Paper Prototyping with Blank Pages:

A Usability Testing Methodology for an Animal Anatomy & Physiology eLearning Application

by Linda Lou Lichtenstein MSPTC

Advisor Dr. Nancy Coppola, Professor of English, Director of MS.PTC

eLearning Website

Animal Anatomy & Physiology

- Undergraduate level
- Concept moved to initial design for this study
- Study consisted of interviews using a paper prototype

Purpose of the Study

To Test

- Ease of Navigation

- Understanding of Website Organization

- Familiarity of Icons

- Clarity of Terms

Primary Persona

Kimberley Richards

"I need to delve into this system and learn all about it for my exam next week."

"A patient at the hospital presented with this set of symptoms, I wonder what is going on physiologically."

Demographics

20 years old   Single

Full-time Pre-Veterinary college student   Attends a small upstate NY college

Lives off campus in own apartment (within a home) in a nice quiet neighborhood

Competitive Analysis and Heuristic Evaluation

Competitive Analysis

- Examined websites whose primary purpose is anatomy and physiology eLearning for either humans or animals
- Twelve websites chosen

Heuristic Evaluation

- *Jakob Nielsen's 10 Heuristics*
- High Scorer Website:

McGraw-Hill Essential Study Partner eLearning Application

Wireframe Prototype

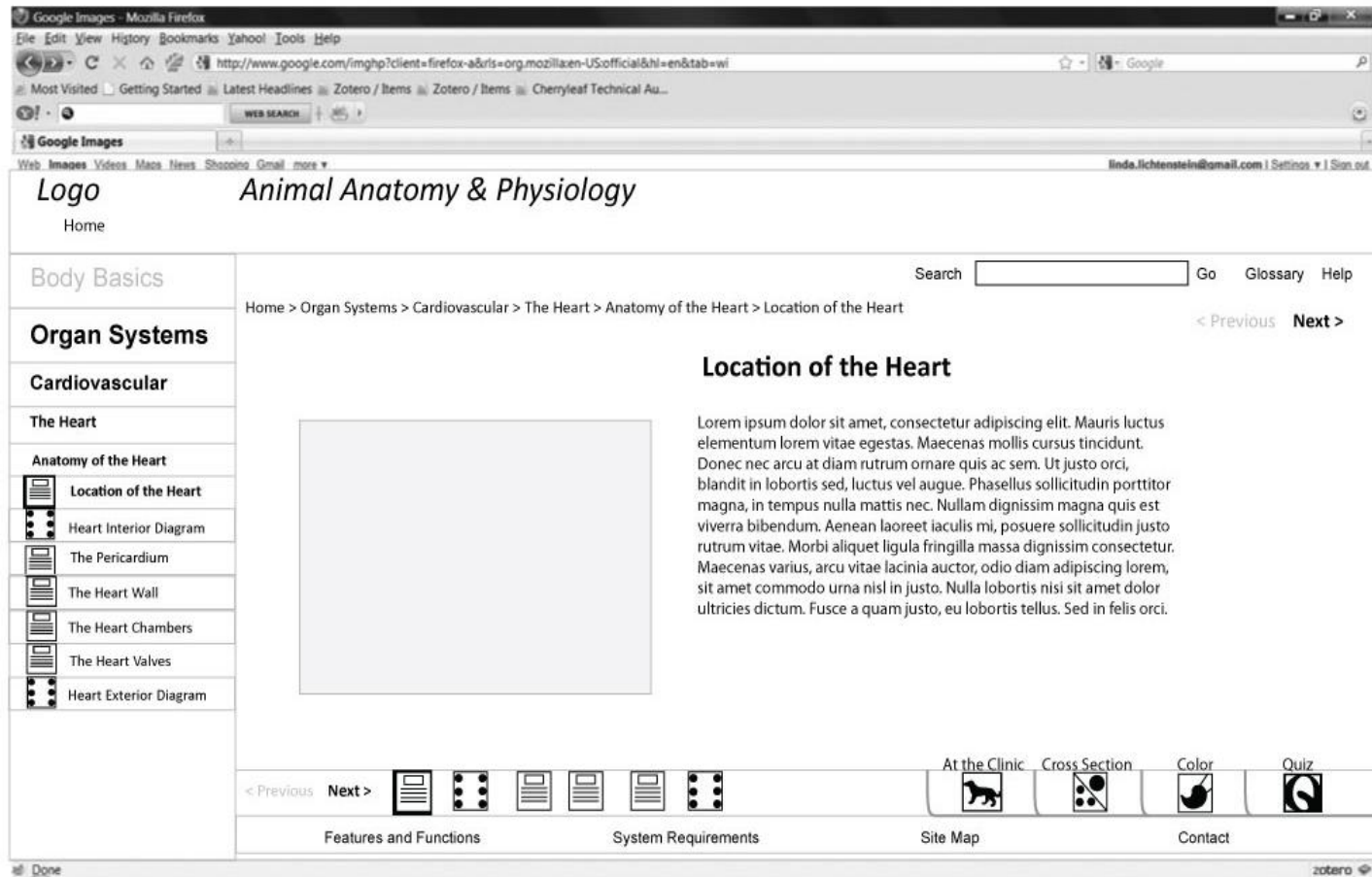Design features from the high scorers

- General page layout
- Icons for page type

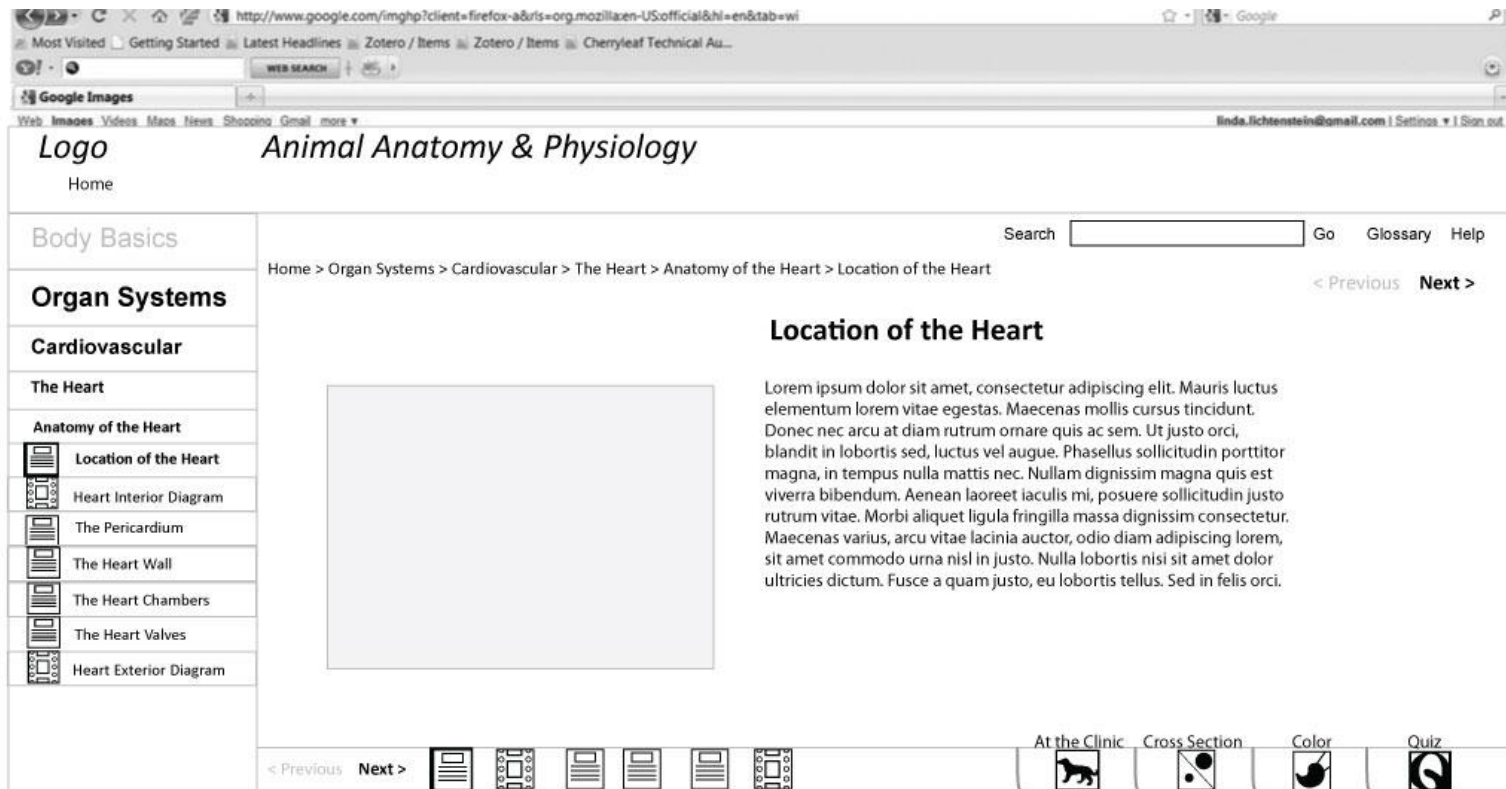Topic Organization after high scorers and A & P text books

- Body Basics
- Organ Systems

Developed in Adobe Illustrator

Designed the Icons

Wireframe Prototype used for Session 1

Wireframe Prototype used for Session 2

Methodology

The Blank Page Technique: Reinvigorating Paper Prototyping in Usability Testing by Still and Morris

Developed web pages

- all pages to complete tasks

Undeveloped web pages

- Pages not in task path
- Message: 'This page has not been developed. Please use the blank sheet provided to fill in what you expected to find here.'

Methodology

Interviews

- Five tasks using a paper prototype with blank pages
- Post-Task closed ended questions
- Post-Evaluation open and closed ended questions

Consultation with a Graphic Designer

- General page layout
- Icons

Interview Participants

Requirements

- Undergraduate
- Biological Sciences Major

Participant Demographics

- 4 Participants
- 3 Biology Majors - 2 Sophomores, 1 Senior
- 1 Biomedical Engineering Major - Junior

Interview Sessions

Session 1

- 2 Participants – both Sophomores in Biology
- Original Wireframe

Session 2

- 2 Participants
  - 1 Senior in Biology and 1 Junior in Biomechanical Engineering
- Wireframe with redesigned icons
- Additional Post-Task questions
- Videotaped

Prototype Logistics

- To select a menu option – point to that option
- To enter information – write on the prototype
- Undeveloped pages – write what expected to find on the blank piece of paper provided
- I played computer

Questions

Pre-Evaluation

- Demographics

Post-Task

- Close Ended
- 5 Point Likert Scale

Post-Evaluation

- Close Ended
- 5 Point Likert Scale
- Open Ended

Tasks

Task 1 In you're A&P 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 2 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 3 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 4 Recently at the veterinary hospital where you work, the veterinarian told you that the dog you are restraining for examination has congestive heart failure. Use the website to find information on congestive heart failure.

Task 5 You want to test your knowledge of the heart. Use the website to find review questions on the heart.

Questions

Post-Task Close Ended Questions

- How easy or difficult was it to complete the task?
- How easy or difficult was it to find the selection in the menus you wanted?
- How familiar or unfamiliar where the terms?
- How familiar or unfamiliar where the icons?

5 Point Likert Scale

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*

Questions

Post-Evaluation Close Ended Questions

- How do you rate the overall ease of use or difficulty of the website?
- How easy or difficult was it to navigate the website?
- How familiar or unfamiliar where the terms?
- How familiar or unfamiliar where the icons?

5 Point Likert Scale

- *Same as Post-Task*

Post-Evaluation Open Ended Questions

- What do you like least about the product?
- What do you like best about the product?

Results – Session 1

Wrong Menu Choices

- Ranged from *0* to *3*
- Wrong menu choices for tasks involving tabs

Post-Task and Post-Evaluation Questions

- Rated *Very Easy* to *Easy*

Level of Frustration

- Ranged from *Almost none* to *a lot*
- Frustration with tasks involving tabs, especially *At the Clinic*

Results – Session 1

Surprise in the data

Task 3 P1 rated the question How easy or difficult was it to find the selection you wanted? as *Very Easy* after 2 wrong menu choices and a little frustration.

Outliners

Frustration Levels / Wrong Menu Choices

Task 4 P2 had a high level of frustration and 3 wrong menu choices.

- P2 began the study with a higher level of anxiety.
- Difficulty with *At the Clinic* Task may be due to inexperience.

Results – Session 2

Wrong Menu Choices
- Ranged from *0* to *2*
- Wrong menu choices for first task and tasks involving tabs

Post-Task
- Rated *Very Easy* to *Very Difficult*

Post-Evaluation Questions
- Rated *Very Easy* to *Neither Easy nor Difficult*

Level of Frustration
- None

Results – Session 2

Surprise in the data

Icons P4 rated Post-task and Post-Evaluation questions as *Very Easy* to *Easy*; but wrote the comment "I thought the icons should be a bit bigger and more representative…" for the open ended question, What do you like least about the product.

Outliners

Task 3

P4 rated the task as *Difficult* to complete.

P4 rated finding the selection as *Very Difficult* and wrote "Because I wouldn't think that I have to click in a different menu to get to the same topic … if it is always visible on the bottom it makes it confusing as to when I need it."

Blank Pages

Task 3 Both P3 and P4 first navigated to Anatomy of the Heart in the left side bar.

P3 wrote,

"I would expect to find a picture of the heart that can be rotated in 3-D so I could move it to see different angles. I would also expect that I could dissect the heart to see the inside.

I would expect to be able to click on specific structures and have it zoom in to give more information about the anatomy and physiology of that specific part of the heart."

Blank Pages

P4 wrote,

"I would think that this link would lead me somewhere similar to what Blood flow through the heart led me in the sense that it would have two more submenus with a discussion and the other with diagrams.

It would be nice if you can click on the diagrams on each single part of the heart and see how it breaks down then have a quiz or game option that lets me choose the color of the blood (representing if it has oxygen in it or not).

The labeling would be a bit more difficult. I would think there is a drag and drop type option that would let me label each part of the heart."

Results Overall

Post-Task Questions - Left side bar navigation

- Completion of the Task – *Very Easy* to *Easy*

- Finding menu items – *Very Easy* to *Neither Easy nor Difficult*

- Familiarity of Terms – *Very Easy*

All participants found the terms familiar, were able to navigate easily to complete the tasks , and easily completed the tasks.

Results Overall

Post-Task Questions – Tabs at lower right of page

- Completion of the Task – *Very Easy* to *Difficult*

- Finding menu items – *Very Easy* to *Very Difficult*

- Familiarity of icons – *Very Easy* to *Easy*

All participants had a harder time finding and completing the first task involving the tabs – none of the participants looked to the tabs until they had exhausted the left side bar menu options.

All participants found the icons to be familiar.

Results Overall

Post-Evaluation Questions

- Use of the Website – *Very Easy* to *Easy*

- Navigation – *Very Easy* to *Neither Easy nor Difficult*

- Familiarity of Terms – *Very Easy* to *Easy*

- Familiarity of Icons – *Very Easy* to *Easy*

The participants found the website easy to use, they were able to easily navigate, and found the terms and icons familiar.

Only P4 answered outside the range of Very Easy to Easy for ease of navigation.

Graphic Designer Consultation

Overall Design

- Liked the grid design

Icons

- Color *"I love the icon for Color"*
- Animated Diagram *"Reminds me of dominoes"*
- Cross Section *Should be 1 to 1 and perhaps amoeba-like.*
- Discussion *Too cryptic. Make it the shape of the organ.*
- At the Clinic *"I see it"*
- Quiz: *"I like it"*
- *"It's confusing to have the icons duplicated in the left side bar and footer"*

Recommendations

- Research alternative designs to incorporate special functionality into the website

- Redesign Icons
  - Cross Section make the circles 1 to 1
  - Animated Diagram modify it to look more like a film strip

  Note: these redesigned icons were on the Session 2 prototype

  - Discussion and Animated Diagram: remove icons from left side bar navigation

Conclusion

- Further Design Research is required
- Further Testing is required
  - Add more tasks
  - Test more sections of the website
  - Expand scope of questions
  - Encourage participants to think out loud