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Usability Test: MorphoSource 2.0

Recommendations

1. On the homepage
    a. Enlarge the title; add a one-sentence description of the purpose and function of the site underneath the navigation/search bar that is understandable to first-time users.
    b. Add an explanation or improved labeling for what is meant by "collections," what is in each collection, and/or how the database is organized.
    c. Provide more ways to browse the database content, for example, by institution or taxonomic order.
2. On the physical object show and media pages
    a. Restructure the metadata so that all categories are collapsable and empty metadata fields do not appear.
    b. Add larger "Download [media file] Now" and "Share" buttons to the specimen page, and a short description of what kind of media the user is downloading.
    c. Change the box icons to thumbnail images of the media files.
    d. Use simpler, non-specialist terminology, particularly in the physical object title, the metadata labels, and the labels of media files. Remove numbers from titles of physical objects and media files.

Additional features to consider, time and resources permitting

1. Provide instructional tutorials for casual users and K-12 students and teachers.
2. Make it possible to interact with the banner of animal images on the homepage, for example, make them clickable or provide a pop up description when the user mouses over them.
3. Make all tags on physical object and media pages (blue boxes underneath the title) clickable/searchable.
4. Add a citation generator for each physical object page and all media files.

[1] *For more information, please contact emily.daly@duke.edu*

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Background

This study was conducted to test the overall usability of MorphoSource 2.0. Testing was conducted using the alpha version of MorphoSource 2.0 (a version of the site that was still in development). The study was developed by Will Sexton and the MorphoSource team, and conducted by Samantha Thorne and Eden Andes with guidance by Emily Daly. On June 10th and 12th, 2019, we recruited eight participants at a table set up in the lobby of Perkins Library at Duke. Each participant was given a voucher for a coffee or snack in exchange for their time. Eden Andes moderated the first three tests on June 10th, Samantha Thorne moderated the next three tests on June 12th, and Eden moderated the final two tests on June 12th.

Questions we hoped to answer through this study:

1. What do users notice about the homepage and the physical object show page? What elements or features stand out, make sense, or don't make sense?
2. Can users locate and interpret physical object and media metadata?
3. From a physical object show page, can users locate media of interest?
4. Can users interact with 3D meshes and volumes in the browser?
5. Can users do single file downloads?
6. What features or design elements did users like and dislike the most about MorphoSource?

Participants

Participant demographics:

- 2 undergraduate students
- 4 graduate students
- 1 staff
- 1 alumnus

Participant frequency of advanced study in biology:

- Yes: 2/8
- No: 6/8

Participant frequency of participating in work or research that involves the use of 3-dimensional images of museum specimens or objects:

- None

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Key findings

1. What do users notice about the homepage and the physical object show page? What elements or features stand out, make sense, or don't make sense?

Homepage

When prompted to explore and browse the homepage, all participants scrolled through and scanned the page content, and clicked on elements of the page. 6/8 clicked on a collection and/or the "Explore Collections" button, 5/8 clicked on the navigation bar ("Home", "About", "Help", "Contact"), and 4/8 tried the search function. 2/8 clicked on the banner of animal images, the "Languages" menu, the "Dashboard" link, and on a specimen link once they had clicked through to a collection.

Participants also remarked on both positive and negative aspects of the page. 4/8 commented that they liked the banner of animal images. One participant said, "It would be cool if the image was interactive, if it would provide description. I wish I could do something more with them because they're so interesting." 4/8 appreciated navigational and organizational features of the homepage, including the search bar dropdown, the overall layout, "Featured Work" and "Recently Uploaded", and the organization by collection. 5/8 expressed confusion about the collections, including what they are, what the titles mean, and what "Explore Collections" means. Two users mentioned that the purpose of the site is not communicated well through the homepage, and that it took exploring to figure what exactly the site is meant to do or provide. One participant mentioned they did not know what "Featured Researcher" meant, and one mentioned they did not know what Submit Work meant.

When asked about their sense of the site for research, 6/8 expressed understanding that the 3D images are organized into collections. However, before exploring the site, participants were informed that the purpose of the site is to "preserve and make available 3-dimensional images of museum specimens," which may have affected this response. 3/8 mentioned that users can contribute their own images to the site.

Participants' reactions to the homepage suggests that while its navigation is clear and familiar to a first-time user, its purpose and meaning are not. One participant expressed a desire for "captions or subtitles to organize or divide the page up," and that he would want explanations for how to use it, where to go, and what the site can accomplish. That being said, it seemed that none of the participants read the explanatory paragraph on the homepage.

Physical object show page

When prompted to explore and browse the physical object show page, all participants scrolled through and scanned the page content. 4/8 clicked on a media file and 2/8 noticed the

"Description" metadata field. 5/8 commented on the amount of information on the page and its organization: there is a lot of information but it's organized and laid out well, it is detailed and informative, it will be helpful once all the information is filled in, and the "Show more" links are helpful for making the page less busy. One participant suggested that the metadata fields for which there is no data should be removed, specifically in the taxonomy. 3/8 expressed confusion about what the media files were. 2/8 commented on the tags underneath the title (e.g. "Biological Specimen Object", "In Collection", and "User Supplied Record") and were not sure what they were. One participant suggested that the collection name should be in the tags or at the top of the page somewhere. Also, one participant mentioned that they were not sure what the numbers in the title meant.

2. **Can users locate and interpret physical object and media metadata?**

All users were able to identify specific features which were located in the metadata of the specimen they were tasked with analyzing. All users were able to identify the holding institution of the specimen in question. All users were also able to identify the scientific name of the specimen in question, and both of the participants who have done advanced study in biology were also able to identify the "order" of the specimen. 7/8 users were able to use the metadata found on the page to confirm it was the appropriate page to find a specific 3D media file. 6/8 were able to identify the physical object that was used to create the media files located on the specimen page. 3/8 users were able to locate the 'raw data' link of the media file. Two of the three had a difficult time locating the link. 3/8 users were also able to locate the history of the media file, including Upload History, Owner, and Download History. Key take-aways: Participant interactions and feedback suggest that the metadata presented on the physical object is clear and straightforward. The metadata presented on the media files, however, isn't as clear and can appear convoluted to users not familiar with the content.

3. **From a physical object show page, can users locate media of interest?**

7/8 users were able to locate specific media files created using specific technology. One user was not clear on whether all of the files fit the criteria. All users expressed momentary confusion around the use of the Greek symbol *mu* used in the naming convention of the files, and based their decision on the presence of "mesh" or "nano", as provided by the moderator. 3/8 asked to have the question repeated before locating the correct files. One user suggested thumbnails, stating "There should be a thumbnail of what it is...It's more for a researcher and not for the general public." These factors indicate that while the files are available, the naming conventions may appear too field-specific for the general public, and would require a more simple and straightforward naming standard to increase accessibility. Adding thumbnails of what the media file would also help all users regardless of experience identify what the file contains.

4. **Can users interact with 3D meshes and volumes in the browser?**

All users successfully interacted with the 3D image, including zooming in and out and rotating the object. All users experienced some kind of lag in loading and reaction time of the image, though whether this is a result of the software or the hardware is difficult to determine. 3/8 users located additional menu options such as full screen and color/brightness of the image. Two users who also accessed the full screen option lost the image when they exited full screen. These occurrences suggest that, while the software has appeal and works on a more superficial basis, full functionality of the software is required before a true usability test can be accurately administered and evaluated.

5. Can users do single file downloads?

7/8 users were able to find the download link. Of that seven, five had difficulty locating the link, and had to search the site in order to find it. One user was not entirely sure "if it would download the picture or the actual raw data", suggesting that users who are not familiar with these types of media files wouldn't be able to identify the type of file they're accessing. Two users also noted the abundance of other links on the page, which lead to confusion about which one would allow them to download the file. These findings suggest that adding a larger, less-discrete "Download [media file] Here" button would increase accessibility of the feature. Adding a description of the type of file the user would download would also be useful.

6. What features or design elements did users like and dislike the most about MorphoSource?

6/8 users said that they enjoyed the pictures and the interactive visualizations of the site, stating "I liked the 3D image the best" and "I...liked the interactive feature...it would be really helpful instead of trying to find it [in a museum]." 5/8 users said that they liked that all the metadata was available in one place. One user stated specifically: "I like how it was organized..[it] gives you all the metadata you need." 1/8 mentioned that they appreciated how they divided the "Recent Uploads" and the "Featured Collections", elaborating that it would help with collaboration and finding important and relevant content.

4/8 users mentioned that the metadata was "very busy" and that there was "too much information...it [may] be useful for a researcher, but too many words." 4/8 users expressed a need for guidance in using the site, one user stating specifically "I don't think a student would have this knowledge...a help or tutorial file would be good." On a related note, 6/8 commented that the site seems more suited to researchers in the field than to the general public. One participant stated, regarding the physical object show page, "If I were an academic, it makes sense." 3/8 users mentioned that thumbnails for the media files would help in easier identification of a specific file, and that icons would help navigation around the site. 2/8 users commented on the absence of a citation generator, stating "It would be cool if there was an easy way to cite them... a dropdown that had the citation formatted."

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Appendix A: Test script

Hello **[NAME]**. Thank you for volunteering to participate in this study. My name is **[NAME]** and I will be walking you through our tasks today. This is **[NAME]** and she will be taking notes. I will mostly be reading from a script to ensure each testing session is as consistent as possible.

We are developing a new website and we're trying to better understand how our users interact with it.

Completing all of the tasks today should only take around ten minutes, but don't worry about going too fast or too slow. There is no right or wrong action, because I am testing the system, not testing you. I will ask you to think aloud while you complete tasks so that I can get an idea of your thought process. Your input is very valuable to our research so please be as honest as possible when providing feedback. If you have any questions as we go along, don't hesitate to ask.

Do you have any questions for me so far?

Now I'd like you to answer a few questions about your previous experience.

[PRE-TEST QUESTIONNAIRE] IN QUALTRICS

Thanks. If you are ready to begin, I am going to start recording.

[START SCREEN AND AUDIO RECORDING]

Just to provide you with some context, we are building a web application to preserve and make available 3-dimensional images of museum specimens, including both cultural heritage objects like pot shards, sculptures and spear points, as well as biological objects like alcohol preserved animals, skeletons, or even fossils.

Now I'm going to ask you to try doing some specific tasks. Please remember to think aloud as you complete each task. For this exercise, I'd like you to imagine that you are working over the summer with a professor who is doing research on 3D images representing museum animal specimens. This professor is interested in collecting 3D images representing many different types of animals.

[TASK 1]

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[DISPLAY THE HOMEPAGE]

Spend a few minutes exploring the homepage and other areas of this interface, browsing around, and talk aloud about your experience. What things do you see? What makes sense or doesn't make sense?

What sense do you get about this site as a source for research?

[OBSERVE: We are interested in very general thoughts.]

[TASK 2]

[DISPLAY THE SPECIMEN PAGE]

Here is an example page for a specimen. Spend a few minutes exploring the page, and talk aloud about your experience.

[OBSERVE:

- What things does the user click on?
- Do they begin to develop a narrative around the specimen and its origins?
- Do they scroll all the way down, click on any of the hyperlinks, including those for media objects?
- Are there any comments about the metadata, particularly the taxonomy?]

[TASK 3]

Now let's try to answer a few questions about the physical object represented on this page by using the information that we find there.

1. What physical object was used to create this page and its associated 3D image files?
2. What institution holds this specimen?
3. What is the scientific species name for this specimen?
    a. If the user has a background in biology - What is the "order"-level grouping for this species?

[OBSERVE: How does the user scan the page for information? What difficulties do they encounter?]

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The professor has asked you to find and download a 3D file of a Homo sapien held at Duke University. Based on the information that we've just gathered, can you confirm that we have found the correct page for that task?

[OBSERVE: User confirms or avers. How confident are they in their response?]

[TASK 4]

The professor specifically wants a MESH file created using MICRO/NANOCT imaging. Can you find the list of 3D files available for this specimen? Can you tell if any fit the professor's criteria?

[OBSERVE: Is the user able to identify the links to files without difficulty?]

[TASK 5]

[DISPLAY THE MEDIA SHOW PAGE]

Take a few minutes to examine this page. Try rotating and zooming on the view display. What can you say about the object that's represented here?

What is the history of the media file?

Can you find a link to the "raw data" that was used to create this file?

[OBSERVE: What sense does the user have of the media page? Are they able to tell anything about the media file's history?]

What step would you take to download this media in order to save and share it with the professor?

[OBSERVE: Is the user able to find the download button?]

[END TASKS]

Great! That concludes our final task. I have some additional questions I'd like to ask you.

[POST-TEST QUESTIONNAIRE]

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Appendix B: Pre-test Questionnaire

https://duke.qualtrics.com/jfe/form/SV_0uEN17PnvpavjvL

1. Which of the following describes you best?
    a. Undergraduate student
    b. Graduate student
    c. Doctoral candidate
    d. Faculty
    e. Staff
    f. Other: _____

2. Have you participated in any advanced study in biology (need to define)?
    a. Yes
    b. No

3. Have you ever done any work or research that involves the use of 3-dimensional images of museum specimens or biological objects?
    a. Yes
    b. No

4. We would like to record your session to allow Duke University Libraries staff members who are unable to be here to observe your session and benefit from your comments.
   Please read the statement below and provide your name and UniqueID where indicated.

   I understand that my usability test session will be recorded.

   I grant Duke University Libraries permission to use this recording for internal use only for the purpose of improving the designs being tested.

    a. Name
    b. UniqueID

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Appendix C: Post-test Questionnaire

1. What two things about this application did you like best?

2. What two things about this application did you like least?

3. Do you have any other comments or suggestions? Anything else you would like to say that you haven't had a chance to tell us yet?

Do you have any questions for me?

Thank you so much for your participation in this study. Here is your voucher for The Perk; you can use it until **[TIME]** today.

Have a great day.