CENGAGE MINDTAP HELP SYSTEM USABILITY STUDY

DATE PREPARED:
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PREPARED FOR:
Mary Dickens, Technical Writer at Cengage Learning
And Team

PREPARED BY:
Caylin Hirapara
Kimberly Jenerette

WITH SUPPORT FROM:
Dr. Tharon Howard

Introduction

Clemson University, in conjunction with Cengage, has been engaged in performing a usability study of the MindTap Help Website to determine areas where navigation and usability could be improved. Through the use of various techniques including think-aloud protocols and card sorting, the team at Clemson recommend specific areas where the help site capabilities could be improved as an aid tool. As such, this report has been prepared in order to advise Cengage on changes that could be made to improve navigability and usability.

Executive Summary

During our usability testing, we measured and analyzed data relating to six research tasks and a card sort. Based on our observations of actual users completing the six tasks and the card sort we have provided numerous recommendations for the Cengage. These recommendations were prioritized according to the severity of the usability problem observed. Although these are not all of our recommendations, many of the usability problems associated with the Mindtap Student Help Page can be corrected by implementing the following changes.

1) Reorganize Navigation. This problem caused significant delays and frustrations and is a "must fix." We suggest creating four base headings titled the following: Getting Started, Using MindTap, Accessibility, More Information
2) Create a page defining icons used throughout the site.
3) Redesign the site such that information is more noticeable to users by means such as inclusion of more screen captures and visuals, more vibrant and distinct colors, and reorganized navigation as previously recommended.

These recommendations will address the major usability problems that were discovered during our tests.

Methodology

The test design was a collaborative effort among the test team and the Cengage development team. The following is a report of the development of our test plan and methodology.

Co-Examiners/Participant Profiles

According to R.A. Virzi (1992), 80% of usability problems in a product are detected by four to five co-examiners and 90% are detected by ten. Citing the research of Nielsen and Molich (1990) and Virzi, Dumas and Redish recommend using three to five

co-examiners in every research subgroup. A total of six individuals participated in our usability tests and the following considerations were made in selecting them.

- **Availability and willingness**. Acquaintances of Ryan and Scott were first asked if they would be interested and willing to assist in our usability study. Scheduling difficulties eliminated several participants.

- **Students of Clemson University.** Participants were required to be currently enrolled at Clemson and taking a minimum of one class during the Fall 2019 semester.

- **Demographic diversity.** In order to represent the needs and skills of various students, we required that at least three majors be represented among our participants. We required that at least two participants were male and two were female. We required that between one and two participants represent a racial minority.

The test was conducted over two weeks from April 1, 2019, to April 11, 2019. After clearing task revisions with the Cengage Team, usability tests began with Caylin and Kimberly as co-examiners in each study.

Six subjects were recruited for this test. All six users had to meet the following criteria:

1. Users will be Clemson undergraduate or graduate students
2. Users will be familiar with distance learning tools

Because users were to include graduate and undergraduate students from a variety of disciplines, prior use of Mindtap or the Mindtap help system was not included as criteria. Furthermore, because users of the Mindtap system may not have experience with the Mindtap help system this lack of experience was not required of the test participants.

Subject Demographics

The following table indicated the summary of characteristics of the actual users in the testing of the Mindtap Student Help System:

Grade Level	2 Freshman, 4 Graduate
Average Age	21

Sexual Identity	4 Females, 2 Males
Majors Represented	Writing Rhetoric and Media, Biochemistry, History, English, Environmental Engineering
Prior experience with distance education	Average of 2.3 experiences

Table 1: Subject Demographics

Note that the majority of users did not come from any single department. Also, users considered themselves proficient users of distance learning tools. Furthermore, during testing, users came across as confident users of the help system. Therefore, any difficulties that users had navigating the discussion area interface were not due to inexperience using such interfaces or help systems in general. However, none of our users claimed to have experience with Mindtap specifically.

Facility and Computer Specifications

Test participants completed their tests in the Usability Testing Facility (UTF) where their user screen and audio was captured. Clips from the video screen captures have been included in a file attachment to accompany this report. All participants completed their tests on a desktop computer in the facility.

Usability Study Methodology

Each participant was asked to read the following instructions at the listed part of the study:

> **Instructions**
> We would like to thank you for agreeing to participate in this study. We are consultants who have been asked to assess the usability of a web application. We are studying how people navigate user help pages. The application that we're going to be using today is being revised and the next version is in the early stages. With your help, we hope to offer revision recommendations to the people who are working on these web-based tools. It is important that you understand that we are NOT testing you. Although it may seem like it there actually are no right or wrong answers in this study. We just want to see how you approach the tasks using the tool. Because we are trying to understand what works well and what doesn't work well in the tool we're going to be examining, it is important that you voice your thoughts as you try to perform these tasks. Harsh language and gestures do not offend us; in fact, they can offer a great deal of information about your experience. All that we request is that you speak out loud about what you are thinking and feeling as you are

using the tool. As the study progresses, I may occasionally ask questions about what you are doing and thinking. In return, you may ask me any questions before, during or after the study I will try my best to answer your questions; however, be aware that I may be unable to answer some questions since my answers could possibly influence your opinions and perceptions of the web application. But I will answer your questions at the end of the study.

Card Sort Task

For the first portion of the study, we are determining the best way to organize the navigation menu of the website. Please assign each of the cards in this stack into five to seven categories. Please provide names for each folder group you create. Name each group with a word or words that describe the set of items it contains. Just stack the items into the groups. Think of where you expect to find these items on a web site. There is no right number of items in each group, but make sure you think about how the items relate to each other. You'll only have 10 minutes.

Think-Aloud Protocol Tasks

For the next part of the study, assume you are a student taking a course on MindTap, a distance learning tool. You have come to the help page because you are having trouble with some part of the site. Once again, as you're using the system, it's very important that you talk out loud and say what you're reading on the screen and, more importantly, what you're thinking about as you use the system. There is no need to write down the answer since we are recording the screen, but there is a sheet of questions on the table for your reference.

Task 1: Where would you find the page that describes metrics of course engagement such as the number of logins?

Task 2: Where would find out what to do if you have purchased access but MindTap still says you haven't made the purchase?

Task 3: Where would you find out if your computer's system is compatible with MindTap?

Task 4: Where would you find out what the different icons for an Audio Clip and an Audio Recording are? What is the difference between the two?

Task 5: Where would you find how to enable Flash on Internet Explorer?

Task 6: It has been two weeks and you haven't received your textbook yet despite receiving confirmation that it had shipped, where would you find out how to contact support?

Data Collection System

Six types of data were collected for this usability test using think-aloud protocol analysis, a data collection tool (Morae), and pre- and post-study questionnaires:

1. Average time spent on each task
    a. Average time spent on each task was collected by Morae software and recorded by the examiner who was using the Morae software during the test.
2. Average ease of use for each task
    a. Following the declared completion of each task by the user, they were asked by the examiner proctoring the test how they would rate the ease of use for each task on a scale of Very Easy / Easy / Somewhat Easy / Somewhat Difficult / Difficult / Very Difficult. The answer was recorded by the examiner.
3. Average confidence level in making correct navigational choices
    a. The confidence level was gauged using a series of questions after each task and as a result of the think-aloud process.
4. Think-aloud comments of most importance
    a. Think-aloud was recorded using Morae recording software. The above data was collected and analyzed in order to uncover specific problems that people were having navigating the Mindtap Help System interface to perform the indicated tasks. Obviously, other problems were also identified with the interface during the test, but these will only be mentioned briefly in this report since they were not the primary area of research for this study.
5. Card Sort Cards and Naming suggestions
    a. Cards were written out by examiners and collected after participants had finished with their ordering maintained. Data was then entered into a Google Spreadsheet for ease of access and comparison between participants.
6. Average number of clicks per task
    a. This too was captured using Morae as a means of analyzing the number of steps people were utilizing to find the information that was needed for each task.

Recommendations

See Recommendation Video

1. **Restructure Navigation**

Through the use of the card sort, we determined that the best way to restructure the navigation menu would be to make the headings into four distinct categories. As there was a general trend toward the existing order of the navigation system, but with fewer categories. Every one of our users, when asked to put the cards into 5-7 categories, chose to put them into less than 7. Two of our users asked to put the cards into four categories because they felt the cards were better suited to four categories. This guided our recommendation of condensing the headings to 4 and restructuring the navigation menu from there. It was often recommended that "Open Tools" be removed as a heading (58 seconds). We also asked each user to give a name to each category that they created. Our recommendations below reflect what we believe to be the most intuitive naming from the user recommendations for the four categories.

1. **Getting Started** which would include currently existing subheadings "What's new in MindTap", "Sign in to MindTap Course", and "Getting Started with MindTap"
2. **Using MindTap** which would include currently existing "Complete Activities"
3. **Accessibility** which would include currently existing "Accessibility" and "System Requirements"
4. **More Information** which would include "Frequently Asked Questions", "Troubleshooting", "Open Tools", and "More Information"

2. Expand on frequently asked questions page to include common user errors involved in using the Mindtap system

For each task that users completed, the hardest tasks (longest average time, and reported most difficult), were tasks 1 and 4, which involved errors that might come up while the user is using the Mindtap page. This is a portion of the larger problem of ambiguous categorization because there was no main page where users could go to find common errors that they might encounter in the system. The current frequently asked questions page contains system error issues. Generally, Mindtap use issues are the most common for users to seek help for, and for these to be the most difficult to find in the help system shows an error that a majority of users who come to the help page are struggling with. We would suggest the creation of a page such as this for problems related to using Mindtap https://www.cengage.com/faq.

3. Create Icons Page

By far the most difficult task was number 4 for a few key reasons. Most users had to look in nearly every category to find the icon for an audio clip, and the majority did not finish the task all. The first problem was that there was no icon page for users to find

when they were looking for the audio clip icon. Users were looking for this page rather than looking inside the pages. If it was not labeled as “Icons”, users would sometimes bypass the information all together even if they were on the correct page to complete the task. Users nearly unanimously recommended the creation of an icon page so that common icons can be defined.

4. **Add Visuals including screen captures (See Video Screen Captures)**

In our initial meeting with Cengage, the question of how screen captures can increase the usability of a help system was introduced as a question to find further research. With such further research completed, technical communication scholars are clear that, in all cases, screen captures increase the usability of help systems. For information regarding this see Appendix 1. Additionally, our users confirmed this outside research by answering the question regarding their general use of screen captures in help systems. Although introducing screen captures to the system may create problems when the system is updated, it will make the system much easier to use. Only one user claimed to read text more than they followed screen captures. The rest of the users claimed that screen captures were imperative to their understanding of any help system. Every user who acknowledged that they were a type of learner considered themselves a visual learner. One user even said that she will not ordinarily read any text when coming to a help page, and will only follow instructions containing pictures or videos. Because of our research, we are strongly suggesting the addition of screen captures and visuals into the Mindtap User Help Page.

5. **Perform an investigation into the backend coding and Google Analytics of the MindTap Help Site so that it is easier to find specific and official answers if searched on Google**

Our final recommendation regards the increased use of Google to navigate the help page. Currently, when Googling the questions introduced in our study, the answers are not the top option and are often not the second or third either. One solution to that that is currently in use in various user help guides located online is to check the Google Analytics of the Mindtap site and see which pages are coming up for each Google search. One way to improve the site to ensure SEO (Search Engine Optimization), is to phrase headings as questions related to specific errors. This will generally increase the googleability of the pages in relation to the specific error. This suggestion stems from the comments of one user who claimed in their post-interview that they “would never come to this site,” rather they would “just google the answer to the question.” In keeping with that general principle, ensuring that when users are

stuck and they are coming to the site from Google, the correct page comes up is going to become increasingly important.

Findings

See Overall Ease of Use Video

Card Sort

While there was a large amount of variance in terms of how participants decided to sort headings in the card sort, a general trend did emerge which seemed in line with the current layout of the site. While the information may often feel as though it's buried and hard to find, the general order of the headings seems to be appropriate for how users would expect to navigate a help site. We have recommendations for condensing the information so that there are fewer headings on the main page, but the order should largely remain the same.

The following chart shows the raw findings from the cart sort. On the y-axis shows the names of the cards. The top row shows which group users put the cards into. The blue cell shows the group or groups that the majority of users put the card into. As there is a general trend toward the existing order of the navigation system, our recommendations considered condensing the headings to four and restructuring the navigation menu from there. Two of our users asked to put the cards into four categories because they felt the cards were better suited to four categories. This guided our recommendation and also explains the discrepancies in our results.

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
"What's new in Mindtap"	33.33%	16.67%	33.33%	16.67%	0.00%	0.00%
"System Requirements"	0.00%	16.67%	33.33%	33.33%	16.67%	0.00%
"Sign in to my Mindtap Course"	66.67%	16.67%	0.00%	0.00%	0.00%	16.67%
"Getting Started with Mindtap"	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%
"Open tools "	0.00%	33.33%	16.67%	0.00%	16.67%	33.33%
"Complete Activities"	0.00%	33.33%	16.67%	33.33%	16.67%	0.00%

"Accessibility"	0.00%	0.00%	66.67%	16.67%	16.67%	0.00%
"Frequently Asked Questions"	0.00%	0.00%	33.33%	16.67%	16.67%	33.33%
"Troubleshooting"	0.00%	0.00%	16.67%	33.33%	16.67%	33.33%
"More Information"	0.00%	16.67%	16.67%	33.33%	33.33%	0.00

Table 2: Card Sort Results

Task 1 - Where would you find in the help page that describes metrics of course engagement such as the number of logins?

Average Time: 157.83 Seconds
Average Clicks vs. Required Clicks: 8.17 vs. 2, difference of 6.17.
Ease of Use (Reported by user):

Ease of Use Rating	Users Rating	%
6- Very Easy	0	0%
5 - Easy	1	16.7%
4- Somewhat Easy	1	16.7%
3- Somewhat Difficult	1	16.7%
2- Difficult	1	16.7%
1- Very Difficult	2	33.3%
Average	2.6	

Table 3: Task 1 Ease of Use

Task 2 - Where would find out what to do if you have purchased access but MindTap still says you haven't made the purchase?

Average Time: 81.16 Seconds
Average Clicks vs. Required Clicks: 3 vs. 2, difference of 1
Ease of Use:

Ease of Use Rating	Users Rating	%
6- Very Easy	1	16.7%
5 - Easy	2	33.3%

4- Somewhat Easy	1	16.7%
3- Somewhat Difficult	2	33.3%
2- Difficult	0	0%
1- Very Difficult	0	0%
Average	4.3333	

Table 4: Task 2 Ease of Use

Task 3 - Where would you find out if your computer's system is compatible with MindTap?

Average Time: 33.03 Seconds
Average Clicks vs. Required Clicks: 2.17 vs. 2, difference of .17
Ease of Use:

Ease of Use Rating	Users Rating	%
6- Very Easy	4	66.7%
5 - Easy	1	16.7%
4- Somewhat Easy	1	16.7%
3- Somewhat Difficult	0	0%
2- Difficult	0	0%
1- Very Difficult	0	0%
Average	5.5	

Table 5: Task 3 Ease of Use

Task 4 - Where would you find out what the different icons for an Audio Clip and an Audio Recording are? What is the difference between the two?

Average Time: 164.06 Seconds
Average Clicks vs. Required Clicks: 15.67 vs. 3, difference of 12.67
Ease of Use:

Ease of Use Rating	Users Rating	%
6- Very Easy	0	0%
5 - Easy	0	0%
4- Somewhat Easy	0	0%
3- Somewhat Difficult	1	16.7%
2- Difficult	3	50%
1- Very Difficult	2	33.3%
Average	1.83	

Table 6: Task 4 Ease of Use

Task 5 - Where would you find how to enable Flash on Internet Explorer?

Average Time: 69.33 Seconds

Average Clicks vs. Required Clicks: 3.17 vs. 3, a difference of .17

Ease of Use:

Ease of Use Rating	Users Rating	%
6- Very Easy	2	33.3%
5 - Easy	3	50%
4- Somewhat Easy	1	16.7%
3- Somewhat Difficult	0	0%
2- Difficult	0	0%
1- Very Difficult	0	0%
Average	5.17	

Table 7: Task 5 Ease of Use

Task 6 - It has been two weeks and you haven't received your textbook yet despite receiving confirmation that it had shipped, where would you find out how to contact support?

Average Time: 59.87 Seconds

Average Clicks vs. Required Clicks: 1.67 vs. 2, difference of -.33

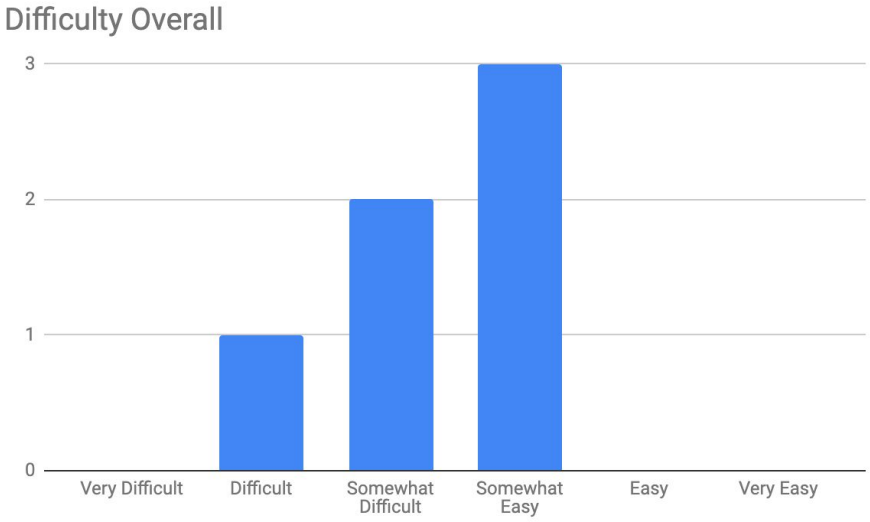
This discrepancy can be accounted by the fact that as participants used the help site through the course of the study, they would not collapse previously opened headings and would thus often have the answers to less complicated questions or have an understanding of where in the site to look.

Ease of Use Rating	Users Rating	%
6- Very Easy	5	83.3%
5 - Easy	1	16.7%
4- Somewhat Easy	0	0%
3- Somewhat Difficult	0	0%
2- Difficult	0	0%
1- Very Difficult	0	0%
Average	5.83	

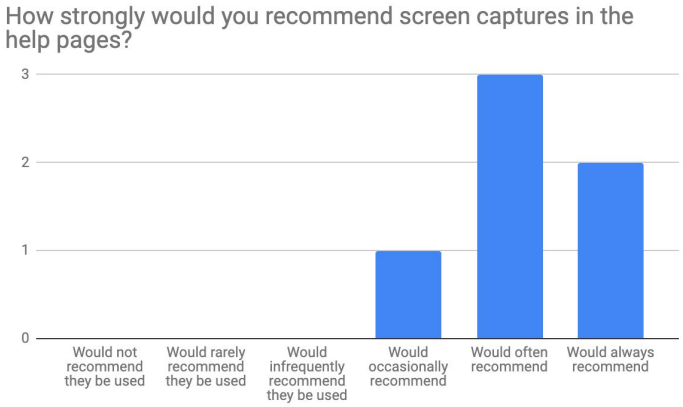
Table 8: Task 6 Ease of Use

Post Interview Questions

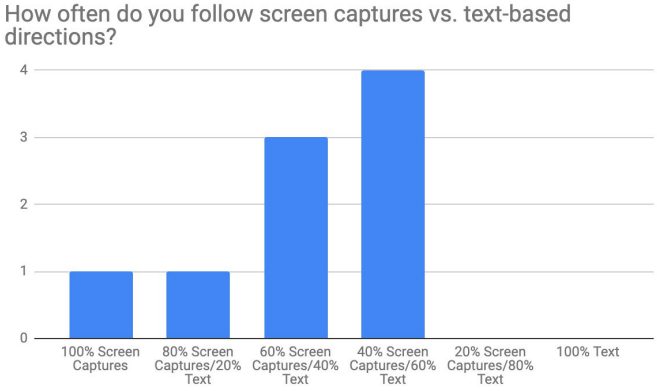
Overall, how difficult or easy did you find completing the tasks?



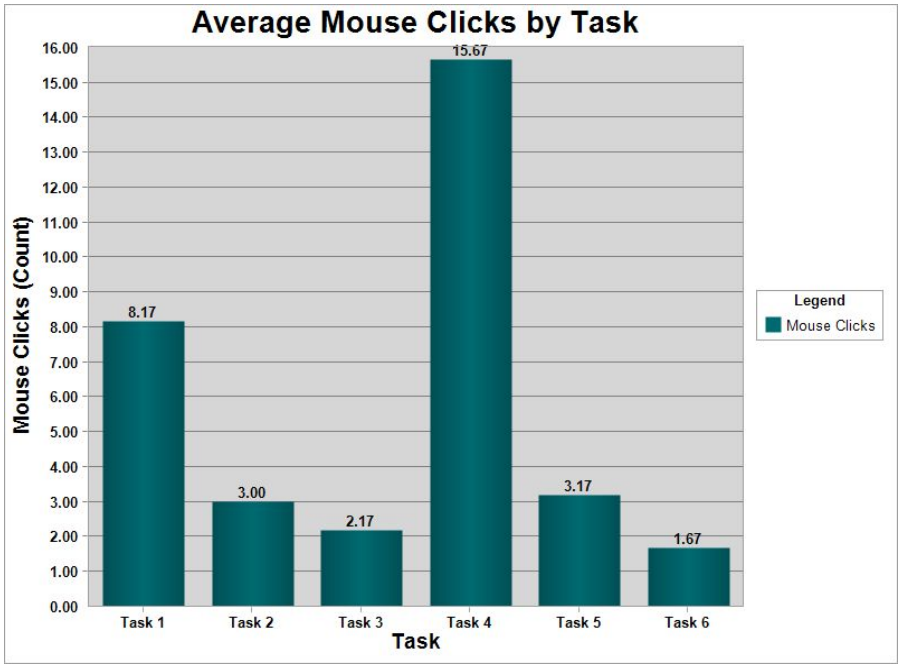
How strongly would you recommend screen captures in help pages?

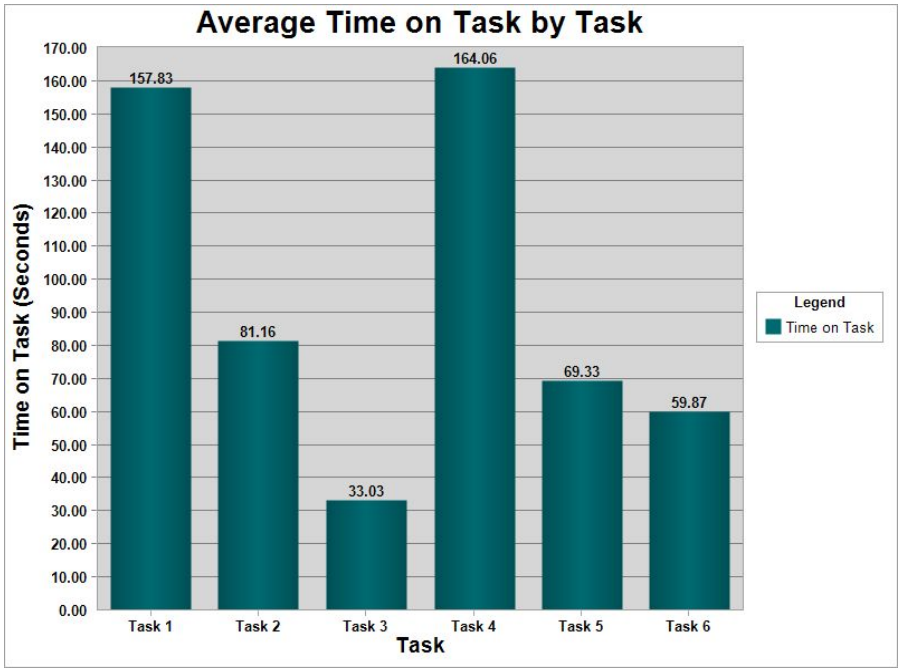


When you've used online manuals in the past, how often do you follow screen captures and how often do you follow text-based directions?

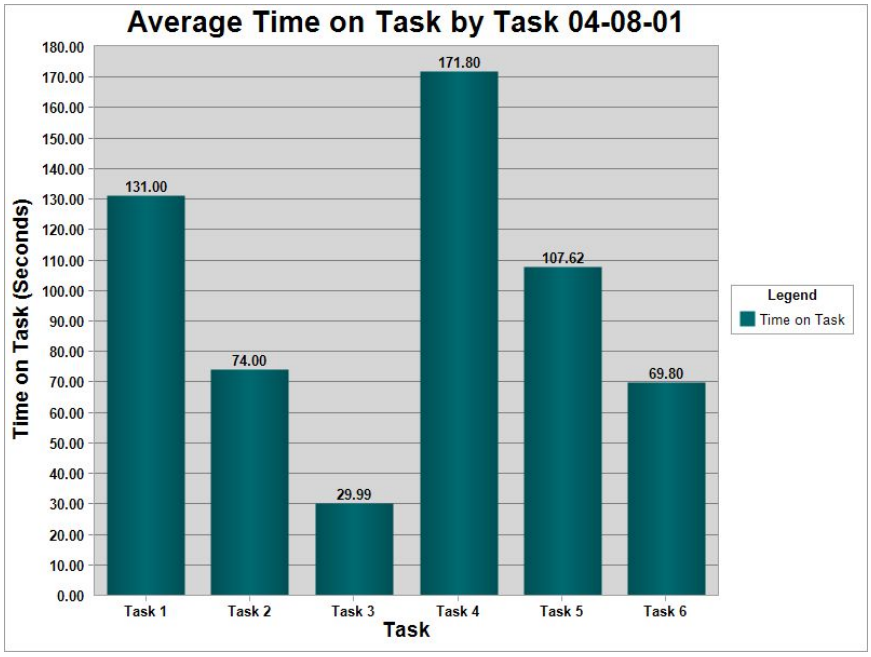


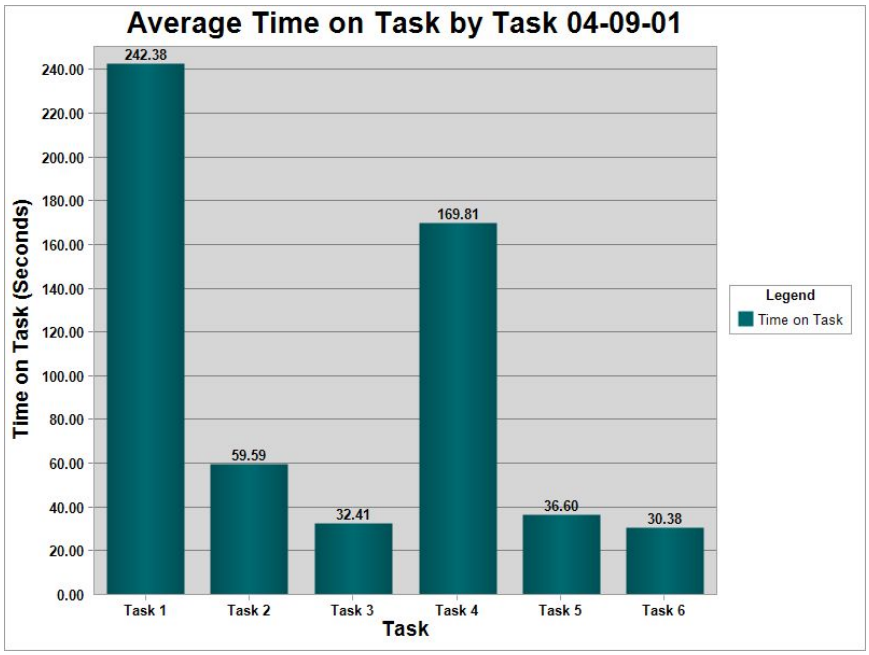
The information which was relevant beyond MindTap's systems such as Contact Support and Flash difficulties was much more easily located than information regarding specifics to MindTap such as Task 5. Overall there was a large amount of polarity in the ease of navigability for the various tasks with some being referred to as somewhat to very easy while others were referred to as very difficult (by the same participants). A comment from Participant 04-01-01 exemplifies this when he says "what was easy was really easy". This would seem to imply that while there are some aspects of the site which work well in terms of navigability, other aspects are much more obtuse. This is important to note as the site is redesigned so as to avoid obfuscating information that was already easy to find.





An interesting point of interest found by the observers was that there was little to no difference between those that utilized the help page's description of headings and those that navigated solely by the sidebar. Both the time to complete tasks and the responses to the perceived difficulty of locating the answers were similar across all individuals participants. Compare the average times of participant 04-08-01 who utilized the site's descriptions and participant 04-09-01 who did not utilize the descriptions to the same extent to visualize this.


Average Time on Task by Task 04-08-01
Time on Task (Seconds)
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
131.00
74.00
29.99
171.80
107.62
69.80
Task 1
Task 2
Task 3
Task 4
Task 5
Task 6
Task
Legend
Time on Task


Average Time on Task by Task 04-09-01
Time on Task (Seconds)
240.00
220.00
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
242.38
59.59
32.41
169.81
36.60
30.38
Task 1
Task 2
Task 3
Task 4
Task 5
Task 6
Task
Legend
Time on Task

Conclusion

A help system is one of the most important aspects of creating a user-friendly distance learning tool. the Cengage Mindtap Student Help system should meet the needs of users who have come to the guide when errors arise in their use of the software. Since action usually immediately follows the reading, it stands to reason that the help system should include everything a user would need so that it can best benefit the student. Our recommendations above are what we have found to be the best way to move the help system toward that goal.

We, the co-investigators would like to thank the Cengage team for this opportunity. We hope it has been as beneficial to your program as it has to ours.

Appendix 1 Literature on Screencaptures

The ongoing conversation surrounding screen captures in technical documentation is beginning to fall out of date. Most notably, from 1996 to 2004, Mark van der Meij conducted empirical research on the effects of visuals to improve understanding in software documentation. The results of the project were published into four academic papers. The research presented shows that a goal-based, functional approach in using screen captures leads to a more effective and efficient manual (van der Meij 1504). The research asserts that screen captures support switching attention between the manual and the computer screen; the development of a mental model of the computer program; the identification and localization of screen objects, and the verification of screen states.

Additionally, Alan Manning in his 2005 presentation on using visual rhetoric to avoid Powerpoint pitfalls presented theories of visual rhetoric to show that improvements in visual communication generally, PowerPoint slides in particular, depend on shifting our orientation away from image-driven thinking and toward diagrammatic modes of presentation. In short, Manning argues that a shift from aesthetic to information will improve powerpoint presentations "goals" (Manning 281-282). Manning asserts that document-design discussion tends to focus largely on formatting and readability issues: invoking the use of margins, white space, font styles, color, headings, paragraphing, columns, etc. Informative-graphics discussion tends to focus largely on effectiveness, defined in terms of accuracy, inoffensiveness, and clarity or readability. In defense of this idea, Manning concluded that graphics can be split into distinct rhetorical purposes with informative having the goal of informing.

Cited:

Manning, Allan. "Using Visual Rhetoric to avoid *Powerpoint* Pitfalls." IEEE International Professional Communication Conference

Van der Meij, Hans and Gellevij, Mark. "Empirical proof for presenting screen captures in software documentation." *Technical Communication*, 51(2), 224-238. 2004.

Van der Meij, Hans and Gellevij, Mark. "Examining the role of screen captures in manuals." *InterCom*, 43(4), 35-38. 1996.

Van der Meij, Hans and Gellevij, Mark. "Screen captures in software documentation." *Technical Communication*, 45(4), 529-543. 1998.

Van der Meij, Hans and Gellevij, Mark."Screen captures to support switching attention." *IEEE Transactions on Professional Communication*, 45(2), 115-122. 2002.

Appendix 2 Observer Comments During Testing

04-01-01: User often displayed feelings of confusion and found most answers by guessing rather than following a logical path of headings and subheadings. Many comments by them were alluded to disorganization and unexpected results.

04-04-01: User felt the need to maintain an organized and less cluttered space on the site, often recollapsing tabs between tasks. User also would approach tasks with a top-down perspective, seeking out headings which felt as though they would give broad, general information then narrowing their search from their. This often led them to the first page or the “more information” page without yielding any fruitful results in their search.

04-08-01: User was confused and misled by the headings, often getting close to finding the correct answer to a task but would not make the final move onto the page with the answer because they did not feel as though they were on the right track with the headings they were seeing. User did find some success when navigating by the descriptions present on the heading pages, however, they did not always use them.

04-09-01: This user found difficulty in understanding information that was directly related to the MindTap site (such as number of logins). Additionally, user would often navigate using the descriptions on the heading pages, going so far as to not even feel the need to navigate to the final page on the task as they felt that they had satisfactorily found an answer. They had in fact located the correct page but felt that the description was enough to be able to say that they had found the correct answer.

04-10-01: Similar to the last, this user would often navigate using the heading descriptions and did not feel the need to navigate to the final page in the tasks. Like all other users, however, they felt the headings were ambiguous and difficult to navigate through. This

user even commented that they wouldn't have found the answer to a particular task if they had not read the descriptions on the page.

04-11-01: Much like user 04-04-01, this user felt the need to reset the page after each task and would approach with a broad to narrow search strategy to find the correct answer. Many of the headings seemed to confuse them and their comments often gave the impression that they were lost as to where they were in the site. Ambiguous headings such as "open tools" were especially difficult for them as they navigated there and felt an answer should have been there but did not find said answer.