Group 2 Project Portfolio:

PHI2WEB Design Improvements

Peter J. "Asikaa" Cosgrove

Samantha Geitz

School of Information Science & Learning Technologies

University of Missouri-Columbia

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Professor Joi Moore

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Executive Summary

This project portfolio details the design and development of a new version of a system that already exists in prototype form. The PHI2WEB system, which is intended for use by students, professors, and researchers in the field of biomedical sciences, uses an algorithmic search function to provide access to literature abstracts based on host-pathogen interaction search terms. The project presented here seeks to improve the visual aesthetic design of PHI2WEB, resolve any usability issues, and apply captology theory (persuasive design) to encourage user participation in functions designed for socially driven information management. To this end, we employ user analysis, hierarchical task analysis, use cases, observations and questionnaires to identify problems, guide design decisions and propose system features. Low fidelity wireframes are tested with users and feedback is utilized to create a high fidelity prototype system, which is once again tested by users. Finally, recommendations are made for future steps in the development of the system.

Problem Analysis & Requirements

Part I: Introduction of Problem

The PHI2WEB system, currently in prototype form, is a Web portal that provides abstracts of biomedical research articles. PHI2WEB uses computer algorithms to search, identify and match host-pathogen interactions (HPI) appearing in the biomedical literature held within its database. The system is intended to be used by the biomedical research community to evaluate, share and manage research information through a Web 2.0 model. Users will obtain information from the system by searching for particular host-pathogen interactions and receiving relevant abstracts of research articles that contain mentions of the host and pathogen search terms.

PHI2WEB is designed to increase the usefulness and accuracy of the HPI information by employing principles of *social informatics*: the study of the design and uses of technologies in the cultural context (Kling, 2000; Kling, Rosenbaum & Sawyer, 2005) and *crowdsourcing*: The moving of labor from the traditional format of a few individuals to an open-call collaborative effort by a very large section of the user-base. Potential for the use of crowdsourcing by non-business entities was studied by Brabham (2008). The developers of PHI2WEB intend users to evaluate the accuracy of the HPI information through the use of a voting mechanism and provide the ability to suggest corrections to the data. An expert curator will moderate the user suggestions before changes are made.

Presently PHI2WEB has a prototype Web interface that allows user voting on HPI information, but the primary developers, Drs. Korkin and Moore of the University of Missouri-Columbia, have expressed the need for increased user participation in information checking and voting. To address this specific need, further Web 2.0 design enhancements were proposed by P. Asikaa Cosgrove (2012) but are yet to be implemented:

1. **User profiles:** The users will be required to create profiles identifying the research interests and areas of expertise.

2. **User ranks:** The user's rank will be derived from the amount of contribution made to the system.

3. **Service transcripts:** Users will be able to obtain a verified transcript of their contributions to PHI2WEB, assisting in promotion and tenure proceedings, etc.

This project aims to analyze the interaction requirements of a fully realized PHI2WEB system, including the enhancements shown above, and specify recommendations for the interface design.

Part II: Environmental Analysis

PHI2WEB is a Web-based system, and therefore exists solely on the Worldwide Web. The portal and database are hosted on a Web server, which responds to HTTP requests from users accessing remotely using standard Web browser software such as Mozilla Firefox, Microsoft Internet Explorer, Apple Safari and Google Chrome. PHI2WEB should adhere to W3C HTML standards and accessibility standards.

Usage of PHI2WEB is sporadic and ad-hoc, so PHI2WEB should be available at all times. When in production, redundant hosting should be used to maximize up-time and availability.

The majority of PHI2WEB's potential users will be using the PHI2WEB system in one of four places: home, office, lab, and library, although they will of course be able to access it anywhere they have an Internet connection. Because these environments are so variable, users

may experience a fairly vast combination of space and lighting conditions, and the application itself may be accessed at any time of the day or night depending on the user's typical working hours.

Part III: User Analysis

  Data Collection and Analysis Instruments:

<div align="center">

Questionnaire

</div>

  The purpose of this questionnaire is to help us develop a new web-based application for users to access and review biomedical literature. Your answers will help us to ensure maximum compatibility for this system as well as to find potential problems our users may experience. All questions are <u>optional</u>, and all responses are <u>anonymous</u>. Thank you for your participation!

1) What is your current profession and title (e.g. Professor, Ph.D. student)?

  1a) How long have you held this position?

2) On a scale from 1-5, 1 being "not at all proficient" and 5 being "highly proficient," how would you describe your experience with the Internet?

3) Currently, where do you most commonly access article abstracts (e.g. subscriptions to journals, databases such as JSTOR, etc.)? Please list your top 3-5 resources.

  3a) What are the most frequent problems you experience while using these resources?

4) Are you currently active on social media (e.g. Facebook, Twitter, LinkedIn)? If so, please list the sites on which you have a profile.

  4a) If you are not currently active on social media, why not?

5) Are you currently active on any message board or forum communities?

6) What operating system (e.g. Windows, OSX) and browser (e.g. Internet Explorer, Firefox, Chrome) do you most commonly use to access the Internet?

7) Do you commonly use a tablet device to access the Internet? If so, what model of tablet?

8) Do you commonly use a smartphone to access the Internet? If so, what model of smartphone?

User answers to the questionnaire can be found in Appendix A.

Justification for using this data collection method: One of the most significant issues we will face in the PHI2WEB project is making sure that the interface is easy and pleasurable to use in order to encourage user participation in the community-based model. If the application is confusing, buggy, or difficult to use, it will discourage users from actively sharing, managing, and evaluating information. This questionnaire will help us to find and address reasons that people may not be interested in being part of an online community (privacy concerns, usability issues, etc.) as well as to determine which devices the project needs to optimize.

Analysis: The questionnaire was issued to five different users who are either working on or have already received a Ph.D. in a science-related field. All of the users identified themselves as at least moderately familiar with the internet. Use of technology permeated both their professional and social lives; all of them listed electronic methods among their top ways to access research materials, are active on social networking sites, and routinely access the internet with a smartphone. In addition, 4 of 5 of the users own and regularly access the internet with a tablet. This information tells us that our target demographic has overall a high familiarity with

accessing similar sites so it may not be of utmost importance that our interface is overly simplified; however, it is very important that PHI2WEB be mobile-accessible, since all of our users do often access the internet from mobile devices.

User Personas

Persona: Jennifer Frankfort

Jennifer Frankfort is a 54-year-old distinguished professor of microbiology at a large research university in the northeast US. Dr. Frankfort specializes in the study of viral infections in vertebrates and how the immune response is activated and sustained. She uses host-pathogen interaction information to support and inform her research. Therefore, Dr. Frankfort and her graduate assistants spend a significant amount of time reading biomedical literature and finding known host-pathogen interactions to reference in her studies. Dr. Frankfort already uses Web-based academic search tools provided by her departmental library but is frustrated by the non-specialized search functions, which rely on keywords alone. As such, she is an enthusiastic proponent of PHI2WEB and believes it will give her an additional level of filtering and intelligence to her information search needs.

Dr. Frankfort prefers to use an Apple iPad 2 tablet computer while working in her lab. The iPad uses the Safari web browser, has a 1024x768 pixel screen resolution and does not support Adobe Flash. Interface elements on the iPad work best when they are designed for fingertip selection.

Persona: Alexander McAvoy

Alex McAvoy is a 25-year-old doctoral student at a private research university in California. He has a .5 FTE appointment as a research assistant for the biomedical sciences department there and spends much of his time outside of the lab looking at biomedical research articles as he prepares to begin work on his dissertation. He does most of his searching on large private library databases and feels frustrated with how often they do not have electronic versions of articles and, subsequently, he is forced to request the paper versions through inter-library loans. He likes the idea of being able to access a more specialized search. Most of the time, he works on his 15" Retina Macbook Pro, which he almost always carries with him in his backpack as he bikes around campus.

As a member of Generation Y, Alex has a strong online presence on social networking sites like Facebook and Twitter. Whenever he finds interesting or amusing information online, he almost always shares it with his friends.

Persona: Lawrence Wilson

Lawrence Wilson is a 46-year-old pharmacologist working in the research and development division of a large multinational pharmaceuticals company in Minneapolis, Minnesota. Dr. Wilson is primarily interested in how new drugs can be developed to combat the pathological effects of certain viruses in Homo sapiens.

Dr. Wilson is not a keen user of computer technology, instead preferring to keep paper notes and organize useful documents into binders, which he stores on his office bookshelves. While Dr. Wilson has a Windows-based company laptop, he only uses it for email, checking his messages only once or twice a week. He has had several negative experiences with computers,

including losing several weeks of work to a system failure. Despite being gently mocked by colleagues, Dr. Wilson continues to state his mistrust of computers, often saying that he has yet to see a computer system that was useful enough to warrant him using it. He uses the on-site company library for research. The library has two full-time librarians, takes all the principal biomedical journals, and is equipped with several computers with Internet access. Dr. Wilson relies heavily on the librarians to find articles relevant to his work, but is sometimes frustrated because they cannot always understand exactly what he is looking for.

Part V: Task Analysis

Hierarchical Task Analyses

User creates a profile

0. In order to create a user profile:

1. Register for an account.

2. Log in.

3. Enter personal information.

4. Enter professional qualifications.

5. Select research interest categories.

6. Save profile.

Plan 0: If registered user, do 2-3-4-5-6. If unregistered user, do 1-2-3-4-5-6.
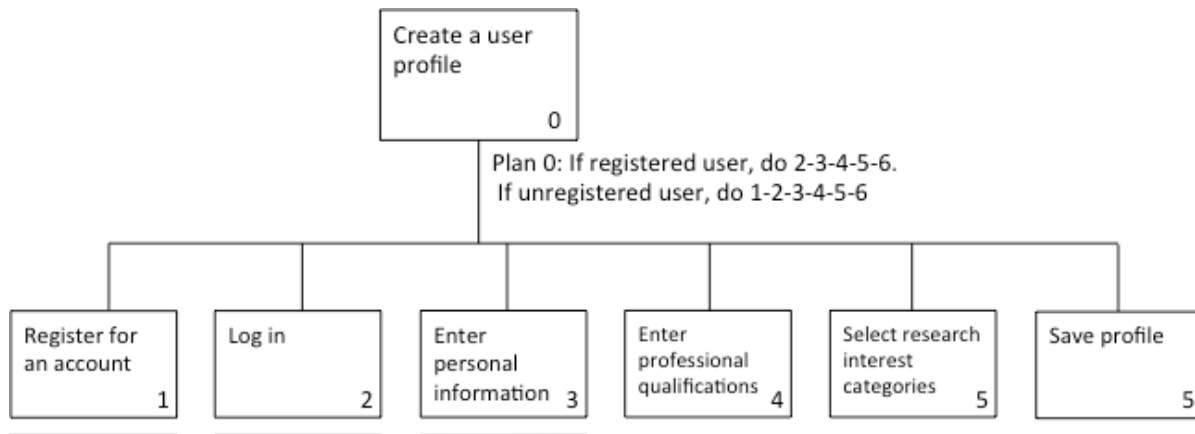
User searches for and views article abstracts

0. In order to find abstracts featuring a specific host-pathogen interaction:

1. Enter host and pathogen identifiers or keywords.

2. Select abstract from search results.

3. Use checkboxes to highlight hosts, pathogens, etc.

4. Return to search results.

Plan 0: do 1-2-3-4. Repeat 2-3-4 until all desired abstracts in search are viewed.
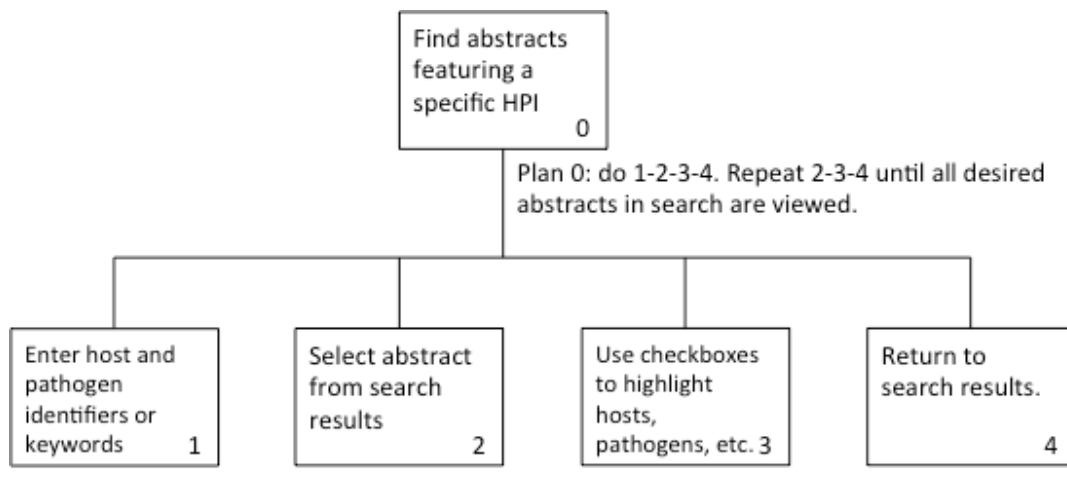
User votes on correctness of abstract:

0. In order to vote on the correctness of an abstract:

1. Log in with username and password.

2. Enter host and pathogen identifiers or keywords.

3. Select abstract from search results.

4. Read abstract.

5. Return to search results page.

6. Cast correctness vote.

Plan 0: do 1-2-3-4-5-6. Repeat 3-4-5-6 until all desired votes are cast.
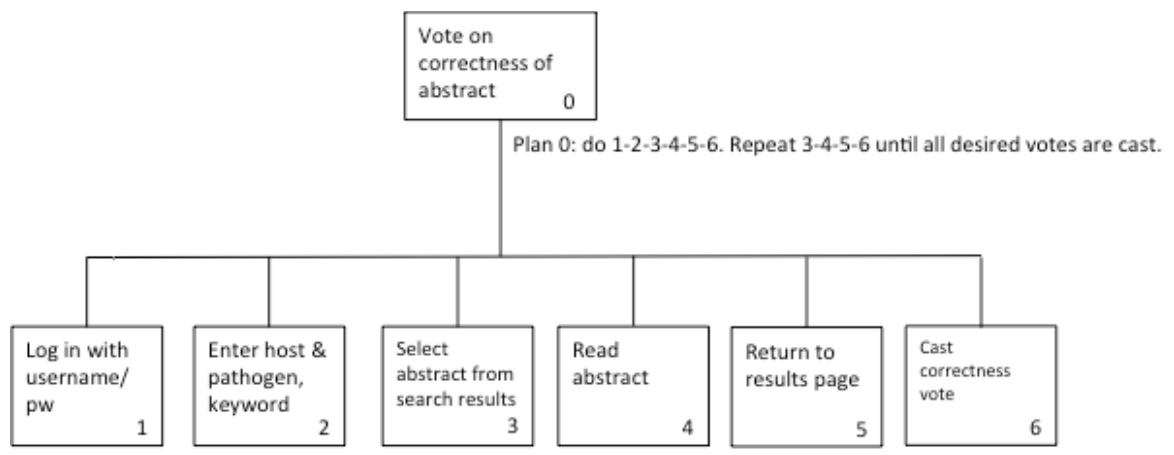
User generates a service transcript:

0. In order to generate a service transcript:

1. Log in with username and password.

2. User selects a date range for the service transcript to include.

3. User prints service transcript.

Plan 0: do 1-2-3.

```
                          ┌─────────────────┐
                          │ Generate a      │
                          │ service         │
                          │ transcript      │
                          │              0  │
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                          Plan 0: do 1-2-3.
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          ┌────────────────────────┼────────────────────────┐
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ Log in with     │      │ User selects    │      │ User prints     │
│ username and    │      │ date range for  │      │ service transcript│
│ password        │      │ transcript      │      │                 │
│              1  │      │              2  │      │              3  │
└─────────────────┘      └─────────────────┘      └─────────────────┘
```
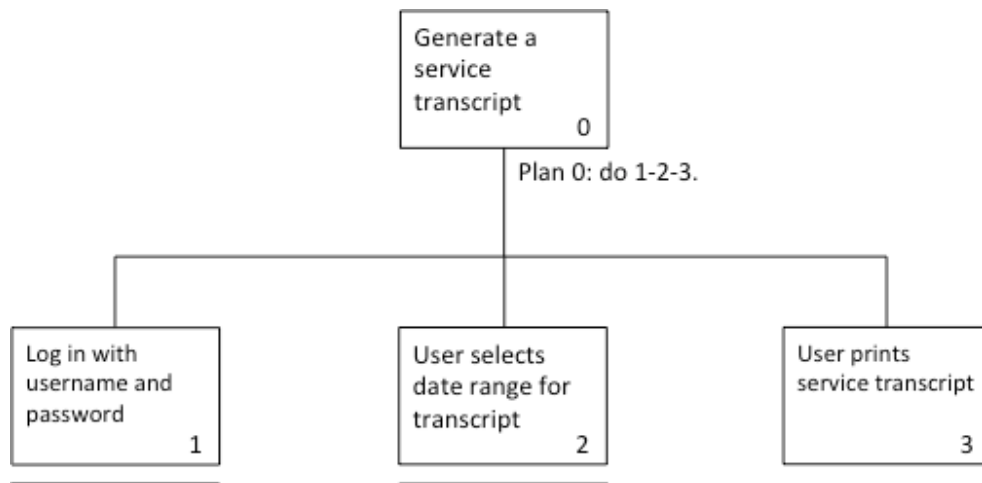
User verifies service transcript:

0. In order to verify a service transcript:

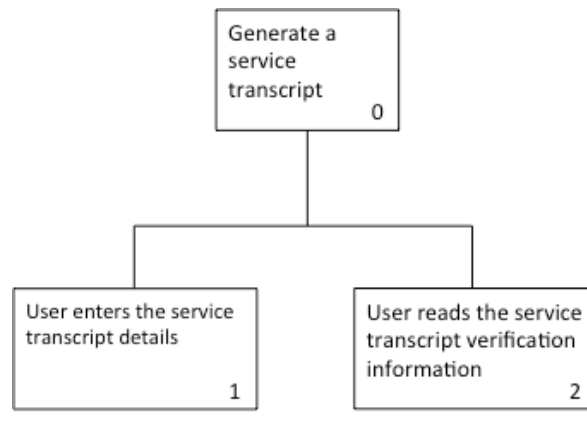1. User enters the service transcript details.

2. User reads the service transcript verification information.

Plan 0: do 1-2.

Use Cases

Use cases are included here to explicate the interactions between user and system. Usability issues such as bottlenecks or unnecessary interface steps can be identified. Note that some of these use cases are hypothetical, as some functions do not yet exist in the prototype. In those cases, we present the interactions as envisioned in the future.

User creates or edits a profile

1. The user selects the option to create or edit a user profile.

2. The system prompts the user to register for an account.

3. The user chooses a username and password, creating a new account.

4. The system prompts the user to log in.

5. The user selects the option to create or edit a user profile.

6. The system prompts the user for their personal information.

7. The user enters their personal information.

8. The system prompts the user to enter their professional qualifications.

9. The user enters their professional qualifications.

10. The system prompts the user to select their research interest categories.

11. The user selects their research interest categories.

12. The user selects the "Save Profile" option.

13. The system confirms that the profile is saved.

Alternative courses:

2. If the user already has an account:

    2.1. The system goes to step 4.

User searches for and views article abstracts, and places accuracy vote

1. System prompts user for host/pathogen/keywords.

2. User enters search terms and clicks *Search* button.

3. The system displays the search results.

4. The user views chosen abstract by clicking on *Abstract* button.

5. The system displays the chosen abstract with checkboxes to optionally highlight host and pathogen information within the abstract.

6. The user selects host/pathogen highlighting checkboxes.

7. The system highlights the selected host and/or pathogen information within the abstract text.

8. The user selects *Back.*

9. The system displays the list of search results.

10. The user selects *Yes* or *No* to confirm or refute the accuracy of the system's identification of the host/pathogen information.

Usability issue: The user has to go back to the search results, visually locate the correct abstract summary and place the accuracy vote. The accuracy vote interface should be placed on the abstract display page to obviate the additional step of returning to the search results.

User generates a service transcript

1. The user selects the *User Profile* link.

2. The system displays the user's profile.

3. The user selects the *Generate Service Transcript* button.

4. The system prompts the user for a date range for the transcript.

5. The user enters a date range.

6. The system displays the service transcript.

User verifies service transcript

1. The user enters the transcript details by scanning the QR code on the transcript.

2. The system displays the service transcript.

3. The user verifies that the printed transcript matches the displayed transcript information.

Alternative courses:

1. If the user does not wish or is not able to scan the QR code:

    1.1. The system prompts the user to enter the verification code printed on the transcript.

    1.2. The user enters the verification code.

    1.3. The system returns to step 2.

Project Scope

From our analysis of developer needs, user tasks and existing design issues, this project will address the following factors:

- Overall visual aesthetic design of PHI2WEB's Web interface

- Interaction efficiency of correctness voting on abstracts

- Implementation of user profiles

- Implementation of service transcript functionality

- User perceptions of proposed persuasive design enhancements

Design Plan & Low Fidelity Prototype

Part I: Design Specifications

Product Description & Conceptual Model

PHI2WEB is, first and foremost, a system designed to search a database of biomedical research article abstracts based on host-pathogen interaction (HPI) search terms provided by the user. The system adds value to the returned information by optionally highlighting mentions of the host organism and protein, the pathogen organism and protein, or search keywords. The abstracts held within the database are extracted from the wider biomedical literature using algorithmic data mining techniques that detect mentions of host-pathogen interactions. Users can then contribute to the accuracy of database entries by editing the abstract highlighting and submitting to a curator for moderation. Users may also cast a correctness vote, whose aggregate values could be used to initiate further user- or curator-conducted checks for accuracy. PHI2WEB includes a function where users can obtain a service transcript, which confirms the number of abstract reviews and correctness votes contributed by the user. These are considered helpful to academicians' documentation of professional service activities for promotion and tenure proceedings. User profiles in PHI2WEB encourage social participation in the site by sharing information on user qualifications, affiliations and interests via user profiles viewable by other registered users.

The theoretical framework for this project is captology (otherwise known as persuasive technology design). Captology is an acronym for *computers as persuasive technologies* and refers to the use of interactive technology to influence and change people's attitudes, opinions and behavior (Fogg, 2003). By including features that incentivize participation in the social

informatics and crowdsourced data accuracy checking of PHI2WEB, the system is utilizing

elements of captology to change user behavior for mutual benefit.

Interface Metaphors

1. PHI2WEB operates like a highly specialized Web search engine. Instead of seeking

    relevant websites in response to keywords, PHI2WEB seeks relevant host-pathogen

    interactions within an information sphere consisting of scientific article abstracts.

2. PHI2WEB acts like a research assistant. PHI2WEB's algorithmic tagging and

    retrieval of host-pathogen interactions performs the kind of search and identification

    function of an actual assistant who reviews and categorizes research materials to help

    the academician conduct research.

3. PHI2WEB functions like a panel of experts. Voting and abstract reviews utilize

    multiple, highly-informed perspectives to arrive at a consensus of the most accurate

    information the way a panel of experts would collaborate to agree on the truth.

4. PHI2WEB user profiles operate as a fraternal order or sorority, in that likeminded

    individuals are brought together and introduced based on their interests, past

    experiences and knowledge.

Visual Aesthetics

The visual interface of PHI2WEB is intended to adhere to W3C Web Content

Accessibility Guidelines (WCAG), ensuring maximal usability for diverse users. Navigation

remains consistent throughout the site with the use of a persistent main navigation menu whose

location and layout does not change between pages. The visual design stresses a clean and simple

aesthetic, eschewing extraneous decoration, clutter and distractions. Whitespace will help define

functional page areas and reduce perceived information overload. The color palette provides

strong contrast to aid in visual discernment of page elements. The palette is limited and consistent between site pages; further reinforcing brand identity, visual continuity, and the user's sense of presence.

We propose using an aesthetic design that is reminiscent of a clinical environment. The occupation of our users and the resultant use context is a moderating variable: Considering that the users of PHI2WEB are likely to spend significant professional time within a laboratory environment, our choice of colors reflects this. The primary color is white, portraying the clinical cleanliness with which lab scientists are familiar. To offset the colorlessness of the background, we propose using a rich accent color that will provide sufficient visual contrast and a pleasing splash of color while remaining consistent with our aesthetic of clinical cleanliness. Continuing the laboratory use context rationale, many lab scientists use a purple dye to stain samples on microscope slides. Therefore we have chosen a rich, dark purple as the accent color.

Interaction Types

Interaction	Type
Search the database	**Conversing:** The user inputs search terms. The system responds by displaying search results. The user selects a search result. The system responds by displaying the abstract.
Cast correctness vote	**Instructing:** The user selects a *Yes* or *No* vote, and the system records the vote as cast.
Submit abstract review	**Instructing:** The user enters their suggested changes, and the system records the changes and informs the curator that a review in pending.
Generate service transcript	**Instructing:** The user enters the date range for the service transcript, and the system generates the transcript in printable form.
Verify service transcript	**Instructing:** The visitor (who was presented with the transcript by the user) enters the transcript verification code and the system displays the verification information.

Information Needs

The system requires access to *PubMed*, a National Institutes of Health database of over 22 million citations, abstracts and full text biomedical research literature. PHI2WEB will mine this data for instances of host-pathogen interaction data and extract matching abstracts into its own database.

The user requires knowledge of the host-pathogen interaction for which abstracts will be retrieved. This knowledge will be required to effectively search for abstracts based on host and pathogen proteins, genes, and species information. The user will have the option to transform this data by suggesting corrections, which will be accepted or rejected by the curator.

High-Level Architecture Blueprint
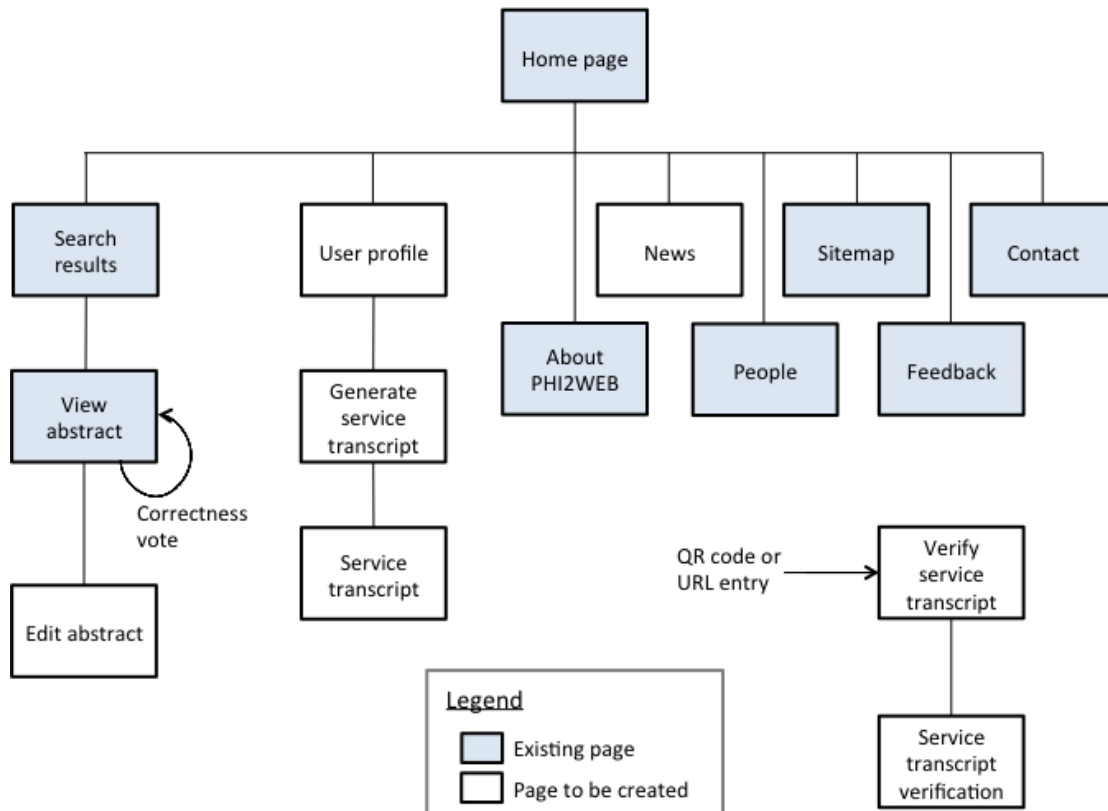
Scenario 1: An Electronic Research Partner

This scenario addresses the positive aspects of using PHI2WEB to assist in conducting biomedical research. It is set in the virology department in the medical school of a large research university in the Midwest.

Dr. Hoener knew that he could finish the literature review for his latest study by the weekend if he could find two more examples of a specific host-pathogen interaction relevant to this study. He got up from his chair and looked into the lobby of the lab suite. His post-doc assistant, Jeff, had already left for the day. Just then, Dr. Hoener remembered that Jeff had

shown him that new Web-based system just yesterday. Didn't that search for host-pathogen interactions?

Taking his iMac out of screensaver, Dr. Hoener opened a browser and clicked on Bookmarks. There it was: PHI2WEB. The scientist brought up the home page and immediately saw the Quick Start fields, patiently waiting for the search terms. Checking his notes, Dr. Hoener entered a host and a pathogen in the correct places. The search results showed him twelve abstracts that matched his needs. Ten minutes later, Dr. Hoener had found the perfect examples for his study and was busily continuing his writing, humming contentedly to himself. For Dr. Hoener, PHI2WEB provides a valuable "self-serve" option for his biomedical research.

Scenario 2: A Misleading Gamble

This scenario addresses the negative aspects of using PHI2WEB to assist in conducting biomedical research. It is set in the virology department in the medical school of a large research university in the Midwest.

Dr. Hoener knew that he could finish the literature review for his latest study by the weekend if he could find two more examples of a specific host-pathogen interaction relevant to this study. He got up from his chair and looked into the lobby of the lab suite. His post-doc assistant, Jeff, had already left for the day. Just then, Dr. Hoener remembered that Jeff had shown him that new Web-based system just yesterday. Didn't that search for host-pathogen interactions?

Taking his iMac out of screensaver, Dr. Hoener opened a browser and clicked on Bookmarks. There it was: PHI2WEB. The scientist brought up the home page and immediately saw the Quick Start fields, patiently waiting for the search terms. Checking his notes, Dr. Hoener

entered a host and a pathogen in the correct places. The search results showed him twelve

abstracts. Ten minutes later, Dr. Hoener had looked at three of the suggested abstracts and was

shaking his head with confusion. This just wasn't right! The abstracts were irrelevant to his

search terms: On two of the three, there were no host-pathogen interactions mentioned anywhere

in the abstract, and the third was about the right host (humans), but had nothing to do with his

hepatitis research. This was useless! The system couldn't seem to give him anything close to

what he needed. Annoyed, Dr. Hoener clicked the *No* button on the correctness vote, but that did

nothing to help his problem. For Dr. Hoener, PHI2WEB is a frustrating waste of time that he

simply can't trust to be accurate or helpful.

Similar Products

Obviously, the most similar product to our iteration of the PHI2WEB site – and what we

will most closely be comparing our final product to – is the original PHI2WEB prototype. We

are basing most of the core functionality on goals set by the original site, and certain things that

the original prototype did well – especially host-pathogen search functionality and printing

service transcripts – we will attempt to closely replicate in our prototype of the site. One of the

major cons of the original PHI2WEB prototype, and an area which we hope to improve upon, is

the design of the site and how it affects users' value judgments about its content. We also want to

make the site more responsive and mobile-accessible so users who want to access the site on

smartphones or tablets can do so with ease; this is another area where the current prototype is

lacking.

Beyond the original PHI2WEB prototype, our version will take cues from repositories

such as Wikipedia. Sites like this have already broken significant ground on Web 2.0 data

accumulation and curation models that are relevant to tasks that will be performed by target users of PHI2WEB. A significant con of sites such as Wikipedia, however, is that they lack the sort of social functionality that allows users to network and assess each other's credentials and expertise. PHI2WEB will have a strong focus on community building that other knowledge repositories lack and will leverage this element to encourage user participation, making the knowledge base larger and stronger as a result.

The voting mechanism within PHI2WEB is somewhat analogous to the "Like" function on Facebook, where users signal their approval of other users' content by tagging it with a "Like" flag. PHI2WEB's vote differs from this because the voting user is vouching for the correctness of the content, not simply whether or not they like it. The correctness vote represents an academic value judgment rather than a social value judgment.

Part II: Project Management

   Milestones:

   November 17, 2012: Low-fidelity prototype complete

   November 20, 2012: Data collection complete. Work on high-fidelity prototype begins.

   November 28, 2012: High fidelity prototype, version 1 complete

   December 1, 2012: Usability testing begins

   December 2, 2012: Usability testing ends

   December 7, 2012: High fidelity prototype, version 2, and evaluation report complete

Individual roles:

Asikaa Cosgrove:

Visual design, HTML structure & CSS

Usability testing with a focus on captological features

Samantha Geitz:

Functional coding, additional design

Usability testing with a focus on accessibility/social networking experience

Part III: Low Fidelity Prototype

Description

Group 2 is redesigning the Web interface for the PHI2WEB system. PHI2WEB is a Web-based application that provides abstracts of articles to users in the biomedical research community. The back-end of PHI2WEB uses computer algorithms to search, identify and match host-pathogen interactions (HPI) appearing in the biomedical literature held within its database. Users retrieve information by searching for specific host-pathogen interactions and receiving relevant abstracts of research articles that contain the host and pathogen search terms. Future versions could be used in fields outside biomedicine, with other relevant algorithmic terms. PHI2WEB will be used to evaluate, share and manage research information through a Web 2.0 social media model.

In the enhanced version that we are designing, users will be able to interact with the data, improving it through voting on the accuracy of the algorithm-derived marking of HPI and through a moderated abstract correction mechanism. We also intend to incorporate features that will encourage users to participate in this curating of data through the use of persuasive design
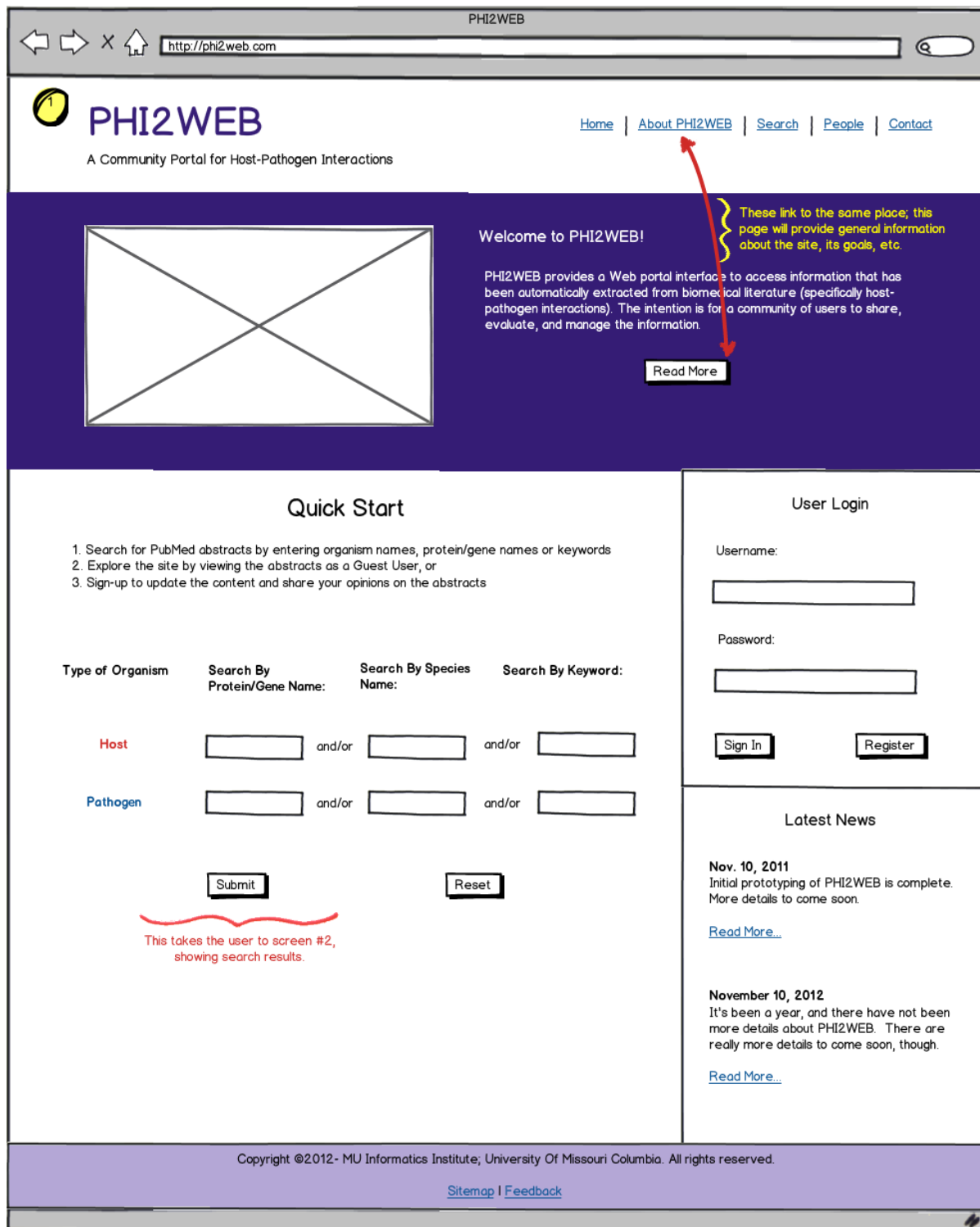
principles: Profiles that list the user's accomplishments, research interests and affiliations; User

ranks that reflect the amount of participation in helping to curate HPI information; Verifiable

service transcripts that document and recognize service to the system community – this will be

valuable to academicians seeking to support promotion and tenure proceedings.

Note that low fidelity wireframes do not include the color palette proposed for this

design. The background color will be white; the main text color will be a very dark gray to

provide strong contrast against the background. The system logo and accents will be a dark, rich

purple. These color choices reflect the chosen aesthetic of clinical cleanliness related to the use

context by lab scientists or academicians with scientific training.

User Tasks & Goals

Tasks	Goals
Register for the site and create or edit a profile	Gain full access to site features Connect and collaborate with peers
Search for and view article abstracts, including highlighted HPI elements	Obtain and review research information
Vote on the correctness of viewed abstracts	Contribute to HPI accuracy
Generate a service transcript	Obtain recognition for service to site
Verify a service transcript presented by another user	Determine the veracity of a presented transcript and view site activity detail

Low fidelity wireframe of PHI2WEB homepage

PHI2WEB

http://phi2web.com

PHI2WEB

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Users can click here to review the abstract

Logged in as John Doe. Log out.

Home > Search Results

Number	Pubmed ID	Host Organism	Host Protein/Gene	Pathogen Organism	Pathogen Host/Gene	Status	Correctness Vote		Vote	View Abstract
1	8626563	human	p32	Human immunodeficiency virus	Rev.	!	✓ 1	✗ 2	NO	Abstract
2	9680131	Homo sapiens	p32	Adenovirus	Adenovirus protein V	!	✓ 2	✗ 0	YES	Abstract
3	12034482	human	p32	rubella virus	capsid	✓	✓ 2	✗ 0	YES	Abstract
4	12388722	human	p32	herpesvirus	ORF 73	✓	✓ 2	✗ 0	Yes ▼ No	Abstract

Allows users a correctness vote

Sitemap | Feedback

Low fidelity wireframe of search results page

Low fidelity wireframe of user profile page

Low fidelity wireframe of Generate Service Transcript page

Low fidelity wireframe of service transcript page

Low fidelity wireframe of verify service transcript page

PHI2WEB

http://phi2web.org/transcripts.php

PHI2WEB

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Service Transcript Verification

Print

The PHI2WEB user **John Doe** has made the following contributions to the PHI2WEB system:

Date ▼	Activity
04/23/2011	User Registration
04/28/2011	3 Correctness Votes
05/02/2011	7 Correctness Votes
05/06/2011	2 Correctness Votes
05/14/2011	8 Correctness Votes
	2 Abstract Reviews
06/03/2011	10 Correctness Votes
06/09/2011	8 Correctness Votes
	4 Abstract Reviews
07/12/2011	12 Correctness Votes
	6 Abstract Reviews
07/29/2011	3 Correctness Votes
08/01/2011	7 Correctness Votes
08/20/2011	5 Correctness Votes
	5 Abstract Reviews

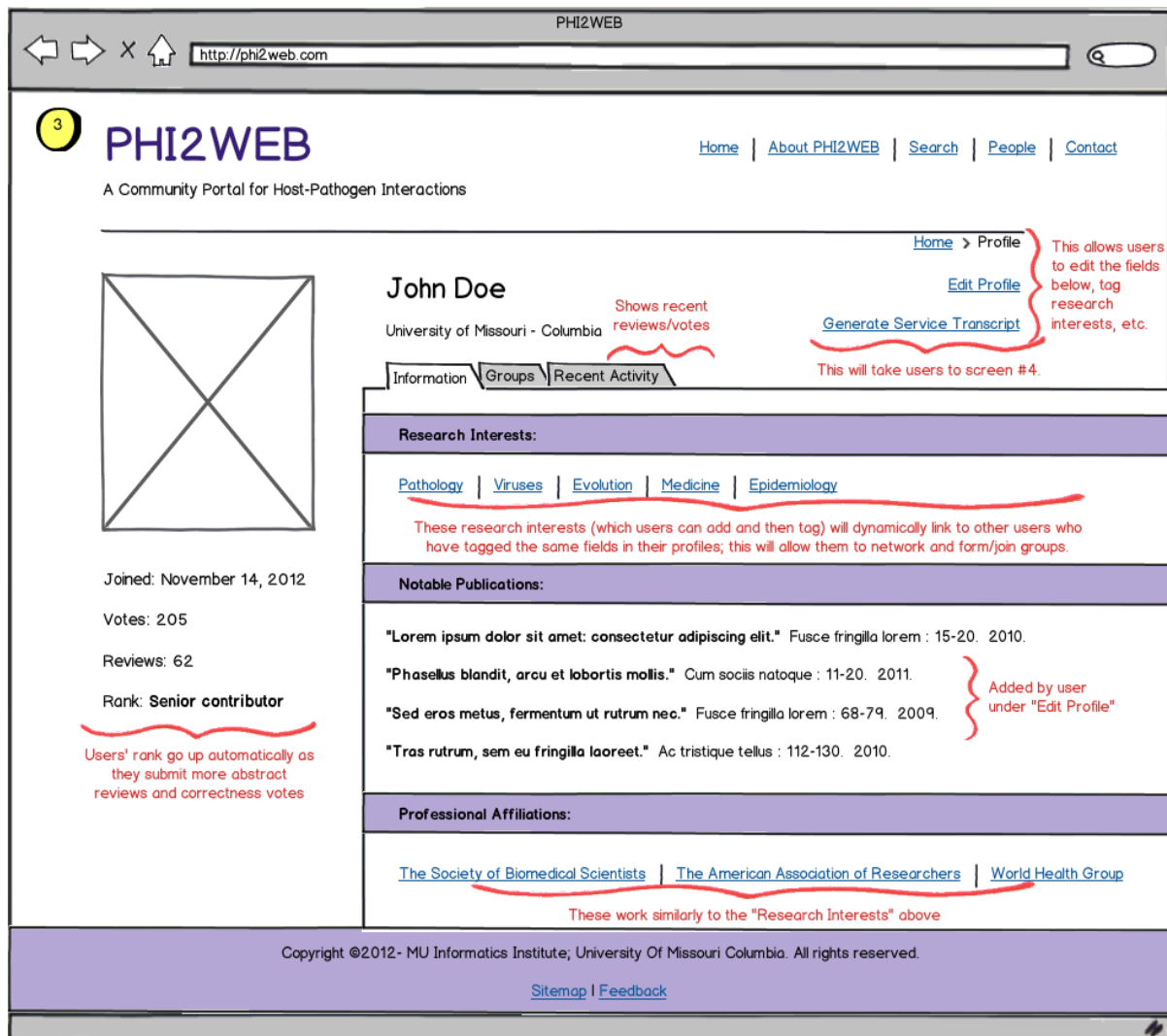| Date ▼	Activity
09/13/2011	11 Abstract Reviews
10/02/2011	12 Correctness Votes
10/11/2011	1 Correctness Votes
	1 Abstract Review
10/27/2011	1 Correctness Vote
12/04/2011	9 Correctness Votes
12/12/2011	2 Correctness Votes
	8 Abstract Reviews
01/19/2012	5 Correctness Votes
	8 Abstract Reviews
03/30/2012	11 Correctness Votes
04/09/2012	2 Correctness Votes
04/23/2012	6 Correctness Votes
05/15/2012	2 Correctness Votes
	5 Abstract Reviews

This user has earned the rank of **Special Contributor**.

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Sitemap I Feedback

Low fidelity wireframe of service transcript verification page

High Fidelity Prototype

Part I: Descriptions

Functionality & Features

The high fidelity prototype built for this project includes the following functions:

- Home page with functional links and search facility (limited search).

- Search results page showing total correctness votes and links to abstracts.

- User profile page.

- Abstract page demonstrating correctness voting and change history.

- Generate service transcript page.

- Example service transcript.

Other functions of the site fell outside the scope of this project and therefore were not implemented in this prototype.

Prototype Development and Testing Tools

The prototype was developed using Adobe Dreamweaver CS5 for HTML and CSS creation. Adobe Photoshop CS5 was used to create and edit site graphics. The Web functionality was implemented using the PHP Web Application Server. The prototype was tested using the latest versions of Mozilla Firefox, Apple Safari and Google Chrome on the Apple Mac OS and iOS/iPad platforms.

Part II: Prototype

A working prototype featuring limited functionality is available for review at:

http://www.drolldevelopment.com

Prototype Screenshots

P H I 2 W E B

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Welcome to PHI2WEB!

PHI2WEB provides a Web portal interface to access information that has been automatically extracted from biomedical literature (specifically host-pathogen interactions). The intention is for a community of users to share, evaluate and manage the information. **Read more...**

Quick Start

1. Search for PubMed abstracts by entering organism names, protein/gene names, or keywords
2. Explore the site by viewing the abstracts as a Guest user, or
3. Sign up to update the content and share your opinions on the abstracts

Type of Organism | **Search by protein/Gene Name** | **Search by Species Name** | **Search by Keyword**

Host   and/or   and/or   and/or

Pathogen   and/or   and/or   and/or

Submit   Reset

User Login

Username:
Password:

Log In   Register

Latest News

Nov 10, 2011
Initial prototyping of PHI2WEB is complete. More details to come soon.
Read more...

Nov 10, 2012
PHI2WEB takes off in a bold new direction with numerous design enhancements.
Read more...

Screenshot of high fidelity prototype: PHI2WEB homepage

PHI2WEB

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Logged in as **John Doe**   **Log Out**

Home > Search Results

Number	PubMed ID	Host Organism	Host Protein/Gene	Pathogen Organism	Pathogen Protein/Gene	Status 🕐	Correctness Vote	View Abstract
1	8626563	human	p32	Human immunodeficiency virus	Rev.	❗	✔1 ✘2	Abstract
2	9680131	Homo sapiens	p32	Adenovirus	Adenovirus protein V	❗	✔2 ✘0	Abstract
3	12034482	human	p32	Rubella virus	capsid	✔	✔2 ✘0	Abstract
4	12388722	human	p32	herpesvirus	ORF 73	✔	✔2 ✘0	Abstract

Screenshot of high fidelity prototype: Search results page
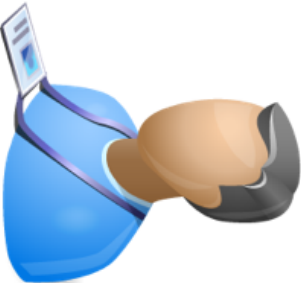
P H I 2 W E B

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Logged in as **John Doe**   **Log Out**

Home > View Profile

Edit Profile

Generate Service Transcript

John Doe

University of Missouri - Columbia

Joined: November 1, 2012

Votes: 15

Reviews: 10

Rank: Contributor

Information | Groups | Recent Activity

About Me

Cras consequat, ipsum sed accumsan eleifend, dui velit tempor ante, sit amet aliquam purus lacus sed urna. Nulla facilisi. Mauris non lectus sit amet erat venenatis pulvinar. Praesent eget velit libero, vitae gravida urna. Donec sit amet turpis erat.

Research Interests:

Epidemiology | Medicine | Evolution | Viruses | Pathology

Notable Publications

- **"Lorem ipsum dolor sit amet: consectetur adipiscing elit."** Fusce fringilla lorem : 15-20. 2010.
- **"Phasellus blandit, arcu et lobortis mollis."** Cum sociis natoque : 11-20. 2011.
- **"Sed eros metus, fermentum ut rutrum nec."** Fusce fringilla lorem : 68-79. 2009.
- **"Tras rutrum, sem eu fringilla laoreet."** Ac tristique tellus : 112-130. 2010.

Professional Affiliations

World Health Group | The American Association of Researchers | The Society of Biomedicine

Screenshot of high fidelity prototype: User profile page

P H I 2 W E B

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

Home > **Profile** > Generate Service Transcript

Generate Service Transcript

Service transcripts provide a verifiable record of your activity in the PHI2WEB system.

Select a date range for your transcript, click "Generate," and print the transcript page.

From:

To:

Generate

User Information

John Doe
University of Missouri-Columbia

View/Edit Profile   **Logout**

Latest News

Nov 10, 2011

Initial prototyping of PHI2WEB is complete. More details to come soon.

Read more...

Nov 10, 2012

PHI2WEB takes off in a bold new direction with numerous design enhancements.

Read more...

Screenshot of high fidelity prototype: Generate Service Transcript page

PHI2WEB

A Community Portal for Host-Pathogen Interactions

Home | About PHI2WEB | Search | People | Contact

User Information

John Doe
University of Missouri-Columbia

View/Edit Profile   Logout

Latest News

Nov 10, 2011

Initial prototyping of PHI2WEB is complete. More details to come soon.

Read more...

Nov 10, 2012

PHI2WEB takes off in a bold new direction with numerous design enhancements.

Read more...

Print

Service Transcript

User: John Doe   **Registered since:** 11/01/2012

This system-generated service transcript certifies that between the dates of **November 1, 2012** and **November 30, 2012** , **John Doe** has made the following contributions to the PHI2WEB system:

15 Correctness Votes
10 Abstract Reviews

In recognition of this service, the user has attained the rank of **Contributor**

The administrators of PHI2WEB deeply appreciate the contributions of the user named on this transcript.

Transcript Verification

This transcript can be verified for accuracy by scanning the QR code to the left or by visiting **http://www.phi2web.org/transcript.php** and entering the verification code shown below.

Verification code: **A B C D E 9 8 7 6 5 0 0 1**

Screenshot of high fidelity prototype: Service transcript page

Evaluation Report

Part I: Evaluation Framework

Evaluation Goals: The main purpose of this project was to improve upon the interface of the existing PHI2WEB prototype built last year. As part of our overall evaluation, we had users test the old version of the PHI2WEB prototype and then about a month later repeat the process on our updated high-fidelity prototype. By having the same users repeat the process throughout the project, we would be able to measure the change in their opinions and evaluate the effectiveness of the new design accordingly.

Evaluation Questions:

- Is the user confident that they completed each task correctly?

- Can the user work through the prototype without encountering major problems?

- Does the user believe that the social functions are potentially useful?

- Does the user believe that the new prototype is an improvement over the original version?

Evaluation Methods:

- **User observations**: this will allow us to watch the user interact with the system, to listen to their comments on what has been done well and what can be improved, and to observe any problems they might experience.

- **Interviews:** After the user observations are complete, we will conclude with a brief interview so that we can ask follow-up questions without influencing the outcome of the initial observations and gather more feedback about their opinions of the prototype.

Data Analysis:

- **Summary of scores:** Review scores of usability reports and peer reviews (for the old

  prototype, the low-fidelity prototype, and the high-fidelity prototype) to look for possible

  areas of improvement

- **Content Analysis:** Review user feedback for common themes, especially regarding

  problem areas and possible solutions

Evaluation Question	Evaluation Method	Data Collection Instrument	Data Analysis Method
Is the user confident that they completed each task correctly?	Interview	See Appendix D	Content analysis of user feedback, identifying problem areas and possible solutions
Can the user work through the prototype without encountering major problems?	Observation	See Appendix C	Evaluated user comments and scores on Likert scale
Does the user believe that the social functions are potentially useful?	Interview	See Appendix D	Content analysis of user feedback, identifying problem areas and possible solutions
Does the user believe that the new prototype is an improvement over the original version?	Interview	See Appendix D	Content analysis of user feedback, identifying problem areas and possible solutions

Part II: Observation Process

Charts showing detailed user information, usability test specifications, observations, and usability forms for the old and new PHI2WEB prototypes can be found in Appendices B and C.

Summary: Three participants, all of whom either have or are working on a Ph.D. in a science-related field, were asked to complete usability tests on both the old and new versions of the PHI2WEB prototype. Two of them are female and one is male. Their ages varied in range from 25 to 33, and all of them consider themselves moderate to advanced users of the Internet. Two of them evaluated the prototypes on a 13" MacBook Air running Google Chrome, and the third on a Windows 7 PC running Firefox.

The opinions of all three users improved drastically between the old and the new prototypes. The consensus seemed to be that the visual aesthetics and improved social features made it far more likely they would use the site. The only negative comment we received was that one user believed the search functionality had been somewhat scaled back on our version of the profile.

Part III: Evaluation Results

Low-fidelity prototype: Two of the three members of Group 3 provided evaluations for our low-fidelity prototype. If "Strongly Disagree" was rated 1, and "Strongly Agree" was rated 4, our composite score would be 3.5, indicating that the reviews were mostly positive -- although we did get two "Disagree" scores. Our reviewers seemed to think that we demonstrated well how users would interact with the site and the organization of information. Most of the negative comments focused on the lack of visual design specifics – which was corrected when we built

our high-fidelity prototype – and social features that could be added. Most of these suggested features were beyond the scope of the project but could be added in later versions.

High-fidelity prototype: The three members of Group 1 provided evaluations for our high-fidelity prototype. Using the same scoring conventions as in the low-fidelity prototype analysis, our composite score would be 3.4. The only two "Disagree" scores we received related to our explanation of how the prototype related to an existing conceptual model; we hope that our portfolio clarifies this point. Otherwise, the comments were mostly positive regarding the visual design and usability of the prototype. Some of our reviewers suggested additional search functionality that goes beyond the scope of the project, but this could be added in later versions.

User Observations: We asked three users to evaluate the old PHI2WEB prototype and then, a few weeks later, to use and evaluate our version. The responses to the new version were overwhelmingly positive. Every one of the users thought the new version was a significant improvement over the old one, and the only negative comment we received was because she felt we might have scaled down the search functionality on our prototype, which we actually did not in a significant way. All of the users said that they would consider using a tool like PHI2WEB and believed it could be useful to them professionally.

Comparison of Usability Testing Scores

Participant	Total Score on Old Prototype	Total Score on New Prototype
Participant 1	36	46
Participant 2	36	47
Participant 3	37	50
Average	**36.3**	**47.6**

Comment Synthesis and Explanation: Overall, most of the feedback we received regarding this project was positive. One can easily track the improvement in users' opinions from the old PHI2WEB prototype to our final high-fidelity version; one user's opinion even changed from having lukewarm interest in using PHI2WEB to seeing how it could be useful to his career after social features were added. We found much of the feedback we received earlier in the process to be helpful in designing the final version, which definitely helps explain our high scores for aesthetics and usability.

Almost all of the "negative" feedback we received was due to features the users believed should have been present. We agree that many of these ideas could – or perhaps even should -- be added to the final version of PHI2WEB; however, features like sorting search results, the ability to "friend" users, and dynamic discussions extend far beyond the scope of what a team of two can accomplish in a 6-week class project. The original version of PHI2WEB lacked in both aesthetics and social features, and so we focused mainly on improving these two areas in our prototype. Our overhauling the design and adding profiles, service transcript generation, and user feedback to abstracts gives any feature team working on PHI2WEB a solid framework to build upon.

Part IV: Design Evolution

Description and identification of changes: As stated before, the two main areas we looked to improve upon the old PHI2WEB prototype was updating the website's design and adding basic social features that could easily be built upon after the project is complete. When comparing the old version of the prototype to the new, the aesthetic changes are immediately clear; in our initial low-fidelity prototypes, which were mostly black and white, we updated the

layout to make it cleaner and more modern. We also added user profiles and service transcript

generation (as these are some of the factors we hope will convince users to participate in the

PHI2WEB community). After gathering user feedback, we improved the high-fidelity prototype

by adding more features to the user profiles and refining the navigation, in addition to adding a

very clean color scheme with a great deal of white space in order to give a "clinical" impression.

Finally, after receiving feedback on our high-fidelity prototype, we added additional social

features such as comments on the abstracts and additional user profiles in our final version.

Tracking one single group of users during evaluations of the old and new PHI2WEB

prototypes was extremely helpful in testing this application. While our classmates who provided

peer evaluations also were familiar with the old PHI2WEB prototype, actually observing the

same group of users interacting with both versions and recording their comments real-time

allowed us to measure improvement between the two prototypes. Observing some of their issues

with the old prototype, and resolving them in the new one, was a concrete measure of success.

Change Log

Source (UT, PE)	Issue Priority (Low, Medium, High)	Issue Description	Recommendation	Changes (Yes/No)
PE – Low Fidelity	Low	Yes/No is too simplified for abstract reviews	Prototype should have discussion area	Yes – added user comments to abstracts
PE – Low Fidelity	Low	Not clear where to search for articles except home page	Search should be present on all screens	No – this goes beyond the scope of the project. We are more focused on social features than expending the search

				functionality already established by the old prototype
PE – Low Fidelity	Medium	User's location not adequately clear	Add breadcrumbs to masthead	Yes – we agreed that this was needed and added it to our high-fidelity prototype
PE – High Fidelity	Low	No way to sort records if hundreds are returned	Add a sorting mechanism to the columns	No – while this is something that would have to be planned for if dynamic, database-driven content were added, we feel that it goes beyond the scope of our goals for the project
PE – High Fidelity	High	Not enough of a social element to prototype; does not meet overall goals	Add more social interactivity, especially to abstract review pages	Yes – added two new "users" with profiles and reviews for each of them on the four sample abstract pages
PE – Usability Testing	Low	Need a way to rank comments	Add 'like' and 'dislike' function to user comments	No – users are already essentially 'liking' and 'disliking' article abstracts; adding the same functionality again would be redundant, at least for this version of the prototype

Part V: Project Reflections and Recommendations

When the class was asked to evaluate the old version of the PHI2WEB prototype, a common theme among several of the students was that the outdated visual appearance led to the impression that the site itself was out of date and thus less credible. In his article "Visual Aesthetics: in human-computer interaction and interaction design," Noam Tractinsky writes,

> "Affect and emotions are oft-cited corollaries of visual aesthetics. The effects of attractive and appealing design on emotions were demonstrated in various studies, including Thuring & Mahlke (2007) in the domain of portable music players, Porat and Tractinsky (2012) and Cai & Xu (2011) in the domain of online shopping. The importance of aesthetics' effects on emotions is twofold. First, as mentioned earlier, positive affect contributes to positive experience and well-being, and as such is an end in itself. Second, emotions have a role in affecting subsequent information processing, appraisal of other system attributes, and forming attitudes towards the system (Tractinsky, 2012).

When observing the difference in usability scores reported by our three participants – 36/50 average on the old prototype and 47.6/50 average on the new prototype – it is not hard to believe that much of this difference can be attributed to the updated aesthetics. The users responded positively in their verbal comments and on our Likert scale to the improvement, and this could have colored their opinions about the usability and credibility of the site as well. Instead of an outdated tool, it became a social networking site they could see themselves using, and benefitting from, professionally.

To design and evaluate our application by basic standards, we followed the four basic activities described in Rogers, Sharp & Preece (2011, pp.330): establishing requirements;

designing alternatives; prototyping; and evaluating. To establish the requirements, we sent out

an initial questionnaire (Appendix A) to target users of the application to determine how the

product might be used; we also had them evaluate the old PHI2WEB prototype in order to get a

good starting point for improvements we needed to make. In order to design alternatives, we

created a problem analysis and design plan, and after this was complete we created two different

prototypes – low-fidelity mockups and an interactive high-fidelity application. By following the

same group of users throughout, as well as adding fresh input from our peers, we were able to

evaluate that our changes were ultimately successful. These four steps gave us a complete view

of our framework and allowed us to ensure we were meeting the design standards of a wider

audience than the initial PHI2WEB prototype had addressed.

Undoubtedly, the most important lesson we learned from the usability evaluation

implementation is the importance of aesthetics to a user's perception of an application. We

changed little of the functionality of the PHI2WEB application; most of what we did involved

improving the design and adding social features, but we measured a huge difference in the

opinions of users about the application as a whole. We also gained valuable experience in

determining a realistic scope for a prototype like this one. There were many features that we

could have added, many of which were suggested by users during their evaluations, but due to

time and personnel constraints we had to prioritize the most important for implementation.

The project could undoubtedly have been improved by adding more advanced social

features, but we feel that our PHI2WEB prototype is an excellent framework for a future team to

build upon. With additional time, we would have added more elements of a social community,

allowing users to better network with each other. While we built the basics of social interaction

into our prototype, such as showing users' interests and associations on their profiles and

submitted comments in the abstracts, it only begins to include social elements that would make

PHI2WEB successful. However, it is our hope that if a team decides to expand the project in the

future, we will have provided them a solid foundation for both a research portal and a social

network.

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Appendix A

Questionnaire Answers

1) What is your current profession and title (eg. Professor, Ph.D. student)?

Post-Doc
Ph.D. Student
Ph.D. Student
Professor
Ph.D. Student

1a) How long have you held this position?

1 Year
4 Years
2 Years
5 Years
2 Years

2) On a scale from 1-5, 1 being "not at all proficient" and 5 being "highly proficient," how

would you describe your experience with the Internet?

3
4
5
4
5

3) Currently, where do you most commonly access article abstracts (e.g. subscriptions to

journals, databases such as JSTOR, etc.)? Please list your top 3-5 resources.

Databases, physical copies of journals in libraries, classroom handouts
Databases, textbooks, journals in libraries
Databases, journals in libraries, subscriptions to magazines, book collection
Subscriptions to journals, databases, book resources
Databases, textbooks, physical journals in library

3a) What are the most frequent problems you experience while using these resources?

Can't find what I'm looking for; lots of irrelevant results
Trouble finding what I need; can't access full articles
Search results too broad

Trouble finding exact information needed
Too many results

4) Are you currently active on social media (e.g. Facebook, Twitter, LinkedIn)? If so, please

list the sites on which you have a profile.

Facebook
Facebook, Twitter, LinkedIn
Facebook, Twitter, Pinterest
Facebook, Linked In
Facebook, LinedIn

4a) If you are not currently active on social media, why not?

5) Are you currently active on any message board or forum communities?

No
Yes – mostly video-game related
Yes – mostly niche interests
No
No

6) What operating system (e.g. Windows, OSX) and browser (e.g. Internet Explorer, Firefox,

Chrome) do you most commonly use to access the Internet?

Windows 7, Firefox
Windows 7, Firefox
OSX, Chrome
Windows 7, Chrome
OSX, Firefox

7) Do you commonly use a tablet device to access the Internet? If so, what model of tablet?

Yes – Nexus tablet
No
Yes - iPad
No
Yes – iPad

8) Do you commonly use a smartphone to access the Internet? If so, what model of

    smartphone?

    Yes – Android smartphone
    Yes – iPhone 4S
    Yes – iPhone 5
    Yes – iPhone 4S
    Yes – iPhone 5

Appendix B

Usability Testing – Old PHI2WEB prototype

Thank you for agreeing to join me here today so I can observe you using the website I am

creating for my final project in my Interface Design course. Your experience working with the

PHI2WEB prototype will help us to refine the design and operation, which can make it easier

and more effective to use. During this experience, please remember that you are not being

tested. Rather, we are working together to help me create a better project. If anything I ask you to

do seems difficult to you or confusing, this is not a reflection on your ability, skill, or knowledge;

your experience will help me figure out what improvements are needed in my design.

I am going to ask you to evaluate two versions of the prototype. Today, I will ask you to use a

version of PHI2WEB developed by another team about a year ago; your comments will help me

to design an improved version of the prototype, which I will ask you to evaluate in a few weeks.

In order for me to understand what you are doing and thinking about, I'd like to ask you to do a

few things while you try out the website. The first, and most important, is that you should

constantly verbalize what you are thinking about while you are doing something -- if you are

confused, say what confuses you and why. If you like something (like text or design) please say

so. For example, if you were trying to play an audio or video file, or open a link to another page

or image you might say: "Now I am typing in search terms to look up abstracts".... If you

encounter a problem, or are confused say something like: "This does not make sense to me, I

can't get this section to work correctly." Basically, I'd just like you to verbalize both the action(s)

you are attempting, and what you are thinking while attempting it. Try not to ask me too many

questions on how things *should* work, unless you are really stuck. Just try to perform the task(s)

to the best of your ability.

Okay, are you ready? Do you have any questions before we start?

First, I'd like to ask you how much experience you have using computers and the Internet. Would you consider yourself a novice user, an average user, or an advanced user?

Okay, now let's begin. Please login and take a minute or two to explore the website.

Now that you are finished exploring, here are some things I would like you to try…

I want you to log in to the website with username "user" and password "test." Remember to verbalize what you are doing and thinking while you work.

Next, I want you to return to the home page and search for an abstract using search terms protein name "p32" and species name "human."   I then want you to review one of the abstracts that come up.

Well, that's it! We're done.

Thank you again for helping me figure out what might make my web application better. Do you have any questions or final thoughts?

Old PHI2WEB prototype - Participant #1		
User Profile	Age / Gender	33 / F
	Internet Experience	Moderate
	Profession	Post-Doc
Test Context	Usability Test Method	Macbook Air 13"
	Date of Test	December 6, 2012
	Platform / Browser	OSX / Google Chrome

Summary of Observations

	Task 1	Task 2	Task 3

Task Description	Logging in	Searching for abstracts	Reviewing abstracts
Time spent to complete the task(s)	2 minutes	3 minutes	5 minutes
*Difficulty rating in completing task	1	1	2
Errors or problems identified by a user	None	None	Could not figure out how to leave a review until prompted
Overall user comments (likes and dislikes)	"I don't really like the color scheme. It looks really outdated."	"Are there any other search terms I can use?" "Where are the social features?"	"Where do I leave a review, and how do I see what other people have said?"

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

	Strongly Disagree		Neutral		Strongly Agree
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous options and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5
5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5

7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

Old PHI2WEB prototype - Participant #2		
User Profile	Age / Gender	30 / M
	Internet Experience	Advanced
	Profession	Ph.D. student
Test Context	Usability Test Method	PC 27" monitor
	Date of Test	November 18, 2012
	Platform / Browser	Windows 7 / Firefox

Summary of Observations

	Task 1	Task 2	Task 3
Task Description	Logging in	Searching for abstracts	Reviewing abstracts
Time spent to complete the task(s)	1 minutes	2 minutes	7 minutes
*Difficulty rating in completing task	1	1	2
Errors or problems	None	None	None

identified by a user			
Overall user comments (likes and dislikes)	"Does logging in do anything?"	"To be honest, I don't really see a situation where I would want to use this."	"The tooltips are helpful to explain what's going on, but they could be condensed and need some proofreading."

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

	Strongly Disagree		Neutral		Strongly Agree
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous o ptions and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5
5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5
7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

Old PHI2WEB prototype - Participant #3		
User Profile	Age / Gender	25 / F
	Internet Experience	Advanced
	Profession	Ph.D. student
Test Context	Usability Test Method	MacBook Air 13"
	Date of Test	November 18, 2012
	Platform / Browser	OSX / Google Chrome

Summary of Observations

	Task 1	Task 2	Task 3
Task Description	Logging in	Searching for abstracts	Reviewing abstracts
Time spent to complete the task(s)	2 minutes	2 minutes	5 minutes
*Difficulty rating in completing task	2	1	1
Errors or problems identified by a user	Had trouble logging in, probably due to misspelling of password	None	None
Overall user comments (likes and dislikes)	"The register button is hanging below the box. That's kind of annoying." "I don't like the design. Nothing is centered."	"What does 'Status' mean? The pop-up doesn't explain it. Am I OK to click on it?"	"I think it's neat that you can highlight the words."

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

		Strongly Disagree		Neutral		Strongly Agree

	1	2	3	4	5
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous options and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5
5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5
7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

Appendix C

Usability Testing – New PHI2WEB prototype

Thank you for agreeing to join me here today so I can observe you using the website I am

creating for my final project in my Interface Design course. Your experience working with the

PHI2WEB prototype will help us to refine the design and operation, which can make it easier

and more effective to use. During this experience, please remember that you are not being

tested. Rather, we are working together to help me create a better project. If anything I ask you to

do seems difficult to you or confusing, this is not a reflection on your ability, skill, or knowledge;

your experience will help me figure out what improvements are needed in my design.

You have already evaluated the old version of the PHI2WEB prototype. Today, I have an

updated version that my team has been working on for the last several weeks. I will ask you to

perform the same basic tasks, although some social functionality has been added that I will ask

you to evaluate as well.

In order for me to understand what you are doing and thinking about, I'd like to ask you to do a

few things while you try out the website. The first, and most important, is that you should

constantly verbalize what you are thinking about while you are doing something -- if you are

confused, say what confuses you and why. If you like something (like text or design) please say

so. For example, if you were trying to play an audio or video file, or open a link to another page

or image you might say: "Now I am typing in search terms to look up abstracts".... If you

encounter a problem, or are confused say something like: "This does not make sense to me, I

can't get this section to work correctly." Basically, I'd just like you to verbalize both the action(s)

you are attempting, and what you are thinking while attempting it. Try not to ask me too many

questions on how things *should* work, unless you are really stuck. Just try to perform the task(s) to the best of your ability.

Okay, are you ready? Do you have any questions before we start?

Let's begin. Please login and take a minute or two to explore the website.

Now that you are finished exploring, here are some things I would like you to try…

I want you to log in to the website with username "user" and password "password." Remember to verbalize what you are doing and thinking while you work.

Once you log in, your profile page will come up. I want you to use this page to generate a service transcript.

Next, I want you to return to the home page and search for an abstract using search terms protein name "p32" and species name "human."   I then want you to review one of the abstracts that come up.

Well, that's it! We're done.

Thank you again for helping me figure out what might make my web application better. Do you have any questions or final thoughts?

New PHI2WEB prototype - Participant #1		
User Profile	Age / Gender	33 / F
	Internet Experience	Moderate
	Profession	Post-Doc
Test Context	Usability Test Method	MacBook Air 13"
	Date of Test	December 6, 2012
	Platform / Browser	OSX / Google Chrome

Summary of Observations

	Task 1	Task 2	Task 3
Task Description	Logging in	Generating a service transcript	Searching for and reviewing abstract
Time spent to complete the task(s)	2 minutes	4 minutes	3 minutes
*Difficulty rating in completing task	1	1	2
Errors or problems identified by a user	Didn't like that the "password" tooltip popped up while the "user" tooltip was still there	None	None
Overall user comments (likes and dislikes)	"I like the new design of the site. It's much cleaner and easier to use."	"This is a neat feature. I could see myself including it in resumes." "I like the profile. I think it could be really good for networking."	"I'm not sure why this abstract is locked down." "There seems to be less functionality in this version than the last one."

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

	Strongly Disagree		Neutral		Strongly Agree
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous options and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5

5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5
7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

New PHI2WEB prototype - Participant #2		
User Profile	Age / Gender	30 / M
	Internet Experience	Advanced
	Profession	Ph.D. student
Test Context	Usability Test Method	PC 27" monitor
	Date of Test	December 6, 2012
	Platform / Browser	Windows 7 / Firefox

Summary of Observations

	Task 1	Task 2	Task 3
Task Description	Logging in	Generating a service transcript	Searching for and reviewing abstract

Time spent to complete the task(s)	1 minutes	5 minutes	3 minutes
*Difficulty rating in completing task	1	2	1
Errors or problems identified by a user	None	Had trouble finding the "generate service transcripts" link	None
Overall user comments (likes and dislikes)	"The site looks much better than the old one."	"Compared to the other prototype, I can maybe see myself using this one, if it were popular. I like the profile." "How do I generate a service transcript?" [He figured it out after about a minute of searching.]	"This seems much cleaner than the other version." "I like that you have other users. It makes the social functionality much easier to understand."

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

	Strongly Disagree		Neutral		Strongly Agree
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous o ptions and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5
5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5

7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

New PHI2WEB prototype - Participant #3		
User Profile	Age / Gender	25 / F
	Internet Experience	Advanced
	Profession	Ph.D. student
Test Context	Usability Test Method	MacBook Air 13"
	Date of Test	December 6, 2012
	Platform / Browser	OSX / Google Chrome

Summary of Observations

	Task 1	Task 2	Task 3
Task Description	Logging in	Generating a service transcript	Searching for and reviewing abstract
Time spent to complete the task(s)	2 minutes	2 minutes	4 minutes
*Difficulty rating in completing task	1	1	1

Errors or problems identified by a user	None	None	None
Overall user comments (likes and dislikes)	"The new site is really pretty! You guys did a really good job with the design."	"I like the profiles. I can see something like this being a Facebook for science geeks. Can you friend people?" "Service transcripts are a neat idea. I think it would motivate a lot of people to contribute. I could see it being a competition with some of my friends, to see who gets the highest score."	"Oh, so that's what the status is for. That makes sense. I remember being confused by that last time. It's good that the abstract is different, too." "I like the comments that you added. Is there a way to 'like' or 'dislike' them?"

*Difficulty rating: 1 = easy, 2 = okay, 3 = difficult

	Strongly Disagree		Neutral		Strongly Agree
1. I think the project was easy to use and navigate	1	2	3	4	5
2. I was not overwhelmed by the numerous options and complexity of the project	1	2	3	4	5
3. The project performed the way I expected	1	2	3	4	5
4. I found it easy to determine my location in the project (i.e., path, linear or hierarchical order, etc.)	1	2	3	4	5
5. All interaction elements, such as buttons or movable objects, worked as expected	1	2	3	4	5
6. I thought the visual design was pleasing	1	2	3	4	5

7. The content was easy to understand and was aligned with the purpose of the project	1	2	3	4	5
8. I found the social functions to be potentially useful	1	2	3	4	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program	1	2	3	4	5
10. My overall experience with the project was very good.	1	2	3	4	5

Appendix D

Usability Interview

1) Do you feel confident that you completed all tasks correctly?
   Yes; I think everything was laid out clearly
   I think so, although there were a few features that were disabled in the prototype, so I might have missed something
   Yes – I think the system was pretty easy to use

2) Do you believe that the social functions are potentially useful to you professionally?
   I think so. Social sites can be really helpful for networking, and it would be nice to belong to a site with other people in my field, especially while I'm applying to tenure-track jobs.
   Maybe. I'm a member of a few social networks right now, but I don't really use them for much. I don't have many Facebook friends, and I interact with only a few of the ones I do have, so maybe I'm not the best person to ask.
   I definitely think so! I could see myself using it to network, especially when I'm looking for jobs, and I think the service transcript generation is really cool.

3) Do you believe that the new version of the PHI2WEB prototype is an improvement over the old version? Why or why not?
   Definitely. It's much cleaner and I thought it was easier to use.
   Yes. I wasn't really sure what the purpose of the old prototype was, even after you explained it to me, but the new one made it much clearer how it could be useful to me.
   Yes, I think it definitely is. The social features are really neat and did a great job showing how the site is supposed to work.

Appendix E

User Perceptions of Captology Features

Six users were provided with a text description of PHI2WEB functions proposed to improve participation in the social management of system information and asked to respond to questions using an alternating positive/negative Likert scale.

Participants:

Date of birth	Gender	Occupation	Academic discipline
January 31, 1987	F	Student	Plant, Insect, and Microbial Sciences
May 13, 1982	M	Student	Health Education and Promotion
October 10, 1979	F	Researcher	Chemistry
December 27, 1964	M	Professor	Biology
June 2, 1988	M	Student	Biology
October 18, 1959	F	Professor	Exercise/Sports Education

Aggregated Questionnaire Responses

1 = Strongly agree, 3 = Neutral, 5 = Strongly disagree

Question	Average score
I **would not** be willing to create a user profile in order to use the system:	4.33
A recommender function **would** motivate me to create a profile and use the system:	1.67
Presenting abstracts requiring review, targeted to my interests and expertise, **would not** encourage me to complete reviews in the system:	4.17
Having my service to the site (by voting and reviewing abstracts) recognized with an increase in user rank **would** encourage me to contribute by voting and reviewing:	2
The ability to verify my contributions to the system and receive evidence of service to my field **would not** be an incentive to voting and reviewing abstracts:	4.17

Motivation to Contribute

For each of the proposed incentives to encourage contribution, please indicate the level to which the measure might motivate you to vote, review abstracts, and generally use the system for more than simply finding research material.

1 = Not motivated to contribute, 10 = Highly motivated to contribute

Incentive	Average score
Creating a user profile, through which other users can see your areas of expertise:	**8.17**
Being recommended to other users that have similar or related interests and areas of expertise:	**7.83**
Having abstracts requiring review being presented to you based on your profile information:	**7.5**
Being awarded a user rank based on your contributions to the system:	**8**
Having the ability to create a service transcript that would provide evidence of your contributions to the system:	**8.33**

Finally, we would like to ask you if you have any other ideas for contribution incentives:

> *Contests with actual prizes*
> *Featured users*
> *Social features*
> *Show user activity*
> *Featured experts*