Version B	
link name	visibility on initial screen	number of times chosen first	visibility on initial screen	number of times chosen first
News	visible	1	visible	
Student Resources	visible		visible	2
Events	hidden	14	visible	13
total		15		15

### *Madonna page*

The final page was designed to test the idea that users presented with a list of largely similar links might tend to select the links that were physically longer, that took up a greater proportion of the screen, simply because of the ease of selecting them. Our study provided little confirmation for this idea. On Version A, where odd-numbered links were longer than the even-numbered links, nine of the 15 participants selected one of the five longer links rather than one of the five shorter links as their first choice. On Version B, where the same odd-numbered links were shorter than the even-numbered links, eight of the 15 participants selected the longer links first. Overall, if we look at all the clicks made as either a first, second or third choice, we see that on Version A, 18 out of 36 total selections were of longer links. On Version B, 17 of 37 total selections were of longer links. Perhaps with a larger sample, a significant trend in this direction might appear. However, given the small size of our sample, no clear trend emerges from these data to favor either longer or shorter links.

<b>Distribution of links chosen on Madonna test pages</b>						
	Version A			Version B		
Name of link	Length of link (L/S)	number of times chosen first	total number of times chosen first, second or third	Length of link	number of times chosen first	total number of times chosen first, second or third
Database	L	2	3	S	5	9
Ray of Light	S	1	4	L	2	6
Evita	L	2	7	S		4
DIVA	S	2	5	L	4	5
Discog	L	1	2	S		3
Mailorder	S	1	4	L		
Sunny's	L	1	2	S	2	4
Paradise	S		1	L	1	4
Madonnanet	L	3	4	S		
Lolax	S	2	4	L	1	2
total for shorter links		6	18		7	20
total for longer links		9	18		8	17
Totals		15	36		15	37

We also notice that on this page, users were much less inclined to choose the first link as they were on the Meg Ryan page. In observation of this point, one must also bear in mind that this page was not designed to test participants' propensity to select the top link first. The same items were presented in the same order each time; so perhaps the intrinsic interest of the links further down the list pulled users to select them, despite a general tendency to select the first link in the absence of other compelling factors. However, other factors could explain this fact as well. Perhaps the presence of the photo of Madonna forced users' eyes to survey the entire page and cancelled the "select the top link" tendency. Perhaps the absence of the bullet points before the list items provided the participants less of a clue that this was a list of similar items, unlike the Meg Ryan page which had such bullet points. These aspects of user interaction with web links bear further investigation.

## Discussion and Conclusion

These results represent only a preliminary study with a small user group. However, if confirmed and elaborated in larger studies, the results could have important implications for web design. The Meg Ryan page results point out the importance of placing the most useful links first. Web designers presenting a list of links might be tempted to list them alphabetically – a technique which makes the ordering system obvious to the user. Thus, a returning user could quickly find a resource he knew was there, without browsing the entire list. However, these results would indicate that designers should perhaps assume that if the links appear similar enough most users will simply pick the first link and, therefore, the designer should make the first link the most useful one. Further studies could study this phenomenon to determine if it occurs in all user populations and the extent to which other factors, such as a graphics to highlight certain links, could counter this tendency.

The Harvard page results show that for at least certain populations, the “usable” length of a web page is greater than what is visible on the initial screen. If links hidden below the bottom of the screen are the most useful, searchers will seek them out. It would be interesting, however, to investigate this phenomenon in other types of populations. Perhaps with other groups, the assumption that users will show that persistence would not be justified. With our study, we had hoped to find correlations between a person’s level of familiarity with the Internet and facility in finding these “hidden” links. However, the fact that almost all our participants went straight to the optimal link made that effort impossible. This phenomena may also be a result of the library student user group.

Finally, the Madonna page provided little confirmation for the idea that the ease of clicking on a longer link would increase visits to that site. However, the tendency of users interacting with the Madonna page to select more freely from items toward the bottom of the list indicates something of the complexity of user-web page interaction and suggests interesting avenues for future research.

Our findings are, in and of themselves, interesting and useful to web designers and others concerned with how humans interact with computer interfaces. In addition to the expansions on the findings made above, one could investigate numerous other subtle web page techniques which might influence users. Do lengthy abstracts or brief abstracts attract users’ attention more? Links hidden just below the initial screen are sought out with ease, but what of links three or four screens below the initial screen? The techniques implemented in this study should prove useful in investigating those and many other aspects of Internet navigation.

# **APPENDICES**

**Appendix I**

**Instructions**

**Appendix II**

**Marking Sheets and Survey Forms**

**Appendix III**

**Figures**

## **APPENDIX I**

### **Instructions**

1. Approach a SLIS student using a computer in the SLIS lab and ask them if they have about 10 minutes to participate in an experiment and survey
2. If they agree, read the statement at the top of the survey form.
3. Set up their workstation with Internet Explorer maximized on the screen and make sure that: the tool bar is present with standard buttons and text labels, the address bar is present, the status bar is present.
4. Go to the URL indicated on the top of your survey form.
5. Ask the participant to click through Site #1 and read the appropriate prompt for that page (listed on the survey form).
6. Indicate which link they selected first, second, third, etc. by placing a number next to the name of that link on the survey page.
7. If they are still searching after approximately two minutes, ask them to move on to the next site.
8. Ask them to return to the survey home page by back clicking or by re-inputting the URL and repeat steps 5 - 7 for the other two sites.
9. After recording their clicks for the three sites, turn the survey over and ask them to fill out the written survey on the back. Leave them with an envelope containing other survey forms and tell them to place the survey wherever they want among the other surveys in the envelope and then return the envelope to you when finished. Leave the immediate vicinity while they fill out the survey.
10. If they have any questions about the nature of their task while exploring the website, tell them that the only instruction you can give them is the written prompt for that page.
11. If they have any questions about the meanings of terms on the survey, note their questions, and tell them to answer as best they can with whatever meaning they give those terms. If they ask what the "Internet" means, say "the Internet includes: email, newsgroups, World Wide Web, FTP and gopher, among other things."
12. In addition to formally recording the participant's first clicks, researchers may make informal notes of any other interesting search behavior on the "Marking Sheet" side of the form, for the purposes of identifying problems in the study or suggesting future avenues of research.
13. In closing the interaction, ask the person not to discuss this study with other SLIS students until the end of the quarter. Tell them to contact you if they want to see the results of the study.

## APPENDIX II Marking Sheets and Survey Forms

Version A, Marking Sheet <http://weber.u.washington.edu/~fbrown/lis599/test.html>

We're studying how people interact with the World Wide Web. Please look at the sites linked from this page for which I will give you some very simple instructions, and then spend as little or as much time as you would like exploring each one. After you finish, we would like you to answer a few questions about your computer and Internet use. You are not obligated to participate in this case study, nor are you obligated to answer any questions you would not like to.

Prompt for page #1: "Please explore the listed sites."

- Meg Ryan Enhanced
- Meg Ryan Homage
- Meg Ryan Picture Archive
- Raky's Meg Ryan Page
- Tom's Meg Ryan Page
- Val's Meg Ryan Page

Prompt for page #2: "Please find the list of upcoming lectures within this website."

About Harvard  
News  
Admissions  
Academics  
Financial Aid  
Directories  
Extension School  
Student Resources  
Health Services  
Alumni  
Athletics  
Events  
Information Technology

Prompt for page #3: "Please explore the listed sites."

A Database From Europe – Madonna - The Archive  
Ray of Light  
Evita - The Complete Motion Music Soundtrack  
DIVA Central  
Madonna @ Discographies For The Masses  
Madonna Mailorder  
Sunny's Tribute to Madonna's Ray of Light  
Into The Paradise  
Madonnanet - creating a net for Madonna  
Lolax

## Appendix II

### Marking Sheets and Survey Forms

Version B, Marking Sheet <http://weber.u.washington.edu/~fbrown/lis599/project.html>

We're studying how people interact with the World Wide Web. Please look at the sites linked from this page for which I will give you some very simple instructions, and then spend as little or as much time as you would like exploring each one. After you finish, we would like you to answer a few questions about your computer and Internet use. You are not obligated to participate in this case study, nor are you obligated to answer any questions you would not like to.

Prompt for page #1: "Please explore the listed sites."

- Val's Meg Ryan Page
- Tom's Meg Ryan Page
- Raky's Meg Ryan Page
- Meg Ryan Picture Archive
- Meg Ryan Homage
- Meg Ryan Enhanced

Prompt for page #2: "Please find the list of upcoming lectures within this website."

About Harvard  
News  
Events  
Admissions  
Academics  
Financial Aid  
Directories  
Extension School  
Student Resources  
Health Services  
Alumni  
Athletics  
Information Technology

Prompt for page #3: "Please explore the listed sites."

Madonna Database  
The Star Ledger's Review of Ray of Light  
Evita  
DIVA Central - A Tribute to the Ladies of Music  
Discographies  
Madonna Total Recall Music Mailorder  
Sunny's Tribute  
Into The Paradise - A Madonna Tribute Page  
Madonnanet  
Lolax - Madonna Discography, Movies and More

## Appendix II

Survey Forms -- Versions A and B (Survey is the same for both)

"<http://weber.u.washington.edu/~fbrown/lis599/test.html>" and

"<http://weber.u.washington.edu/~fbrown/lis599/project.html>"

Mini survey:

Before filling out this mini survey, please be reminded that you are in no way obligated to answer any of these questions.

1. Age: \_\_\_\_\_
2. Sex: M / F
3. How long ago in years did you first search the World Wide Web? \_\_\_\_\_
4. Do you have a computer at home? yes / no
5. Do you consider yourself a beginning, intermediate, or advanced Internet searcher?  
(please circle.)
6. How many hours in the past week did you spend on the Internet? \_\_\_\_\_

## APPENDIX III

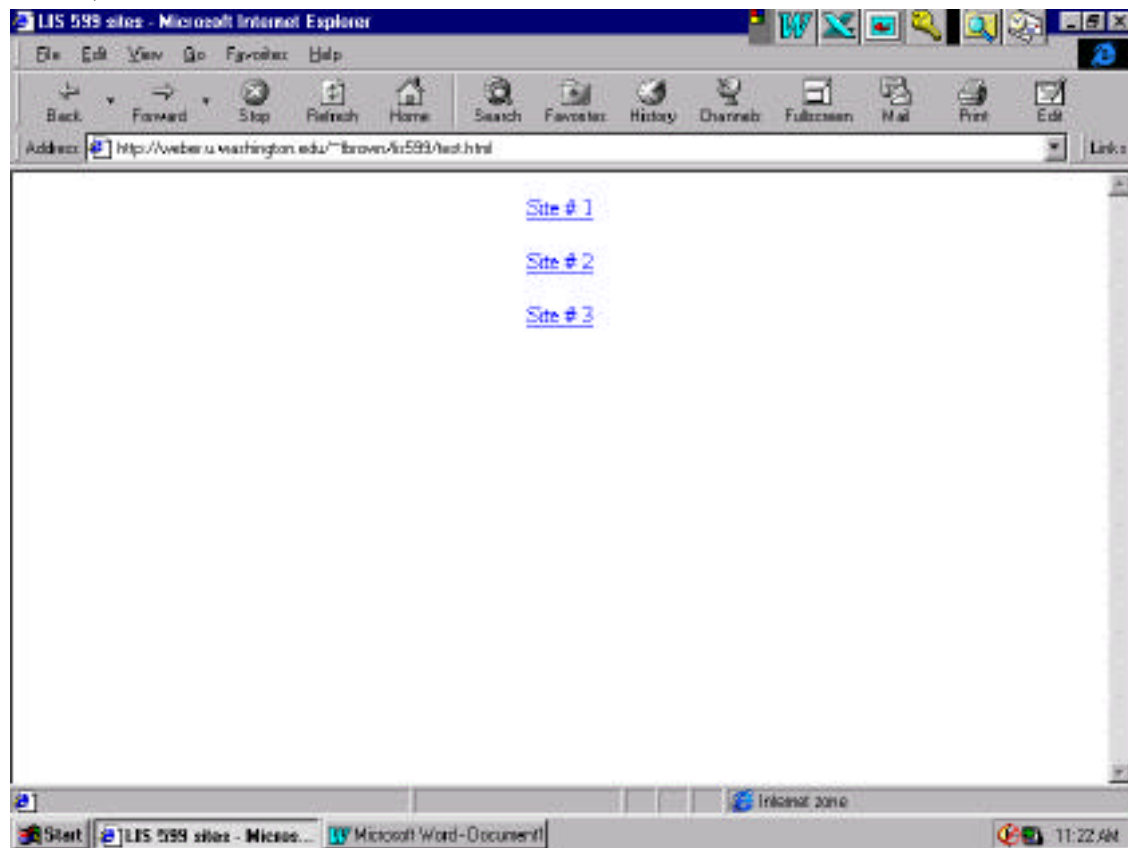


Figure 1. Main Page "...test.html" -- Version A

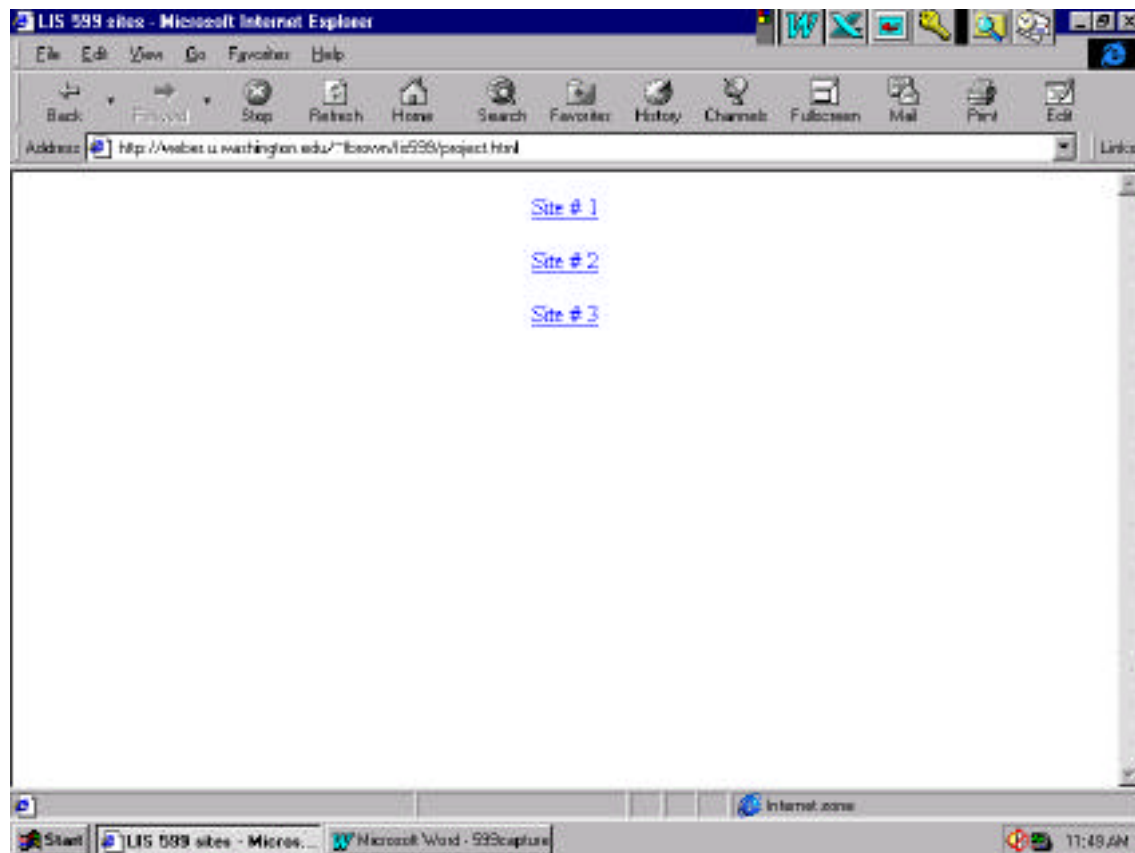


Figure 2. Main Page "...project.html" -- Version B

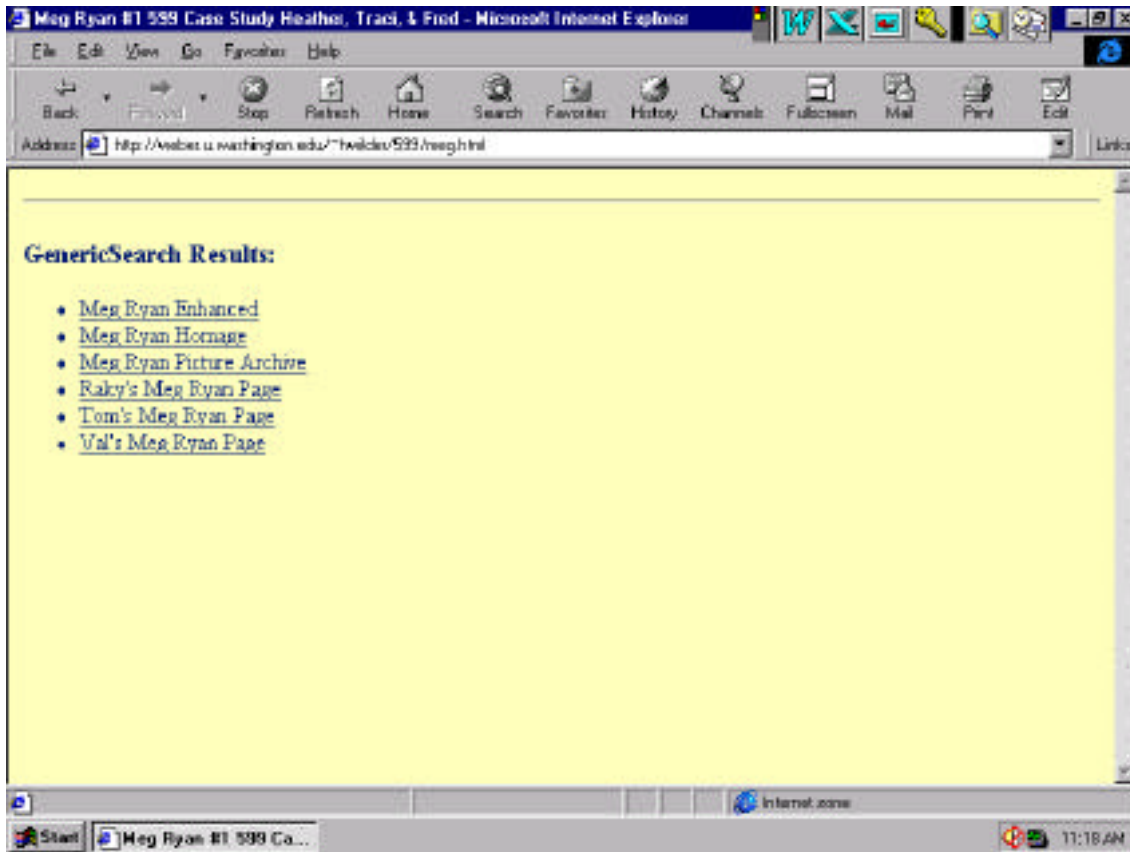


Figure 3. Meg Ryan – Version A

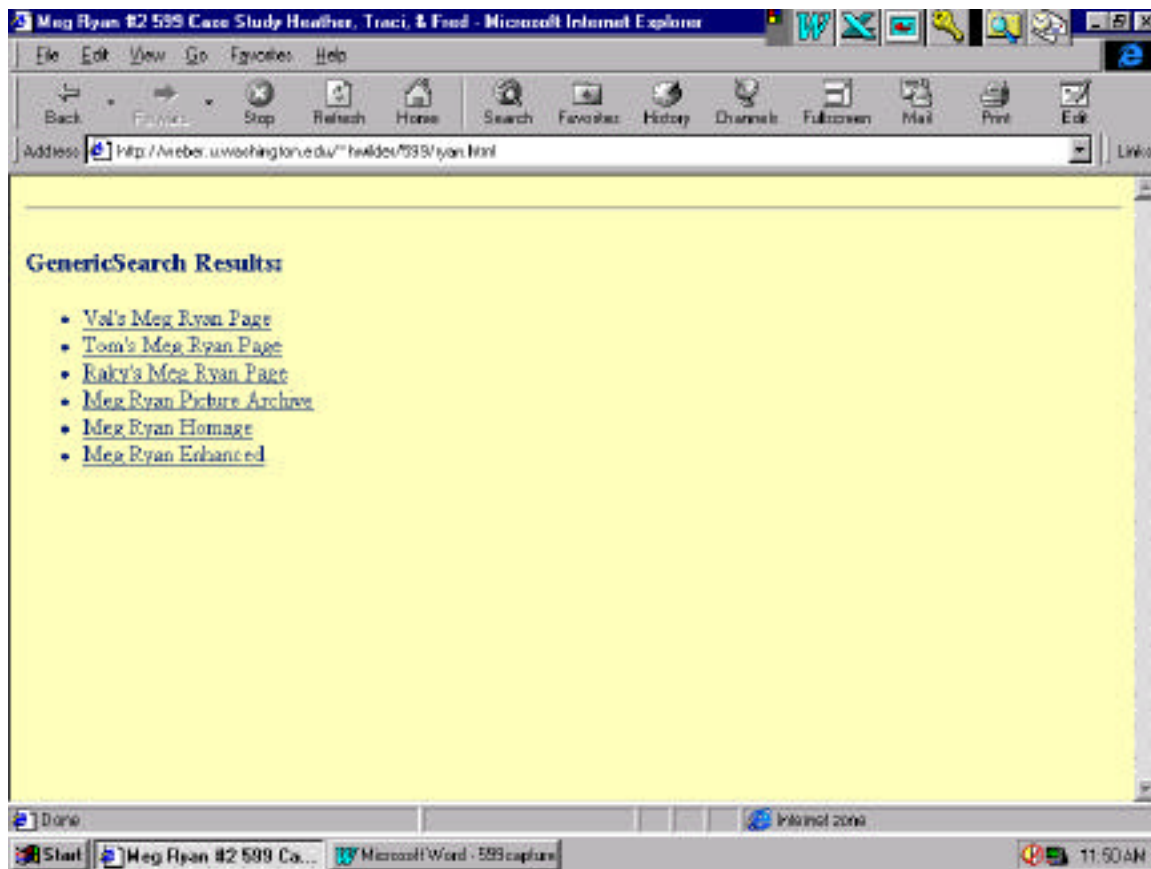


Figure 4. Meg Ryan – Version B

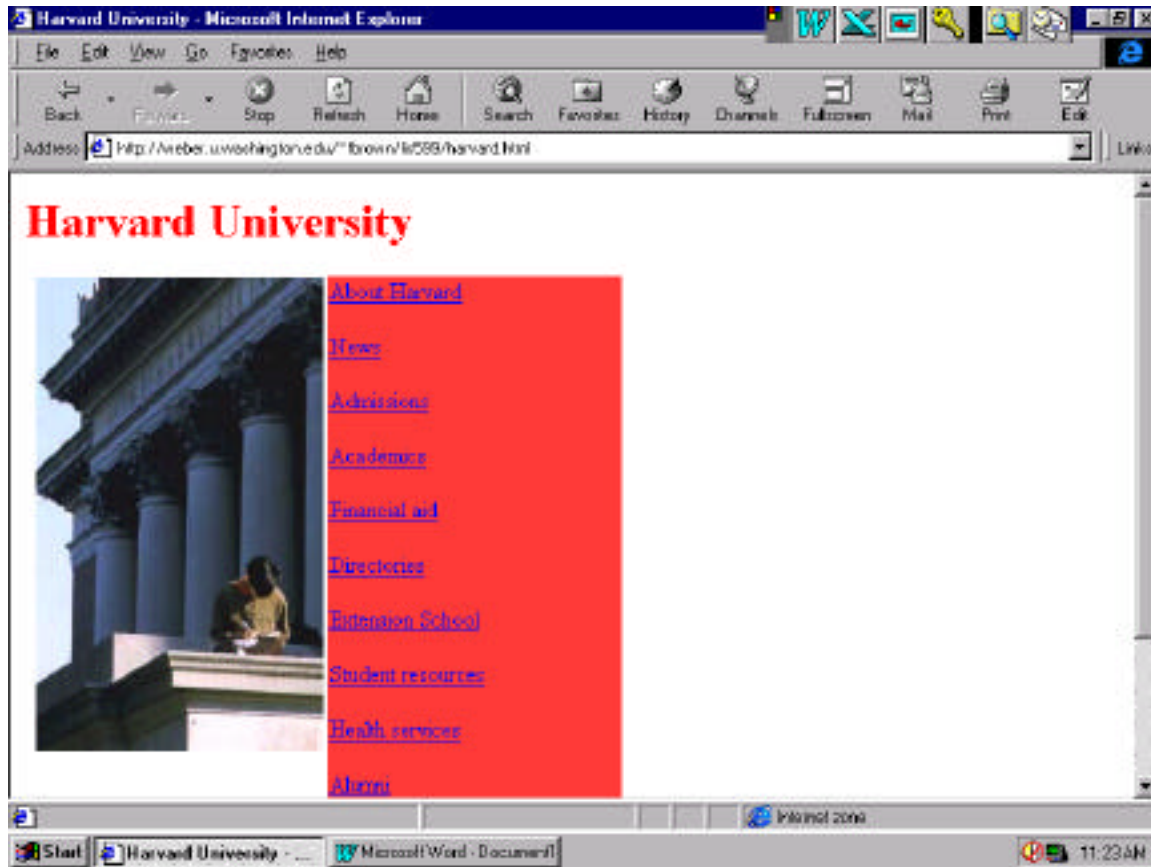


Figure 5. Harvard – Version A

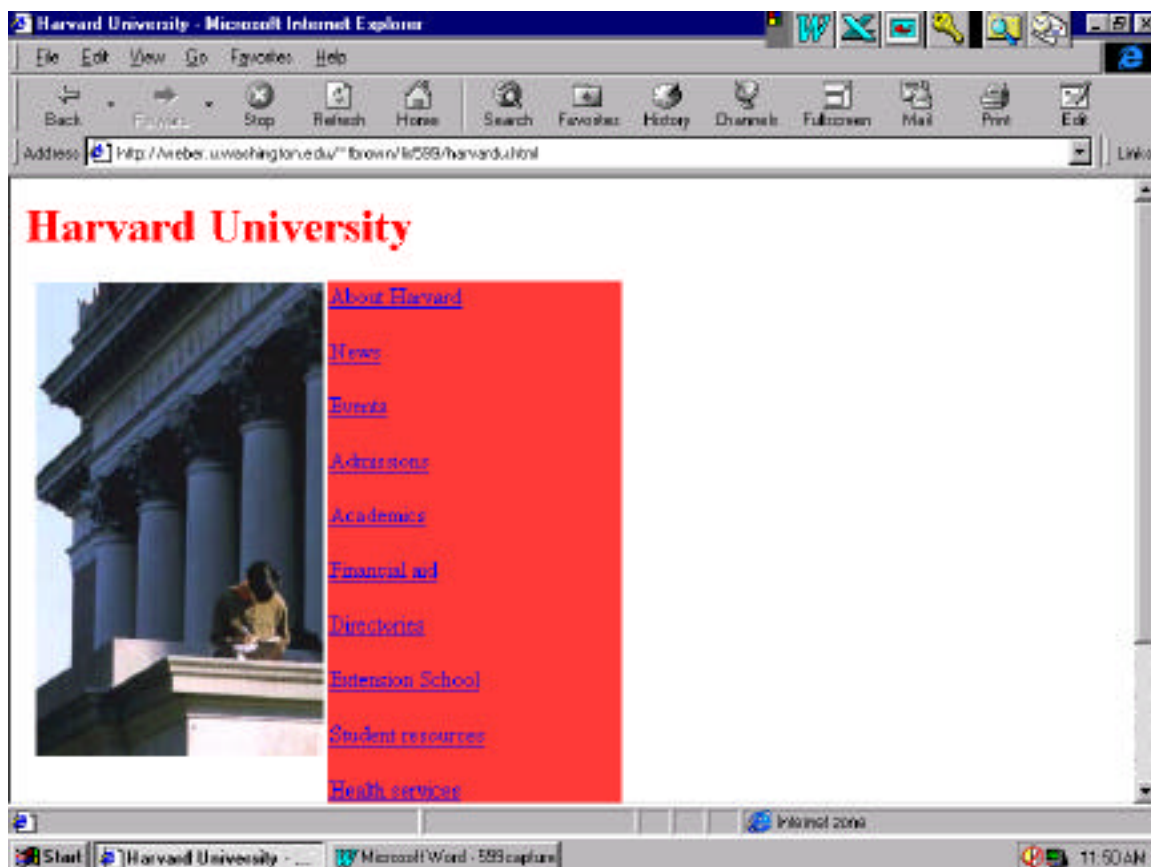


Figure 6. Harvard – Version B

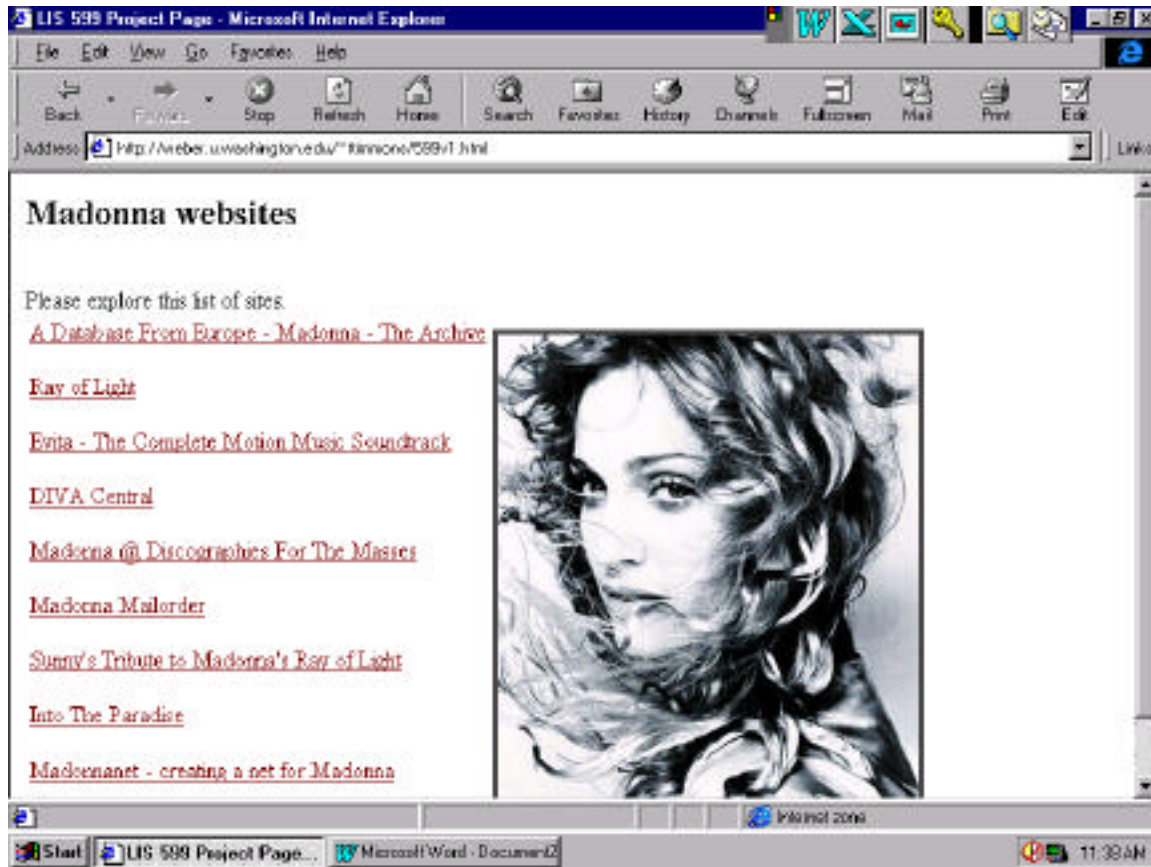


Figure 7. Madonna – Version A

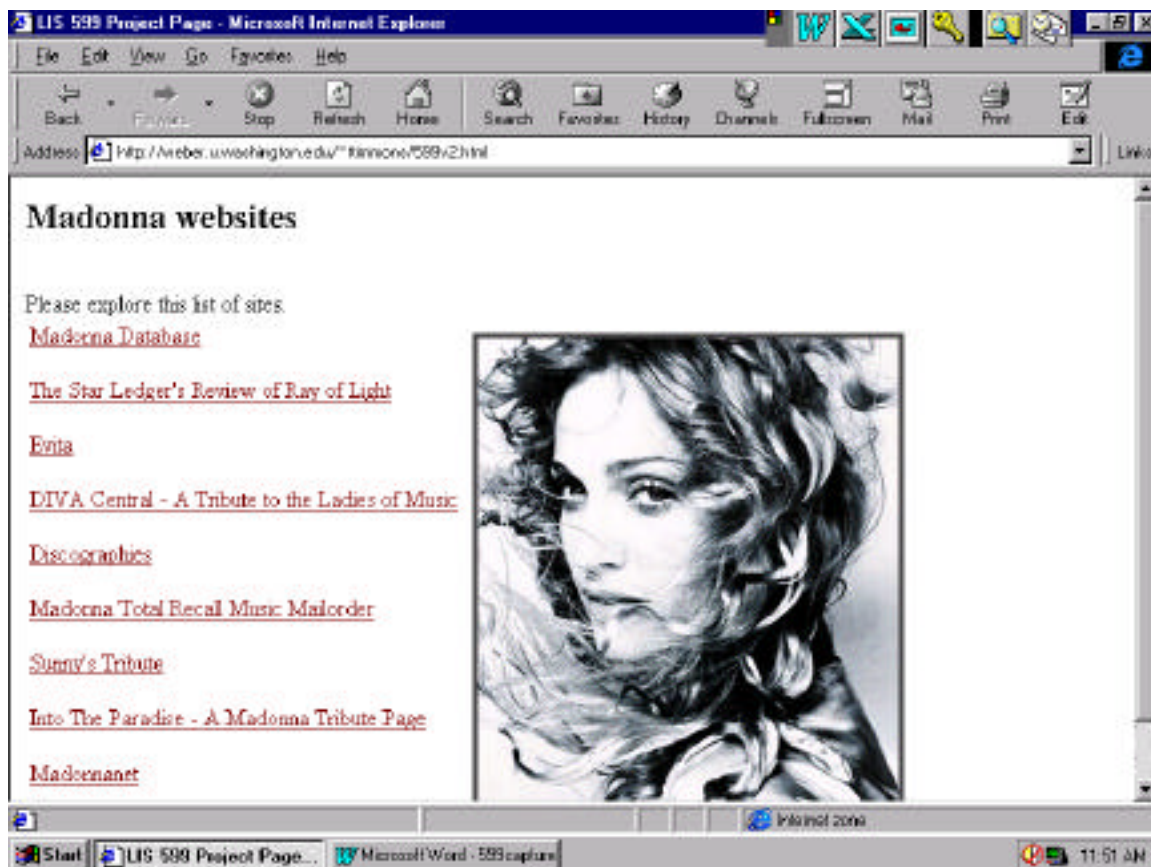


Figure 8. Madonna – Version B