

Deep Blue: A Usability Assessment

Assignment #7 User Testing

by

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1. EXECUTIVE SUMMARY	1
2. DEEP BLUE – THE PRODUCT	1
2.1. OVERVIEW OF DEEP BLUE	1
2.2. TARGET AUDIENCE	2
3. METHODOLOGY	3
3.1. METHODOLOGY OVERVIEW	3
3.2. TASK SCENARIOS	3
3.3. QUESTIONNAIRES	5
3.4. SUBJECT SELECTION & RECRUITMENT	5
3.5. PHYSICAL SETUP	5
3.6. TESTERS’ ROLES	6
3.7. SEVERITY RANKINGS	6
4. FINDINGS & RECOMMENDATIONS	7
4.1. SUMMARY OF FINDINGS	7
4.2. SPECIFIC FINDINGS	9
4.2.1. ISSUE #1	9
4.2.2. ISSUE #2	9
4.2.3. ISSUE #3	10
4.2.4. ISSUE #4	10
4.2.5. ISSUE #5	11
4.2.6. ISSUE #6	11
4.2.7. ISSUE #7	11
4.2.8. ISSUE #8	12
4.2.9. ISSUE #9	12
4.2.10. ISSUE #10	12
5. SUMMARY	13
6. REFERENCES	14
APPENDIX A – PARTICIPANT PROFILES	15
APPENDIX B – DATA	16
APPENDIX C – FORMS	19
APPENDIX D – SCRIPT	25

1. Executive Summary

The Deep Blue User-Testing Report summarizes the concerns, problems, and views of four test subjects regarding Deep Blue. Test subjects included two PhD students, a professor, and librarian. The goals of the testing process were to evaluate the usability of the system, identify problem areas, and create a prioritized list of issues that should be addressed in future revisions of the product.

A total of four participants were tested over the course of this phase of the project. In each session, the subject was presented with three task scenario (Search, Subscribe, and Deposit). These exercises were based upon similar real-world challenges that a new user of Deep Blue might encounter. In addition, the four subjects completed pre-test and post-test questionnaires designed to measure their satisfaction with Deep Blue and their emotional reactions to the exercises.

In general, the test subjects were extremely pleased with Deep Blue's functionality and usability, but noted difficulty or concerns in six areas:

1. Unknown Document Download Time
2. Inconsistent/Incomplete Metadata
3. Subscription and Authentication Redirection
4. Subscribe Button Hidden
5. Unable to Customize Subscription
6. Placement & Language of Licensing Agreement

These findings are explored in more detail in Section Four. Similarly, the group's methodology, procedures, and test subject recruitment are addressed in Section Three.

2. Deep Blue – The Product

2.1. Overview of Deep Blue

Deep Blue is a digital repository designed to serve the University of Michigan's scholarly community in preserving their intellectual work. Begun in August 2004, this initiative uses the open-source digital repository software of D-Space as a foundation to provide a long-term means for university students, professors, and staff to store their finished articles, unpublished works, and related datasets. Deep Blue is committed to ensuring the lasting preservation of the scholarly and artistic work done at the university by encouraging formats technologies that will enable reliable data migration and future format upgrades for a variety of systems and platforms.

As the underlying source code, the D-Space software was developed jointly by the Massachusetts Institute of Technology and Hewlett Packard; Deep Blue is the University of Michigan's implementation of D-Space. Organized into communities, sub-communities, and collections, D-Space (and, Deep Blue) is designed so that every community contains one or more collections which contain items of text documents, datasets, or images. In the current version of Deep Blue, the only community is the University of Michigan which contains two collections: College of Engineering and University of Michigan Transportation Research Institute (UMTRI). These collections will expand as Deep Blue staff work with other departments to foster greater interest and source material.

Deep Blue offers the student, faculty, staff and general public a number of functional options ranging from browsing collections, searching for articles, email notification of new deposits, and the ability to deposit their own works. However, in order to deposit a document, edit profile or subscribe to email notifications, users must authenticate themselves using their Kerberos password like other web-based University of Michigan applications. Figure 1 shows the home page of Deep Blue.

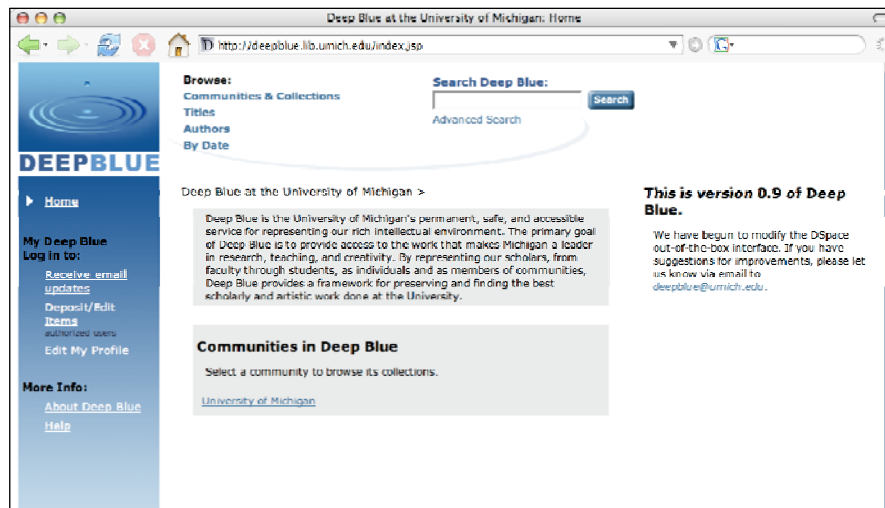


Figure 1: Deep Blue Homepage

2.2. Target Audience

Deep Blue is provided to the faculty, staff and students as part of the University of Michigan scholarly community. Yet its main target audience is the faculty, since they conduct the vast majority of academic research. Staff members and students may also deposit items into Deep Blue, but staff members are not copyright owners.

3. Methodology

3.1. Methodology Overview

User testing was conducted in four hour-long sessions from March 13-15, 2006, in the School of Information Usability Lab on North Campus. These sessions consisted of a pre-test questionnaire, three exercises, and a post-test questionnaire and debriefing. Subjects were presented with three tasks (Search, Subscribe, and Deposit) and asked to talk through the tasks as they attempted to complete each exercise. During the testing, the subject's on-screen actions, speech, and facial expressions were recorded with the Morae software package. To exert as much control over the experiment, the questionnaires, tasks, and testing host were identical for all four sessions. All subjects were presented with a \$25 American Express gift card upon completion of the exercise.

Prior to these four sessions, the group conducted a practice user test with a volunteer subject to gain experience with the software and hardware tools, determine potential testing problems, and modify either the format or the tasks. This practice session provided valuable experience in mastering the Morae software setup and questionnaire structure.

3.2. Task Scenarios

The design of task scenarios were based on concerns identified in the group's previous heuristic evaluation report. The scenarios of Search, Subscribe, and Deposit were constructed as high-level real-world tasks that new users of Deep Blue would likely perform. These scenarios were created explicitly to have the subjects navigate multiple pages of Deep Blue and address all primary functions of the system. In addition, they were unveiled in order of precedence, so that later tests both had the potential to illustrate learning within the system and to be dropped if time became a constraint.

For the third task of depositing a document, the subjects were given the special access to the test area of Deep Blue, where the staff of Deep Blue develops new features prior to public release. In addition to access, the test subjects were provided a Microsoft Word document on the desktop of the test PC with associated metadata on the first and second pages.

Each of the three scenarios is detailed below, along with the implicit subtasks that it encompassed.

Scenario 1 – Search for Article	Implicit subtasks for scenario 1
<p>During a meeting, one of your colleagues mentions a series of articles published by Daniel E. Atkins on the subject of robotics. Because this subject relates to a project you are working on, you decide to find the publications in Deep Blue. Please navigate your browser to publications by Daniel E. Atkins. After finding all of them, download one of the publications and open it.</p>	<ol style="list-style-type: none"> 1) Locate Article 2) Download the article <p>NOTE: These subtasks can be accomplished in multiple ways depending on whether the user searches or browses and downloads or simply opens the document in the browser.</p>

Scenario 2 – Subscribe	Implicit subtasks for scenario 2
<p>Now that you have found a collection of interest, you wish to stay informed as new publications are added. Please enroll to receive email updates when new items are added to the UM Engineering collection. After you are finished with the task, please unsubscribe so that you do not get email communication from Deep Blue.</p>	<ol style="list-style-type: none"> 1) Navigate to Engineering collection 2) Click on Subscribe 3) Log-in 4) Navigate to Engineering collection 5) Click on Subscribe 6) Navigate to “Receive email updates” 7) Click on the Unsubscribe button

Scenario 3 – Deposit Provided Article	Implicit subtasks for scenario 3
<p>You would like to add a document to a Deep Blue collection. You will find a document containing a paper on copyright issues located on the desktop. Please open and review this document. Upload the document with its metadata to the Deep Blue ‘Usability Test’ collection. When you have finished, open the uploaded document to ensure that the task was done correctly.</p>	<ol style="list-style-type: none"> 1) Click on “Deposit an Item” 2) Login (might already be authenticated) 3) Click on “Start New Deposit” 4) Select Usability Test 5) Select “Only One File” 6) Enter Metadata 7) Select File 8) Verify File 9) Verify Information 10) Read & agree to license 11) Complete

3.3. Questionnaires

In addition to the task scenarios, the subjects also engaged in several activities designed to measure their satisfaction with Deep Blue and their emotional reactions to the exercises. These activities included two questionnaires (one pre-test and one post-test which appear in Appendix C) as well as a debriefing session with the testing host.

The pre-test questionnaire focused on demographic information, such as age, education, and level of experience with computers and web-based applications. The pre-test questionnaire allowed us to place each test subject in our previously identified demographic categories (PhD students, experienced librarians and professors that have done considerable amount of research), and provided background information for our analysis of the session data. The post-test (feedback) questionnaire gauged impressions of both the particular tasks from each scenario and the broader impressions of Deep Blue. Data from these questionnaires is included in Appendix B. The debriefing session allowed the testing host to probe subjects for elaboration and clarification regarding their questionnaire responses.

3.4. Subject Selection & Recruitment

To aid in our recruitment of subjects for this phase of the project, we asked our survey recipients for permission to contact them for further questions or user testing of Deep Blue. The survey respondents who indicated that they would be interested in helping us for user testing of Deep Blue were contacted. Approximately 40 individuals were approached in person or over email, and provided with a brief summary of the scope and purpose of the evaluation. Of these, seven expressed an intention to participate; in the end, scheduling conflicts and cancellations resulted in a total of four test subjects. These included S1, a professor at the School of Information, S2, a PhD student at the School of Information, S3, another PhD student at the School of Information, and S4, a librarian.

Though slightly smaller than ideal, the number of subjects met our recruitment goals. The difficulty of finding test subjects was an important factor that contributed to the choice of conducting detailed test sessions with a smaller number of subjects, rather using our time conducting shorter sessions with a larger set of participants. The consistencies of our observations across these three tasks suggest that we would have obtained similar results with additional subjects as well.

3.5. Testers' Roles

The user test sessions were undertaken in groups of three and each tester was assigned a particular role: host, equipment manager, or observer/note-taker. The host greeted the subject, stayed in the room with the subject during the test session, issued the pre- and post-test questionnaires, and conducted the debriefing interview. Though working from a script (see Appendix D), the host was allowed to help the subject with tips if the subject was unable complete a subtask. The host and script were the same for all four testing sessions.

The remaining two group members observed and monitored the test on the other side of the two-way mirror. The equipment manager was in charge of running the recording equipment, and coordinating its functioning during the course of the test. The observer was the primary note taker during the course of the exercise, observing both the task progress and the emotional effects on the subject.

3.6. Physical Setup

The usability test sessions were conducted at the School of Information Usability Lab on the North Campus of the University of Michigan. The primary reason for utilizing this location was the access to a two-way mirror, which allowed for observations of the subjects interacting with Deep Blue. The testing sessions were recorded with both the Morae software package and a mini-Digital Video (DV) camera. While Morae provides both audio and video recording features, the mini-DV camera was a backup in case the Morae webcam or microphone failed during a session.

A typical testing session consisted of two people in two separate rooms. In the first room, the host presented Deep Blue tasks to the subject who used a desktop PC to complete the exercise. The desktop PC had an Internet connection to Deep Blue, but also ran Morae in the background to capture on-screen movement, facial expressions, and audio from the webcam. The subject was also recorded with the mini-DV camera. In the second room, the equipment manager and observer monitored the testing through a two-way mirror and a laptop receiving the Morae recording feed.

3.7. Severity Rankings

At the conclusion of the testing period, the group compiled their session notes and reviewed the Morae files to identify common use. The severity of the problems were ranked using Jakob Nielsen's rating scale for usability problems (Nielsen, 1993):

Rating	Definition
0	I don't agree that this is a usability problem at all.
1	Cosmetic problem only: need not be fixed unless extra time is available on project
2	Minor usability problem: fixing this should be given low priority.
3	Major usability problem: important to fix, so should be given high priority.
4	Usability catastrophe: imperative to fix this before product can be released.

Utilization of this rating scale provided a convenient way of prioritizing the group findings, and helped maintain consistency in combining the results obtained from each test subject.

4. Findings & Recommendations

4.1. Summary of Findings

The test subject all enjoyed Deep Blue and completed their assigned exercise with little or no difficult. In that respect, Deep Blue is an unqualified success. Yet, in reviewing the subjects' questionnaires, video recordings, and screen captures, it became apparent that six issues were deemed problematic. None of these seven issues are catastrophic or warranted a Nielsen rating of a "4", but Deep Blue should be aware of these minor obstacles.

The table below presents subject time-to-completion durations that were recorded during user testing sessions. These times do not exemplify the time required to complete the tasks since the subjects were requested to think out loud throughout the exercise. However, the times approximate the subjects' time to understand, experiment, and ultimately complete the task. The table also includes the expert and average subject time-to-completion durations for each task for comparison purposes.

It is important to note that Subject 1's (S1) task times are not included in the calculation of average values; the user experience difficulties with the wireless mouse while Deep Blue continued to work perfectly.

Time to complete subtasks, per user, by scenario (min:sec.csec)			
User	Scenario 1 (Search)	Scenario 2 (Subscribe)	Scenario 3 (Deposit)
Expert	00:20.00	00:38.00	03:03.00
S1	02:23.60	02:23.40	07:21.90
S2	01:00.00	00:48.83	08:40.90
S3	00:52.88	01:48.70	05:21.50
S4	01:19:18	1:00:40	7:36:19
Subject Average	01:04.02	01:12.64	07:12.86

As summarized in the table below, six problems were identified as a result of user testing. Issues are ranked and presented in the table in order of severity and list the broader categories to which these problems are grouped. Each issue is discussed in detail in the following section of the report in the order they are presented in the table.

#	Usability Issue	Priority	Category
1	Unknown Document Download Time	3	Document Retrieval
2	Inconsistent/Incomplete Metadata	3	Input
3	Subscription and Authentication Redirection	2	Navigation
4	Subscribe Button Hidden	2	Subscribe
5	Unable to Customize Subscription	2	Subscribe
6	Placement & Language of Licensing Agreement	2	Deposit

4.2. Specific Findings

4.2.1. Issue #1: Unknown Document Download Time

Priority: 3 – Major usability problem

Category: Document Retrieval

Details: Users found the document download of a Daniel Atkins robotics article took too much time, crashed Internet Explorer, or failed to indicate where the document would be found after downloading. Though Deep Blue does inform the user of a document's file size, the testing subjects failed to realize the size and subsequent time to download.

Solution: While the file size information is already present, making the information larger or more pronounced might aid users. In addition, Deep Blue could advise users to "Save Target As" or automatically open a dialog box requiring users to save the document to a specific location. This standard feature in web browsers would present the user with an estimated time to completion.

4.2.2. Issue #2: Inconsistent/Incomplete Metadata

Priority: 3 – Major usability problem

Category: Input

Details: Users had problems understanding metadata fields and concerns over their use. Deep Blue does not provide examples on how to enter information into the metadata fields. While some fields are intuitive, not all the fields are obvious. In

short, the system does not guide users as thoroughly as it could; this is both a functionality and usability problem. More fundamentally, the use of keywords without a controlled vocabulary appears problematic for subsequent searching. As the users noted:

“Deposit was OK, but there were a lot of fields for me to fill in.”

“It should tell me what kind of citation [Deep Blue] wants because there are thousands of ways to cite stuff. So, I’m going to sort of make one up. It should also tell me if it accepts html [for bold, italics, underline], but I don’t know if the text box would accept it.”

“Description? Um, I don’t know where that’s going to show-up or what kind of description would go there that I haven’t already provided, so I would just skip it. But, if it meant putting something in Description would make my document easier to find, then I’d fill it up with all kinds of stuff.”

“[Deep Blue is] generally well designed and well indexed (especially appreciate use of NACO forms for authors). A concern about metadata: will controlled vocabulary be used at any point? Natural language descriptors could produce a wide variety of inconsistent terminology.”

“They really should have an ‘Import from Endnote’ or a data miner, especially if you’ve published a lot and you want to upload stuff. It’s going to take forever. You’re going to have to hire an undergrad to put your stuff in Deep Blue and that’s not worth it.”

Solution: Deep Blue would be well served to implement a controlled vocabulary and to provide examples of how metadata should be entered in close proximity to every metadata entry field. While two users wished there was an Endnote interface, it seems unlikely that potential users would Endnote their own work; rather, people tend to use Endnote to manage the citations of other scholarly works.

In addition, Deep Blue might consider adding a “pages” field to the metadata screen. This would allow users to realize how long (or short) a document is prior to download. Not only would a “pages” metadata field better describe the document, but it could serve notice to the potential time of the document download.

4.2.4. Issue #3: Subscription and Authentication Redirection

Priority: 2 – Minor usability problem

Category: Navigation

Details: When users want to perform tasks requiring authentication, they are redirected to the login page common to all University of Michigan web-based applications. After they log in using their unique name and Kerberos password, users are taken

to the “Deposit/Edit Items” page no matter what page they requested before logging in. For example, if a user wants to subscribe to a collection, he typically clicks on either “Subscribe to this Collection” or “Receive Email Updates”. After clicking either link, he is directed to a Kerberos authentication screen and enters his username and password. Once that data is submitted, the user does not return to the Collection area; rather, he must re-navigate to the subscribe button for the previous collection despite the fact he was on that page moments beforehand. The users commented that:

“That is a bit awkward”

“My first thought is that I should go into the collection in order to subscribe to email updates, but I hope if I go over here [Left toolbar], it’ll let me log-in without making me lose all my spots... [logs in]... and it lost my page which is kind of annoying.”

Solution: One solution would be for Deep Blue to return users to the web page that launched the user to the Kerberos screen. In addition, Deep Blue could add a Log-In button to their homepage and allow users to authenticate before conducting any searches, subscribing, or uploading.

4.2.5. Issue #4: Subscribe Button Hidden

Priority: 2 – Minor usability problem

Category: Subscribe

Details: The “subscribe” and “unsubscribe” buttons on collection pages are somewhat hidden; specifically, it is located under the search box, utilizes a small font size, and requires the user to scroll down the page in order to see the button. Notification that a user had successfully subscribed was also not immediately obvious.

“Had this not been my task, I’m not sure I would have known this was an option.”

“Presumably there will be an email notice saying you have subscribed/unsubscribed to this.”

Solution: In addition to increasing the Subscribe button size on a collection page, Deep Blue might consider a large and immediate message telling the user, “You are now subscribed to the X Collection.” In addition, Deep Blue could send an email to the user’s account notifying the user of the added subscription.

4.2.6. Issue #5: Unable to Customize Subscription

Priority: 2 – Minor usability problem

Category: Subscribe

Details: Currently, Deep Blue only permits users to receive email notification for updates to entire collections rather than specific authors or a combination of keywords.

Moreover, when users subscribe for notification, they receive an email every time a new item is uploaded. Users might prefer to change the rate of notification; so, a daily or weekly summary of uploads. As one test subject remarked:

“I would never, ever get an update for the entire college of engineering.”

Solution: Customize subscription feature. Let users subscribe to updates focused on people or keywords rather than entire collections.

4.2.7. Issue #6: Placement & Language of Licensing Agreement

Priority: 2 – Minor usability problem

Category: License Agreement

Details: The license agreement is difficult to interpret and at the end of the deposit upload sequence. If users decide to retain their rights or are unclear about the nature of the agreement, they might get frustrated after spending time on the metadata entry.

Every test subject hesitated at the licensing screen and remarked about the agreement's lack of clarity:

“Licensing text is quite long; I wouldn't like to read such a long document.”

“Not sure what the first paragraph of this [License Agreement] means, but I understand that the work that I provide while I'm at Michigan isn't really mine anyway, so it's not clear that this is any more restrictive or less restrictive than my agreeing to do research on behalf of the University. So, I'd just grant the license anyway and hope I'm not giving up rights I should have kept.”

“I hate to read this kind of thing [copyright license], but I trust U of M to do this [meaning maintain the document and adhere to copyright law].”

“I thought I was done [with the upload]... The [License Agreement] screen came up after I was done. I could say that I don't agree, but I already spent time on this. I hate that...after I spent all that time.”

Solution: Users should be given the option of agreeing to copyright license as soon as possible. This would be similar to software license agreements in which users

must accept the software manufacturer's agreement prior to installing and executing the program.

In addition, Deep Blue might be well served to rethink how they issue their licensing agreement. Similar to the Creative Commons, Deep Blue could initially offer users a brief and concise bullet point list of what the agreement allows and prohibits. If users wanted additional information or the formal legal language, then Deep Blue could provide a link or downloadable document of the full agreement.

5. Summary

The Deep Blue User-Testing exercise illustrated two critical concepts. First, test subjects were overwhelmingly pleased with the options, functionality, and interface of Deep Blue. Second, the six problems identified by the four test users were not catastrophic and had no significant impact on the successful completion of typical tasks. While this graduate student group hopes that Deep Blue's staff of developers and programmers heed the concerns of this report, that same community of creators should recognize their current achievement.

The success of Deep Blue may be best verified by noting that each of the six areas of concern implicitly ask for additional content or assistance to current features; Deep Blue does not lack in functionality, but simply requires additional visual assistance. For example, users appreciate the ability to subscribe to collections, but simply request a finer detail as to what authors, subjects, or articles warrant notification. Similarly, the test subjects easily subscribed and unsubscribed to collections, but desired more demonstrative confirmation of subscription or unsubscription. It is to Deep Blue's credit that users are pleased with the current version and want additional features and services.

6. References

Deep Blue. (2006). Retrieved March 5, 2006, from <http://deepblue.lib.umich.edu/index.jsp>

DSpace Federation. (2006). Retrieved March 5, 2006, from <http://dspace.org/>

Nielsen, J. (1993). Usability Engineering. Academic Press, San Diego, CA.

Appendix A – Participant Profiles

A.1 Pre-test (Demographics) Questionnaire Summary

	Subject 1	Subject 2	Subject 3	Subject 4																																																							
Age Interval	35-49	25-34	25-34	35-49																																																							
Gender	Female	Male	Female	Female																																																							
Title	Assistant Professor	Doctoral Student/GSRA	Doctoral Student/GSRA	Associate Librarian																																																							
Major area of study/Department	Information	Information	Information	Classics; MILS																																																							
Years at UM	4	3.5	3	1 (work) + 2 (school)																																																							
Usage of web-based applications	<table border="1"> <thead> <tr> <th></th> <th>Hourly</th> <th>Daily</th> <th>Weekly</th> <th>Monthly</th> <th>Never</th> </tr> </thead> <tbody> <tr> <td>CTools</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Webmail</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MFile</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Blue Stream</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Wolverine Access</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MIRLYN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Electronic Reserves</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Job Search Sites</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Hourly	Daily	Weekly	Monthly	Never	CTools						Webmail						MFile						Blue Stream						Wolverine Access						MIRLYN						Electronic Reserves						Job Search Sites					
		Hourly	Daily	Weekly	Monthly	Never																																																					
	CTools																																																										
	Webmail																																																										
	MFile																																																										
	Blue Stream																																																										
	Wolverine Access																																																										
	MIRLYN																																																										
	Electronic Reserves																																																										
Job Search Sites																																																											
Current Storage Methods	Web page, file server, computer	Web page, file server, removable storage, computer, email	Computer	Computer, file server																																																							
Are you currently using a digital repository service to preserve your work?	No	No	No	No																																																							

Appendix B – Data

B.1 Post-test (Feedback) Questionnaire Summaries

Scenario 1 – Search

	Subject 1	Subject 2	Subject 3	Subject 4																											
How hard was this task?	<table border="1"> <thead> <tr> <th rowspan="5">Very Difficult</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Very Easy</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Very Difficult	1	2	3	4	5	Very Easy																				
Very Difficult	1	2	3	4		5	Very Easy																								
Would you use this feature again?	<table border="1"> <thead> <tr> <th rowspan="5">Definitely Not</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Definitely Yes</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Definitely Not	1	2	3	4	5	Definitely Yes																				
Definitely Not	1	2	3	4		5	Definitely Yes																								

Scenario 2 – Subscribe

	Subject 1	Subject 2	Subject 3	Subject 4																											
How hard was this task?	<table border="1"> <thead> <tr> <th rowspan="5">Very Difficult</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Very Easy</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Very Difficult	1	2	3	4	5	Very Easy																				
Very Difficult	1	2	3	4		5	Very Easy																								
Would you use this feature again?	<table border="1"> <thead> <tr> <th rowspan="5">Definitely Not</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Definitely Yes</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Definitely Not	1	2	3	4	5	Definitely Yes																				
Definitely Not	1	2	3	4		5	Definitely Yes																								

Scenario 3 – Deposit

	Subject 1	Subject 2	Subject 3	Subject 4																											
How hard was this task?	<table border="1"> <thead> <tr> <th rowspan="5">Very Difficult</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Very Easy</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Very Difficult	1	2	3	4	5	Very Easy																				
Very Difficult	1	2	3	4		5	Very Easy																								

Note: None of the subjects used the help function.

	Subject 1	Subject 2	Subject 3	Subject 4
What was the easiest aspect of Deep Blue for you to use?	- Search and Upload	- Browse	- Searching for documents and downloading them	- Search function good; appears to be well-indexed
What was the most difficult aspect of Deep Blue for you to use?	- Licensing texts quite long. I wouldn't like to read such a long document.	- Upload (difficult because it took forever)	- Knowing what I could do with the technology; knowing the architecture so I knew I was progressing appropriately	- "subscribe" link somewhat hidden; should be more obvious

	Subject 1	Subject 2	Subject 3	Subject 4																											
USABILITY	<table border="1"> <thead> <tr> <th rowspan="5">Difficult to Use</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th rowspan="5">Easy to Use</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Difficult to Use	1	2	3	4	5	Easy to Use																				
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	<table border="1"> <tr> <td rowspan="4">Complex</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td rowspan="4">Simple</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Complex	1	2	3	4	5	Simple															
	Complex		1	2	3	4	5		Simple														
<table border="1"> <tr> <td rowspan="4">Not Useful</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td rowspan="4">Useful</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Not Useful	1	2	3	4	5	Useful																
Not Useful		1	2	3	4	5		Useful															
USER EXPERIENCE	<table border="1"> <tr> <td rowspan="4">After test, less likely to use DB to find documents</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td rowspan="4">After test, more likely to use DB to find documents</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	After test, less likely to use DB to find documents	1	2	3	4	5	After test, more likely to use DB to find documents															
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Appendix C – Forms

C.1 Pre-test (Demographics) Questionnaire

Pre-test Questionnaire on Deep Blue

Name: _____ Title: _____

Please answer the questions in order to help us understand your background and experience.

1. Please circle the category that includes your age.

Under 24 25-34 35-49 50-64 65 and over

2. Please circle your education level.

Bachelor Degree(s): 1 2 3 More than 3

Masters Degree(s): 1 2 3 More than 3

PhD Degree(s): 1 2 3 More than 3

3. Please list your major area of study / department.

4. How many years have you been at the University of Michigan? _____

5. What do you use the Internet for?

7. Please circle the types of web-based applications you have used before, followed by the approximate months of experience with each one used.

Application	Frequency of Use				
	Hourly	Daily	Weekly	Monthly	Never
CTools					
Webmail					
MFile					
Blue Stream					
Wolverine Access					
MIRLYN					
UM Electronic Reserves					
Online Job Search (i.e., Monster.com)					
Other:					
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

8. Which Internet browser(s) do you currently use? (circle all that apply)

Internet Explorer Safari Firefox Other (please name)

9. Where do you presently store your documents? (check all that apply)

- ___ Personal webpage
 - ___ File server (network space, AFS or MFile)
 - ___ Removable storage (thumb drive, CD, DVD, ZIP drive, Jazz drive, floppy)
 - ___ On my computer (non-network storage)
 - ___ Other (please specify):
- _____
- _____
- _____

10. Are you currently using a digital repository service to preserve your work?

Yes ____ No ____ Don't know ____

11. I would find a digital repository helpful.

Yes ____ No ____

If you would find it useful, why?

If you don't find it useful, why?

12. Prior to this usability testing, had you heard of Deep Blue?

Yes ____ No ____

13. If you answered "Yes" to Question 12, how did you use Deep Blue?

____ General Exploration of Deep Blue

____ Browsed a collection

____ Searched for a specific document

____ Enrolled to receive email updates

____ Uploaded a document

C.2 Post-test (Feedback) Questionnaire

Post-test Questionnaire on Deep Blue

Please print your name: _____

If the help function was used:

1. I found the help function useful.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

2. I found the search task easy to accomplish.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

3. I found the subscribe task easy to accomplish.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

4. I found the upload task easy to accomplish.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

5. I would use the search feature again.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

6. I would use the subscribe feature again.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

7. I would use the search feature again.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

8. What was the easiest aspect of Deep Blue for you to use?

7. What was the most difficult aspect of Deep Blue for you to use?.

8. Deep Blue's terminology was clear and precise.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

9. The amount of screen explanation was adequate for performing the tasks.

Strongly Disagree					Strongly Agree
1	2	3	4	5	

I found Deep Blue’s user interface (graphics, font, colors):

- | | | | | | |
|------------------------|---|---|---|---|-------------------------|
| 10. Easy to use | 1 | 2 | 3 | 4 | Difficult to use |
| | | | | | 5 |
| 11. Pleasant | 1 | 2 | 3 | 4 | Unpleasant |
| | | | | | 5 |
| 12. Interesting | 1 | 2 | 3 | 4 | Uninteresting |
| | | | | | 5 |

I found Deep Blue’s functionality:

- | | | | | | |
|----------------------|---|---|---|---|--------------------|
| 13. Simple | 1 | 2 | 3 | 4 | Complex |
| | | | | | 5 |
| 14. Rewarding | 1 | 2 | 3 | 4 | Unrewarding |
| | | | | | 5 |
| 15. Useful | 1 | 2 | 3 | 4 | Not useful |
| | | | | | 5 |

16. After this experience, I am more likely to use Deep Blue to find documents.

- | | | | | | |
|----------------------|---|---|---|---|-------------------|
| Strongly
Disagree | | | | | Strongly
Agree |
| 1 | 2 | 3 | 4 | 5 | |

17. After this experience, I want to deposit items into Deep Blue.

- | | | | | | |
|----------------------|---|---|---|---|-------------------|
| Strongly
Disagree | | | | | Strongly
Agree |
| 1 | 2 | 3 | 4 | 5 | |

18. In the space provided below, please add any comments that you feel will help us to evaluate Deep Blue. We would especially appreciate your input on the following topics:

- **Functions that are essential and/or superfluous for your work**
- **Aspects of the product that are either worse or better than similar products**
- **Features you’d like to see on future revisions**

Appendix D – Script

User Testing Script

Host:

Hello, [*Participant's Name*]!

We really appreciate you coming in today to test Deep Blue. My name is Jodi Tyron and I will be facilitating the test today. Mark Bard, Craig Kussmaul, and Ayca Aksu Erkan will be in the next room observing as you go through the tests. We are all students at the School of Information and we are evaluating Deep Blue as part of a class project.

It might sound a little weird to have me read this to you, but I need to make sure that I cover all this information in a particular order. Reading from this paper will help me with this.

Before we begin, can I offer you some water?

We have asked you to come in and test Deep Blue today. Deep Blue is a digital repository being developed by the University of Michigan's library to preserve the community's digital documents. Your participation in this test will help produce a better product that, we hope, will benefit both yourself and the University. Again, we want to thank you for the time that you have generously donated to our group and to Deep Blue.

Throughout the test, we will all be observing how you complete the tasks we give you and we will be recording this session using a video camera. We will also be using screen capture software called MORAE. Your participation in this test will be completely confidential. We will not divulge the name of our participants--only the outcome of the test. At some point in the test, you will be prompted to enter your unique name and password. I just want to assure you that our screen capture software will not record your password. It will only capture the asterisks that we see on the screen.

Before we begin with the usability test, we will ask you to fill out a quick form with some demographics about yourself. Then you will be asked to perform three tasks using Deep Blue: you will locate an item within Deep Blue, you will sign up for email notifications to find out when new items are added to Deep Blue, and you will upload a document to a Deep Blue collection. After these tasks are completed, we would like you to fill out a questionnaire about your experiences with Deep Blue. You and I will go over your answers before you leave.

I want to make clear as you work on these tasks that we are testing Deep Blue and not you. Any difficulties or successes you may have will help us in evaluating the system.

Participation is voluntary and if you feel uncomfortable at any time, you may stop or skip a particular task.

As you're going through these tasks, please think out loud. It will help us to be able to hear your thought processes as you work through these tasks. Also, please feel free to ask any questions you may have. To keep the simulation as real as possible, I might not always be able to answer your questions, but it will help us to hear where there might be confusion.

Before we begin, do you have any questions about how what we will be doing here today?

OK, let's start by filling out this questionnaire. Please let me know when you are finished.

[Participant Fills Out Pre-Test Questionnaire.]

Great! Let's go ahead and get started with the first task. Remember: we are testing the system and not you; so don't worry about how you do with these tasks.

Scenario 1.

Librarian

You are working the reference desk and a patron comes in requesting publications on robotics written by Daniel E. Atkins, a professor at the University. You are aware that he may have some publications on Deep Blue, but before you direct them to that resource, you want to make sure that they are accessible at this location. Please navigate your browser to publications by Daniel E. Atkins. After finding all of them, download one of the publications and open it.

PhD Student

While studying robotics, your advisor has recommended that you read up on publications by Daniel E. Atkins and recommends that you find the publications in Deep Blue. Please navigate your browser to publications by Daniel E. Atkins. After finding all of them, download one of the publications and open it.

Faculty

During a faculty meeting, one of your colleagues mentions a series of articles published by Daniel E. Atkins on the subject of robotics. Because this subject relates to a project you are working on, you decide to find the publications in Deep Blue. Please navigate your browser to publications by Daniel E. Atkins. After finding all of them, download one of the publications and open it.

[Outcome for all: searches and retrieves article within 5 minutes.]

Scenario 2.

Now that you have found a collection of interest, you wish to stay informed as new publications are added. Please enroll to receive email updates when new items are added to the UM Engineering collection.

[Outcome for all: logs in and subscribes to email within 10 minutes.]

After you are finished with the task, please unsubscribe so that you do not get email communication from Deep Blue.

Scenario 3.

You would like to add a document to a Deep Blue collection. You will find a document containing a paper on copyright issues located on the desktop. Please open and review this document. Upload the document with its metadata to the Deep Blue 'Usability Test' collection. When you have finished, open the uploaded document to ensure that the task was done correctly.

[Outcome for all: uploads a word document and its metadata to a Deep Blue collection and reviews deposit within 15 minutes.]

Thank you! We're almost finished. Please fill out this questionnaire so that we can learn about your experiences completing these tasks. Please let me know when you are finished.

[Participant Fills Out Post-Test Questionnaire.]

Lets just go through this questionnaire so that I can ask any questions I might have about your responses.

[Participant goes through exit interview.]

Thank you again for coming in today. Here is a \$25 Visa gift card to show our appreciation.