

## Methods

### Method 1 Interviews

#### Participants

Initially I wanted to recruit participants who closely fit my primary user profile; that is, undergraduates in a veterinary technology or animal science discipline. But I felt that would be too restrictive, so I broadened the qualifications to undergraduates with a major in the biological sciences. Coursework in anatomy and physiology was not required. Computer literacy was a requirement as well, but since that skill is ubiquitous in the target population, it was not a concern.

Two participants were recruited for the study. Both are Biology majors in their sophomore year at Ramapo College in Mahwah, New Jersey.

Ramapo College is a small liberal arts college near my home. I first went to their website to ensure they have an undergraduate major in Biology. Next, I physically went to the Biology Department and found a professor working in his office; I introduced myself, told him about the study and asked if he knew where I could find undergraduates majoring in the biological sciences. He gave me a tour of the department; he showed me where the labs for biology, and anatomy and physiology are as well as the study room. At that time there was a Biology lab class in session, so I waited until it let out. As students came out of the room, I asked them what their major is. If their major is in the biological sciences I then asked them if they would like to participate in my evaluation. The first two students I asked (who were together) said “No”, they had to eat lunch and go to their next class. The next two students I asked (who were also together) were very eager to participate, even before I mentioned the incentive and asked if they would mind signing a consent form. I asked them if they knew of a quiet place where we could do the evaluation. We agreed that the library would be the best place. The library was a long walk away, so we chatted while we walked. During this ‘warm-up’, I asked them questions such as:

What year they were in,

Had they taken an anatomy and physiology course,

What their post-graduation plans were - one of the participants wants to be a veterinarian.

Each participant was given a \$15.00 gift card to Starbucks as an incentive for participation in the study.

### Method 2 Consultation

I consulted with a Graphic Designer to test the layout and readability of the icons. The Graphic Designer works in the field, teaches at Parsons The New School for Design, and is pursuing a Master of Fine Arts degree at Brooklyn College. No incentive was given.

## Materials

### *Paper Prototype*

A paper prototype, in the form of a wireframe, and blank pages as described by Still and Morris in their paper, *The Blank Page Technique: Reinvigorating Paper Prototyping in Usability Testing* (IEEE Transactions on Professional Communication, Vol. 53, No. 2 June 2010) was used for the study – both interviews and consultation.

I modeled my prototype after the resources that scored the best in the Heuristic Evaluation and tried to avoid the pitfalls of the lower scoring resources. The McGraw-Hill *Essential Study Partner Anatomy & Physiology* website ([http://www.mhhe.com/biosci/esp/2002\\_general/Esp/default.htm](http://www.mhhe.com/biosci/esp/2002_general/Esp/default.htm)) and *Interactive Physiology* DVD tied for the best score. The McGraw-Hill site is easy to use, aesthetically pleasing, and explicit in language but still familiar. The site has features not found in the other sites which enhance the user experience. For example, icons serve to show type of page (informational versus animation versus activity) as well as position within topic. These icons can also be used to navigate backwards or forwards through a topic. And Help is always available from the main navigation bar. Likewise, the *Interactive Physiology* DVD is easy to use. It has a nice clean interface and uses breadcrumbs.

An inconsistent interface is common trend found among the low scoring resources. For example, many of the sites had the appearance that individuals worked on the site independently without corroboration. Other sites faltered with navigation; they did not provide a means to reach other parts of the site easily; and, or did not indicate position within the application.

Specifically, to design the prototype's general structure and navigation, I looked at the organizational schemes and navigation of the McGraw-Hill website, the *Interactive Physiology* DVD, and books on animal anatomy and physiology. These resources organized the topics in three different ways; most by body system, one by body part, and one by body function. In addition, for navigation design guidance, I read the books, *Don't Make Me Think* by Steve Krug and *Designing Web Graphics* by Lynda Weinman.

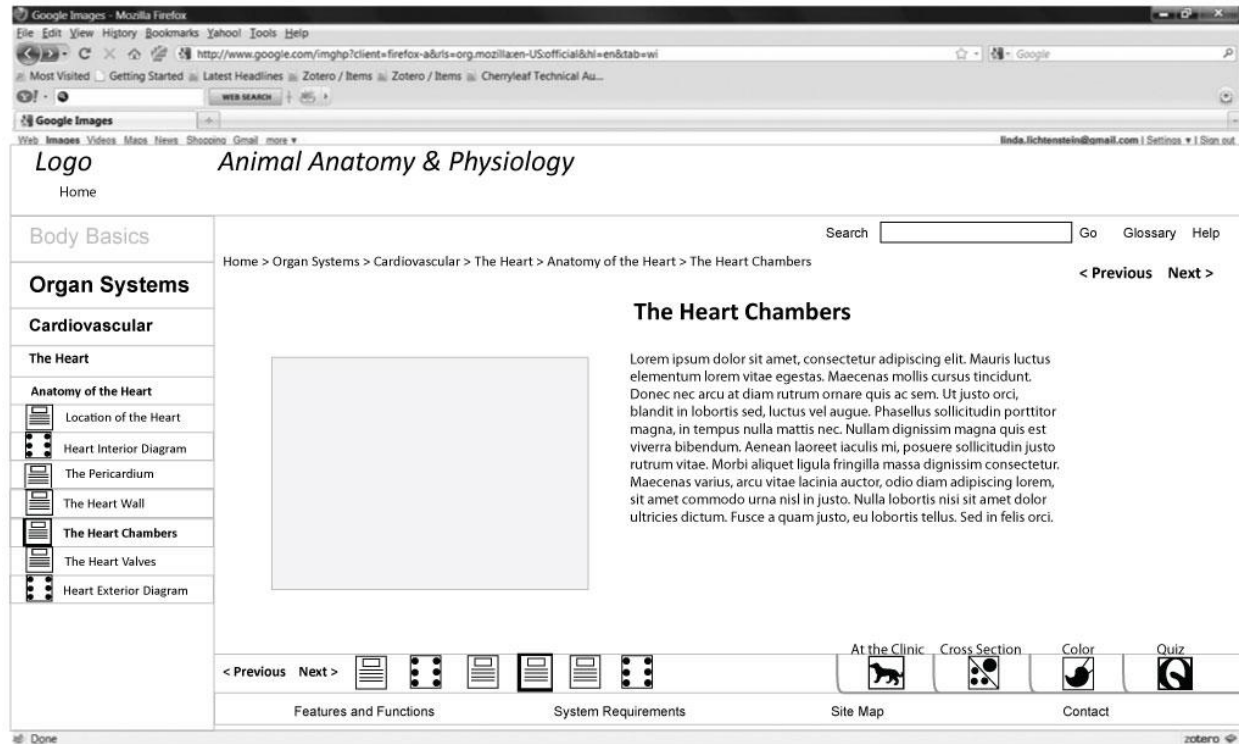
I developed the wireframe prototype with Adobe Illustrator. I chose Adobe Illustrator because it is a vector program and the program I know best. To make the prototype screens seem more realistic, I placed them in my plain browser window. All wireframes are black and white, and devoid of graphics (other than the icons and browser frame), so that color and graphics would not be a factor in the study.

The website is designed so that the academics, **Body Basics** and **Organ Systems**, are in the left side bar and separate from the special functions (**At the Clinic**, **Cross Section**, **Color**, and **Quiz**). I designed the icons for the special functions, discussions and diagrams. The designs for the discussion and diagram icons were modeled after those in the McGraw-Hill website, and the **Color** icon was modeled after painting icons. The **At the Clinic**, **Cross Section**, and **Quiz** icons were my own designs.

The wireframe prototype was constructed so that paths that lead to target pages for each scenario were complete. One wireframe page corresponds to one page of the website.

But, all other pages, including **Search**, **Glossary** and **Help**, were not developed. For these functions, a page was constructed with the message *'This page has not been developed. Please use the blank sheet provided to fill in what you expected to find here'*.

Illustrator-generated JPEGs of the complete set of the pages can be found in Appendix 3. A sample page showing all functionality follows:



## Sample of prototype web page

### Training Script for Interviews

I prepared a Training script for my own use to explain the procedure to the interview participants to ensure that I talked about all the relevant points. The training script can be found in Appendix 4.

Key points in the training script include:

- Five tasks which will require navigating to the appropriate page
  - To select a menu option, point to that option.
  - To enter information into a data entry box, write on the paper prototype in the appropriate input area.

- If a page that has not been developed is selected, you will be given a blank piece of paper and asked to fill in what you would expect to find there.
- Evaluation questions before tasks, immediately after completion of a task, and at the end of all tasks.
- Procedure for doing evaluation
  - Turn the page,
  - Read the scenario and task,
  - Use the paper prototype to navigate to the appropriate page,
  - I will play computer and give you the page you select,
  - Answer questions,
  - Repeat until all tasks are complete.
  - Answer post evaluation questions.

### *Evaluation Booklet for Interviews*

I compiled a booklet for each interview participant that included the consent form, the pre-interview questions, scenarios and tasks, post-task questions, post-interview questions, and a set of the prototype pages. The evaluation booklet (minus the prototype pages) can be found in Appendix 4; the prototype pages can be found in Appendix 3.

Key points include:

- The basic language in the consent form was taken from our text and Dumas which I modified to fit my needs.
- Seven pre-evaluation closed end questions were asked.
- Five scenarios and tasks followed. Each task was followed by one or two closed end questions that related to that task.
- Four closed end and two open end post-evaluation questions were asked.

### *Data Collection Sheet for Interviews*

The data collection sheet was used to log interview participant right and wrong menu choices, frustration levels, use of blank pages and other relevant notes. The data collection sheet can be found in Appendix 4.

### **Procedure 1 Interviews**

The actual evaluation activity took place at a table in the back of the library at Ramapo College. This location was chosen because it was quiet and had little to no distractions.

Participants worked with the prototype one at a time. Participant 1 sat next to me on one side of the table, participant 2 sat on the other side of the table. The participants switched places after participant 1 finished the evaluation.

The entire session took about forty five minutes.

After we settled in, I gave each participant an evaluation booklet and read the training script (See Appendix 4) to both participants at the same time.

Next, I paraphrased the consent form as they read along. Then I asked them if they had any questions, which they did not. Both participants signed the form and answered the pre-evaluation questions.

Participant 1 worked through the scenarios and tasks while I played computer and logged right and wrong menu choices, and other relevant data. The participant answered the post-task and post-evaluation questions.

After participant 1 finished, the participants changed places.

Participant 2 worked through the scenarios and tasks while I played computer and logged right and wrong menu choices, and other relevant data. The participant answered the post-task and post-evaluation questions.

After Participant 2 finished, I thanked them for their help, wished them well and gave them each a \$15.00 gift card to Starbucks.

Shortcomings to note are first, it was harder to play computer and log data than if I had a helper to do one of those jobs; and second, it would have been better if participant 2 was further removed from the area while participant 1 worked on the evaluation. Participant 2 sat on the other side of the library table from participant 1. Although participant 1 expressed a low level of frustration, participant 2's anxiety level tended to increase at those times.

### **Procedure 2 Consultation**

I presented the Graphic Designer with a page that includes all of the functionality, the Location of the Heart page and asked for initial reactions and feedback. The interaction was very informal and took about ten minutes. The Graphic Designer commented on the overall design of the page as well as on the icons. The session consisted of question and answer – mainly the Graphic Designer asking me what the functionality in the tabs was. I asked questions about the understandability of the icons.

## Results

### *Interviews*

On the whole, interview participants answered the post-task and post-evaluation questions for all tasks as very easy to easy.

Both Participant 1 and 2 understood and navigated to the pages for Task 1 and 2 immediately. Both these tasks entailed use of the left side bar. They were able to do so because they understood the organization of the site and the terms – they understood that the task involved **Organ Systems** rather than **Body Basics**. They understood the difference between discussions and diagrams as well.

They did, however, have more incorrect menu choices for tasks that involved the tabs (Task 3 and Task 4) and hence, the organization. At first they thought that the page could be found in the organ systems section in the left sidebar. For Task 3, Participant 1 incorrectly chose **Anatomy of the Heart**; this may be because anatomy of the heart wording was in the scenario for the task. They did not realize that the task involved special functions that would be in a separate navigation menu. So it can be said that initially they did not understand the organization of the site with respect to these special functions. They paused and looked around the page longer than expected before they found the tabs at the bottom of the page; and did so only after they determined that the page they were looking for could not be accessed from the left sidebar navigation, or the top horizontal bar. Therefore, they understood the terms; they knew in which part of the website the information could not be found. For Task 4, Participant 2 had more wrong menu choices. After options in the left side bar were exhausted, Participant 2 looked to the tabs. Participant 2 was not sure if Congestive Heart Failure information would be found under **At the Clinic** or **Cross Section**, but correctly chose **At the Clinic**. Perhaps Participant 2 is not familiar with the condition Congestive Heart Failure. From the data I collected it was not clear why there was some confusion with this task. However, once both participants chose the correct tab, they had no problem navigating to the correct menu option.

Both Participants understood the Quiz icon and term.

Neither participant used the help functions (like Search, Glossary, Help, Features and Functions). Although Participant 1 did ask me if Search was the place to start for Task 1. I answered that it is up to the participant which page options are used. Participant 1 then decided to use the left side navigation menu.

### *Graphic Designer Consultation*

The Graphic Designer liked the grid layout as well as the **Color** icon. The Graphic Designer found that the discussion icon was “too cryptic”, meaning it looked too much like text (which is my intent for the icon). The diagram icon looks like dominos, the suggestion is to make it look more like a film strip with squares rather than circles. The **At the Clinic** icon was understandable, but the **Cross Section** did not read as optimally as it could. The suggestion was made to have a one-to-one correspondence between the circles; perhaps make it look more like a magnifying glass, and to have the shapes be more irregular like an amoeba rather than circles. I asked about the **At the Clinic** icon – this icon was found to be

understandable. But, the discussion and diagram icons along the bottom were perceived as too much information and the correspondence between icon and topic is not clear potentially causing confusion.

No special tools were used to evaluate the data.

### Appendix 3 Paper Prototype

Below is the complete set of website screens used for the study:

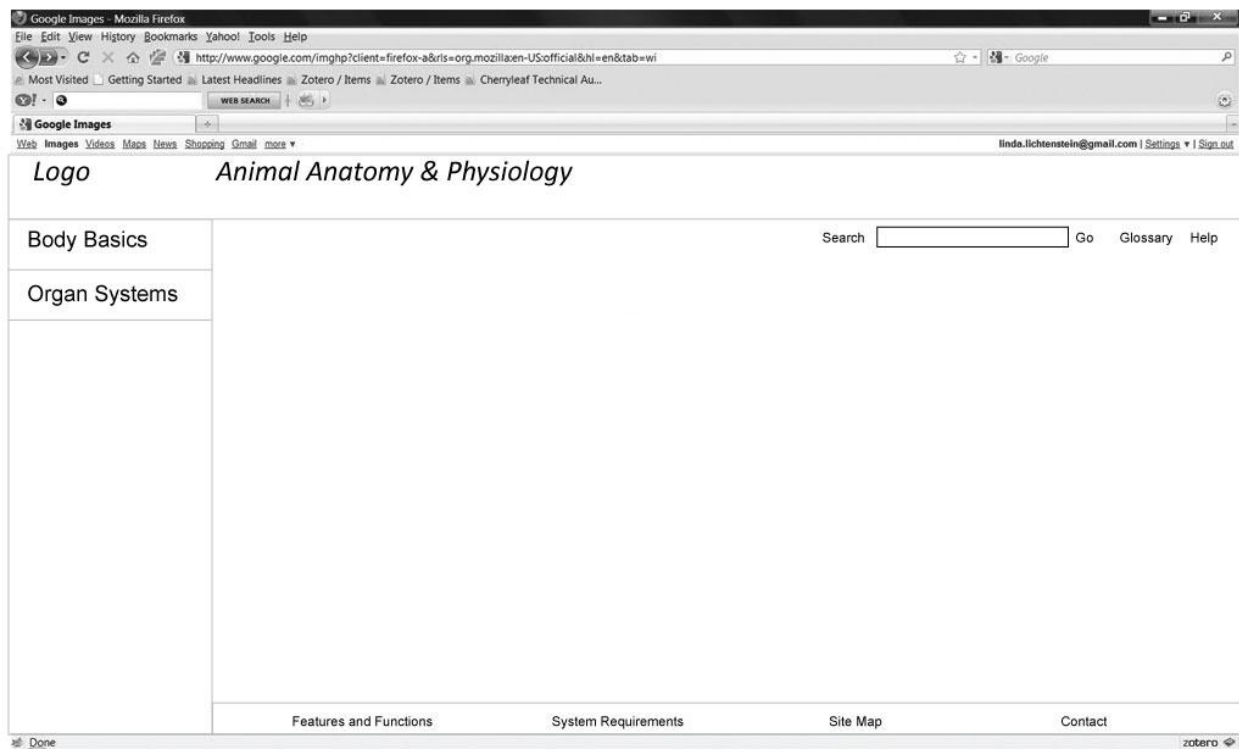


Figure 1. Home Page

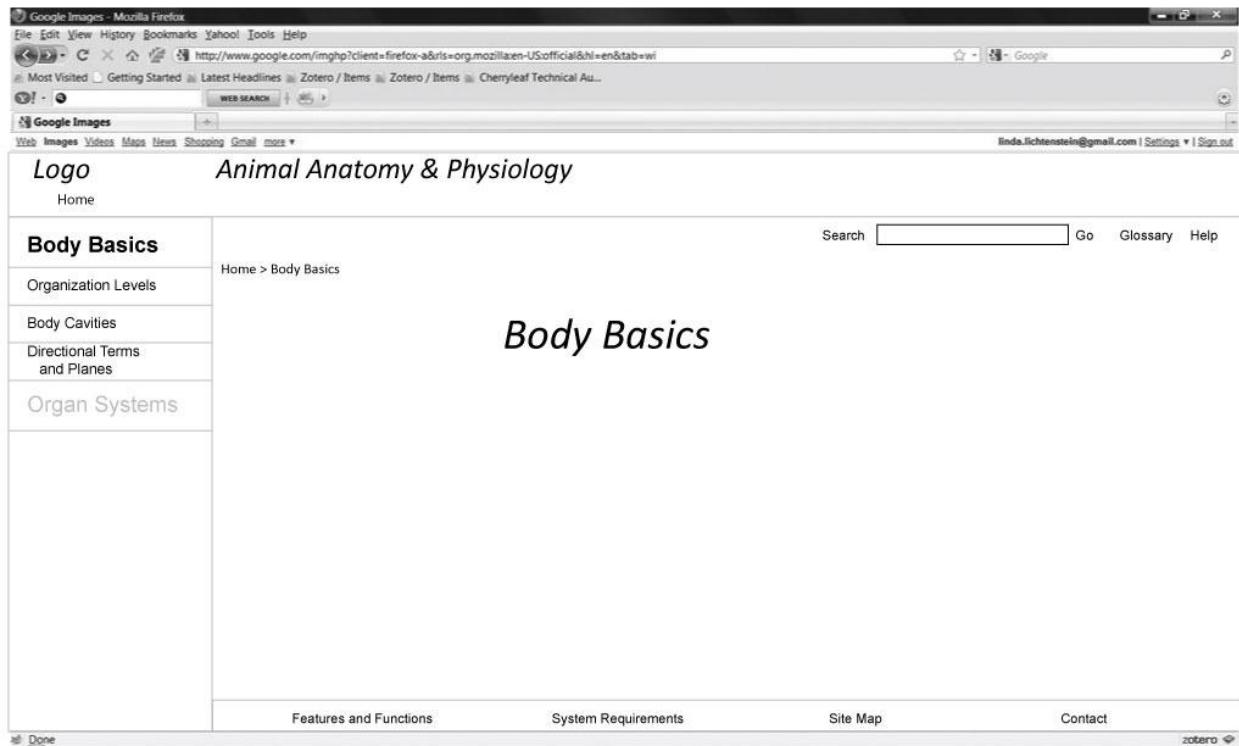


Figure 2. Body Basics Home Page



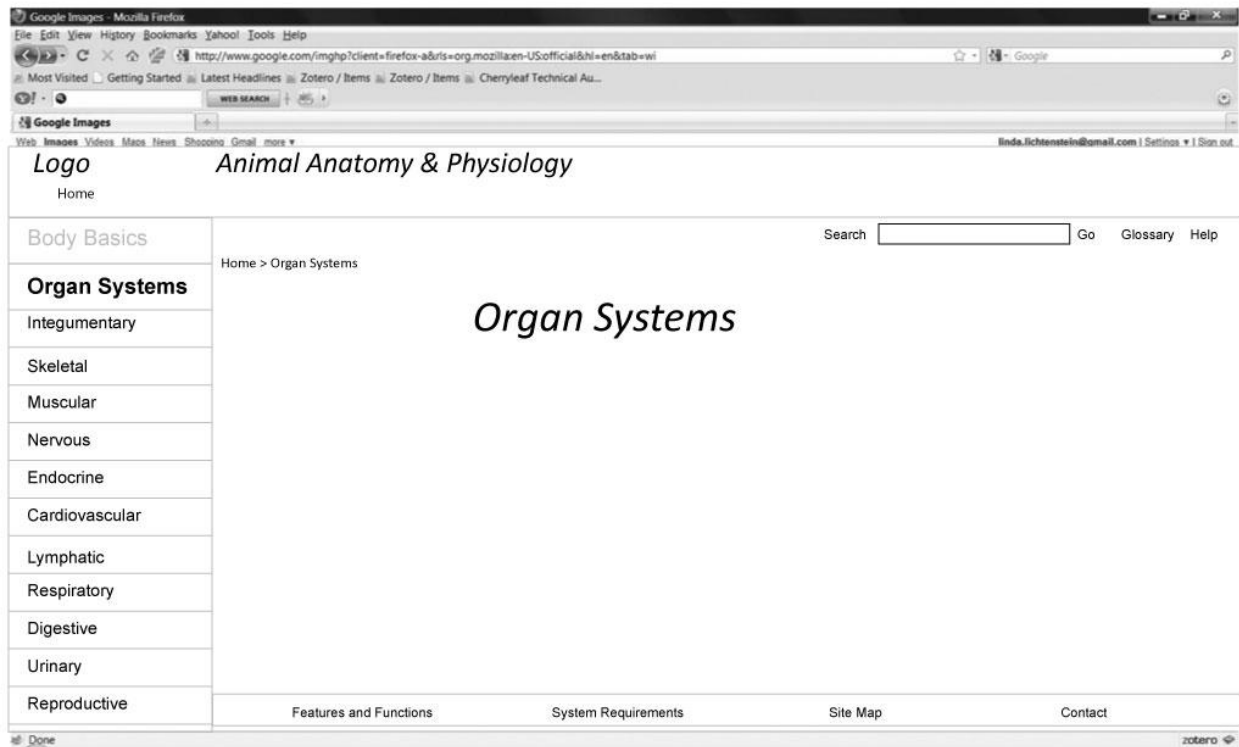


Figure 3. Organ Systems Home Page

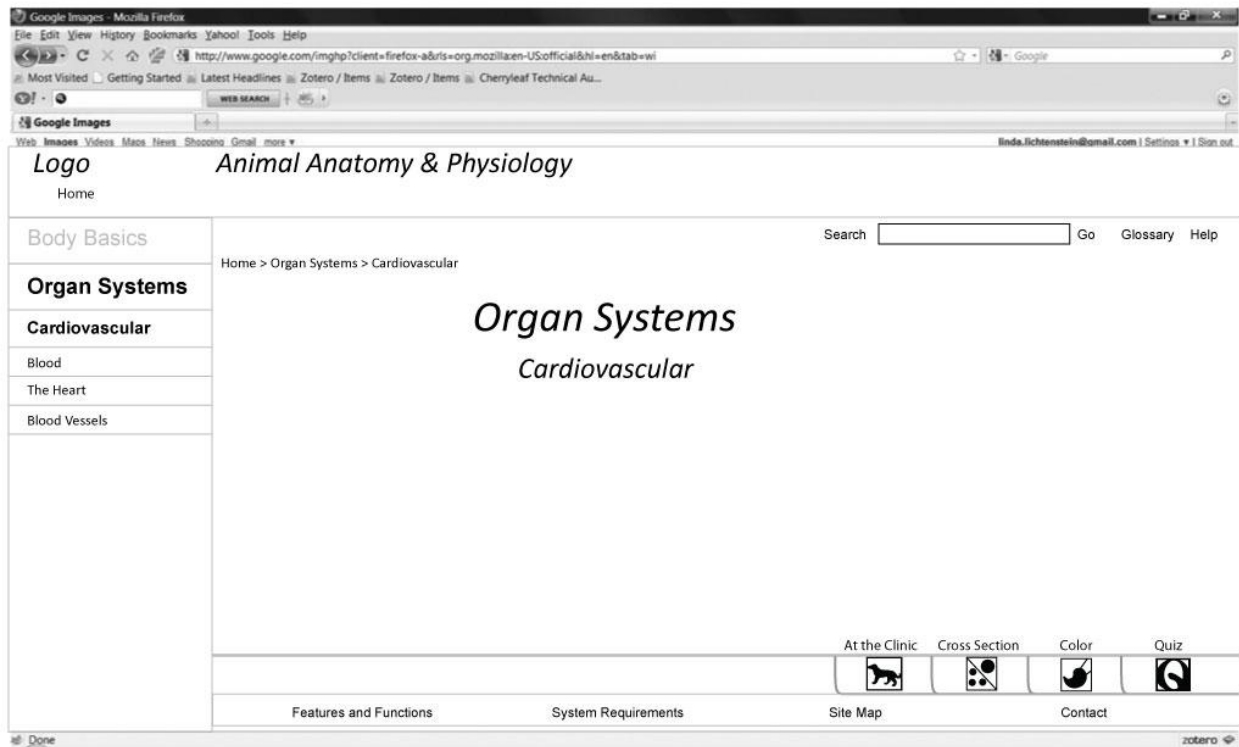


Figure 4. Cardiovascular Topic Page

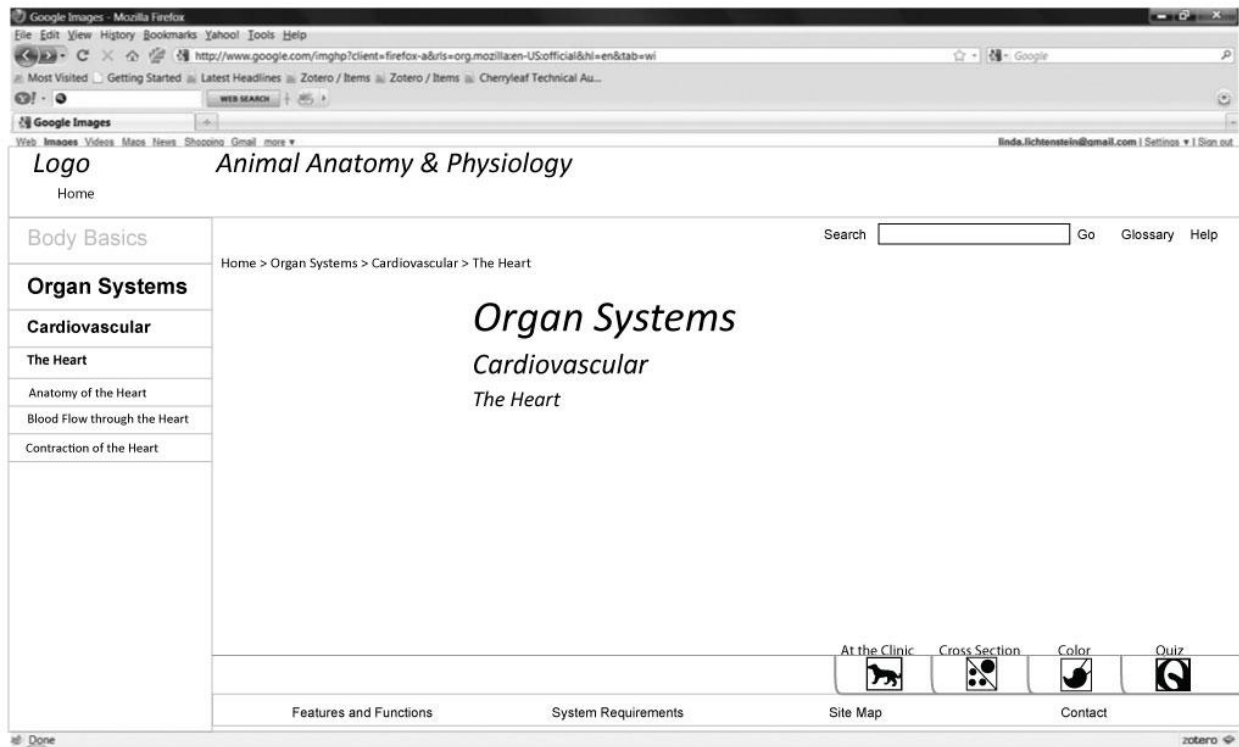


Figure 5. The Heart Subtopic Page

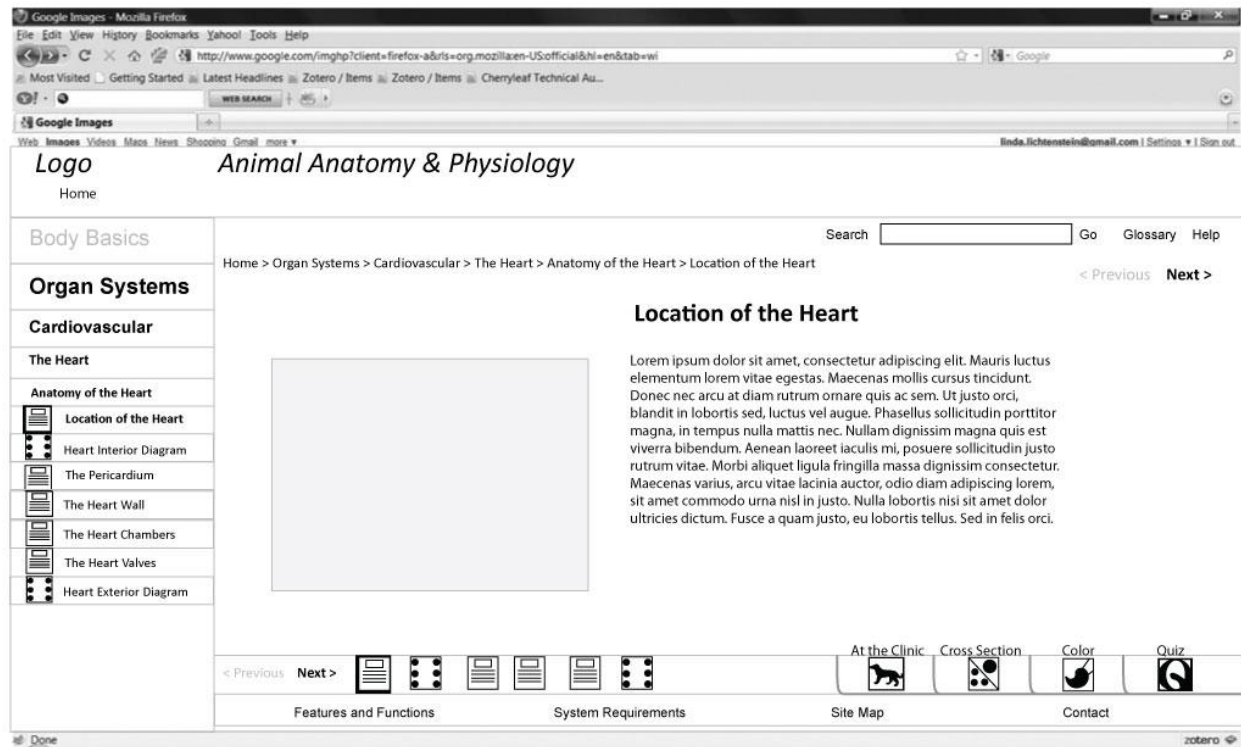


Figure 6. Anatomy of the Heart – Location of the Heart discussion

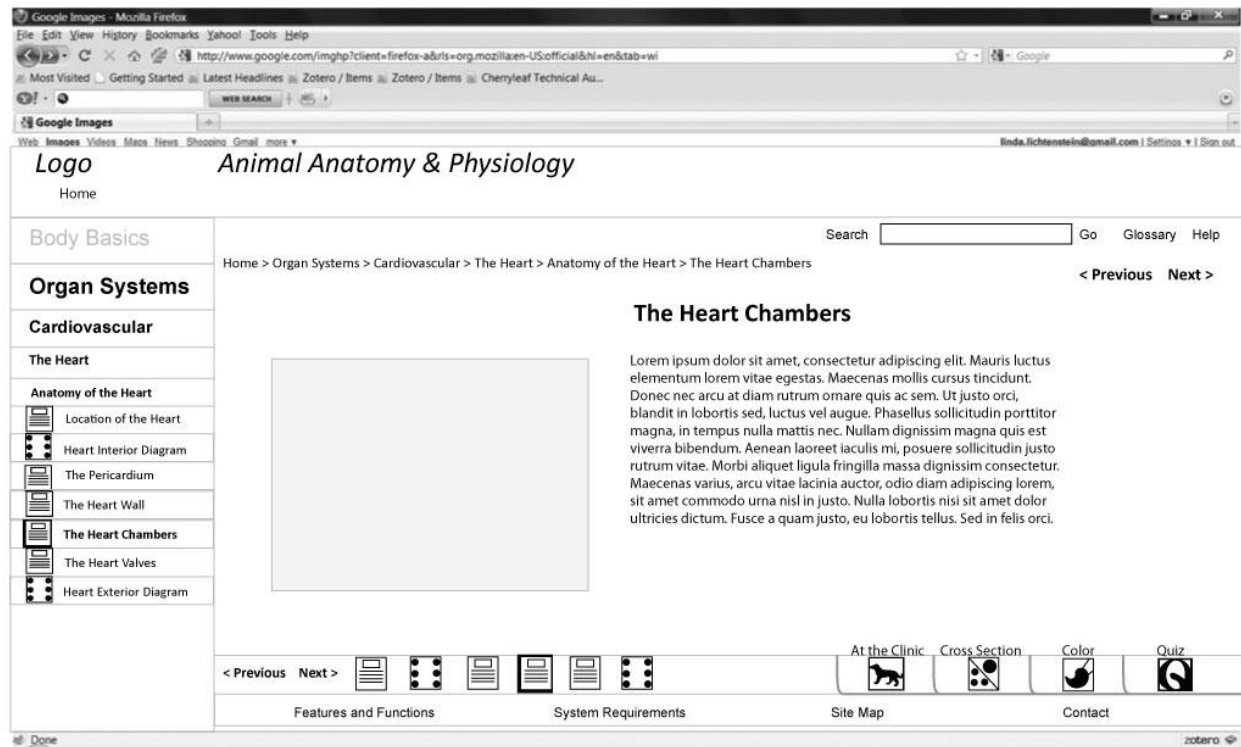


Figure 7. Anatomy of the Heart – The Heart Chambers discussion

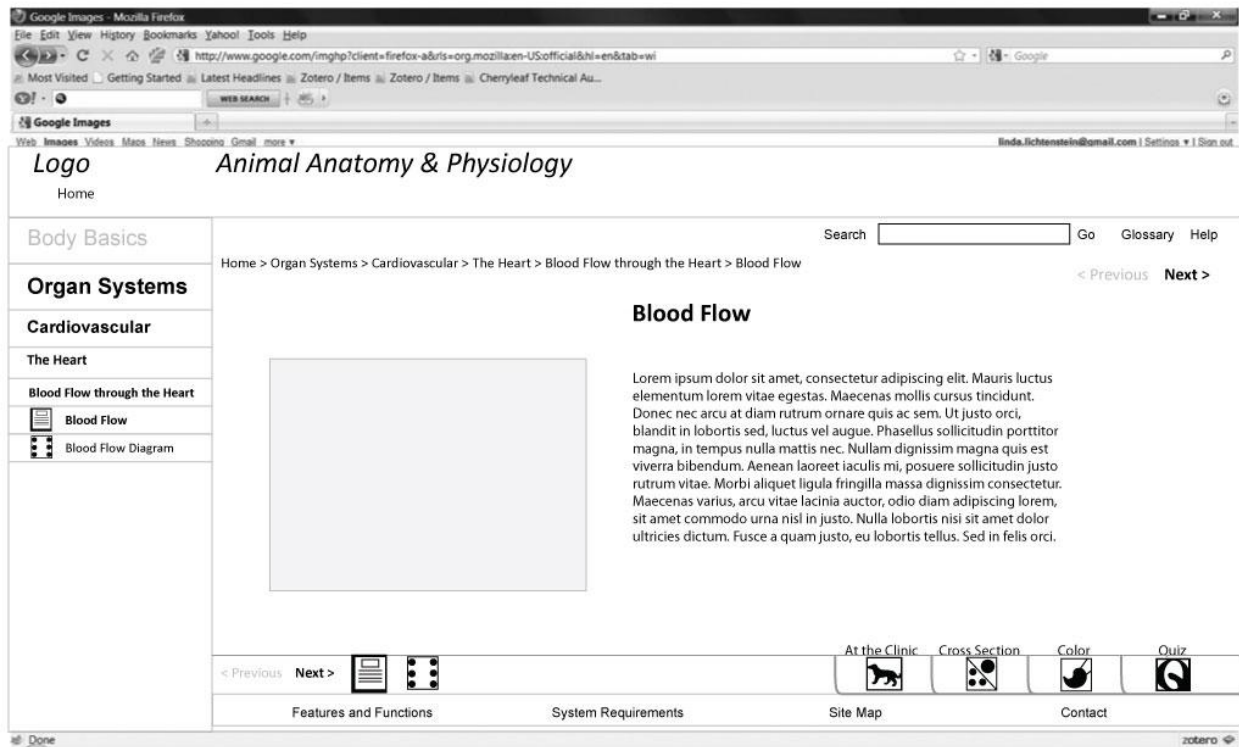


Figure 8. Blood Flow through the Heart – Blood Flow discussion

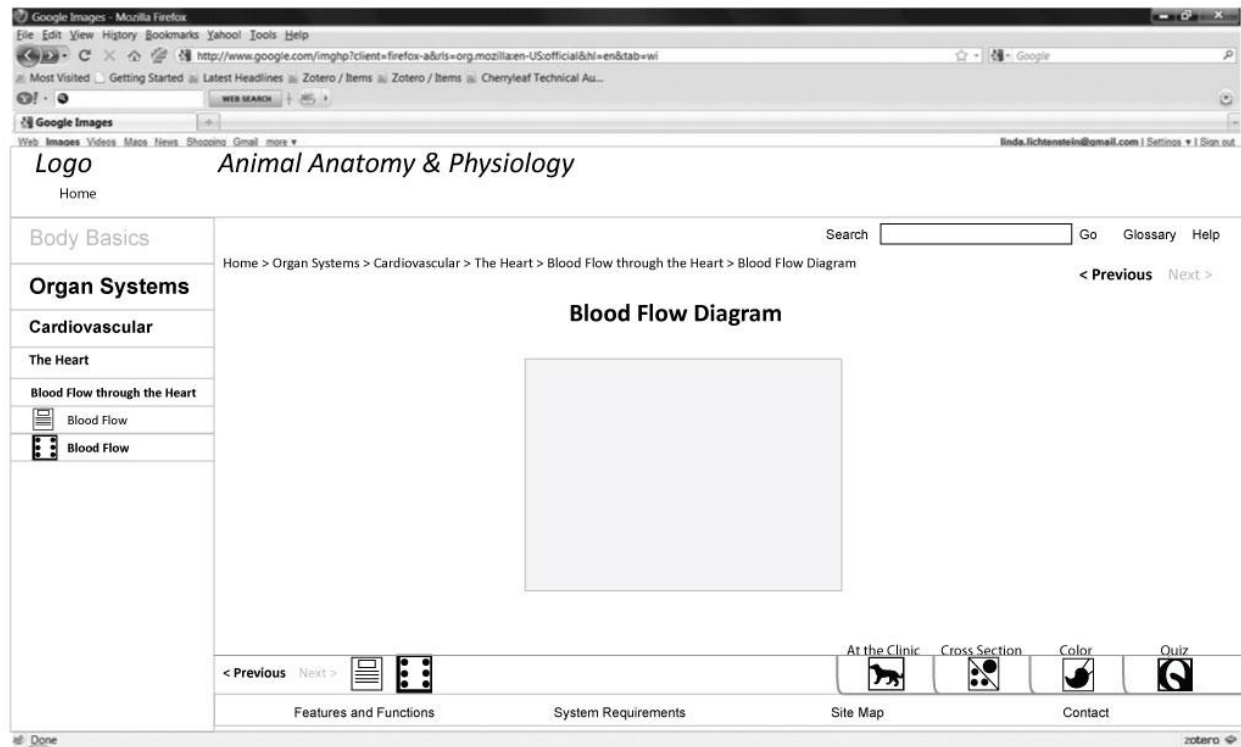


Figure 9. Blood Flow through the Heart – Blood Flow diagram

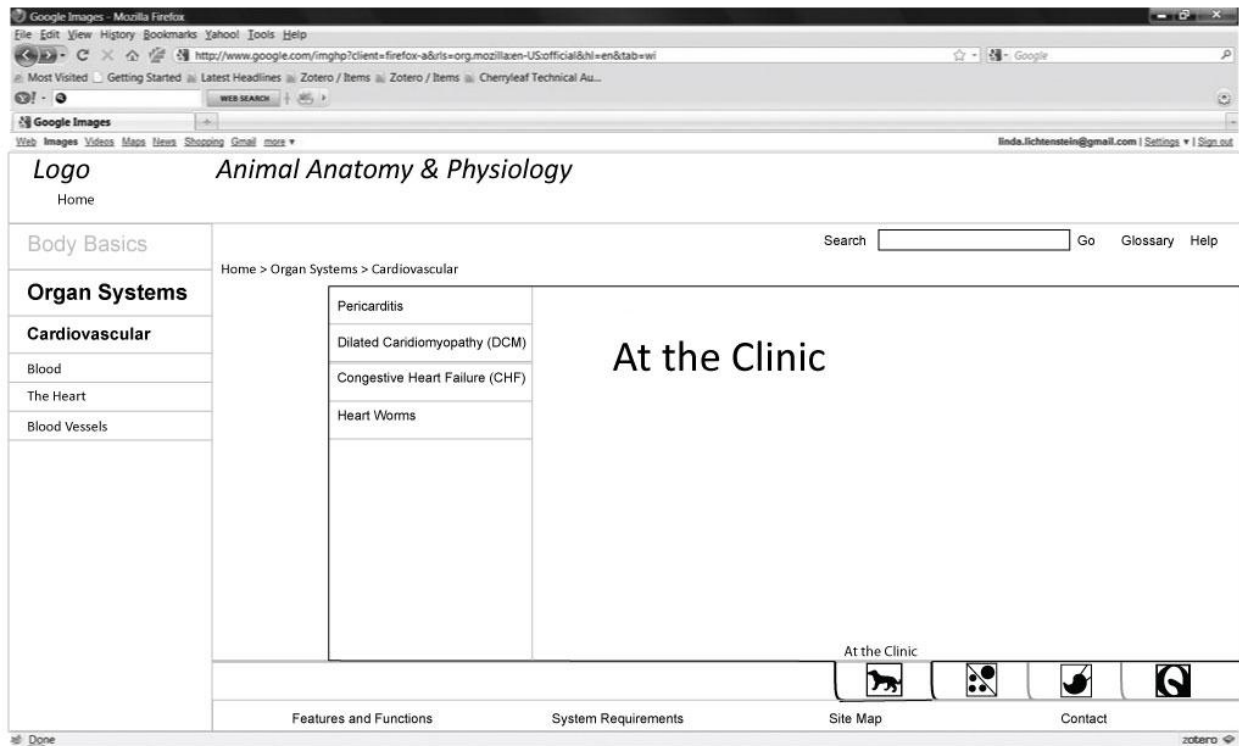


Figure 10. At the Clinic special topics page



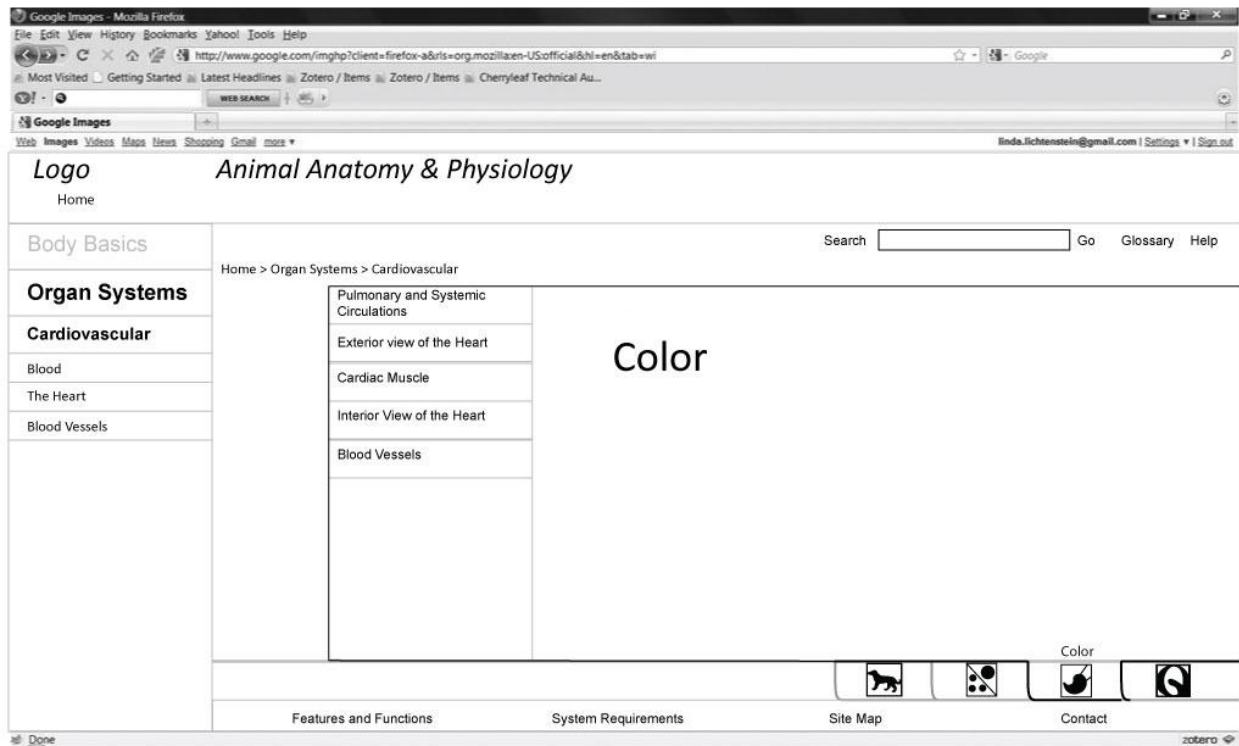


Figure 11. Color special topics page

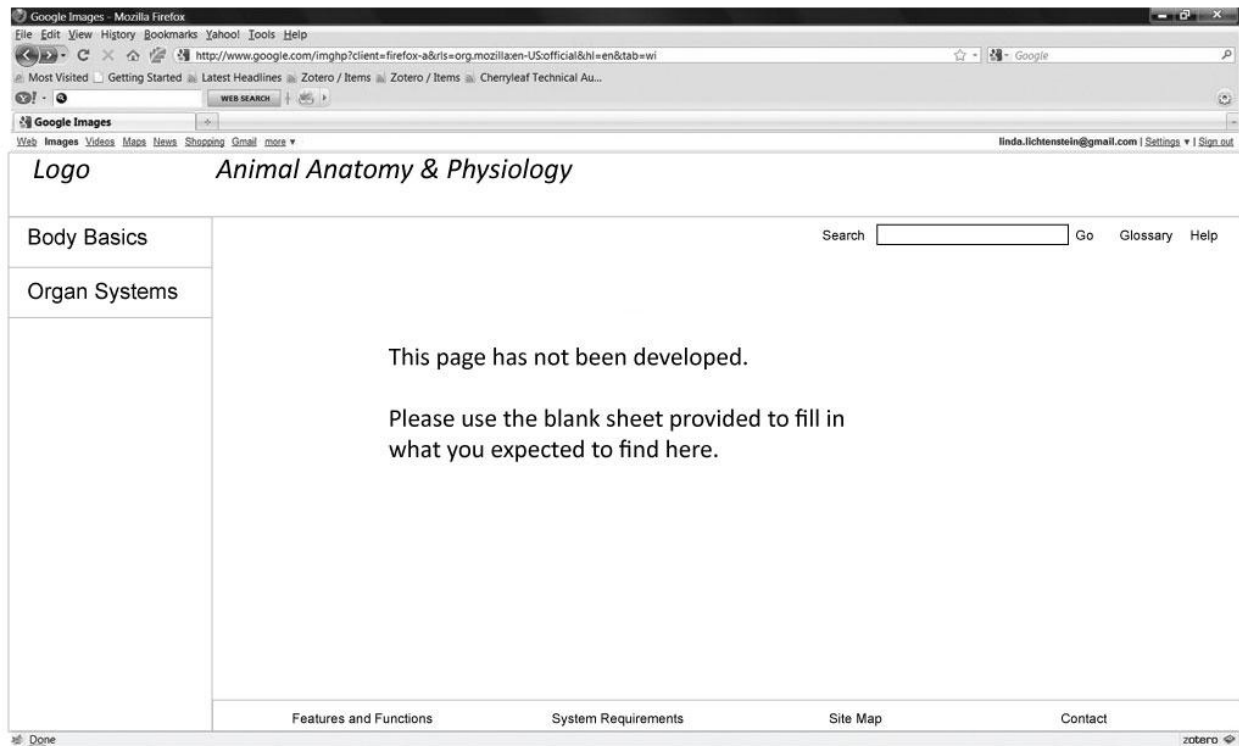


Figure 12. Not developed message

## Appendix 4 Interview Participant Instructions

### *Training Script*

You will be asked to complete five tasks using a paper prototype of my website which will require navigating to the appropriate page.

To choose a menu option, simply point to the option.

To enter information into a data entry box, write the information on the paper prototype.

Some of the pages have not yet been developed. Should you choose an option that has not been developed, you will be given a blank piece of paper and asked to fill in what you would expect to find on that page.

Pre Evaluation Questions - You will be asked seven questions before you start work on the tasks.

Evaluation Questions - After each task, you will be asked a question or two about the task you just completed.

Post Evaluation Questions - Then, after you complete all the tasks, you will be asked questions about the website as a whole.

There will be twelve evaluation and post evaluation questions.

To begin, I will tell you to turn the page. Read the task. Use the paper prototype to make your selections. I will hand you the appropriate pages. At the completion of the task, I will ask you to turn the page to answer a question or two about that task.

After you have completed the last task and task questions, I will ask you to answer questions about the website as a whole.

Do you have any questions?

Sign consent agreement.

Begin tasks.

### *Evaluation (Interview) Booklet*

This booklet includes the consent form, pre-evaluation questions, tasks and post-task questions, and post-evaluation questions.

# Anatomy & Physiology Task Booklet

Participant Number

Date

# Consent Form

## *Purpose*

You have been asked to participate in a usability evaluation for a paper prototype of an Animal Anatomy and Physiology eLearning application I am developing. By participating in this activity, you will help me make the application easier to learn and use. This activity is meant to help me develop my product; it is not intended to test your individual performance in any way.

## *Evaluation Procedure*

You will be asked to complete tasks using a paper prototype of my website which will require navigating to the appropriate page. You will be asked questions before you start work on the tasks. After each task, you will be asked a question or two about the task you just completed. Then, after you complete all the tasks, you will be asked questions about the website as a whole.

While you work, I will make note of how you use the prototype. I WILL NOT record or videotape you.

## *Confidentiality*

I will use the information you give me, along with the information I collect from other participants, to improve my eLearning application. To ensure confidentiality, I will not associate your name with your data.

## *Non-Disclosure Agreement*

During this evaluation, I will ask you to work with an unannounced product. Any information you acquire relating to this product is confidential and proprietary, and is being disclosed to you only so that you can participate in this evaluation. By signing this form, you agree that you will not tell any of this information or anything about this product to anyone else.

## *Breaks*

There will not be a scheduled break. However, you may take a break at any time. Merely inform me that you would like to do so.

## *Freedom to Withdraw*

You may withdraw from the activity at any time without penalty.

## *Freedom to Ask Questions*

If you have any questions, you may ask me now or at any time during the evaluation.

If you agree to these terms, please indicate your acceptance by signing below:

Signature \_\_\_\_\_

Printed Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Pre-Evaluation Questions

Please circle the appropriate choice.

1. What is your major in college?

Biology  
Zoology  
Microbiology  
Chemistry  
Biochemistry  
Other

2. What year in college are you?

Freshman  
Sophomore  
Junior  
Senior

3. Have you taken an anatomy class? YES NO

4. Have you taken a physiology class? YES NO

5. Do you use a computer? YES NO

6. Have you used the internet to find information relevant to anatomy and physiology? YES NO

7. Have you used an eLearning program, in any area, in the past six months? YES NO

## Task 1

Scenario	Task
In your Anatomy and Physiology class the other night, the professor described blood flow in the canine heart, but you are not sure you got all the details correct.	Use the website to find the discussion of blood flow in the heart.

## Task 1 Evaluation Questions

1. How easy or difficult was it to complete the task?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

2. How easy or difficult was it to find the selection in the menus you wanted?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult



## Task 2

Scenario	Task
Now that you've read the discussion of blood flow, you would like to look at the animated diagram.	Use the website to find the animated diagram of blood flow in the heart.

## Task 2 Evaluation Questions

3. How familiar or unfamiliar where the terms?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

### Task 3

Scenario	Task
In your Anatomy Lab, you dissected the heart. You find that you retain your anatomy better if you draw and label your own diagrams.	Use the website to find diagrams of the heart that you can color and label.

### Task 3 Evaluation Questions

4. How easy or difficult was it to find the selection you wanted?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

## Task 4

Scenario	Task
Recently at the veterinary hospital where you work, the veterinarian told you the dog you are restraining for examination has congestive heart failure.	Use the website to find information on congestive heart failure.

## Task 4 Evaluation Questions

5. How familiar or unfamiliar where the icons?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

## Task 5

Scenario	Task
You want to test your knowledge of the heart.	Use the website to find review questions on the heart.

## Task 5 Evaluation Questions

6. How easy or difficult was it to complete the task?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult



## Post-Evaluation Questions

7. How do you rate the overall ease of use or difficulty of the website?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

8. How easy or difficult was it to navigate the website?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

9. How familiar or unfamiliar were the terms?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

10. How familiar or unfamiliar were the icons?

1 – Very easy    2 – Easy    3 – Neither Easy nor Difficult    4 – Difficult    5 – Very Difficult

11. What do you like least about the product?

12. What do you like best about the product?

### *Data Collection Sheet*

This sheet was used to log menu choices, frustration levels and notes.

Participant Number

Date

Task	Menu Error	Menu Correct	Frustration	Blank Page	Notes
1					
2					
3					
4					
5					

## References

Dumas, Joseph S. and Janice C. Redish. *A Practical Guide to Usability Testing*. Revised Ed. Oregon: Intellect Books, 1999. Print.

Krug, Steve. *Don't Make Me Think: A Common Sense Approach to Web Usability*. 2nd Ed. Berkeley, CA: New Riders. 2006. Print.

McGraw-Hill. *McGraw-Hill Essential Study Partner Anatomy & Physiology*. Web.

Morris, John and Brian Still. *The Blank Page Technique: Reinvigorating Paper Prototyping in Usability Testing*. IEEE Transactions on Professional Communication, Vol. 53, No. 2 June 2010. Print.

Nielsen, Jakob. *F-Shaped Pattern For Reading Web Content*. Jakob Nielsen's Alertbox, April 17, 2006. Web.

Pearson Benjamin Cummings. *Interactive Physiology*. 2008. DVD

Snyder, C. *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*. London,UK: Morgan Kaufmann, 2003. eBook.

Weinman, Lynda. *Designing Web Graphics*. 4th Ed. Berkeley, CA: New Riders, 2003. Print.