

AN ABSTRACT FOR THE PROJECT OF

Vignesh Viswanathan for the degree of Master of Science in Computer Science
presented on July 27, 2011

Title: Redesigning Beaversource through User Centered Design

Abstract approved:

Carlos Jensen

Beaversource provides both code-hosting tools and social networking in one place. Students and faculty at Oregon State University have been using Beaversource to host their projects, both for classwork and research. Several usability problems were reported in a survey conducted on Beaversource last year. Some of these issues were severe and eventually led users to leave the site or consider alternative tools. It was clear that the usability of the site needed improvement.

A User Centered Design approach was used to redesign key parts of the website to address some of the usability problems reported by users. A high-fidelity prototype of the new design was developed. A focus group was conducted with Beaversource users to get their opinion and feedback on the new design. Participants gave positive feedback about the design and agreed that the new design would solve many of the usability problems that it had addressed. They also provided suggestions to improve certain aspects of the design.

©Copyright by Vignesh Viswanathan

July 27, 2011

All Rights Reserved

Redesigning Beaversource through User Centered Design

by

Vignesh Viswanathan

A PROJECT REPORT

submitted to

Oregon State University

in partial fulfillment of

the requirements for the

degree of

Master of Science

Presented July 27, 2011

Commencement June 2012

Master of Science project of Vignesh Viswanathan presented on July 27, 2011.

APPROVED:

Major Professor, representing Computer Science

Director of the School of Electrical Engineering and Computer Science

Dean of the Graduate School

I understand that my project report will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my project report to any reader upon request.

Vignesh Viswanathan, Author

ACKNOWLEDGEMENTS

I would like to thank my family for their constant support and encouragement throughout my master's program.

I express my sincere gratitude to my advisor, Dr. Carlos Jensen for his guidance and invaluable support from the time I began the master's program through completing this project.

Oregon State University has provided world class research facilities and an excellent atmosphere for learning. I am thankful to Drs. Carlos Jensen and Christopher Scaffidi for giving me an opportunity to be a teaching assistant for their classes. I am grateful to Dr. Bella Bose for his guidance. I am thankful to Vickie Nunnemaker for giving me an opportunity to work as a web developer at the Faculty Senate.

I would like to thank all the members of the HCI research group for their help and invaluable suggestions during various stages of this project. Thanks to Jose for all his help while working on Beaversource. I enjoyed being a part of the Beaversource team with Jose, Victor and Helen and will cherish the good times we had together.

Thanks to Akhil, Aniket, Karthick, Santosh and Vivek for being such great friends. I am also thankful to Aravind, Sathish, Sekhar, Kunal, Harsha, Vasanth and many others for making my stay in Corvallis fun and enjoyable.

TABLE OF CONTENTS

	<u>Page</u>
1. Introduction.....	1
2. Background.....	3
2.1 History.....	3
2.2 Original design goals.....	3
2.3 Current user interface.....	4
2.3.1 Homepage.....	5
2.3.2 Navigation system.....	7
2.3.3 Profile page.....	9
2.3.4 Group.....	10
2.3.5 Project.....	11
2.3.6 Help.....	13
2.4 Original evaluation of the website.....	14
3. Methodology.....	16
3.1 User comments.....	16
3.2 Heuristic evaluation.....	18
3.3 Data-mining help emails.....	22
3.4 Our approach.....	22
3.4.1 User centered design.....	22

TABLE OF CONTENTS (Continued)

	<u>Page</u>
3.4.2 Sitemaps.....	23
3.4.3 Personas.....	24
3.4.4 Scenarios.....	26
3.4.5 Interactive wireframes.....	26
3.4.6 Low-fidelity prototype.....	31
3.4.7 High-fidelity prototype.....	32
3.5 Evaluation.....	33
3.5.1 Focus group.....	33
3.5.2 Study design.....	34
4. Design.....	37
4.1 Navigation system.....	40
4.2 Homepage.....	38
4.3 Social-project integration.....	44
4.4 Project admin interface.....	45
4.5 Help.....	47
4.6 Group/Project homepage.....	48
4.7 Other changes.....	48
5. Results.....	50

TABLE OF CONTENTS (Continued)

	<u>Page</u>
5.1 Usability problems.....	50
5.1.1 Code related problems.....	50
5.1.2 Design related problems.....	51
5.2 Personas.....	52
5.3 Scenarios.....	54
5.4 Focus group.....	55
6. Conclusion.....	58
Bibliography.....	60
Appendices.....	62
A Appendix 1.....	63
B Appendix 2.....	105
C Appendix 3.....	111

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
Figure 2.1 Homepage	6
Figure 2.2 Social side navigation.....	7
Figure 2.3 Left menu.....	8
Figure 2.4 Project side navigation.....	9
Figure 2.5 Profile Page.....	10
Figure 2.6 Group page.....	11
Figure 2.7 Project page (social side).....	12
Figure 2.8 Project page (project side).....	13
Figure 2.9 Help page.....	14
Figure 3.1 Usability template problem.....	20
Figure 3.2 Usability problem from the Heuristic Evaluation.....	21
Figure 3.3 Sitemap shown for the top navigation menu.....	24
Figure 3.4 Navigation 1.....	28
Figure 3.5 Navigation 2.....	29
Figure 3.6 Navigation 3.....	30
Figure 3.7 Projects page low-fidelity prototype.....	31
Figure 3.8 Screenshot used for unaffected features.....	32

LIST OF FIGURES (Continued)

<u>Figure</u>	<u>Page</u>
Figure 4.1 Current navigation system (top) VS New navigation design.....	37
Figure 4.2 Settings page.....	39
Figure 4.3 Profile page.....	40
Figure 4.4 Homepage.....	41
Figure 4.5 Messages page.....	42
Figure 4.6 Project activity page.....	43
Figure 4.7 Friend requests page.....	44
Figure 4.8 Social-project change.....	45
Figure 4.9 Admin page.....	46
Figure 4.10 Manage page.....	47
Figure 4.11 Help page.....	48
Figure 5.1 Persona.....	54
Figure 5.2 Scenario.....	55

LIST OF TABLES

<u>Table</u>	<u>Page</u>
Table 2.1 Social networking features.....	4
Table 2.2 Code-hosting tools.....	5

List of Appendix Figures

<u>Figure</u>	<u>Page</u>
Figure 1.1 Groups option on both toolbars.....	64
Figure 1.2 Projects option on both toolbars.....	65
Figure 1.3 Friends page.....	66
Figure 1.4 Request a project page.....	67
Figure 1.5 First version of the second level navigation menu.....	68
Figure 1.6 Second version of the second level navigation menu.....	69
Figure 1.7 First version of search bar.....	70
Figure 1.8 Second version of search bar.....	70
Figure 1.9 Profile page.....	71
Figure 1.10 Edit profile page.....	72
Figure 1.11 Group membership.....	73
Figure 1.12 Search bar (people page).....	74
Figure 1.13 Dashboard.....	75
Figure 1.14 Dashboard help links.....	76
Figure 1.15 Homepage (activity).....	77
Figure 1.16 Recent activity.....	78
Figure 1.17 Recent members (activity page).....	79
Figure 1.18Newest members (dashboard).....	80
Figure 1.19 ‘The wire’ page.....	81
Figure 1.20 ‘The wire’ (activity page).....	81

List of Appendix Figures (Continued)

<u>Figure</u>	<u>Page</u>
Figure 1.21 Project policy page.....	82
Figure 1.22 Project request page.....	83
Figure 1.23 Project request page (top menu links).....	85
Figure 1.24 Message board.....	86
Figure 1.25 Browse source page.....	87
Figure 1.26 Statistics page.....	88
Figure 1.27 New ticket form.....	89
Figure 1.28 New ticket form (attaching files).....	90
Figure 1.29 Files page.....	92
Figure 1.30 No files available page.....	93
Figure 1.31 Blog post page.....	94
Figure 1.32 Editing group details.....	95
Figure 1.33 Friends page.....	96
Figure 1.34 All site projects.....	97
Figure 1.35 Your projects.....	97
Figure 1.36 All site groups.....	98
Figure 1.37 Your groups.....	99
Figure 1.38 Your groups (no alphabetical listing).....	100
Figure 1.39 Your projects (no alphabetical listing).....	100
Figure 1.40 Search results.....	101

List of Appendix Figures (Continued)

<u>Figure</u>	<u>Page</u>
Figure 1.41 Search results (filter options).....	102

1. INTRODUCTION

Beaversource is unique in that it provides both social networking and code-hosting tools in one place. For OSU users, there is no registration required for using Beaversource . Anyone with a valid ONID ID can log into Beaversource and start using it. Users have a profile page where they can write something about themselves and provide their contact details etc. Users use the project request form on the site to request projects. These project requests have to be approved by the Beaversource administrators before users can start using their projects. Groups provide a place for users to meet other users who share similar interests and have discussions online. Faculty also uses Beaversource for classes. They create a group for the class and ask students to join it. It allows them to upload lecture materials to the group and have discussions with students.

Beaversource became popular with students, and had a little over one thousand members, when its first birthday was celebrated in January 2010. A survey (Cedeno 2010) was posted on Beaversource to gather demographic information and to better understand the user's needs and usage of various features. The survey had three questions where users could provide comments. We extracted a list of usability problems from these comments. This motivated us to redesign Beaversource to solve some of these problems. We then wanted to validate the user interface against established user interface design principles. Hence we did a heuristic evaluation of the user interface. This gave us some more usability problems. Users also reported usability issues that they were having with the site through the bsc-help email alias. We had three lists of usability problems, one each from the user comments, heuristic evaluation and bsc-help. We consolidated these three lists of usability problems and prepared a final list of usability problems that we would address with the new design.

Since we wanted to involve our users in the design process, we decided to follow a User Centered Design (UCD) approach to redesign the site

Personas were created to represent typical users of Beaversource. For each persona, scenarios were written describing how it would interact with the system to achieve its goals. The scenarios which were relevant to the usability problems that were being considered were then broken down into individual tasks to identify finer details of the persona's interaction with the system. Wireframes were developed and iteratively refined to come up with a low-fidelity prototype. A high-fidelity prototype was developed by adding color and images to the low-fidelity prototype to make it look more realistic and closer to the finished product. The appropriate user interface components in the high-fidelity prototype, which would be required for users to perform tasks with the prototype during the focus group, were made interactive.

We did a focus group to evaluate our new design. The group gave positive reviews for the new design. The collective opinion was that the new design would solve the usability problems that it had addressed.

The rest of the report is organized as follows. Chapter 2 provides the history, original design goals, current user interface and the original evaluation of the website. Chapter 3 discusses our methodology, Chapter 4 the design. The results are presented in Chapter 5 and Chapter 6 concludes the report.

2. BACKGROUND

2.1. History

Several interesting projects were going on at different departments at Oregon State University (OSU). Some of them had their own websites, but collaboration was difficult since there was no central place to host these projects. A central place would make it easier for different departments to work together on projects. EECS (Electrical Engineering and Computer Science) showed interest in having a place where students could work on their projects and in the process gain experience with using code-hosting tools such as bug tracker, code repository, wiki and forums (Cedeno 2010). This motivated a couple of students to work on a website that would provide such a place for hosting projects. This website was called Beaversource.

2.2. Original Design Goals

The main motivation for creating Beaversource was to provide an online tool where students and faculty at OSU could collaborate and work together on projects. Even though tools like these already existed, they were not properly maintained and did not facilitate collaboration.

TRAC (<http://trac.edgewall.org/>) was chosen as the foundation for Beaversource since it provided all the necessary code-hosting tools. PostgreSQL (<http://postgresql.org/>) was chosen as the backend database. Later, Elgg (<http://elgg.org/>), a social networking framework was chosen as the foundation for the social networking features.

One goal behind adding the social features to Beaversource was to make it easier for users to find projects, groups and people and help them track their groups and projects. The profile pages serve to showcase the projects that students have worked on throughout their education. It allows faculty to create groups and use them for their

classes. In these pages they can host forums and upload lecture materials (Cedeno 2010).

To summarize, the main design goals of Beaversource were

- To provide a centralized location where students and faculty could collaborate on projects
- To provide code-hosting tools like bug tracker, wiki, SVN etc.
- To provide social networking tools like groups, profile, forums etc. to augment the code-hosting tools

2.3. Current User Interface

The social side of Beaversource provides features such as profile, groups, blogs, chat, friends and forums (see Table 2.1) and the project side provides code-hosting tools such as wiki, history, roadmap, bug tracker, source code browser and statistics(see Table 2.2).

Table 2.1 Social networking features

Feature	Function
Profile	Provides users with a page where they can have information like contact details, interests, etc. about them
Group	Allows users to create and join groups that match their interests
Blogs	Provides users the ability to write blog posts and publish them in the site
Chat	Allows users to chat with other friends when they are online.
Friends	Allows users to track users with similar interests
Forums	For having discussions in groups

Table 2.2 Code-hosting tools

Feature	Function
Wiki	Allows collaborative editing of information about the project
History	For viewing project activity between two specified dates
Roadmap	For creating milestones to track the project's progress
Bug tracker	For creating tickets to track bugs in the project
Source code browser	For browsing source code and viewing changes between two versions of a file
Statistics	Provides graphs to visualize project activity like code commits.

The user interface, as it is present today, is discussed below.

2.3.1 Homepage

The Beaversource homepage is shown in Figure 2.1.

Dashboard My Profile People Groups Projects Request a Project Help!
Log out



Beaversource



Oregon State University
Open minds. Open doors.™

Blog
Groups
Pages
Projects
Settings

Welcome, Vignesh Viswanathan

Beaversource is a place where Oregon State University students, faculty and staff come together to connect and collaborate. We encourage students to become active in open source through discovering new and innovative projects that other students have created. Create a profile, find friends, join a community and get connected to OSU.

Check out the [karma badges](#) to view the various badges and categories. You can view a person's [profile](#) to check out his/her karma badges.

Latest Project Activity

caoc: In sidebar.js, included insertStarterScriptSuggestion() to take care of the starter script suggestion. Modified user-event-mediator to call insertStarterScriptSuggestion() instead of onComment(). (in project [ideas4eups](#))

slonet: More schematic entry. (in project [ork](#))

slonet: Created parts CAP_RAD_10X16MM and XTAL_ABL5-16.000MHZ-B4-T. (in project [efeedback](#))

bsc_bfor: Fixing the bug ill mentioned in her email. Updated Files: * coscripter-sidebar.js Updated Functions: * assemblerRepeatAdvice (very similar to onComment) (in project [ideas4eups](#))

bsc_bfor: Bug fix and code clean up relating to "insert script" functionality of advice script. Updated Files: * coscripter-editor-richtextbox.js * coscripter-sidebar.js (in project [ideas4eups](#))

Latest Projects



IEEE Citation Parser

Created 3 days ago by [Dan Albert](#)



ECE44x Sample 1

Created 13 days ago by [Donald Heer](#)



Energy Consumption Feedback in the Home

Created 19 days ago by [Ron Metoyer](#)



EECS ABET Objectives Management Web Page

Created 19 days ago by [Dan Albert](#)

Featured Groups



Gourmet Cuisine for College Students open group / 11 members

Love to **cook**, and love **food**? Share recipes and discuss cooking/eating **healthy** on a **budget**.

Rules:

1. Quick Recipes: Cooking in 20 minutes or less.
2. Budget Recipes: Cooking with only 3 main ingredients.
3. Must-Have Staples: Is it always in your pantry?
4. Upload photo of the final dish

Latest Activity

1 2 3 4 ... 152 153 154 155 Next »



IEEE Citation Parser

Created 3 days ago by [Dan Albert](#)



ECE44x Sample 1

Created 13 days ago by [Donald Heer](#)



Energy Consumption Feedback in the Home

Created 19 days ago by [Ron Metoyer](#)



Todd Kulesza: @naval It looks like some code/documentation is available at <http://beaversource.oregonstate.edu/projects/admin/>

Posted to the wire 19 days ago via site.



EECS ABET Objectives Management Web Page

Created 19 days ago by [Dan Albert](#)



Communities Take Charge

Created 23 days ago by [Tuan Pham](#)



Species Distribution Modeling

Created 32 days ago by [Arwen Twinkle Lettkeman](#)



Blog: Encore screening of THE DOVE ON THE ROOF

[Sebastian Heiduschke](#) 34 days ago

1 2 3 4 ... 152 153 154 155 Next »

Newest people













People Online Now




Figure 2.1 Homepage

The homepage has a welcome box on the top right of the page. The “Latest Activity” box shows updates from all members in the site. These updates can be a blog post, wire post, new group or project etc. The “Latest project activity” box shows commit updates from all projects in the site. “Latest projects” shows a list of newest projects that have been created on the site and “Newest people” shows the newest members to join the site. A group that needs to be advertised on the site is chosen and shown in the “Featured groups”. People logged into the site at any given moment are shown in “People online now”.

2.3.2 Navigation system

All pages in Beaversource have two menu bars at the top. The menu bar shown with a green border as shown in Figure 2.2 exists in all pages throughout the website and is the website’s global navigation (<http://www.motive.co.nz/glossary/navigation.php>). We will refer to this as “top navigation menu” throughout the report.

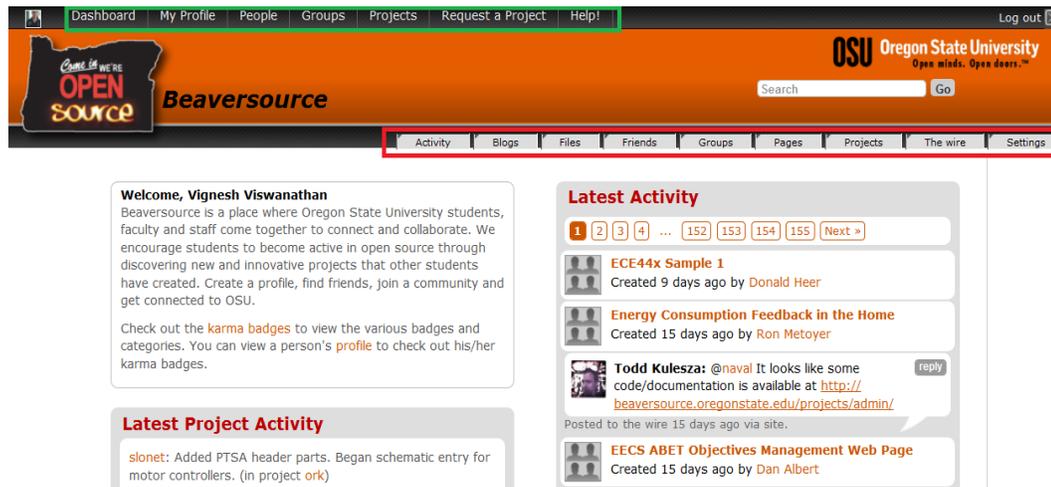


Figure 2.2 Social side navigation

Figure 2.2 shows the navigation in the social networking side of Beaversource. We have two menus which are available in all pages. The horizontal menu below the top navigation menu will be referred to as “social second level navigation menu”. Hence we can say that these two menus form the global navigation of the social networking side of Beaversource.

In addition to the global navigation, some other pages in the social side like a group or project page also have a left menu shown with a black border as shown in Figure 2.3.

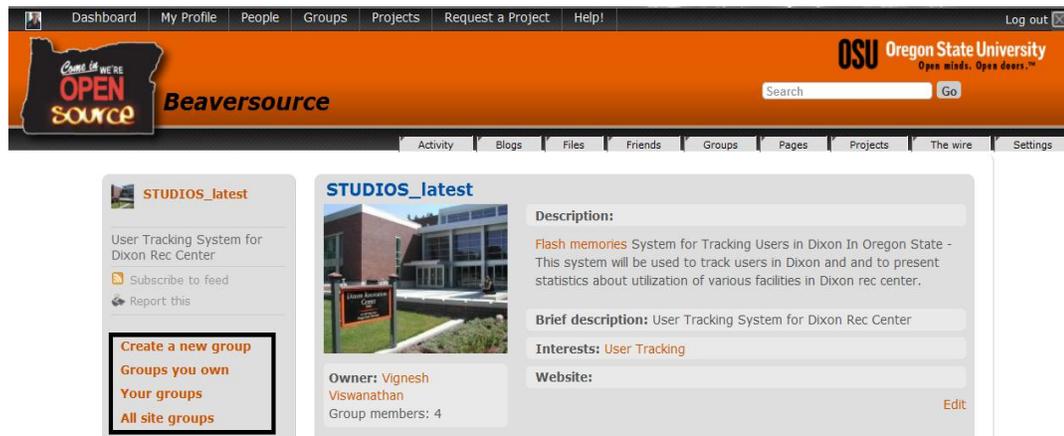
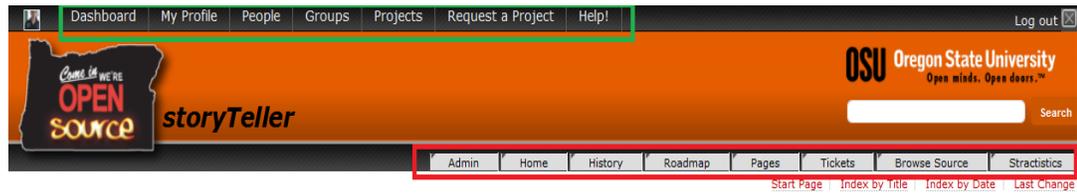


Figure 2.3 Left menu

Figure 2.4 shows the navigation in the project side of Beaversource.



Welcome to storyTeller

This project is for creating a story teller application using object oriented concepts for CS 582

This project is licensed under the [GPL 2.0](#)

To checkout the SVN tree for this project, use the following command:

```
svn co --username <onid username> https://code.oregonstate.edu/svn/storyteller
```

SVN will then prompt you for your ONID password. other useful SVN commands are:

```
svn up
```

to update your local copy

```
svn ci
```

Figure 2.4 Project side navigation

Similar to the social networking side, we have two menus which are available in all pages in the project side of Beaversource which form the global navigation. The horizontal navigation menu below the top navigation menu will be referred to as “project second level navigation menu”.

2.3.3 Profile page

The profile page can be accessed by clicking on “My profile” in the top navigation menu. All members in Beaversource have a profile page as shown in Figure 2.5 where they can provide details about them like their location, phone number, email etc. They can use the “About me” and “Brief description” sections to talk about themselves. Students can find peers with similar interests by looking at the “Interests” section.

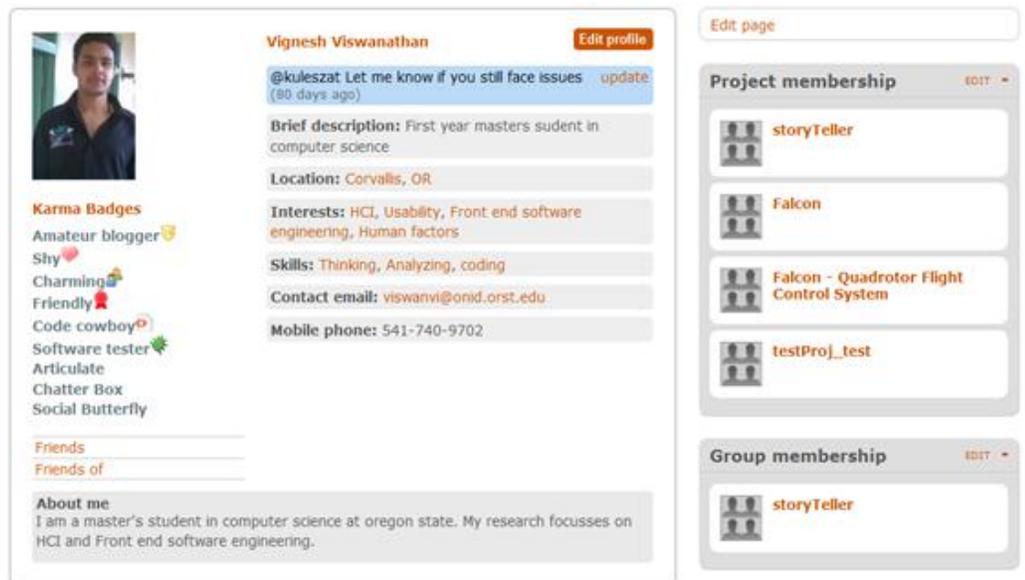


Figure 2.5 Profile page

The profile page can be customized by clicking on the “Edit page” link on the top left of the page. The user can choose a set of widgets from among “File widget”, “Message board”, “Pages”, “Group membership”, “Wire posts”, “Google calendar”, “Twitter”, “Activity”, “Friends”, “Project membership” to display on their profile page.

2.3.4 Group

The user interface of a group page is shown in Figure 2.6.

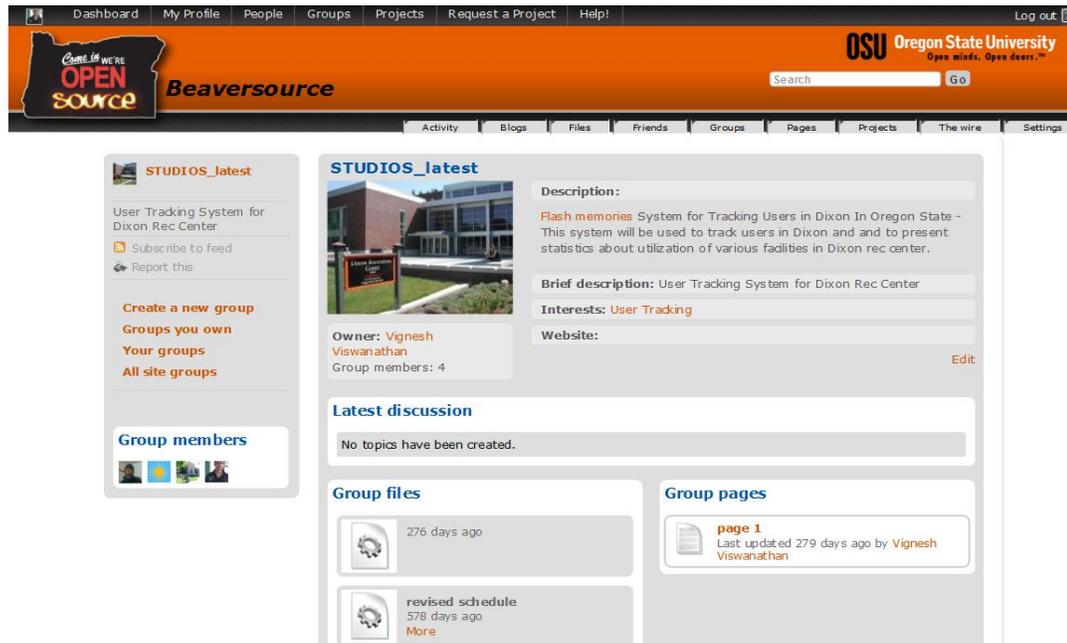


Figure 2.6 Group page

There are some links on the left which can be used to filter the groups that are shown in the user interface. The “Create a new group” link is used to create a new group. The “Group members” box displays the members of the group. The “Description”, “Brief description” and “Interests” can be used to display information about the group. The “Latest discussion” displays the discussions. . The “Group files” displays files that have been uploaded by group members and the “Group pages” the pages that members have created and linked to the group.

2.3.5 Project

A project in Beaversource has a social and project side. The social side provides forums to have discussions while the project side provides the code-hosting tools. The social side of a project is shown in Figure 2.7.

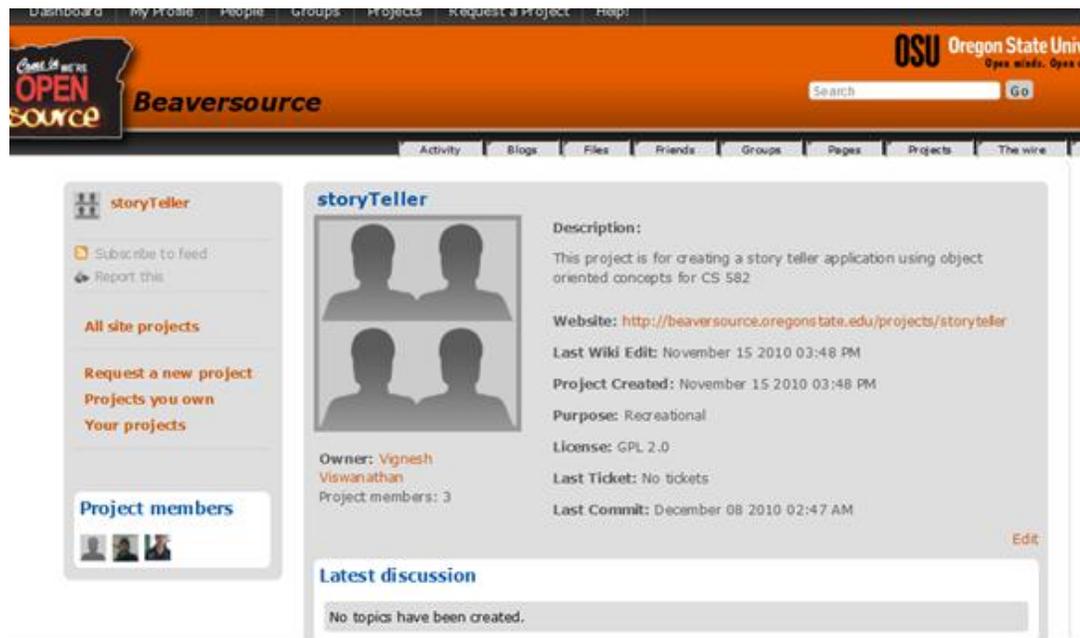


Figure 2.7 Project page (social side)

The user interface is very similar to that of the group page except that there are no “Project files” or “Project pages”. Clicking on the link provided in “Website” takes the user to the project side of a project. The user interface of the project side of a project is shown in Figure 2.8.

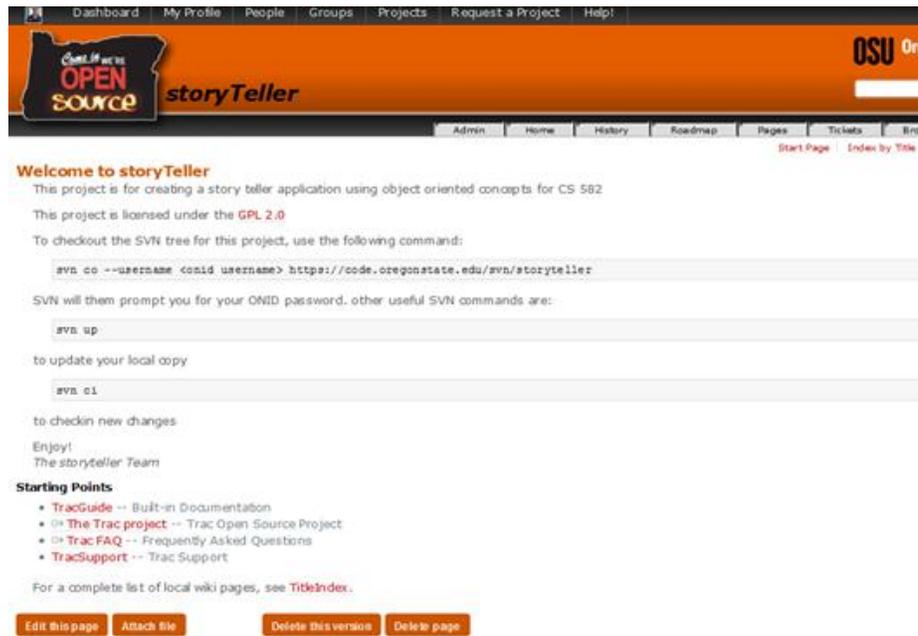


Figure 2.8 Project page (project side)

The code-hosting tools are available on the horizontal second level menu. The “Admin” page provides various administrative functions. The “Home” contains the Wiki which usually contains information about the project. “History” allows viewing project activity like commits, ticket updates etc. between two specified dates. “Roadmap” allows creating milestones and displays all the milestones. Tickets can be created and updated in “Tickets”. “Browse source” allows browsing through the source code and “Statistics” provides graphical representations of project activity like commits.

2.3.6 Help

The help system in Beaversource can be accessed by clicking on “Help!” on the top navigation menu. It lists the topics, and for each topic, its contents. The help system is powered by a Wiki. The help page is shown in Figure 2.9.

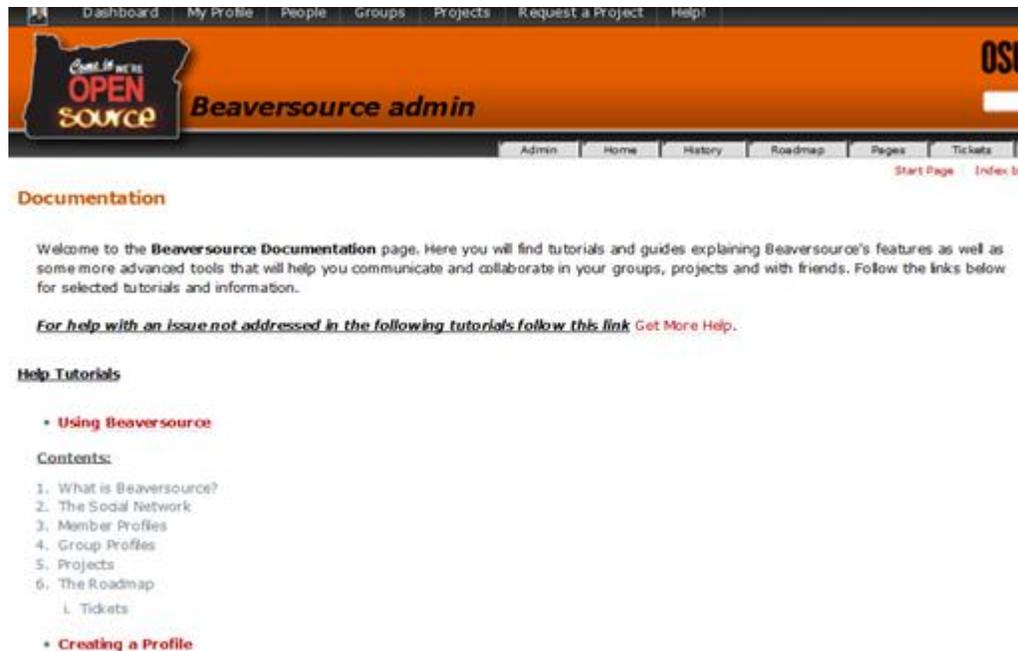


Figure 2.9 Help page

2.4. Original Evaluation of the website

A survey was conducted in January 2010 by Jose Cedeno, one of the students working on the project, which got 100 valid responses from Beaversource users. The goals of this survey were to obtain demographic information and to better understand the user's needs and their usage of different features. All of the questions except three were multiple choices. Three questions had an input box next to them where users could provide feedback. The results from this survey most relevant to this work are presented below.

The majority of Beaversource users (80%) were CS and ECE majors. Their two main reasons for using Beaversource were found to be for class (70%) and project (20%). Social networking was ranked the lowest in reasons for using Beaversource. Hence it

was clear most users were not using the social networking features of Beaversource. On the other hand, over 40% of the users were using Beaversource for code hosting.

Users were asked to rank the features of Beaversource. The important features starting with the most useful were code repository, file uploads, group and project discussions, bug tracker, SVN viewer and Wiki. The least important features in decreasing order of usefulness were user blogs, user profiles and project statistics. (Cedeno 2010)

These survey results helped us better understand our user population and the popularity and usage of various features. We wanted to probe more into the low popularity of certain features among users. It was clear that there was scope for improving the website.

3. METHODOLOGY

3.1. User comments

A questionnaire is a good investigation method to gather a lot of information from a wide a range of users. It can be used to get feedback on an existing website (Liu 2008). The survey that was mentioned earlier had three questions that had an input field for users to enter their comments.

These questions were:

Q1. "What would you change in Beaversource?"

Q2. "What features would you add to Beaversource?"

Q3. "Why do you think the social and project is not integrated properly?"

We wanted to read through the user comments because we strongly believed that it would help us design a more efficient and usable website.

After reading through the user comments for Q1, we found that certain parts and features of the website received more user comments than the others.

These were:

- Navigation system
- Search
- Wiki
- Social Networking

Usability is a quality attribute that is used to assess how easy user interfaces are to use. It is defined by 5 quality components.

- **Learnability** – Ease of performing basic tasks with the design for the first time

- **Efficiency** – Ease of performing tasks after using the design for a while
- **Memorability** – Ease of using the design after a period of not using it
- **Errors** – Number of errors, their severity and the ease of recovering from them
- **Satisfaction** – Pleasantness of using the design
(<http://www.useit.com/alertbox/20030825.html>)

Any issue in the website that fails to satisfy one or more of these quality components can be classified as a usability issue.

Reading through the user comments for Q1, with this definition of a “usability issue”, we were able to compile a list of usability issues that users were having with the site.

These were:

- Issues with the navigation system – several people mentioned the problem with two menu bars on the homepage. Other issues reported were broken links, unexpected behavior in certain scenarios.
- Issues with Wiki – better formatting, issues with simultaneous editing, ability to attach multiple files
- Project approval is slow, and not automatic
- Search not efficient
- Files – uploading fails sometimes, no access control for files uploaded
- Poor access management – managing permissions for project members not intuitive and easy to use
- User’s groups/projects are not shown on the homepage
- Posting in message boards and forums can be improved
- Files cannot be dragged and dropped into SVN
- Inviting people to group/project does not work
- Tools not available to add and view code
- Old groups that are no longer in use cannot be erased

The user comments for Q2 provided us a list of usability issues

The usability issues were:

- Inconsistent and cumbersome navigation
- Poor access management in projects
- Inefficient search
- Difficult to use Wiki
- No project updates from user's projects in the homepage

The user comments for Q3 gave us a list of issues that people faced when switching between the social and project sides.

- Inconsistent and cumbersome navigation
- Poor integration between social networking and project features
- Different look and feel between social networking and project features

Reading through the user comments for these three questions gave us a good idea of the problems users had with the site and their expectations.

3.2. Heuristic Evaluation

We had a list of usability issues from the user comments. At this point, we were not sure if there were more usability problems with the site than what the users had reported. Hence we decided to do a heuristic evaluation. Heuristic evaluation can be used to find usability problems in a user interface by checking its compliance with a recognized set of heuristics (Nielsen 1992). (Nielsen & Landauer 1993) found that it can be used with the intention of finding usability problems so that they are not present in the new design. We wanted to find as many usability issues as possible with the current design so that they could be fixed in the new design.

A person who performs the heuristic evaluation of the website is called an evaluator. We chose eight graduate students in computer science as our evaluators. These graduate students were also part of the Human Computer Interaction (HCI) research group and had taken graduate level courses in HCI. We can therefore assume that they had knowledge of user interface design issues. These evaluators were also users of Beaversource. (Nielsen 1992) defines a “Double Specialist” as someone who has both expertise in user interface issues and the system that is being evaluated. Hence we can call all of our evaluators, double specialists. (Nielsen 1992) further found that double specialists found more usability issues with an interface than non-specialists. Since the evaluators were all students of the HCI research group, there was a risk that the evaluators could be positively biased in their evaluations. Because none of the students worked on the Beaversource project and that they were trying to improve their skills as evaluators, we can rule out the risk as not very significant.

Individual evaluators are not efficient when doing a heuristic evaluation. On the other hand, it has been shown that aggregating individual evaluations gives better results. To achieve best results with aggregation, it is suggested that evaluators perform their evaluation of the interface independently of each other. It was also found that an evaluator was willing to accept something as a usability issue when pointed out by other evaluators (Nielsen & Molich 1990).

There are several heuristics that can be used for doing a Heuristic Evaluation.

Some of the popular ones are:

- Nielsen’s 10 heuristics (http://www.useit.com/papers/heuristic/heuristic_list.html)
- Tognazzini’s 16 principles (<http://www.asktog.com/basics/firstPrinciples.html>)
- Shneiderman’s 8 golden rules for interface design (Shneiderman 1997)

We chose to use Nielsen’s 10 usability heuristics because they were the most widely used. To determine the severity of the usability problems that was found in the

Heuristic Evaluation, we decided to use Nielsen's severity ratings (<http://www.useit.com/papers/heuristics/severityrating.html>). The severity rating is a number between 1 and 5. A higher number means a higher severity.

The evaluators were given a presentation about Nielsen's usability heuristics. They were also instructed to use the template shown in Figure 3.1 for reporting a usability problem.

- **Task** – the task that was performed
- **Problem** – problem that was discovered
- **Heuristics violated** – the heuristic(s) that were violated
- **Severity** - from the ratings
- **Recommendation** – solution to the problem
- **Screenshot**

Figure 3.1 Usability problem template

If while doing a task, more than one usability problem was discovered, the task was to be noted and the problems were to be reported individually, along with the heuristics violated, severity and a screenshot if applicable. After these instructions, the evaluators were asked to do the Heuristic Evaluation independently of each other. Once we had individual evaluations, the evaluators met to discuss the evaluations. The goals of this meeting were to determine which of these problems were related to usability and also to agree on their severity. After this meeting, we had a final list of usability problems. I prepared a final report with the list of usability problems and sent it out to all the evaluators.

The eight evaluators together found 45 usability problems. After analysis, we found that these constituted 37 unique usability problems. Seventeen of these had a rating of 3, 19 had a rating of 2 and 1 had a rating of 1.

The heuristic evaluation gave us usability problems that we already had after reading through the user comments. In addition to this, it gave us a set of new usability problems. Since all of our evaluators were double specialists, we were confident that we had maximized our count of usability problems. A usability issue from the final report is shown in Figure 3.2. A full list of usability problems is provided in Appendix A.

Task: General navigation

1. Problem: "Groups" option is present in both Toolbars. This is confusing for users because they have the same name. The difference, if any between the two options is not clear.

Heuristic(s) violated:
Nielsen - Consistency and Standards, Aesthetic and minimalist design

Reported in survey: Yes

Severity: 3

Recommendation: consider removing the "Group" option from the second level navigation menu



The screenshot shows the Beaversource website interface. At the top, there is a navigation bar with links: Dashboard, My profile, People, Groups, Projects, Request a Project, and Help. Below this is a secondary navigation bar with links: Activity, Blogs, Files, Friends, Groups, Pages, Projects, The store, and Settings. The 'Groups' link in both bars is circled in red. A text box on the right side of the screenshot contains the text: 'Consider removing this option since it is already present on the top navigation menu'.

Figure 3.2 Usability issue from the Heuristic Evaluation

3.3. Data-mining help emails

The bsc-help (bsc-help@engr.orst.edu) alias was set up to enable users to contact the Beaversource developers with questions and issues. We looked to the archive of this list to identify usability problems users had reported since the start of the project, and determine whether these had been addressed.

The usability problems that we were able to get from these emails and conversations with the users were:

- The process of inviting a person to a group/project was not intuitive.
- There was no way for students who left the university to deactivate their account in Beaversource.
- There was no way to transfer ownership of a group/project when a student left the university or for other reasons

3.4. Our Approach

Given an initial list of usability problems and design challenges, we wanted to involve our users in the design process of the new Beaversource. It was clear that a User Centered Design (UCD) approach would fit our needs. Hence we decided to use a UCD approach for the redesign process.

3.4.1. *User centered design*

(Abrams et al. 2004) defines UCD as “a broad term to describe design processes in which end-users influence how a design takes shape. It is both a broad philosophy and variety of methods. There is a variety of ways in which users are involved in UCD but the important concept is that users *are* involved one way or another”. It is widely used to design usable and effective products which cannot be achieved with system

centered design. The participants in a study that was conducted also mentioned that UCD had improved both the usability and effectiveness of their products. It has been recognized as an international best practice and is defined in ISO 13407 and associated technical report ISO TR 18529 (Mao et al. 2005).

3.4.2. Sitemaps

Since one of the main goals was to redesign the navigation system, we wanted to do a sitemap to visualize the website's navigation system. The site maps were developed using an online tool called writemaps.com (<http://writemaps.com>).

The global navigation of Beaversource consists of a top navigation menu and a second level navigation menu on all pages as discussed earlier in Section 2.3.2. The top navigation menu is the same across all pages in the site while there's a different second level navigation across the social and project sides. Hence the global navigation of the site was served by three menus.

We did sitemaps of all these three menus. The individual pages were further decomposed into links and user interface components and these were also represented in the sitemap. Doing so gave us a clear picture of the position of links and information in the navigation hierarchy. The site map for the top navigation menu is shown with "Groups" expanded in Figure 3.3.

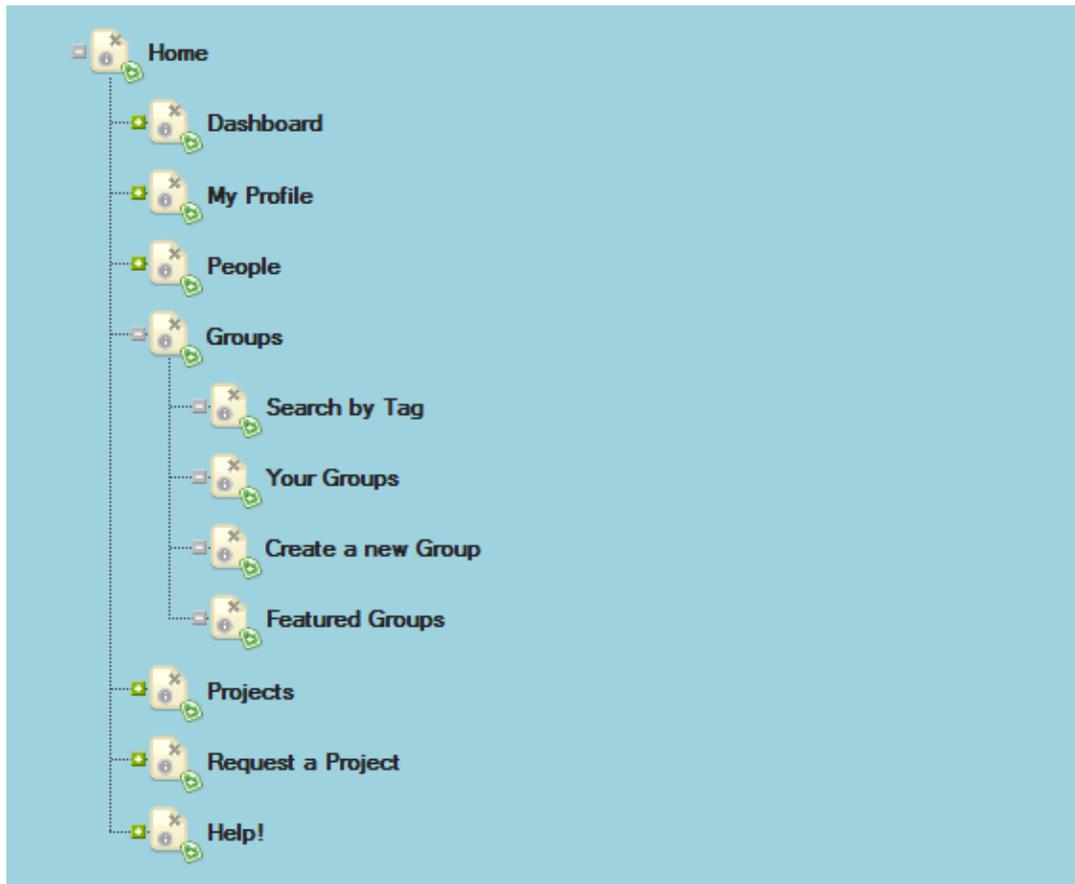


Figure 3.3 Sitemap shown for the top navigation menu

3.4.3. Personas

We created personas to represent our users. (Sinha 2003) suggests that the persona development process should focus on identifying and writing descriptions in detail for typical users and not for representative users. (Cooper 2004) defines a persona as a precise description of a hypothetical user and their goals representing a group of users throughout the entire design process. Personas can be used to identify features of a website so that it fully satisfies the needs of users

(http://www.steptwo.com.au/papers/kmc_personas/index.html). It is mentioned in (Goodwin 2002) that personas also serve as communication tools and a narrative approach better conveys the persona's expectations. Personas based on actual data

along with good design principles can produce good solutions. (Blomquist & Arvola 2002) suggest having between three to seven personas. Personas help designers stay focused on designing for the users during the entire design process. This results in designing only those features that the users want in an application. The designers come up with solutions to satisfy the needs of the personas. Once the personas are developed, the designer(s) list the major goals for each of the persona. They then develop scenarios or storyboards around those goals explaining how a persona would achieve them in their everyday life. In this way, personas and scenarios together help designers understand users better and the constraints like technology proficiency, time spent in Beaversource etc. that must be taken into consideration when designing for them. The designers first go about designing solutions to achieve the goals of the primary personas. The goals of the primary personas have to be satisfied by the design. After this they work on realizing the goals of the secondary personas. Often in design meetings, huge posters of the personas are kept in the room so that designers can easily draw attention to specific parts of the persona to back their design decisions. During the entire design process, the designers can always refer back to the persona documentation to justify that a specific aspect of the design. If a new kind of user emerges during the design process, personas make it easy to introduce them in the design process and communicate it with other members in the team. Hence personas play a pivotal role in the design process in making sure the designers focus on designing for the users.

We wanted to identify typical Beaversource users so that we could base our personas on them. From the survey data, we found that over 70% of the users were using Beaversource for class work. Hence we decided to have a persona to represent a student who uses Beaversource for class work and one to represent a professor who uses Beaversource for their class. 40% of the users were hosting their projects in Beaversource and using the code-hosting tools. Since the majority of the users who took the survey were students, it was decided to have a persona to represent a student hosting their project and using the code-hosting tools. From our interactions with

students and faculty who were Beaversource users, we came to know that professors collaborate with students on projects. Hence we decided to have a persona to represent a professor who uses Beaversource to collaborate with students on projects. Several respondents from non-EECS majors had mentioned in the survey that they were interested in services provided by Beaversource. We had talked to some students from non-EECS backgrounds who told us they used the “Groups” feature to have online discussions. Hence it was decided to have a persona to represent a typical user from a non-EECS major who uses groups to have online discussions. Since one of the initial design goals of Beaversource was to have social networking and code-hosting tools in one place, it was decided to have a persona to represent a user who uses the social networking features.

Our personas helped us stay focused and design for our users. We designed user interfaces keeping in mind the persona’s goals to make sure that they would help the persona achieve its goals. We always referred back to the persona documentation to back design decisions. In this way, the personas helped us engineer efficient and usable solutions throughout the design process.

3.4.4. Scenarios

After developing the personas, we wrote scenarios covering the goals for each of the persona. A scenario describes how a persona would interact with a system to achieve something (<http://www.infodesign.com.au/usabilityresources/scenarios>; Dantin 2005). The scenarios relevant to the problems that were being addressed were then broken down into individual tasks so that we could think about the user interface required to do that task.

3.4.5. Interactive wireframes

A website wireframe is used to represent the skeletal framework of a website (Brown 2006). It shows the layout of various components and the navigation on the page (Garrett 2004). The wireframe does not have color, graphics or topographic style since importance is given to achieving a design solution.

Sketchflow

(http://www.microsoft.com/expression/products/sketchflow_overview.aspx) was used to develop the wireframes. We chose Sketchflow because of the following reasons

- Ability to create interactive user interface components
- “Map” tool provides the ability to visualize all the pages in the application and the links between pages
- “Player” provides ability to view the wireframe/prototype in the browser and allows for easy collaboration.

We decided that the navigation in the new site would consist of a site-wide navigation system and a local navigation system. A site-wide navigation system helps the users understand where they are within a site and where they can go from there and a local navigation system does the same thing within a part of the site (Morville & Rosenfeld 2006).

We created wireframes for three navigation designs for the site. The first navigation design as shown in Figure 3.4 has a horizontal site-wide top navigation system shown with a green border. In addition to this, each page had a vertical local navigation system shown with a red border on the left.

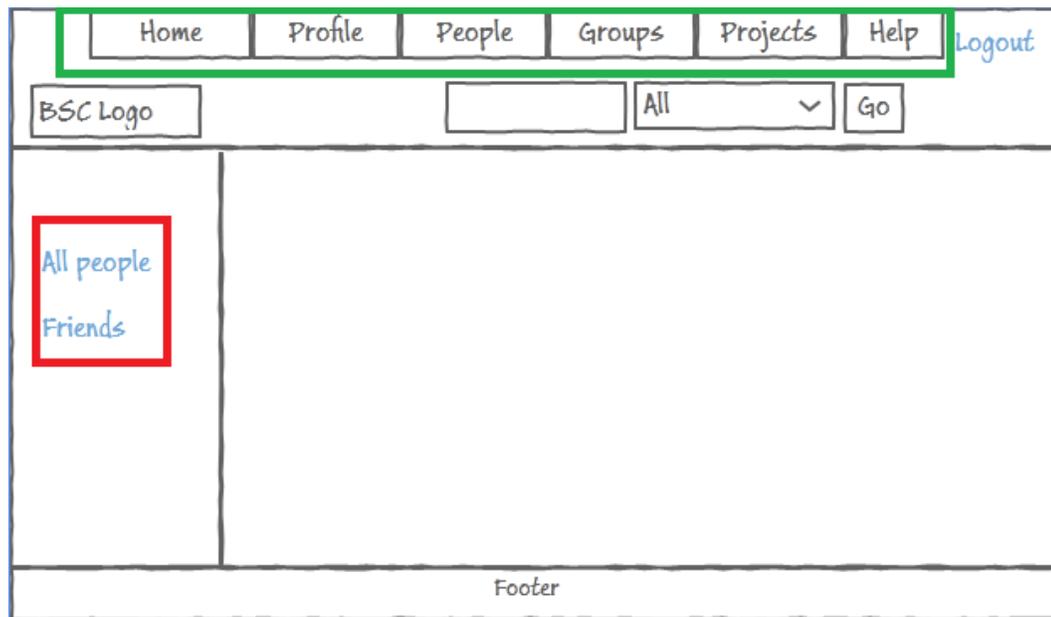


Figure 3.4 Navigation 1

The horizontal navigation menu is used frequently for site-wide navigation if there are 5-12 items (<http://sixrevisions.com/user-interface/navigation-design-patterns/>) to display on the menu. It was decided to have a vertical sub-menu to aid in local navigation within a page as they are commonly used together in website navigation.

The second navigation design as shown in Figure 3.5 has a horizontal site-wide navigation system shown with a green border and a horizontal local navigation system shown with a red border.

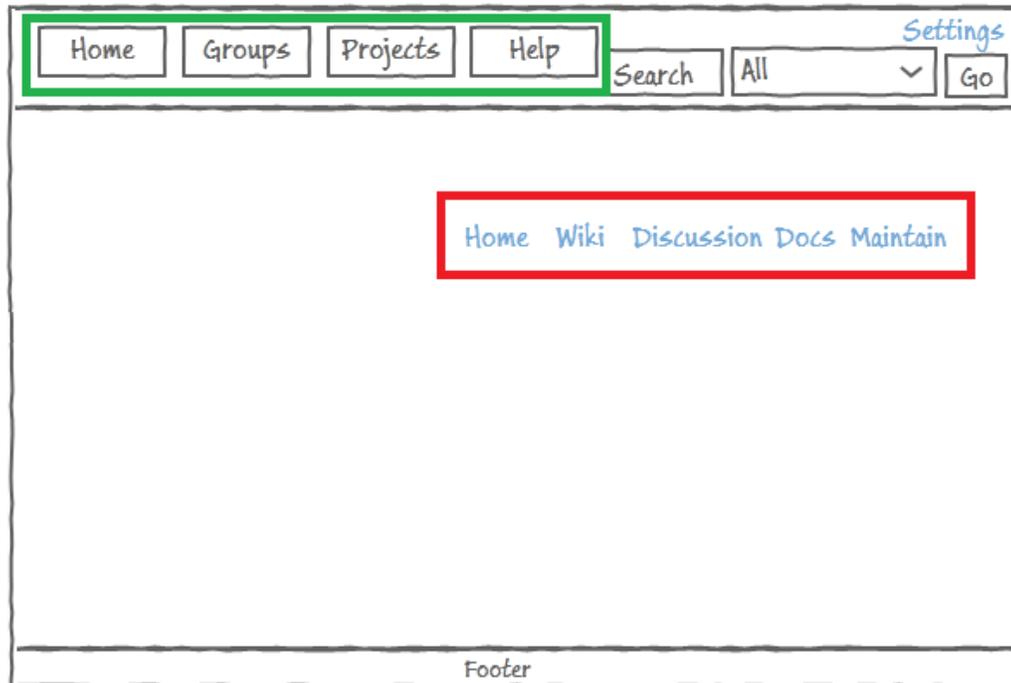


Figure 3.5 Navigation 2

In this design, the horizontal menu was kept in place and it was decided to have a horizontal instead of vertical sub-menu for local navigation within pages.

The third navigation design as shown in Figure 3.6 has a vertical site-wide navigation shown with a green border and a horizontal local navigation shown with a red border.

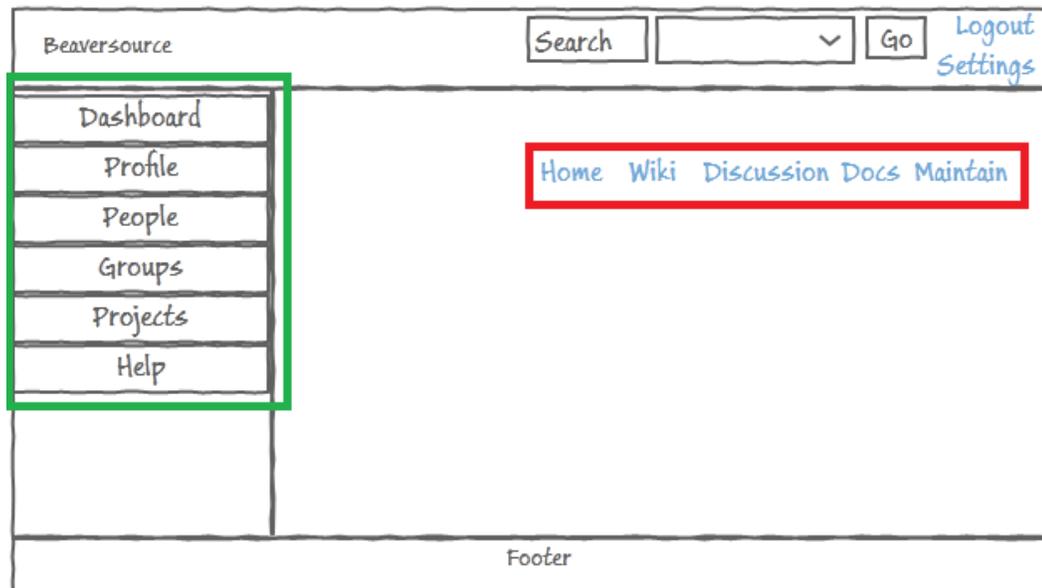


Figure 3.6 Navigation 3

The vertical menu is also used for site-wide navigation when there are a lot of options. For instance Amazon (<http://www.amazon.com>) employs a vertical menu for its site-wide navigation. Since all of the menu options in the vertical menu had only a few sub-options, it was decided to have a horizontal sub-menu to aid in local navigation within pages.

The first navigation system was chosen because of the following reasons

- The horizontal style menu was chosen for site-wide navigation because it was popular and widely used.
- The vertical style left navigation was chosen because it worked better with the horizontal site-wide navigation (<http://sixrevisions.com/user-interface/navigation-design-patterns/>).

Once the navigation system was in place, we started designing the individual pages.

3.4.6. Low-fidelity prototype

Low-fidelity prototypes have limited or no functionality and can be used to rapidly prototype ideas and communicate them with others. They usually consist of a set of static screens which can be rapidly developed and displayed (Rudd et al. 1996). Sketchflow allows adding some interactivity to user interface components and linking individual pages to buttons or links. Hence we used it to create a lo-fi prototype with a certain level of interactivity. This low-fidelity prototype went through several iterations until we had a final user interface design which would then be converted into high-fidelity so that it could be tested with users. The projects page from the low-fidelity prototype is shown in Figure 3.7.

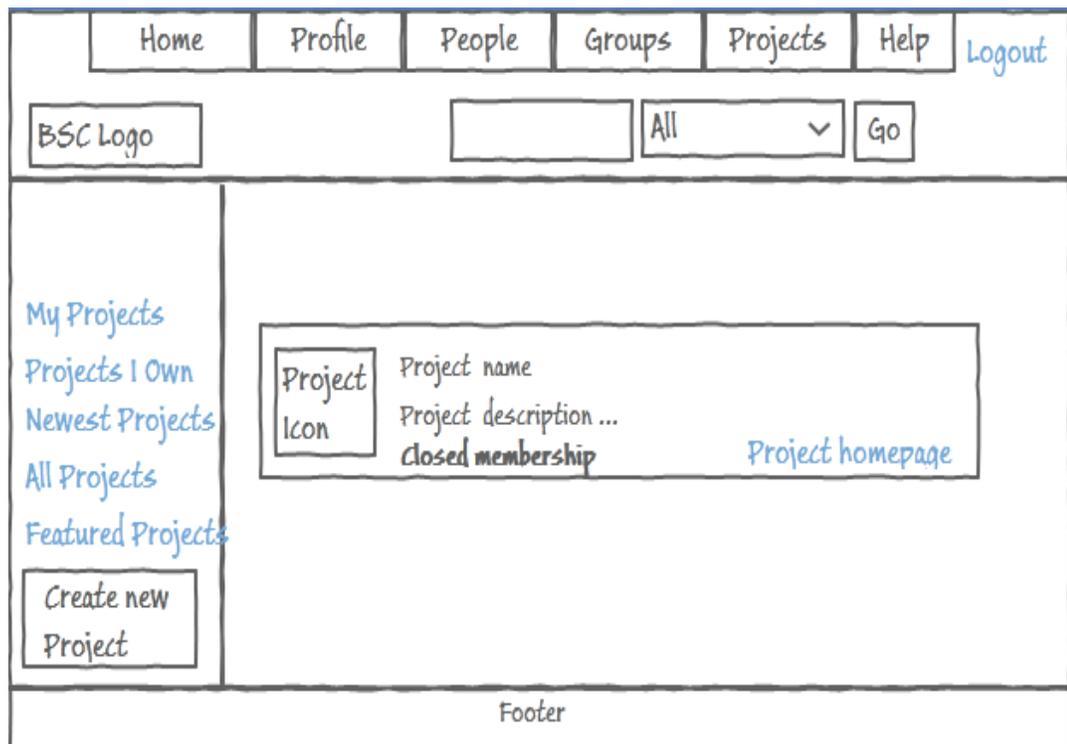


Figure 3.7 Projects page low-fidelity prototype

3.4.7. High-fidelity prototype

A high-fidelity prototype is more interactive than a low-fidelity prototype and provides fully functional user interfaces. It allows the user to interact with the system and perform tasks as if it were a finished product. Because of this, users can provide informed recommendations on improving the user interface (van Harmelen 1989).

The high-fidelity prototype was developed using ExtJS (<http://www.sencha.com/products/extjs>), HTML and CSS. We chose ExtJS because it provides a rich collection of user interface components which fit our needs. We only added functionality to parts of the website and features that would help us test whether the new design would solve the usability problems that were being addressed. We used screenshots of the current user interface as placeholders for features that were not affected by the new design. Chapter 4 discusses the new design in depth. Figure 3.8 shows the “Discussions” page with a screenshot from the current system since it was not affected by our design changes.

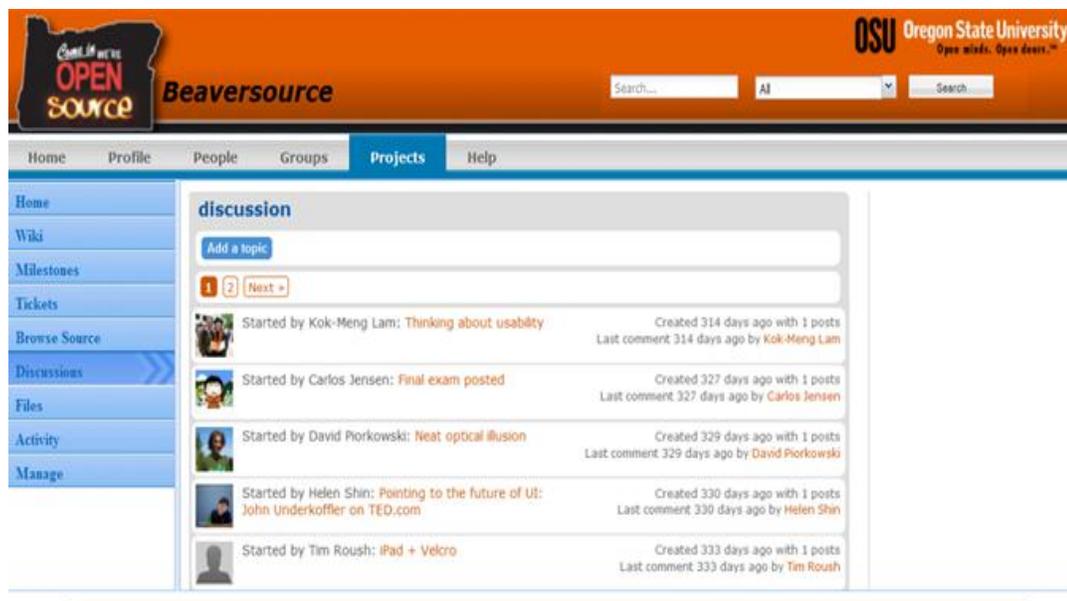


Figure 3.8 Screenshot used for unaffected feature

3.5. Evaluation

After the high-fidelity prototype was developed, the next task was to ask actual users to evaluate the new design. We decided to do a focus group for this purpose. The purpose of our focus group was to get the users' thoughts and feedback on the design changes for four main areas that we had addressed in this redesign. These were:

- Navigation system
- Home page
- Social-project integration
- Project admin interface

We also wanted to know whether the new design would solve the usability problems that it had addressed.

3.5.1. Focus group

A focus group typically gathers 6 – 9 users to discuss issues and concerns about the features of a user interface. It usually lasts about 2 hours

(<http://www.useit.com/papers/focusgroups.html>). A moderator conducts the session and asks 4 – 7 questions to the group which includes 1 – 2 warm-up questions

(<http://www.cse.lehigh.edu/~glennb/mm/FocusGroups.htm>). A “section” in a focus group is the length of time the group discusses in response to a question.

(<http://www.tgci.com/magazine/How%20to%20Conduct%20a%20Focus%20Group.pdf>) suggest keeping the individual sections no longer than 20 minutes because the average adult attention lifespan is only that much.

A script must be written well in advance for a focus group session. It helps the moderator keep track of time and ensure that all of the questions are asked. It consists of three parts:

- Introduction: welcoming the group, purpose of the focus group, participant introductions
- Questions: Asking the questions
- Closing: thanking the participants and telling them how the data collected during the focus group would be used.

3.5.2. Study design

We wanted to recruit users who used Beaversource regularly, for our focus group. We wanted to get a list of such people from the Beaversource database. We decided to use three parameters for this purpose. These were:

- Number of commits
- Number of tickets opened
- Number of tickets modified

We wrote SQL queries for each of these parameters. These queries were then run on the database, and for each, the top 10 results were chosen. Then, emails were sent out to these users informing them about the study and asking them if they would be interested. We got five responses from potential participants in a period of two weeks after sending out the emails. We communicated with them via email and had a final list of five participants for the focus group. I decided to moderate the focus group.

On the day of the study, the purpose of the focus group was explained to the participants. Then I introduced myself with my major, interests and what I used Beaversource for. The participants followed, introducing themselves. After this, I asked an introductory question to the group.

“What are some of your good and bad experiences with Beaversource?”

After the group had spent some time talking about this, I went on to the actual questions. The first area we wanted to discuss was the change we had done to improve the social-project integration. I showed the group a quick demo showing what we had done. After this, I asked them a question.

“Under what circumstances would seeing that your friends are members of a group make you want to learn more about it and contribute to it?”

The participants discussed with others in the group about their opinion.

After this, I proceeded to demo the navigation system. First I demoed the navigation system in the current Beaversource and asked the group their opinion about it. I followed the same approach again for the navigation system in the new design. Then I asked them a question.

“Do you think that the problems mentioned with the current navigation system would be solved by the new design?”

In addition to this, we wanted the group to get a feel for using the navigation. We decided to give them a couple of tasks to perform on the both the current system and the prototype. It was decided that only one participant would use my laptop to perform the task. The laptop was connected to a projector and its display was projected on the screen so that all participants could see it. The other participants were told that they could help the person with the task. We had two tasks, one for using the navigation system to perform a task, and the other to find information on the site. These tasks were:

- Inviting your friends to one of your projects
- Finding help on “creating a profile” on the help page without using search

Once the group had completed the tasks, we asked them to talk about their experience doing the tasks.

Next, we wanted to get the group's opinion on the new homepage. We showed them a demo of the homepage in the current system and asked them their opinion of it. We did the same thing for the new design. I asked a question to the group.

“What do you think about seeing updates and project activity from your projects in contrast to updates and project activity from all users?”

The final page that we wanted to show the participants was the redesigned admin page called “Manage” in the new design. For this, we showed them a demo of the “admin” page in the current Beaversource. We did the same thing for the prototype showing them the “Manage” page in the prototype.

This was followed by asking the participants to do a task on both the current system and the prototype. The task was to change permissions for one of the members in their projects. We followed the same procedure that we had done earlier for the navigation tasks. After they had performed the task on both systems, I asked them a question.

“Do you think that Manage provides all the admin related tasks in one place?” Which of the two provides a better user experience and why?”

After this, I wrapped up the focus group. I thanked the participants for taking part in the study and told them how the data from the study would be used.

4. DESIGN

4.1. Navigation system

Figure 4.1 shows the present global navigation system in the social side of Beaversource (top) and the global navigation system in the new design.

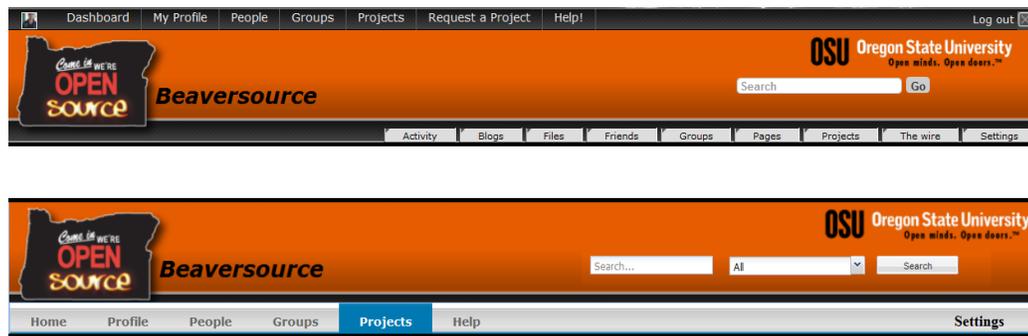


Figure 4.1 Current navigation system (top) VS New navigation design

As is evident from Figure 4.1, the two horizontal menus in the current system had to be converted into a single horizontal menu in the new design. To achieve this, some options had to be merged between the two menus and some others had to be removed.

First we discuss about the menu options in the current system that were merged. Since both menus had a “Groups” and “Projects”, it was decided to have both these options only once in the new menu. Also “Friends” is a subset of all the site members which is available in “People”. Hence both these options were merged and it will be available as “People” in the new menu.

Next we discuss about the menu options that will not be available in the new menu design. There are some options that have been completely removed and some others that will not be available in the menu because they are available at a different location in the site. ‘Blogs’ and ‘Pages’ were removed from the menu, as these features, would

not be available in the new design. ‘The Wire’, ‘Activity’, ‘Files’ and ‘Settings’ options were removed because they were available at a different location in the site. The rationale behind the removal of each of these options is discussed below.

- **Activity** - Since we wanted to keep the social component as simple and unobtrusive as possible and over 40% of users used BSC for projects, activity only from the user’s projects will be displayed on the home page and also in the project homepage. Hence the Activity option has been removed.
- **Files** - Most of the files are uploaded in groups and projects. So this has been moved to the group and project pages. This will allow users to upload or view files in a specific group or project. In addition users will also have the option to search for files and only those files which the users uploaded or the ones that were uploaded in a group or project of which they are a member, will be displayed.
- **Settings** - users were not able to find “notifications” as it was present in the “settings” page. The settings page in the present system is shown in Figure 4.2. The “Group notifications” option has been moved so that it is available in the group homepage. The language option currently supports only English and Dutch. The new design will only support English. The “Account statistics” only shows the number of groups and projects which is already shown in “My groups” and “My projects”. “Configure your tools” is not necessary since there will be no tools in the new design that need to be configured to work.

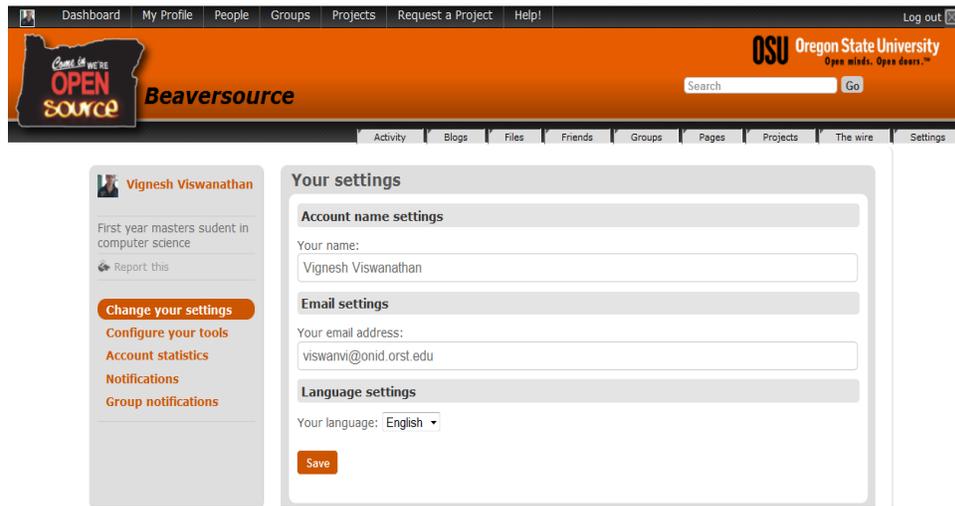


Figure 4.2 Settings page

In the new design, “Settings” will be available on the extreme right as shown in Figure 4.1. The user will be able to change their display name, notification email and set personal notifications.

- **The Wire** - this feature has been integrated into the profile page as shown in Figure 4.3 with a red border giving the user the ability to set and update their status from their profile and thereby eliminating the need for a separate page.

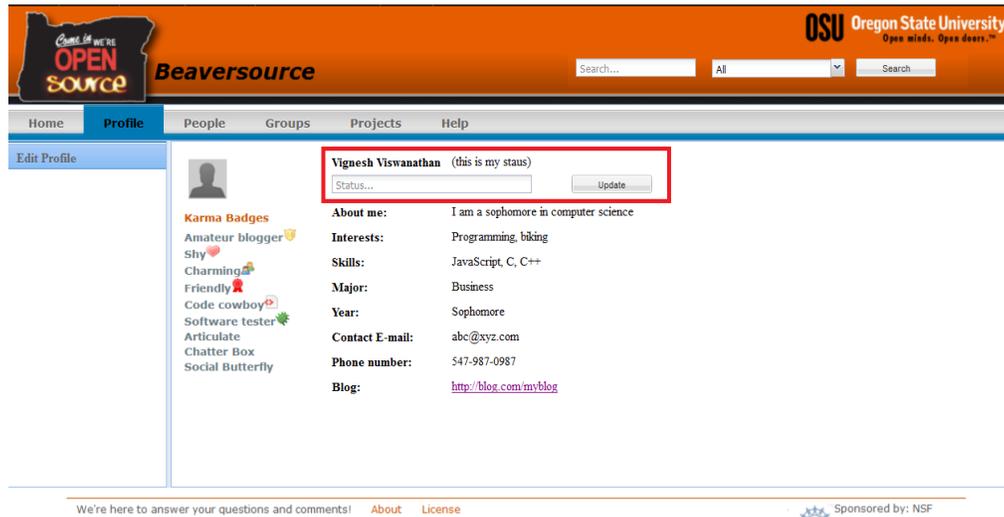


Figure 4.3 Profile page

- **Blogs** - blogs were rated as least useful in the survey. So this feature has been removed. We will instead provide users the option to link an external blog site from their profile page.
- **Pages** – this feature has been removed since the same functionality can be achieved with files.

In addition these changes, “Dashboard” will be renamed to “Home” in the new design and “My Profile” to just “Profile.

4.2. Homepage

The new home page design is shown in Figure 4.4.

The screenshot shows the Beaversource homepage. At the top, there is a navigation bar with links for Home, Profile, People, Groups, Projects, Help, and Settings. The main content area is divided into several sections:

- News:** Contains links to "OSU to open for Spring term on March 2" and "EECS to host Bar camp on April 7".
- Featured Groups:** Lists three groups: "CS 411 - UI Design", "CS 211 - OS", and "UI renderer". Each group has a "Group homepage" link.
- Featured Projects:** Lists three projects: "JAVA project - UI Design", "Redesign", and "Meta search". Each project has a "Project homepage" link.
- Project Activity:** Shows a list of activities performed by "John Doe", such as "committed in Project 2" and "opened new ticket 333333".
- Messages:** Displays two unread messages from "John Doe".
- Friend Requests:** Shows two accepted friend requests from "John Doe".

Figure 4.4 Homepage

“News” on the top left links to news items from the EECS (<http://eecs.oregonstate.edu>) and the OSU (<http://oregonstate.edu>) websites. This would allow students to be aware of the happenings in the university and the school of EECS when they are logged into Beaversource.

“Messages” displays new unread messages. “Go to messages” will take the user to a page as shown in Figure 4.5 where the user can view all their messages.

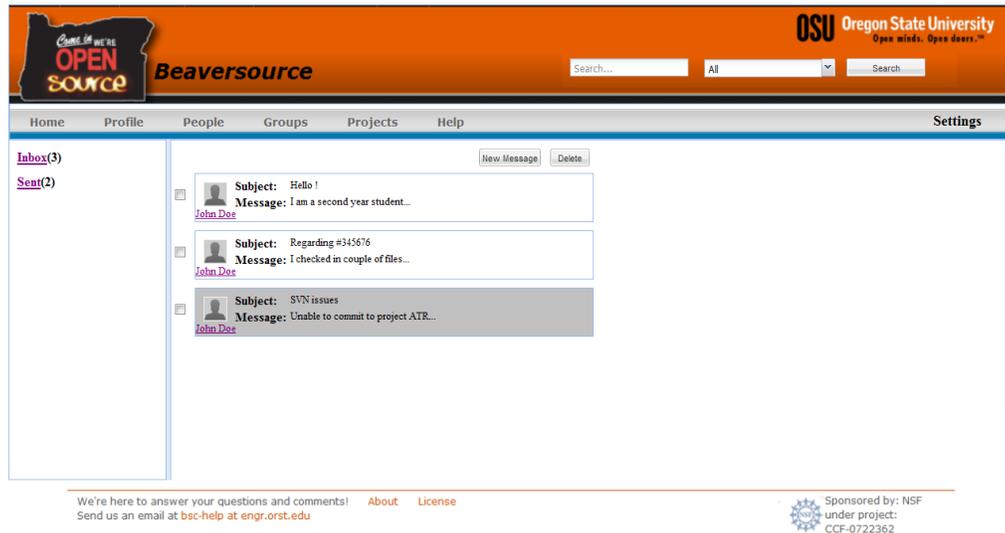


Figure 4.5 Messages page

In addition to this, it will also allow the user to send and delete messages. The purpose of introducing the messaging feature is to allow users to send private messages to other users.

“Featured groups” and “Featured projects” will display a set of groups and projects chosen by Beaversource developers to be displayed on the home page. Clicking on the “More” link in either of these components will take the user to a page which will display more featured groups and projects.

“Project activity” will display recent activity from the user’s projects. The user’s projects include those that they own or those they are a member of. Recent commits, updates to tickets or new tickets will be displayed here. Several users had mentioned in their comments that they would like to see updates from their projects on the home page instead of all projects in the site. Hence this component was introduced so that users could see recent activity from their projects when they logged into the site. The “More” link will display a page as shown in Figure 4.6 allowing the user to filter activity by choosing an activity type, date range and a specific project.

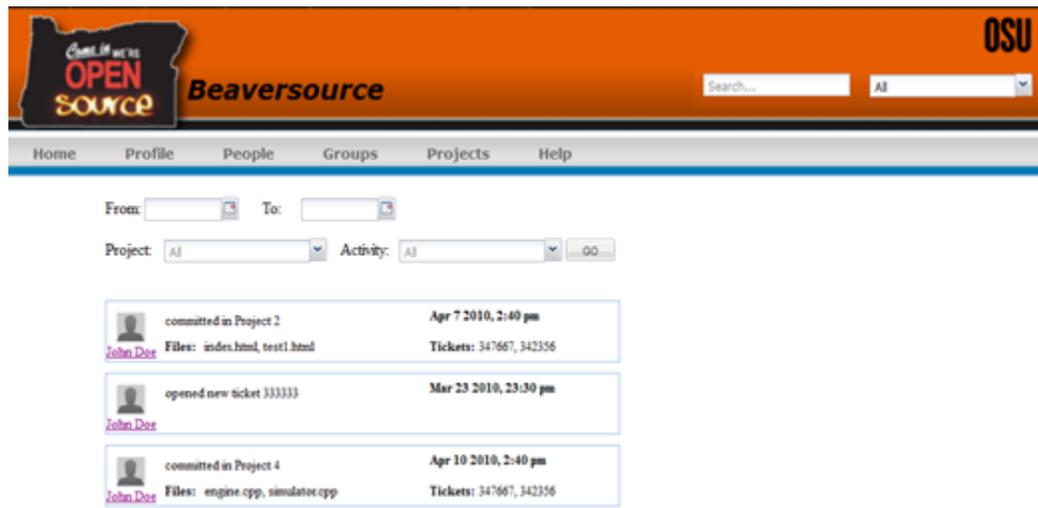


Figure 4.6 Project activity page

“Friend requests” will display a list of both recently received and sent requests. Presently in Beaversource, two people have to add each other in order to become friends. Also a user can add any other user as their friend without the other person accepting it. They can choose not to add the person as a friend in return, but still they would show up in that person’s friends list. This was confusing and was not consistent with what most other social networks were doing. So in order to make it easier and consistent with other social networks, we decided to change the way the friend feature works. In the new design, when a person sends another user a friend request, that user can accept or reject the request. Accepting the request would make users mutual friends and rejecting it would mean they would not be friends of one another. The “More” link will take the user to page as shown in Figure 4.7 where they can view all requests.

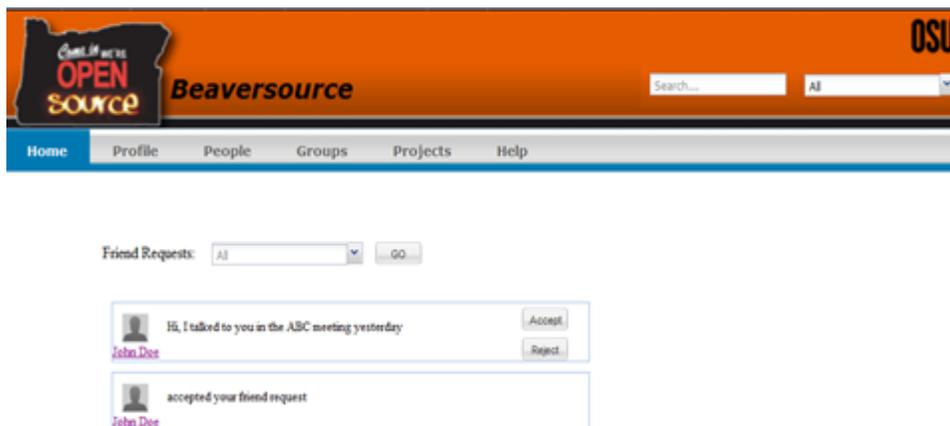


Figure 4.7 Friend requests page

4.3. Social-project integration

There was a different look and feel across the social and project sides. We also wanted better integration between the two sides and also provide a smooth transition when switching between them.

First, we discuss the changes we made to have the same look and feel across the social and project sides. The two sides of a project in the current Beaversource were explained in Section 2.3.2. The two sides – social and project are provided by different software. Hence there is a noticeable difference in the look and feel between them. In the new design, we have used the same page layout and eliminated the inconsistencies in look and feel.

Another change we made was to better integrate the social and project sides. The user's friends who are members in a project are highlighted with a red border around their profile picture as shown in Figure 4.8.

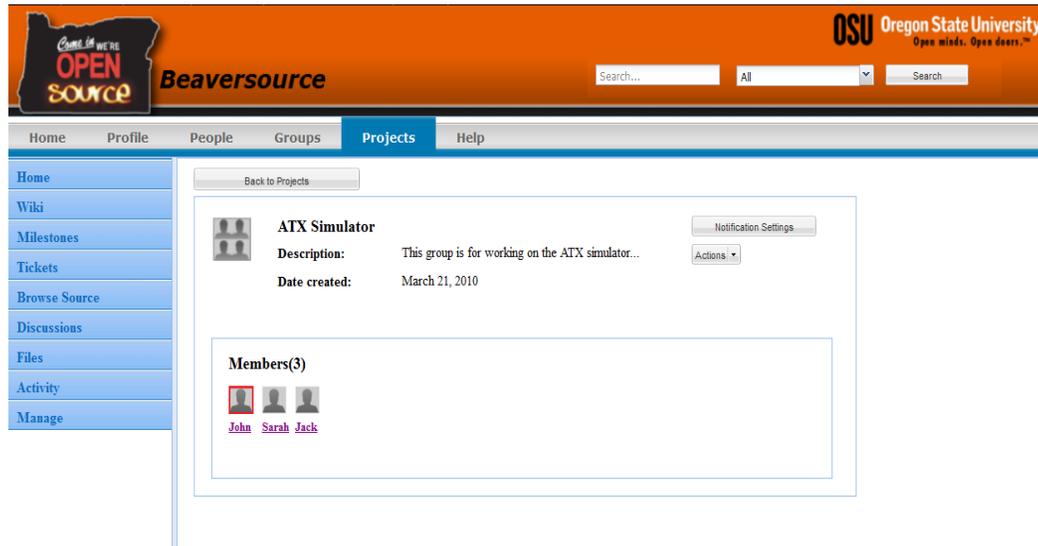


Figure 4.8 Social-project change

This change allows using social data like friends in projects. The goal of making this change was to encourage users to explore projects by showing them that their friends were members in it.

4.4. Project admin interface

The “Admin” page in a project in the current system is shown in Figure 4.9.

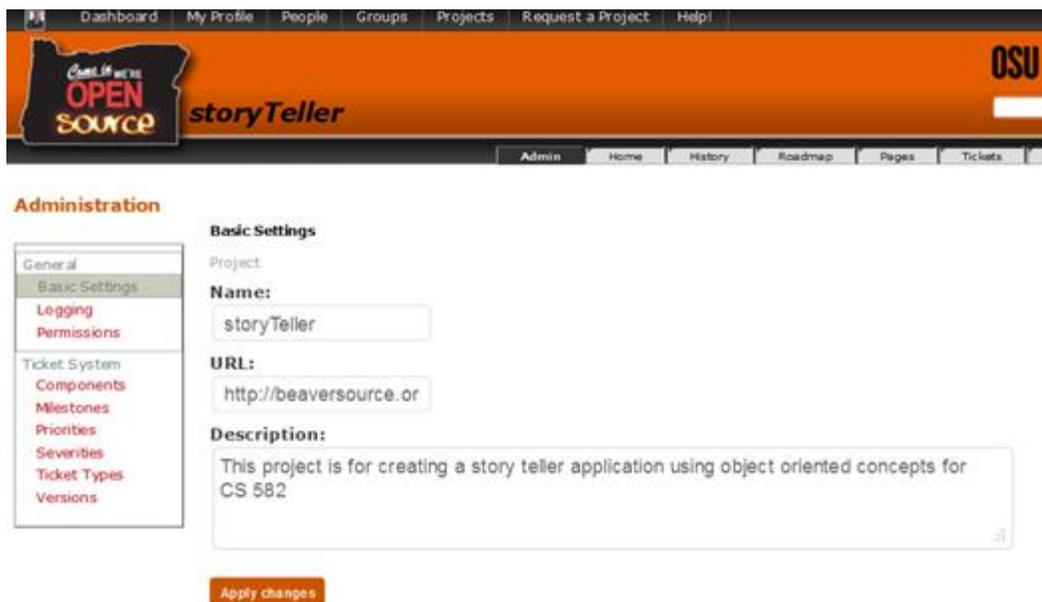


Figure 4.9 Admin page

This page provides some administrative settings like changing the name etc. of a project, logging, permissions etc. The “Permissions” option, to grant or revoke permissions to the project members was not very intuitive and was difficult to use. Also there was no option to transfer ownership of a project to another user. Since most of the projects were research or class projects, there was no way to transfer ownership when students left the university or for other reasons.

The new admin interface which is called “Manage” in the new design is shown in Figure 4.10. This interface is available for both groups and projects. The “Actions” button next to each member allows removing a member from a project or changing their permissions. The ownership of a project can be transferred using the “Manage ownership” option. The “Manage requests” displays the received and sent project requests. The “Invite people” allows inviting people to the project.

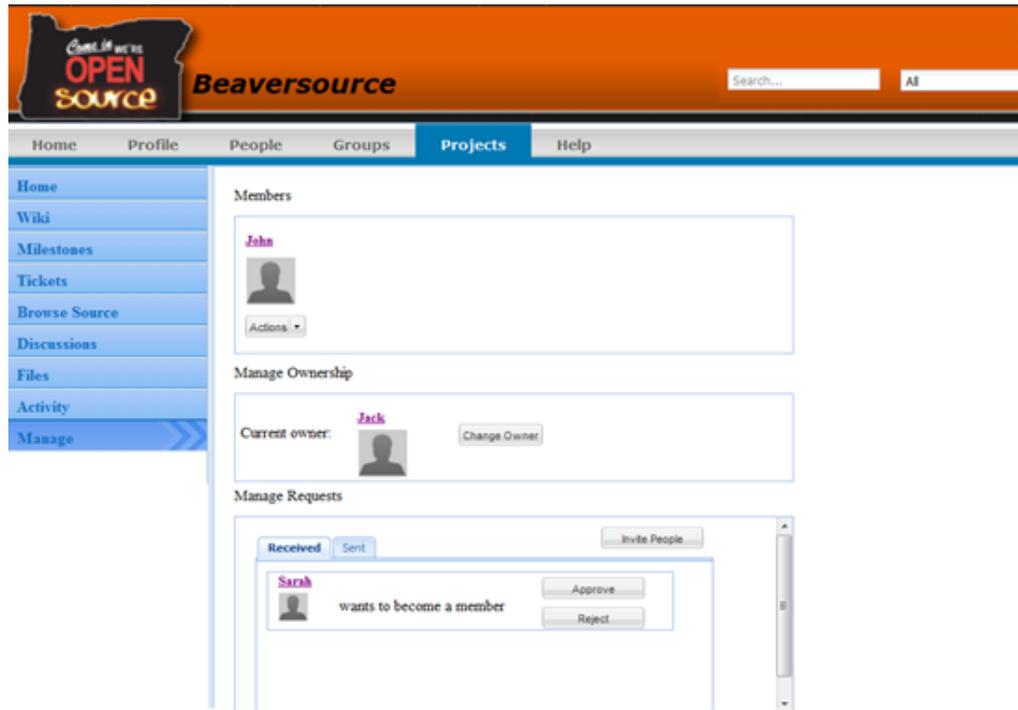


Figure 4.10 Manage page

4.5. Help

The new help page is shown in Figure 4.11. The help page will have a tree structure on the left with a list of topics. Clicking on any topic will load a list of FAQs (Frequently Asked Questions) in the right pane.

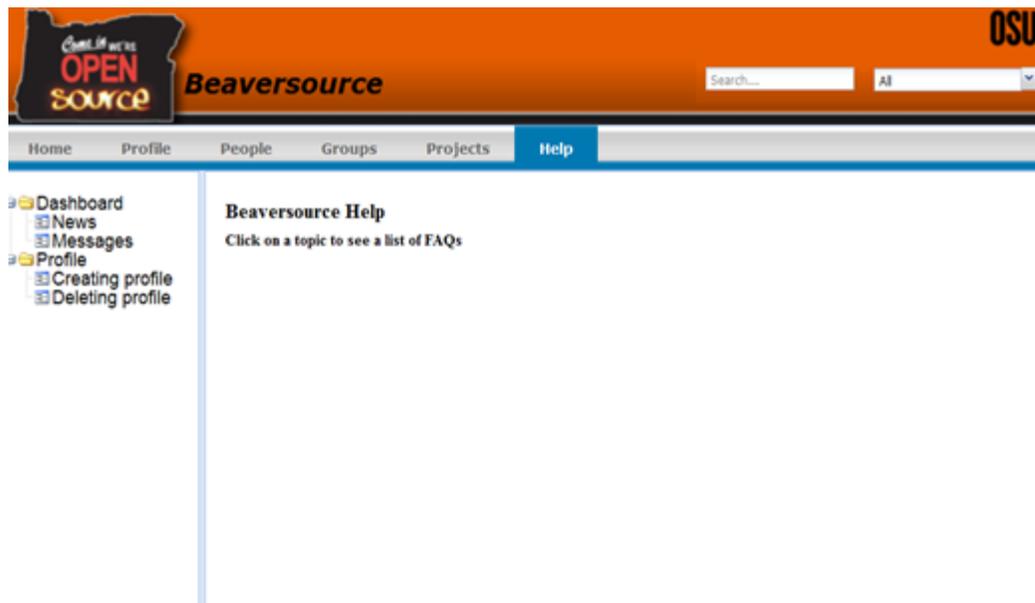


Figure 4.11 Help page

4.6. Group/Project home page

The project and group homepages have a similar design as shown in Figure 4.8. The “Notification settings” will open a pop-up window where the user can choose to receive notifications on commits, tickets etc. The “Actions” button allows the user to leave a project, and in addition, allows administrators to edit project details and delete the project.

4.7. Other changes

Search was modified so that the user can search in a specific category. For instance to search only in groups, they can select groups from the drop down and then search for a group.

Two new fields have been added in the profile page. These are the “Major” and “Year”. Since Beaversource works in a university setting, we believe having these fields in the profile in conjunction with “skills” would help users to find other users with similar interests to collaborate on projects.

5. RESULTS

5.1. Usability problems

We had a list of usability problems from the user comments, the heuristic evaluation and the bsc-help email list. Some of these problems were due to bugs in the code and had to be fixed with code changes while the majority of the problems could only be fixed with design changes.

5.1.1. *Code related problems*

Many users reported that search was not efficient and did not return results as expected. After careful analysis, I found that this was due to the fact that the search was tag based rather than string based i.e. when the user entered a string into the search box, the system searched for tags that matched it rather than with names of groups, projects etc. Hence the users received unexpected results. I then proceeded to locate the search module in the code and modified it to search through names of entities such as groups, projects etc. instead of searching through tags.

It was also reported that the “Request a project” link on the top navigation menu was not working properly and users had problems with requesting projects. The problem was due to the fact that the “Request” button in the “Request a project” form was redirecting back to the same form. So the first time user clicked “Request”, users were brought back to the same form and only on the second click, the user’s project request was sent. Hence the extra redirect statement was removed from the code to ensure that the request was sent the first time the “Request” button was clicked.

5.1.2. Design related problem

The final list of usability problems that would be addressed with the new design are discussed below.

- **Problems with the navigation system** - There were many user comments complaining about the navigation especially the two menus on every page. Users also faced difficulty in finding things within the site. Solving the problems with navigation was the primary goal of the new design.
- **Homepage shows site-wide updates** - Presently the homepage showed updates from all members in the site. Users had asked for project updates from their projects in the homepage.
- **Process of inviting users to a group or project is not intuitive**- Several users had complained about this feature in the survey. Users had mentioned that this feature was not intuitive. We also received complaints via the bsc-help alias.
- **User account cannot be de-activated** - Since users had personal data on Beaversource, some users told us that they wanted to deactivate their account when they had to leave the university.
- **Cannot transfer ownership of groups/projects** - This request came from users who owned projects on the site. There was no way to transfer the ownership of the project to someone else, when they had to leave the university.
- **Poor access management in projects** - The current user interface for granting or revoking permissions to users was not intuitive and difficult to use.

- **Need for better communication tools** - There were complaints about the current message board and posting in forums. Users had requested for better communication tools.
- **Better integration between the social networking features and code-hosting tools** - The social and project sides had a different look and feel and there were several inconsistencies in the design between the two sides. The integration between the two sides had to be improved.
- **Unobtrusive and minimal social networking features** - A lot of users had mentioned that there were too many social features which were getting their way of using the code-hosting tools. There was a need for minimal, unobtrusive social networking.

5.2. Personas

Our discussions with Beaversource users both via email and in person and analysis of survey results helped us identify six typical Beaversource users.

These were:

- EECS students using it for class
- EECS students using it for hosting projects
- Students from non-EECS majors using it to create their own groups for having discussions
- Professor using it for class
- Professor collaborating with students on projects
- Students who used it to connect with friends and share data

We then developed personas to represent these users. It was decided that a single persona would be used to represent the needs of both students and professors who use it for classes. Hence we had a total of 5 personas. The personas were written using a narrative approach describing their expectations. To make the personas look realistic, personal details, such as their interests, education etc., were added.

These personas were Frank, Sean, Katie, Peter and Sarah.

- **Frank** – Frank is a freshman who uses Beaversource for classes. He is new to Beaversource and is interested in exploring the different features available.
- **Sean** – Sean is a senior who uses Beaversource to host his projects. He is interested in the code-hosting tools provided by Beaversource.
- **Katie** – Katie is a non-EECS student who is interested in using groups to have online discussions.
- **Peter** – Peter is a professor who uses Beaversource to collaborate on projects with students.
- **Sarah** – Sarah is interested in using the social networking features of Beaversource.

We then classified these personas as either primary or secondary. The needs of a primary persona(s) have to be met and the needs of other personas cannot satisfy them (Blomquist & Arvola 2002). Sarah was the persona used to represent a user, using Beaversource for social networking. Since social networking came up as the least significant reason for using Beaversource, Sarah was classified as a secondary persona

and the rest as primary. Readers can refer to Appendix B for a detailed description of all the personas. The persona for Frank is shown in Figure 5.1.

Students use Beaversource for one of their classes.



Goals

- Join the class group
- Participate in discussions in the Group
- View assignments posted in the group

Frank is a freshman in the school of EECS at Oregon State University. Frank is taking an introductory course in JAVA. Frank is straight out of high school and this is his first term at OSU. He likes programming in HTML, JavaScript and CSS. He works part time at a coffee shop to pay for his living expenses. He usually works three hours every day Monday through Friday between 9 am and 5 pm depending on his class schedule. Outside of school, he enjoys rafting, soccer and travel. He has rafted on several rivers along the west coast. This summer he plans to save up some money and travel to Western Europe. He is passionate about soccer and his favorite team is Manchester United. He does not miss any of their games and likes to watch them with his friends. He likes to keep up with the latest in technology. He spends a lot of time online and a bulk of this time is spent researching for homework and projects. When he has problems while coding, he uses a search engine for answers which he mostly finds in online forums. He recently got a smartphone with a data plan and texting. He uses it a lot to surf the internet. He uses it to check scores and for accessing social networking websites. His operating systems professor will be using Beaversource for his class. Frank has just been introduced to Beaversource in his class and is eager to learn more about it.

Figure 5.1 Persona

5.3. Scenarios

We wrote scenarios for each of our persona. A scenario for Frank is shown in Figure 5.2.

Frank's professor gives the class the name of the group that they have to join and told them that all lecture materials would be posted on BSC. He also added that there would be discussions on BSC about topics relevant to the class and encouraged the students to actively participate. He told them to join the group as soon as possible so that they do not miss any of the lecture materials that are posted. After a lecture, Frank likes to login into Beaversource and go to the class page. He then downloads the lecture materials posted there. An assignment is due next week. So Frank goes to the class group page to download the assignment. He usually likes to work on homework during the weekend that is due next week. As he is solving the assignment, he finds that there is a discussion relevant to one of the homework questions in the forums. He posts a reply to the discussion.

Figure 5.2 Scenario

The scenario was then broken down into individual tasks so that they could be implemented in the user interface. The tasks for the scenario in Figure 5.2 are:

- Join class group
- Download lecture materials and assignments
- View and participate in discussions

Readers can refer to Appendix C for scenarios for all of the personas.

5.4. Focus group

All of our participants used Beaversource to host their projects both for research and class, and extensively used the code-hosting tools. Some of the good things about Beaversource that participants mentioned were the SVN, wiki and the search. Difficulty in collaborating with people outside OSU, wiki formatting and the site being slow were some of the negatives mentioned by participants.

The group agreed that if the group or project seemed interesting, then seeing their friends as members in a group would be a little additional motivation for them to learn more about it. Some participants also added that they would talk to their friends, who are members of the project, to get a better idea of the project and then make a decision

about joining it. The group also agreed that showing some statistics about the activity on the project homepage would be helpful for visitors to get an idea of the project.

Regarding the navigation system in the current system, the group said that the look and feel was different across the social and project sides. One participant gave a specific example for this saying that the sidebar was absent on the project side and it was all text, in contrast with the small boxes on the user interface and the links on the side menu on the social side of the project. The group also agreed that having two menubars on the top was confusing.

When asked whether the new navigation design would solve the problems with the current system, the group agreed. The group also said that it was nice to have a concrete sidebar on all pages. Participants also gave some suggestions on the new user interface. They felt that “Back to projects” button on the project homepage was redundant since they could just click on the “projects” button on the menu to go back to the projects page. Another was about having “All groups”, “All projects” etc. where the group felt it was not necessary to list all the groups or projects in the site. Lastly it was also mentioned to consider having breadcrumbs to aid in navigation.

The group could not figure out the “Inviting friends to a project” task on the current system, and eventually gave up after trying for some time. On the new design, they found it quickly and mentioned that it was prominently present at the right place. The “finding help on a topic” task was successfully completed by the group in the current system, but the group mentioned about links under a main topic not being clickable on the user interface. Compared to the current system, the group finished the task faster on the prototype and the mentioned that the new design was easier to use. They suggested that the tree structure would not scale very well with a large number of links or when some links were buried deep in the hierarchy.

Next, we showed them the homepage in the current system. The participants mentioned that they rarely used it and that the information shown was not relevant to

them. With the new homepage, it was the group's opinion that the information displayed was more relevant to them like recent activity from their projects, messages and friend requests. A few participants suggested showing recommended groups and projects instead of featured ones.

The group mentioned that it was not very intuitive to grant permissions to members in their projects in the current system. When we showed them the "Manage" page in the new design, the group agreed that it had all of the administrative tasks in one place.

6. CONCLUSION

We followed a UCD approach to address a list of usability problems that were gathered from user comments in the survey, heuristic evaluation and problems reported by users via email. We developed a sitemap for visualizing the current navigation system. After this we developed personas to represent typical users. Scenarios were developed to explain persona interaction with the system. Sketchflow was used to quickly prototype design concepts and ideas. The low-fidelity prototype that was developed with Sketchflow was then converted into High-fidelity using ExtJS, HTML and CSS.

To evaluate our high-fidelity prototype, we decided to do a focus group with actual users. The group agreed that the new design would solve the problems that were being addressed by it. They also expressed eagerness towards seeing the new design live. The group also provided several valuable suggestions for improving certain aspects of the user interface.

The new design was kept as simple as possible and features that were not used by users were removed. The new navigation system was well received and would fix most of the problems with the current navigation system. Users would be able to accomplish most of their usual tasks and find information on the website faster. The page layout design, color, typography has been modified to make the user interface design consistent across all the pages. The information shown on the home page would be more relevant to the user like their messages, updates from their projects etc. The project activity component would be helpful to users to view updates from their projects like commits, ticket updates etc. as soon as they login into the site.

The design change to increase social-project integration did not appeal to users and they felt it would only matter if they liked the project description. The social-project integration needs to be analyzed further for finding better ways to use social data in

project and vice versa so that both complement each other. Some ideas that could be explored are suggesting members/friends to users to hire for their projects, a better way of showing users their friends working on projects that might be of interest to them and better ways to motivate new users to join/contribute to projects. The new help page would perform better than the current design but there are some drawbacks with the design. If there are too many topics or the nesting becomes deep, there would be problems locating a topic. This area could be analyzed further to come up with a better design.

At this point, it is clear that the new design has a lot of potential to perform well and users have provided a lot of positive feedback. We hope future researchers can do one or two more focus groups to get more feedback from users and iteratively refine the design. It is mentioned in (<http://www.useit.com/papers/focusgroups.html>) not to rely only on focus groups for evaluating interface usability because users never get to perform actual tasks on the user interface. We tried to address this by having the users do some tasks during the focus group. In addition to focus groups, future researchers must also plan on doing dedicated usability testing sessions with fully functional prototypes to get better feedback from users about performing various tasks. We strongly feel that the new design can serve as a starting point for someone interested in developing a new user interface for Beaversource.

The new design after it is finalized can be developed using popular UI technologies and released to users. After the new design is made live to users, following it up with usability testing at regular intervals can ensure that the product continues to meet user expectations and addresses their concerns.

BIBLIOGRAPHY

- F. Liu, "Usability evaluation on websites," *Computer-Aided Industrial Design and Conceptual Design, 2008. CAID/CD 2008. 9th International Conference on*, pp. 141–144.
- Abras, C., Maloney-Krichmar, D. & Preece, J., 2004. User-centered design.
- Blomquist, A. & Arvola, M., 2002. Personas in action: ethnography in an interaction design team. In *Proc. NordiCHI*.
- Brown, D., 2006. *Communicating design: Developing Web site documentation for design and planning*, New Riders Publishing Thousand Oaks, CA, USA.
- Cedeno, J.J.D., 2010. Motivating programmers through karma systems.
- Cooper, A., 2004. *The inmates are running the asylum: Why high tech products drive us crazy and how to restore the sanity*, Pearson Higher Education.
- Garrett, J., 2004. The Elements of User Experience. *Diagram retrieved January*.
- Goodwin, K., 2002. Getting from research to personas: Harnessing the power of data. *Cooper Newsletter*.
- van Harmelen, M., 1989. Exploratory user interface design using scenarios and prototypes. In *People and computers V: proceedings of the fifth conference of the British Computer Society Human-Computer Interaction Specialist Group, University of Nottingham, 5-8 September 1989*. p. 191.
- Mao, J.Y. et al., 2005. The state of user-centered design practice. *Communications of the ACM*, 48(3), p.105–109.
- Morville, P. & Rosenfeld, L., 2006. *Information architecture for the world wide web*, O'Reilly Media.
- Nielsen, J., 1992. Finding usability problems through heuristic evaluation. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. pp. 373–380.
- Nielsen, J. & Landauer, T.K., 1993. A mathematical model of the finding of usability problems. In *Proceedings of the INTERACT'93 and CHI'93 conference on Human factors in computing systems*. pp. 206–213.

- Nielsen, J. & Molich, R., 1990. Heuristic evaluation of user interfaces. In *Proceedings of the SIGCHI conference on Human factors in computing systems: Empowering people*. pp. 249–256.
- Rudd, J., Stern, K. & Isensee, S., 1996. Low vs. high-fidelity prototyping debate. *interactions*, 3(1), p.76–85.
- Shneiderman, B., 1997. *Designing the user interface: strategies for effective human-computer interaction*, Addison-Wesley Longman Publishing Co., Inc.
- Sinha, R., 2003. Persona development for information-rich domains. In *CHI'03 extended abstracts on Human factors in computing systems*. pp. 830–831.

APPENDICES

A Appendix 1

Heuristic Evaluation

Heuristics used

- Nielsen's usability heuristics

Severity rating

- Nielsen's severity ratings
(<http://www.useit.com/papers/heuristic/severityrating.html>)
- Number of Evaluators: 8

Problems Found: 37(Rating **3** – 17; Rating **2** – 19; Rating **1** - 1)

Task: General navigation

1. Problem: “Groups” option is present in both Toolbars as shown in Figure 1.1. This is confusing for users because they have the same name. The difference, if any between the two options is not clear.

Heuristic(s) violated:

Nielsen - Consistency and Standards, Aesthetic and minimalist design

Reported in survey: Yes

Severity: 3

Recommendation: consider removing the “Group” option from the second level navigation menu

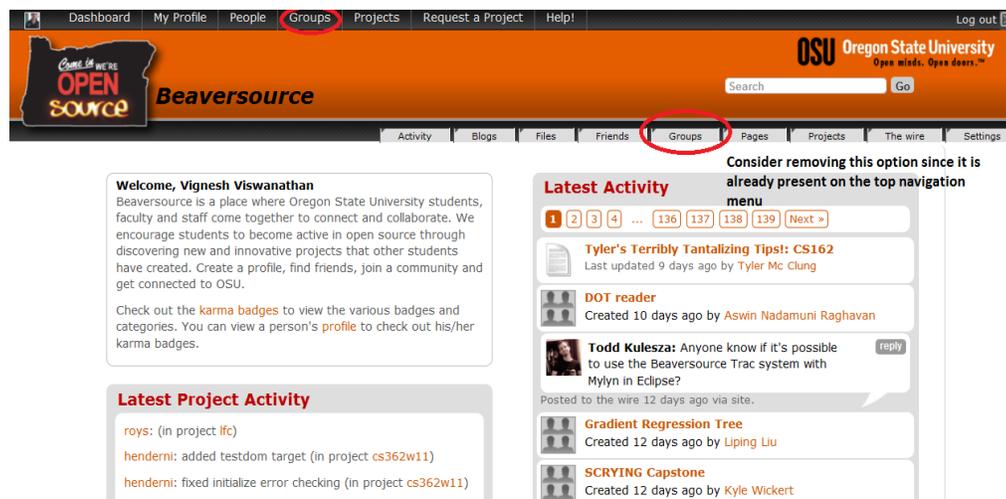


Figure 1.1 Groups option on both toolbars

2. Problem: “Projects” option is present in both Toolbars as shown in Figure 1.2. This is confusing for users because they have the same name. The difference, if any between the two options is not clear.

Heuristic(s) violated:

Nielsen - Consistency and Standards, Aesthetic and minimalist design

Reported in survey: Yes

Severity: 3

Recommendation: consider removing the “Projects” option from the second level navigation menu

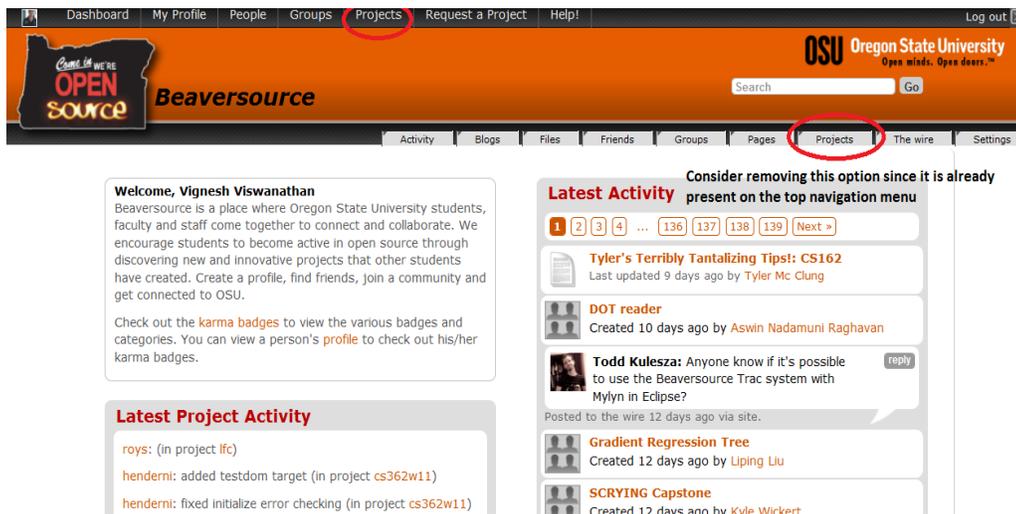


Figure 1.2 Projects option on both toolbars

3. Problem: The “Friends” link allows the user to view the people they have friended, people who have friended them. It also allows them to create “Collections of friends” and displays “Collections of friends”.

Heuristic(s) violated:

Nielsen - Aesthetic and minimalist design

Reported in survey: No

Severity: 2

Recommendation: The “Friends” link allows the user to view their friends as shown in Figure 1.3. The “People” link on the top already lists all the people on the site and hence it would be a good idea to move the options available under the “Friends” link to the “People link” so that the user can view all of their friends and also find people at the same place.

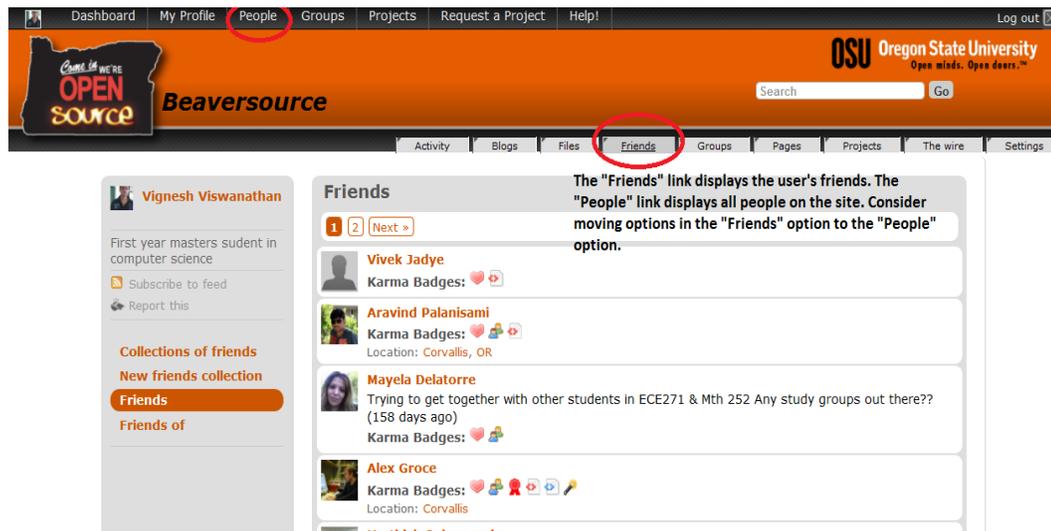


Figure 1.3 Friends page

4. Problem: The “Request a new project” link is on the top and is also present on the left menu bar under the “Projects” option as shown in Figure 1.4.

Heuristic(s) violated:

Nielsen - Consistency and Standards

Reported in survey: No

Severity: 1

Recommendation: Try to make it consistent with Groups and remove it from the top toolbar and have it only in the left menu bar under “Projects”.

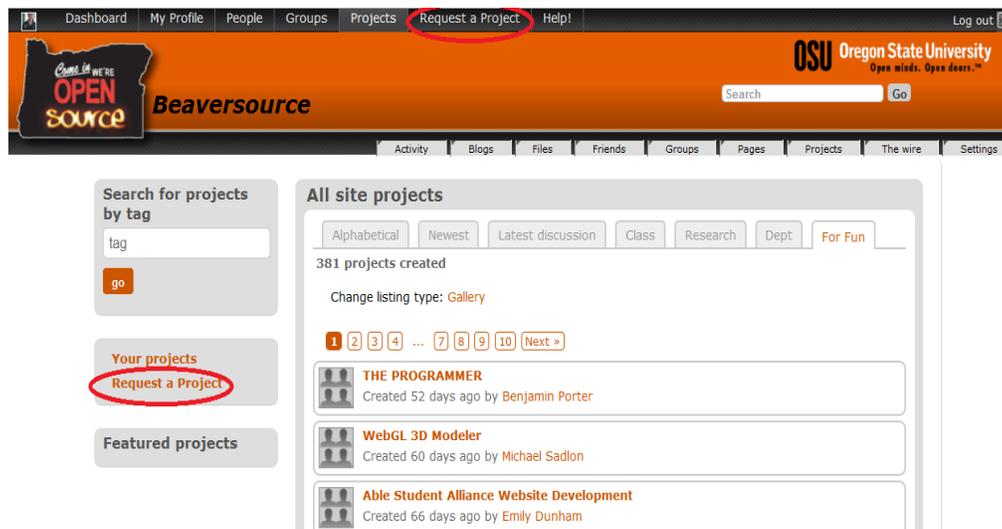


Figure 1.4 Request a project option

5. Problem: When a user logs in, a second level navigation menu appears. After the user clicks on any of the top navigation menus, a different version of the second level navigation menu appears. The first version of the menu that initially appears when the user logs in is shown in Figure 1.5 and the second version of the navigation menu is shown in Figure 1.6.

Heuristic(s) violated:

Nielsen – consistency and standards, error prevention

Reported in survey: No

Severity: 3

Recommendation: consider using the same navigation menu throughout the system

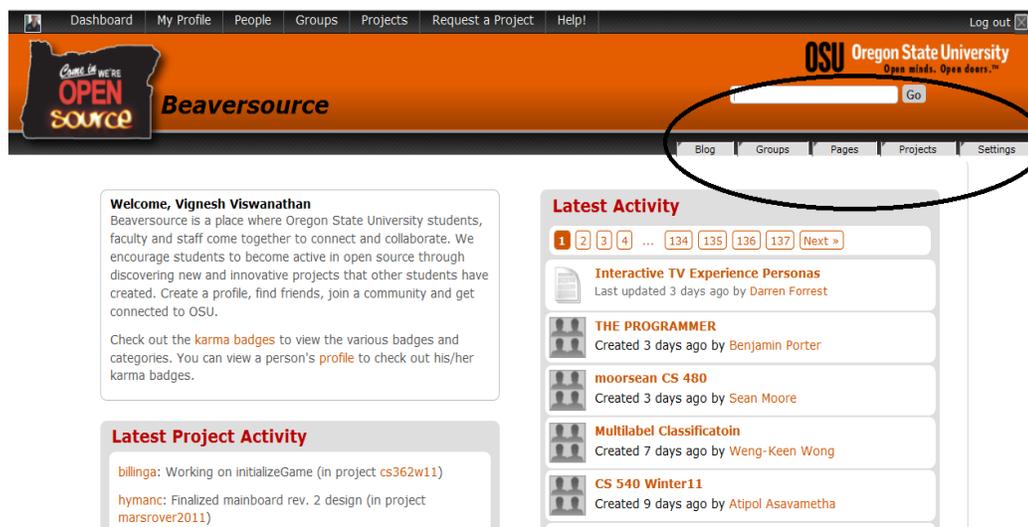


Figure 1.5 First version of the second level navigation menu

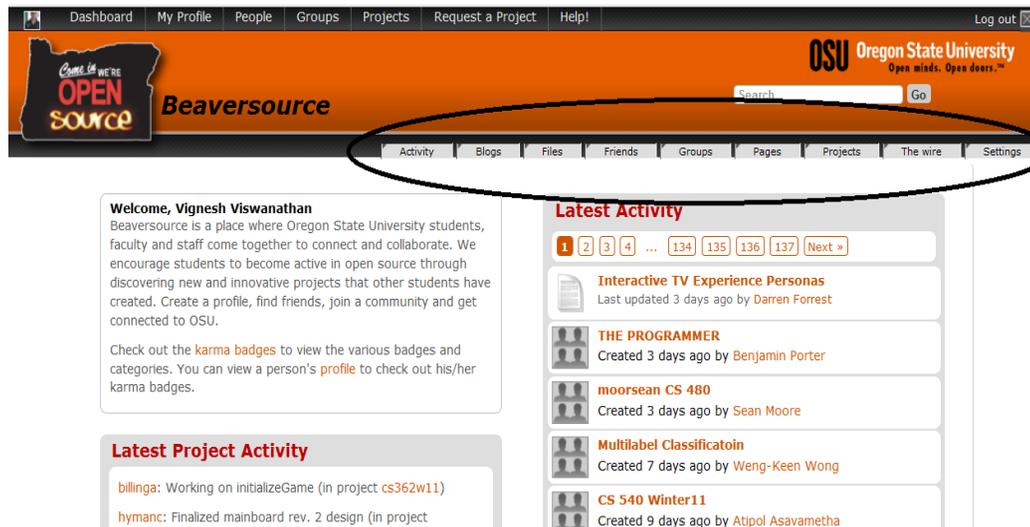


Figure 1.6 Second version of the second level navigation menu

6. Problem: the user sees a different version of the search bar on the top than the one that appears in the homepage of the project. The search bar has a “Go” button next to it when the user clicks on any of the toolbar links except the “Help!” or if the user navigates to the project homepage. The version of the search bar that appears on all pages except “Help!” and the project homepage is shown in Figure 1.7. The other version of the search bar is shown in Figure 1.8.

Heuristic(s) violated:

Nielsen – consistency and standards

Reported in survey: No

Severity: 3

Recommendation: consider using the same version of the search bar throughout the site

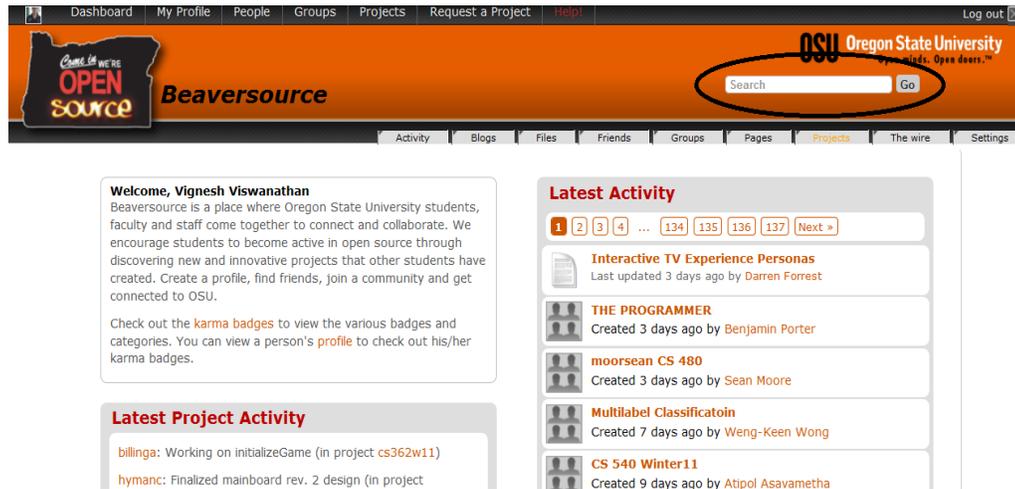


Figure 1.7 First version of search bar

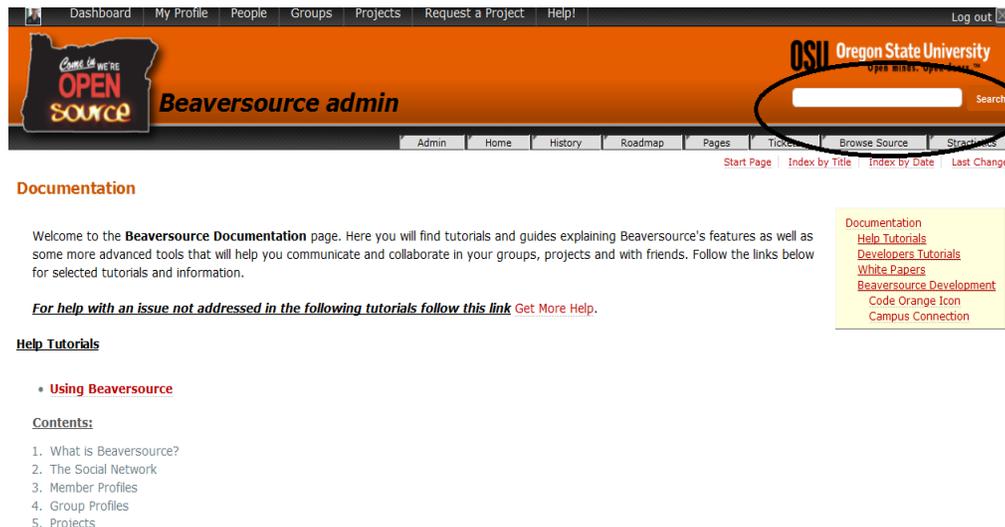


Figure 1.8 Second version of search bar

Task: “My profile” page

1. Problem: Clicking on “Edit profile” from the “My Profile” link leads to the page below where the user can edit their profile details. The “Edit Details” option here is redundant and also clicking on it does nothing. Clicking on “Edit profile” in Figure 1.9 leads to the “Edit profile” page as shown in Figure 1.10.

Heuristic(s) violated:

Nielsen – Error prevention

Reported in survey: No

Severity: 2

Recommendation: consider removing this link from this page since the user is already on the “Edit profile” page

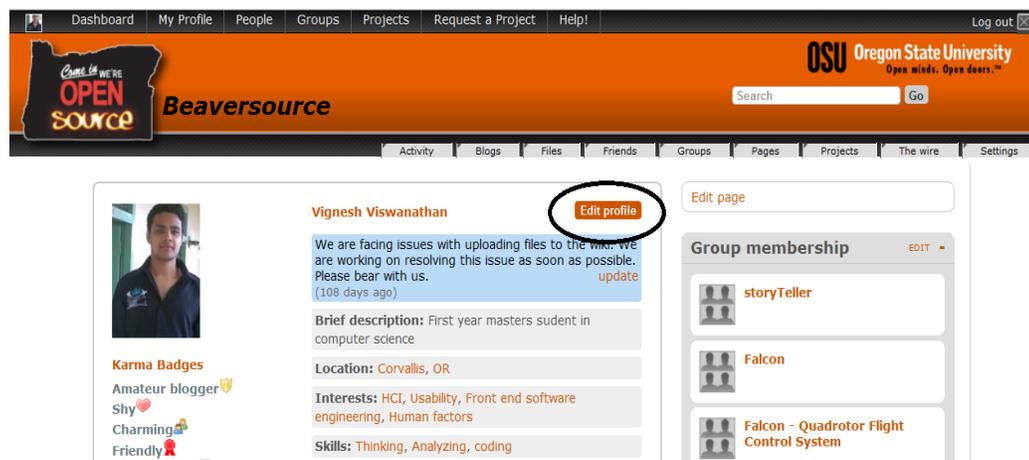


Figure 1.9 Profile page

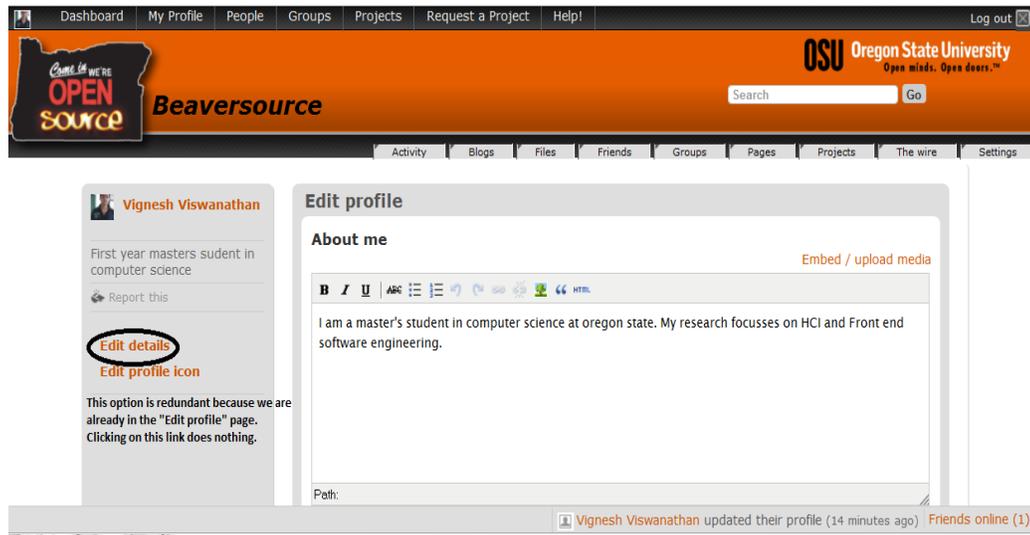


Figure 1.10 Edit profile page

2. Problem: the “Group membership” and “Project membership” widgets do not display all groups and projects that the user is a member of. The user has to change the display setting every time their group/project membership increases as shown in Figure 1.11.

Heuristic(s) violated:

Nielsen – Recognition rather than recall, match between system and real world

Reported in survey: Yes

Severity: 3

Recommendation: display all groups and projects that the user is a member of



Figure 1.11 Group membership

Task: Search bar in “People” link

1. Problem: We have a top search bar and also a “Search people via name” as shown in Figure 1.12. The “Search people via name” field on the left panel is redundant.

Heuristic(s) violated:

Nielsen – Consistency and standards, Minimalist and Aesthetic design

Reported in survey: Yes

Severity: 2

Recommendation: Consider having just one search field on the top.

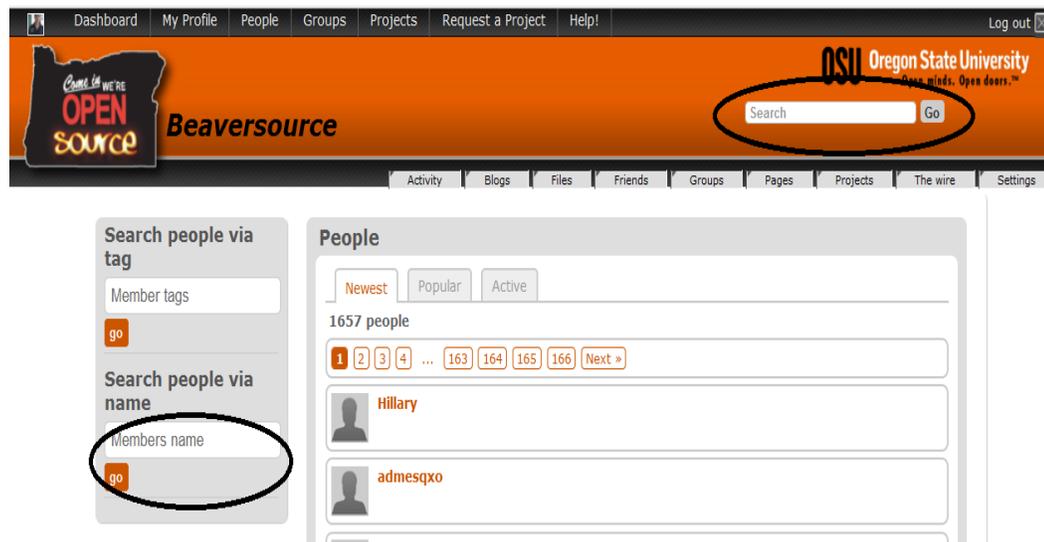


Figure 1.12 Search bar (people page)

Task: Dashboard

1. Problem: The purpose of the Dashboard is not very clear. Here the “Edit Page” leads to the page where the user can add/remove widgets from the available set of widgets similar to the one we get by clicking on “Edit page” on the “My profile” page.

Heuristic(s) violated:

Nielsen – Minimalist and Aesthetic design

Reported in survey: No

Severity: 2

Recommendation: Either the entire functionality should be restricted to the “Dashboard” or remove the “Dashboard” option and have both the profile details as well as the widget editing in the “My Profile” page.

2. Problem: The “Edit page” link on the Dashboard as shown in Figure 1.13 does not look like a button and it is not very clear whether it can be clicked. The text “Edit page” is not very clear because the user does not realize they can add/remove widgets to customize the dashboard.

Heuristic(s) violated:

Nielsen – consistency and standards

Reported in survey: No

Severity: 2

Recommendation: make the “Edit page” link into a button so that it is clear to the user that it can be clicked. Modify the text “Edit page” to something more intuitive so that the user can understand that they can customize the dashboard with the widgets of their choice.

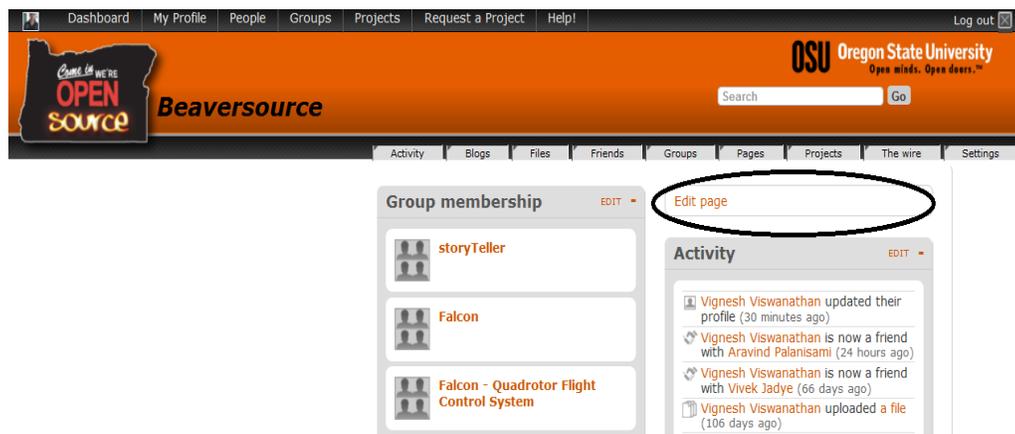


Figure 1.13 Dashboard

3. Problem: “Help” links on widgets in the dashboard as shown in Figure 1.14 become visible only when hovering with the mouse. Clicking on all “Help” links lead to the same topic in the “Help” page

Heuristic(s) violated:

Nielsen – error prevention, recognition rather than recall

Reported in survey: No

Severity: 3

Recommendation: consider keeping the help links on widgets more prominent and link the “Help” links on widgets to appropriate help pages

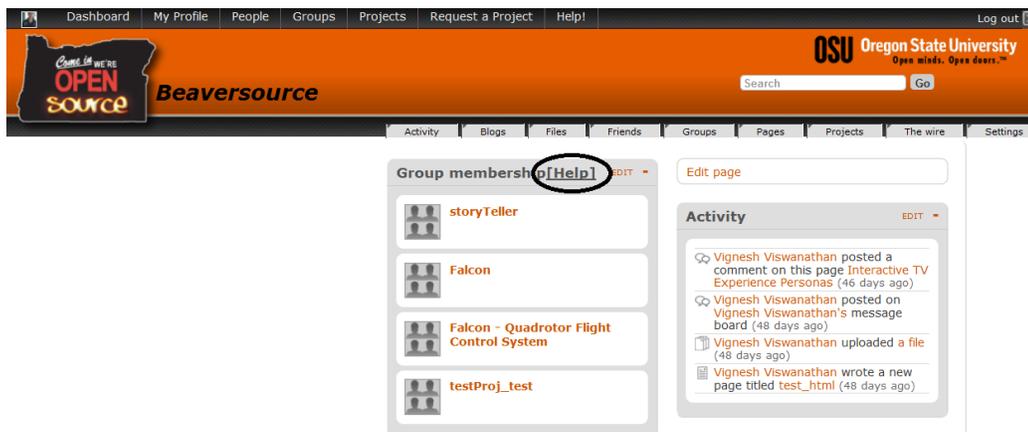


Figure 1.14 Dashboard help links

Task: Viewing activity statistics

1. Problem: On the homepage as shown in Figure 1.15, we have two widgets namely the “Latest activity” and the “Latest project activity”. The user may get confused as to whether “Latest activity” also shows latest activity in various projects? There is

another link “Activity” on the top clicking on which the user is presented a list of updates similar to latest activity.

Heuristic(s) violated:

Nielsen – Minimalist and Aesthetic design, consistency and standards

Reported in survey: No

Severity: 3

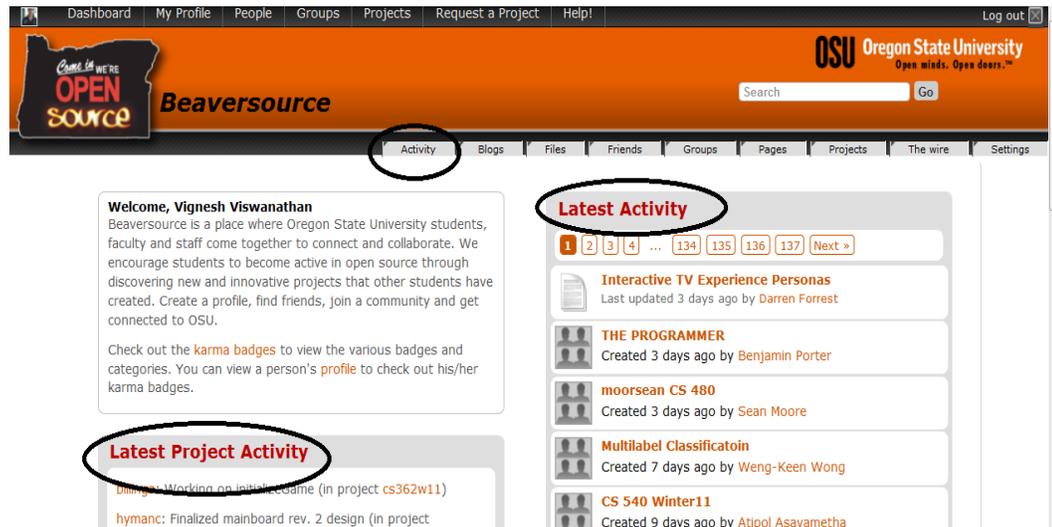


Figure 1.15 Homepage (activity)

2. Problem: clicking on “Activity” option in the second level navigation menu displays recent activity as shown in Figure 1.16. This shows more recent updates than those displayed in the “Latest Activity” widget on the homepage and information shown in both places are different.

Heuristic(s) violated:

Nielsen – Minimalist and Aesthetic design, consistency and standards

Reported in survey: No

Severity: 3

Recommendation: Consider showing latest activity in a single place in a clear unambiguous manner.

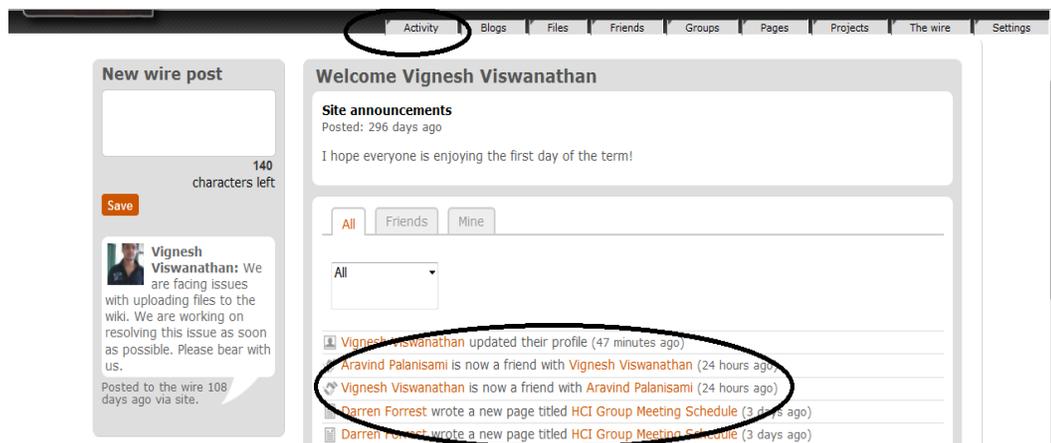


Figure 1.16 Recent activity

Task: Viewing newest people

1. Problem: The “Recent members” widget under the “Activity” link shows the new members who have joined as shown in Figure 1.17. The “Newest people” widget on the dashboard also displays the most recent members who joined Beaversource as shown in Figure 1.18.

Heuristic(s) violated:

Nielsen – Minimalist and Aesthetic design, consistency and standards

Reported in survey: No

Severity: 3

Recommendation: Consider removing it from the “Activity” link since it is already available in the homepage.

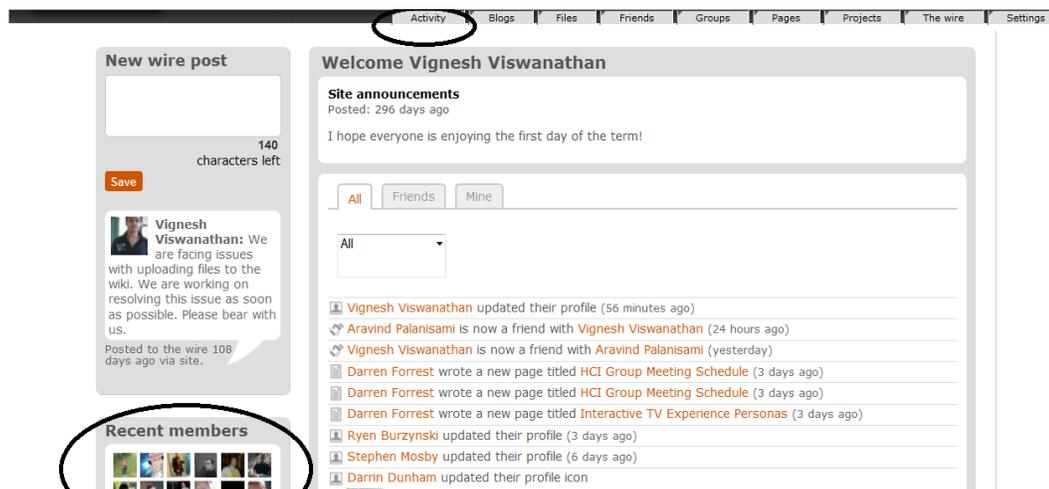


Figure 1.17 Recent members (activity page)

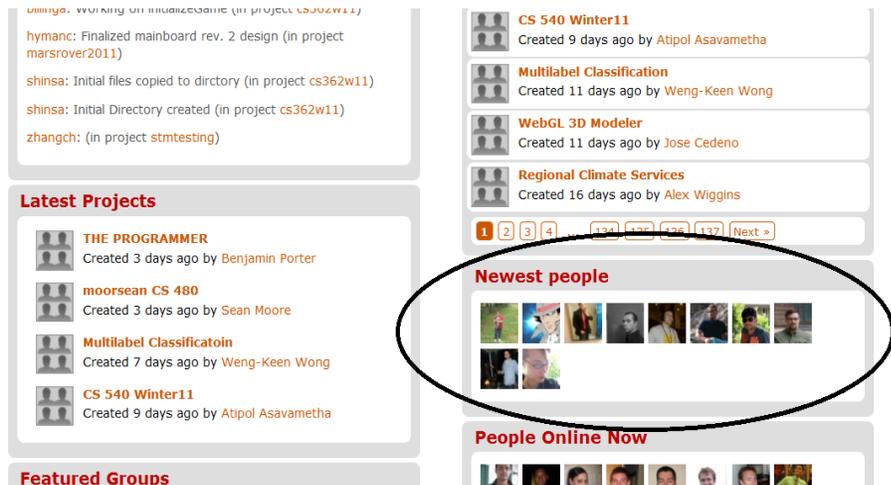


Figure 1.18 Newest members (dashboard)

Task: Using the feature “The wire”

1. Problem: The Wire feature is available in the “The wire” option in the second level navigation menu as shown in Figure 1.19. This is again available in the “Activity” tab but with a different look and feel as shown in Figure 1.20.

Heuristic(s) violated:

Nielsen – recognition rather than recall, consistency and standards

Reported in survey: No

Severity: 3

Recommendation: Consider removing it from the “Activity” tab since it is already available under “The wire”

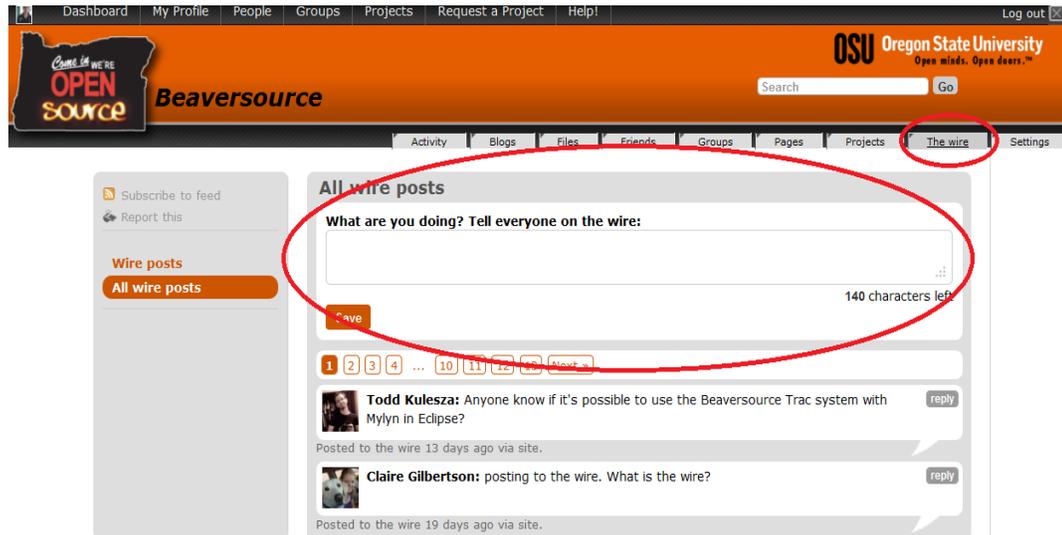


Figure 1.19 'The wire' page

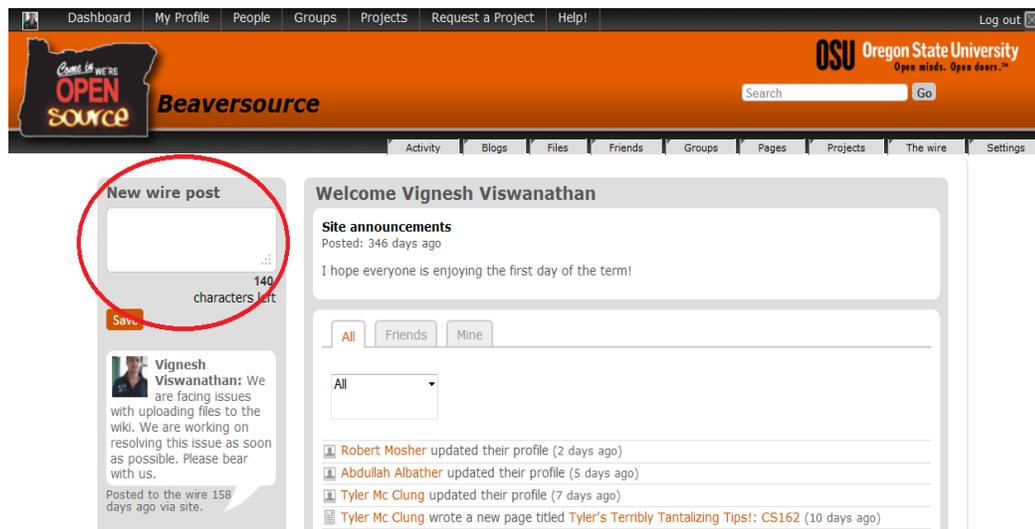


Figure 1.20 'The wire' (activity page)

Task: Request a project

1. Problem: The ‘accept policy’ shown in Figure 1.21 just looks like text and does not look like a button.

Heuristic(s) violated:

Nielsen – consistency and standards

Reported in survey: No

Severity: 2

Recommendation: It should be consistent with the rest of the site and look like a button similar to the “Edit this page” button.

The screenshot shows a project policy page with the following content:

- Projects must comply with the [OSU Acceptable Use Policy](#).
- Projects must **not** be commercial in nature.
- If code or other content is included from another source, use of that content must comply with the license under which it is published, and must not violate copyright law.
- Content produced by OSU employees using OSU resources is property of the University and should be approved for publication on BeaverSource by the employee's supervisor. (See [OSU Copyright Policy](#) for more information.)

NOTE: BeaverSource Administration will disable any project that violates the above requirements.

Project Best Practices
We recommend the following for all BeaverSource projects:

- Each project should be licensed under a well-recognized open source license. (See http://en.wikipedia.org/wiki/Open_source_license or [Licensing in Beaversource](#) for some examples.) Choose your license carefully.
- While BeaverSource does allow a range of access restrictions, we suggest you keep your project as open as possible to promote participation and code review.

If you agree, with the Policy above, click here to continue

Below the circled text are four buttons: "Edit this page", "Attach file", "Delete this version", and "Delete page".

At the bottom, there is a section for "Download in other formats:" with a link for "Plain Text".

Figure 1.21 Project policy page

2. Problem: When filling in data for a new project request as shown in Figure 1.22, “This field is required” message could be more helpful, and coded more smoothly. “Short name” description could be more concise, “Initial ONID users” is a confusing

term. The acceptance checkbox at the bottom isn't consistent with the first page (However, if you fix the first page to a checkbox then it makes sense), automatically load the ONID username from the SSO, can't "cancel" out of project creation.

Heuristic(s) violated:

Nielsen – consistency and standards, use names that are conceptually related to the function, automate unwanted workload, help users recognize, diagnose, and recover from errors, user control and freedom

Reported in survey: No

Severity: 2

Recommendation: consider using error message are more precisely located and offer acceptable suggestions for the corresponding area. Also I suggest an "out" or a clearly-marked button to cancel project request.

Project Request

Project Name • This field is required.

Short Name
A single word or acronym for your project. Using this, the URI for your project will be: <http://beaversource.oregonstate.edu/projects/<short name>> • This field is required.

Project Description
A sentence or two describing the purpose of this project. • This field is required.

Owner
ONID of the primary point of contact for administrative information.

Owner Email
Email address for the primary contact person.

Purpose
If this project is for research, department, or a class project, select one of the other options, else just leave as recreational.

Project Visibility
If your project is being produced with University resources in the course of your regular work, please confirm with the OSU Research Office that it is okay for you to share it with the public.

Intended License
It is the responsibility of the project owner to understand the license they select

<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Free	Eclipse	MPL	BSD	LGPL	GPL 2.0	Apache

Suggested Licenses

- Apache License 2.0
- Simplified BSD License (3 clause)
- GPL 2.0
- Microsoft Public License
- Linux (GPL)
- Eclipse Public License

• This field is required.

Figure 1.22 Project request page

3. Problem: The URLs on the menu buttons include an extra slash mark as pointed out Figure 1.23, which results in a “not found” message when clicking “profile.” This is true for all buttons on the menu except “Tag cloud” and “settings.”

Heuristic(s) violated:

Nielsen – consistency and standards, Error prevention

Reported in survey: No

Severity: 3

Recommendation: consider removing the extra / mark from the links.

Project Request

Project Name • This field is required.

Short Name
A single word or acronym for your project. Using this, the URL for your project will be: <http://beaversource.oregonstate.edu/projects/<short name>> • This field is required.

Project Description
A sentence or two describing the purpose of this project. • This field is required.

Owner
OSU of the primary point of contact for administrative information.

Owner Email
Email address for the primary contact person.

Purpose
If this project is for research, department, or a class project, select one of the other options, else just leave as recreational.

Project Visibility
If your project is being produced with University resources in the course of your regular work, please confirm with the OSU Research Office that it is okay for you to share it with the public.

Intended License
It is the responsibility of the project owner to understand the license they select.

	Eclipse	MPL	BSD	LGPL	GPL 2.0	Apache
Free software	✓	✓	✓	✓	✓	✓
OSI approved	✓	✓	✓	✓	✓	✓
GPL Compatible			✓	✓	✓	✓
Copyleft			✓	✓	✓	✓
Linking allowed	✓	✓	✓	✓	✓	✓

Suggested Licenses • This field is required.

- Apache License 2.0
- Simplified BSD License (3 clause)
- GPL 2.0
- Microsoft Public License
- Lesser GPL
- Eclipse Public License

Other Licenses

- Other/Multiple/Unlicensed
- GPL 3.0

<http://beaversource.oregonstate.edu/social/profile>

Figure 1.23 Project request page (top menu links)

Task: Posting on messageboard

1. Problem: The message board allows the user to post a message as shown in Figure 1.24, on their own message board. This is redundant because “Wire” provides this functionality to the user.

Heuristic(s) violated:

Nielsen – consistency and standards

Reported in survey: No

Severity: 2

Recommendation: Consider allow using the message board to post only on someone else’s message board to keep the behavior consistent with that followed on several other websites.

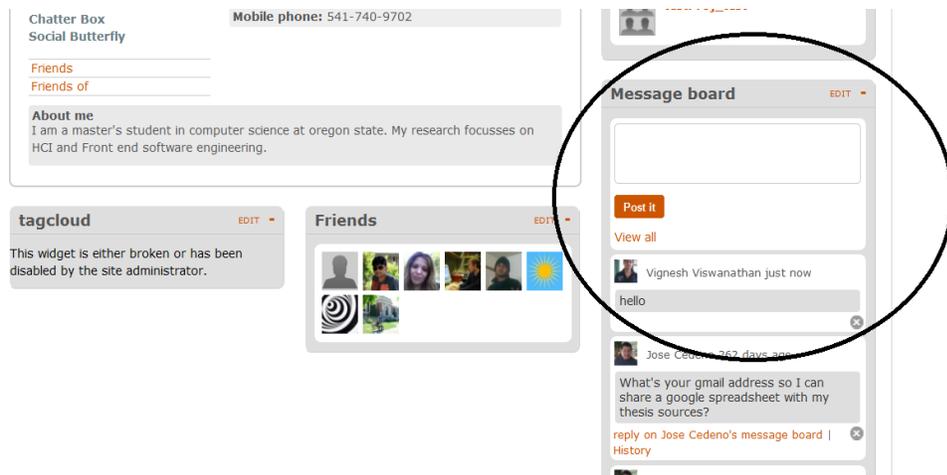


Figure 1.24 Message board

Task: Browsing source code

1. Problem: The “Browse source” option provides a user interface for the user to view files and compare files between any two specified revision numbers as shown in Figure 1.25. It is not possible for the user to remember all possible revision numbers of a file.

Heuristic(s) violated:

Nielsen – recognition rather than recall

Reported in survey: No

Severity: 3

Recommendation: Consider providing a list of revision numbers for a file and also information about the ticket(s) associated with that revision number so that it is easier for the user to compare any two revisions of a file.

The screenshot shows the Beaversource admin interface. At the top, there is a navigation bar with links for Dashboard, My Profile, People, Groups, Projects, Request a Project, and Help. The main header features the OSU Oregon State University logo and the text "Beaversource admin". Below the header is a search bar and a navigation menu with links for Admin, Home, History, Roadmap, Pages, Tickets, Browse Source, and Stratictics. The main content area displays a form titled "Select Base and Target for Diff:". The form has two rows: "From: elgg/trunk/mod/bsc_karma/ at Revision: 590" and "To: elgg/trunk/mod/bsc_karma/ at Revision: 569". A "View changes" button is located below the form. A note at the bottom right of the form area reads: "Note: See [TracChangeset](#) for help on using the arbitrary diff feature." The footer contains contact information, a "trac" logo, and mentions that the interface is powered by Trac 0.10.5 by Edgewall Software. It also lists sponsors: NSF under project CCF-0722362, and mentions that changes to Trac are licensed under the BSD, and Elgg under the GPL. The BeaverSource logo is licensed under the Creative Commons BY-NC-ND license.

Figure 1.25 Browse source page

Task: Viewing “Statistics” option in the second level navigation menu

1. Problem: Clicking on the “Statistics” link gives a huge error message that cannot be understood by an average user as shown in Figure 1.26.

Heuristic(s) violated:

Nielsen – error prevention

Reported in survey: No

Severity: 3

Recommendation: Consider providing a simple error message to the user.

Dashboard My Profile People Groups Projects Request a Project Help! Log out

OSU Oregon State University
Open minds. Open doors.™

Beversource admin

Admin Home History Roadmap Pages Tickets Browse Source Stractistics

Oops...

Trac detected an internal error:

If you think this really should work and you can reproduce it, you should consider reporting this problem to the Trac team.
Go to <http://trac.edgewall.org/> and create a new ticket where you describe the problem, how to reproduce it. Don't forget to include the Python traceback found below.

TracGuide – The Trac User and Administration Guide

Python Traceback

```

Traceback (most recent call last):
  File "/usr/lib64/python2.6/site-packages/trac/web/main.py", line 406, in dispatch_request
    dispatcher.dispatch(req)
  File "/usr/lib64/python2.6/site-packages/trac/web/main.py", line 237, in dispatch
    resp = chosen_handler.process_request(req)
  File "build/bdist.linux-x86_64/egg/stractistics/web_ui.py", line 123, in process_request
    db)
  File "build/bdist.linux-x86_64/egg/stractistics/global_reports.py", line 31, in global_reports
    weeks_back, db)

```

Figure 1.26 Statistics page

Task: Creating a ticket

1. Problem: no suggestion is provided for usernames for “Assign to” and “CC” fields in the new ticket form as shown in Figure 1.27.

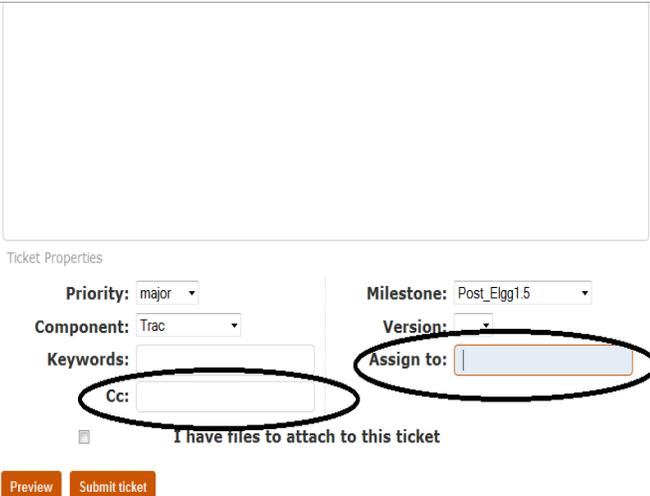
Heuristic(s) violated:

Nielsen – recognition rather than recall

Reported in survey: No

Severity: 2

Recommendation: Consider providing a list of usernames to the user from which they can choose or display relevant choices based on what the user enters in the text field.



The image shows a screenshot of a 'New ticket form'. At the top is a large empty text area. Below it, the form is titled 'Ticket Properties'. It contains several fields: 'Priority' (dropdown menu set to 'major'), 'Component' (dropdown menu set to 'Trac'), 'Keywords' (text input field), 'Milestone' (dropdown menu set to 'Post_Elgg1.5'), 'Version' (dropdown menu), 'Assign to' (text input field), and 'Cc' (text input field). The 'Assign to' and 'Cc' fields are circled in black. Below these fields is a checkbox labeled 'I have files to attach to this ticket'. At the bottom are two buttons: 'Preview' and 'Submit ticket'.

Figure 1.27 New ticket form

2. Problem: Attaching files to a ticket is not very straightforward. Checking the box “I have files to attach to this ticket” as shown in Figure 1.28, does nothing. Only when the user clicks on “Submit ticket” after that does it provide the UI to attach files. This is confusing to the user because clicking on “Submit ticket” might make them think that they are actually creating a ticket.

Heuristic(s) violated:

Nielsen – consistency and standards

Reported in survey: No

Severity: 3

Recommendation: consider including the user interface to attach files in the same form.

The image shows a screenshot of a 'New ticket form' titled 'Ticket Properties'. At the top is a large empty text area with 'SSS' in red. Below it are several form fields: 'Priority' (dropdown: major), 'Component' (dropdown: Trac), 'Keywords' (text input), 'Cc:' (text input), 'Milestone' (dropdown: Post_Elgg1.5), 'Version' (dropdown), and 'Assign to:' (text input). At the bottom, there is a checkbox with the label 'I have files to attach to this ticket', which is circled in black. Below the checkbox are two buttons: 'Preview' and 'Submit ticket'.

Figure 1.28 New ticket form (attaching files)

Task: Viewing files

1. Problem: On this page as shown in Figure 1.29, there's a set of options that allows the user to choose whose files the user wants to view. The available options are "Your files", "Your friends' files", "All site files" & "Upload a file".

Below this, another set of options are available which allows the user to choose what kind of content they want to view.

Suppose the user wants to view their friends' pictures. Ideally the user would click on "Your friends' files" option from the first set of options and then click on "Pictures" from the set of options below that.

Once the user clicks on the "Your Friends' files" option and then clicks on the "Pictures" option, the option selected in the first set of options becomes unselected.

Heuristic(s) violated:

Nielsen – recognition rather than recall

Reported in survey: No

Severity: 3

Recommendation: Consider showing the file options in the left panel in a combo box so that it is clear to the user the option that is currently selected.

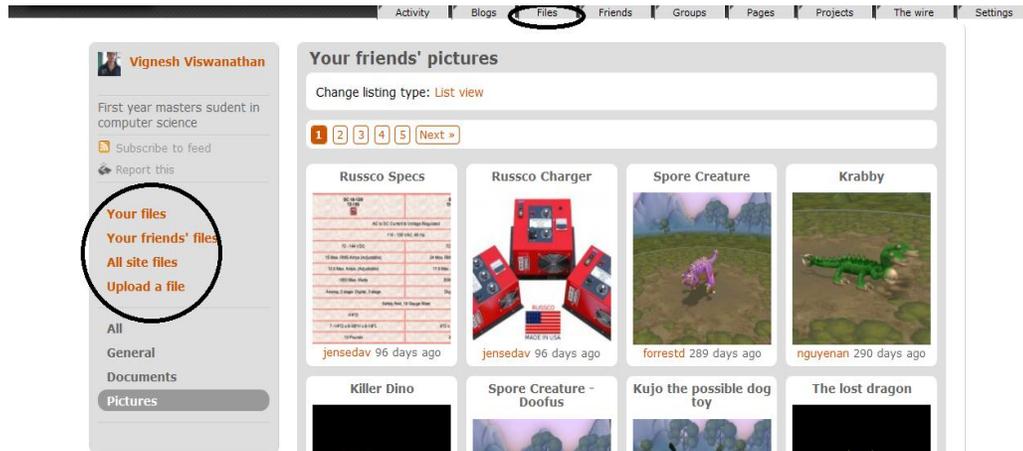


Figure 1.29 Files page

2. Problem: in a group page, when the “Group files” link is clicked, when there are no files to display, the message displayed(We couldn’t find any files at the moment) is not very clear as shown in Figure 1.30.

Heuristic(s) violated:

Nielsen – Consistency and standards

Reported in survey: No

Severity: 2

Recommendation: Consider changing the message to something that is clear and unambiguous.

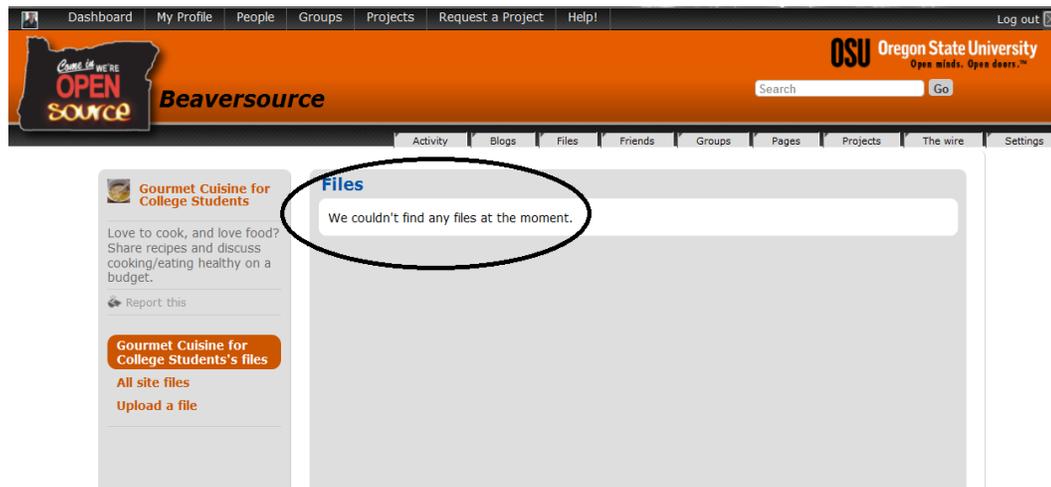


Figure 1.30 No files available page

Task: Writing a blog post

1. Problem: The “Preview” button looks disabled and not clickable as shown in Figure 1.31.

Heuristic(s) violated:

Nielsen – Consistency and standards, recognition rather than recall

Reported in survey: No

Severity: 2

Recommendation: Consider using the same color for all buttons.

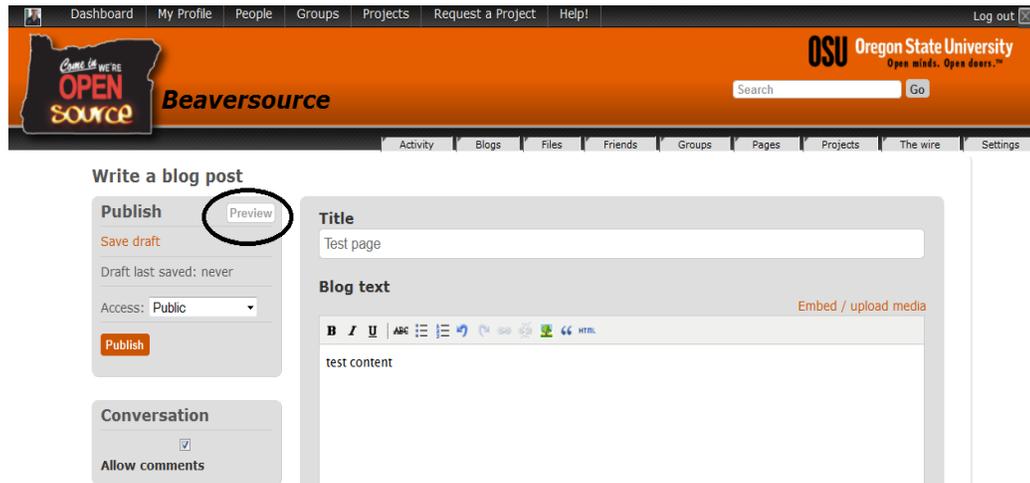


Figure 1.31 Blog post page

Task: Editing group details

1. Problem: the “Embed/upload media” link above the “Description” box as shown in Figure 1.32 is not very clear. It allows embedding and uploading files.

Heuristic(s) violated:

Nielsen –Match between system and real world

Reported in survey: No

Severity: 2

Recommendation: Consider using terminology familiar to the user instead of “media”

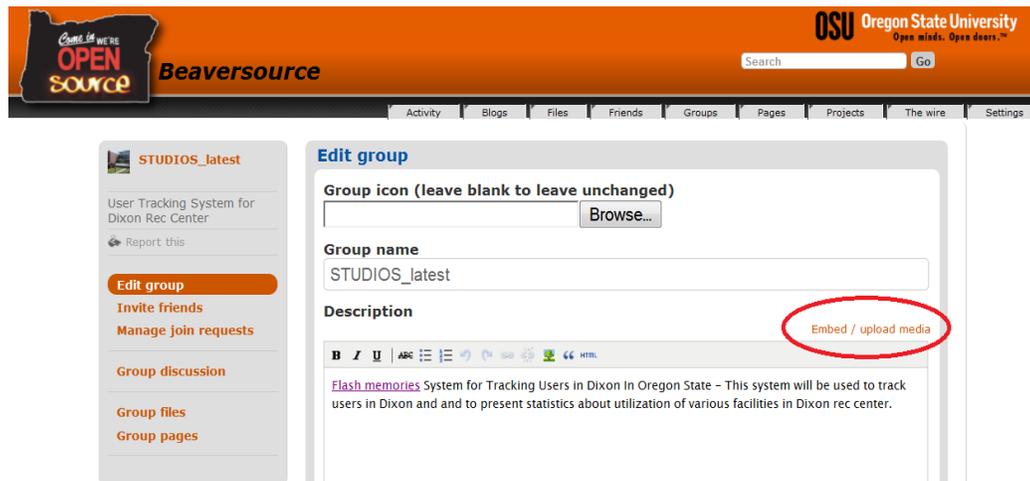


Figure 1.32 Editing group details

Task: Viewing friends

1. Problem: friends are displayed in a random order in the “Friends” option as shown in Figure 1.33.

Heuristic(s) violated:

Nielsen – Match between system and real world

Reported in survey: No

Severity: 2

Recommendation: Consider using terminology familiar to the user instead of “media”

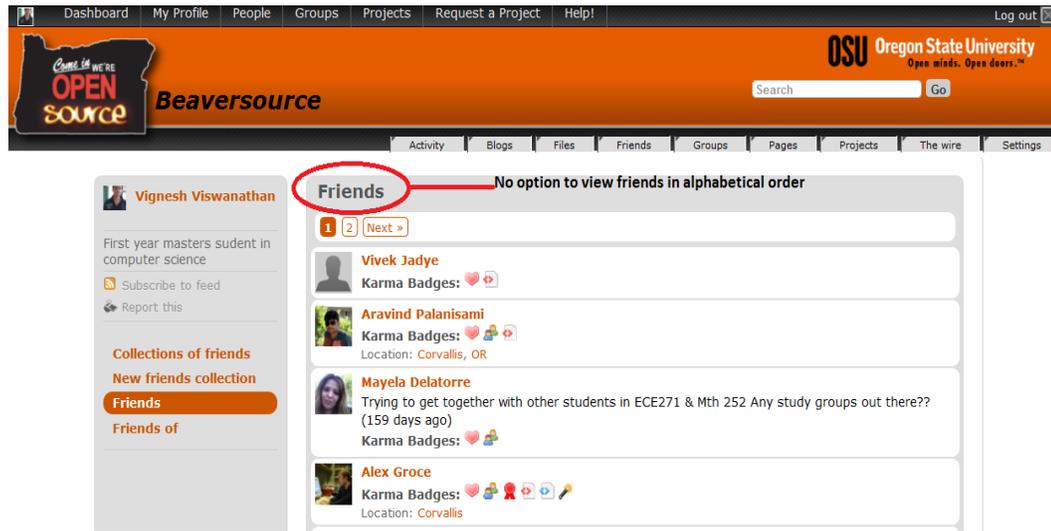


Figure 1.33 Friends page

Task: Viewing groups and projects

1. Problem: “All site projects” has tabs like “Alphabetical”, “Newest” etc. as shown in Figure 1.34 but these tabs are not present when the user navigates to “Your projects” as shown in Figure 1.35.

Heuristic(s) violated:

Nielsen – Consistency and standards,

Reported in survey: No

Severity: 2

Recommendation: Consider having the same behavior across different project options

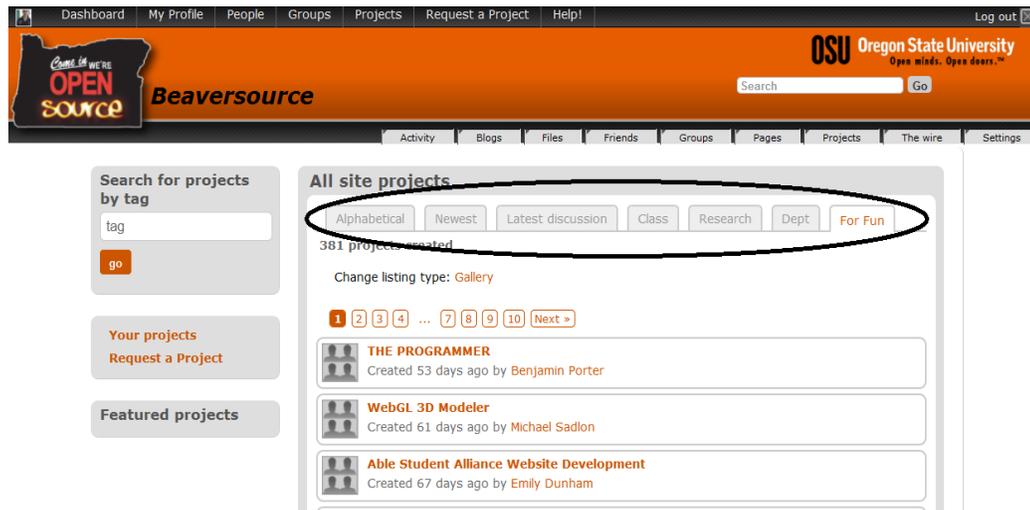


Figure 1.34 All site projects

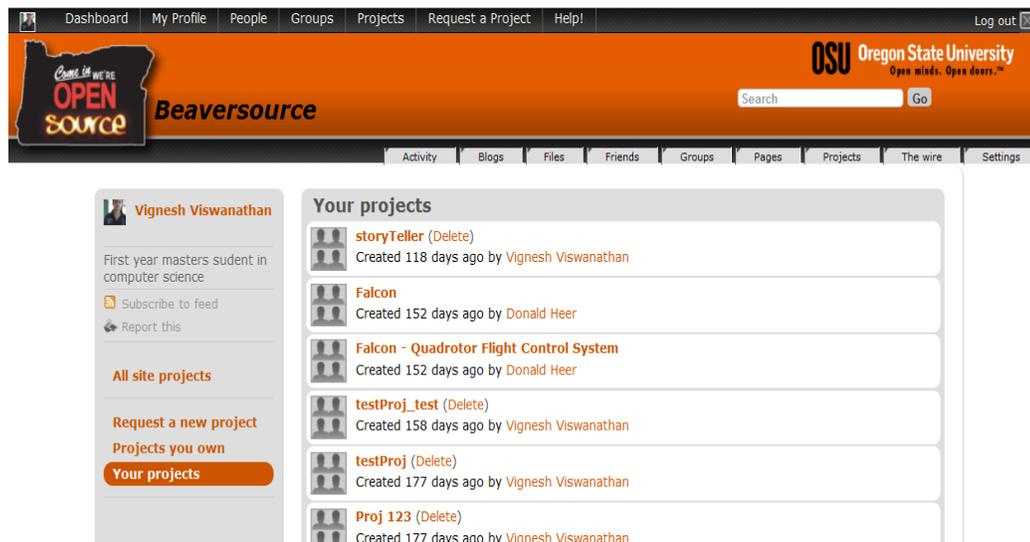


Figure 1.35 Your projects

1. Problem: “All site groups” has tabs like “Alphabetical”, “Newest” etc. as shown in Figure 1.36 but these tabs are not present when the user navigates to “Your groups” as shown in Figure 1.37

Heuristic(s) violated:

Nielsen – Consistency and standards

Reported in survey: No

Severity: 2

Recommendation: Consider having the same behavior across different group options

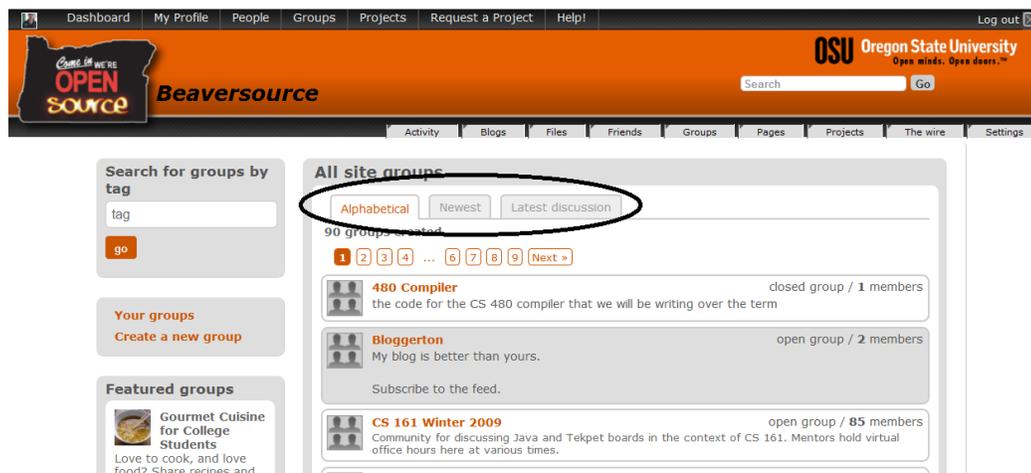


Figure 1.36 All site groups

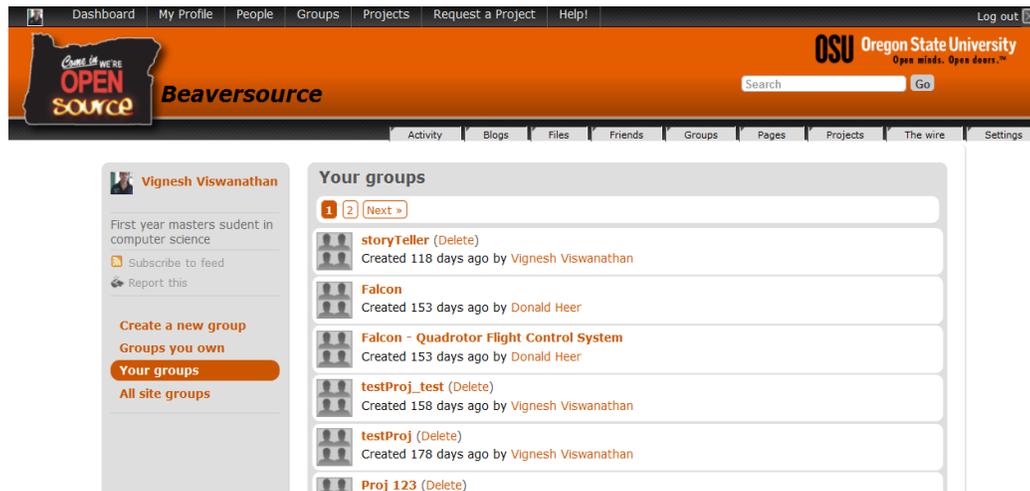


Figure 1.37 Your groups

1. Problem: there is no option to view the groups in “Your groups” as shown in Figure 1.34 and the projects in “Your projects” as shown in Figure 1.35 in alphabetical order

Heuristic(s) violated:

Nielsen – match between system and real world

Reported in survey: No

Severity: 2

Recommendation: Consider having an option to view ‘your groups’ and ‘your projects’ in alphabetical order.

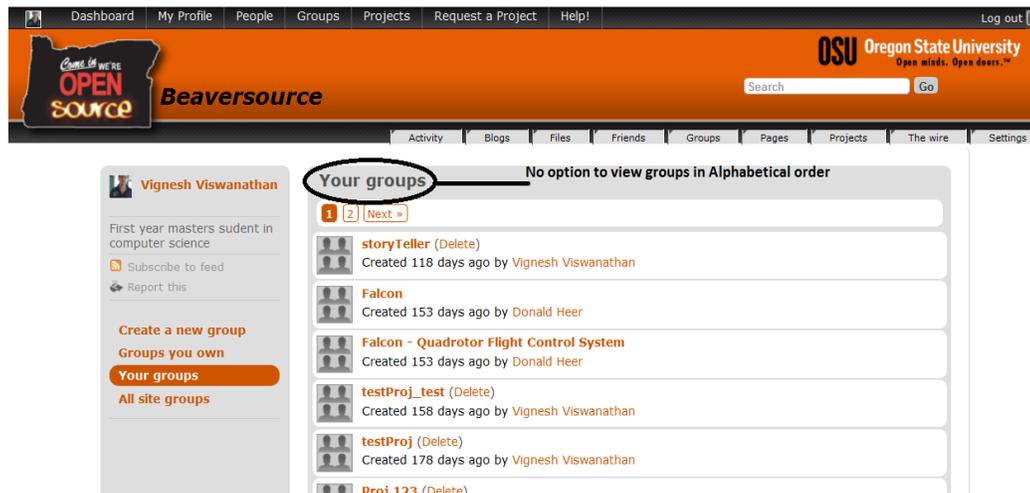


Figure 1.38 Your groups (no alphabetical listing)

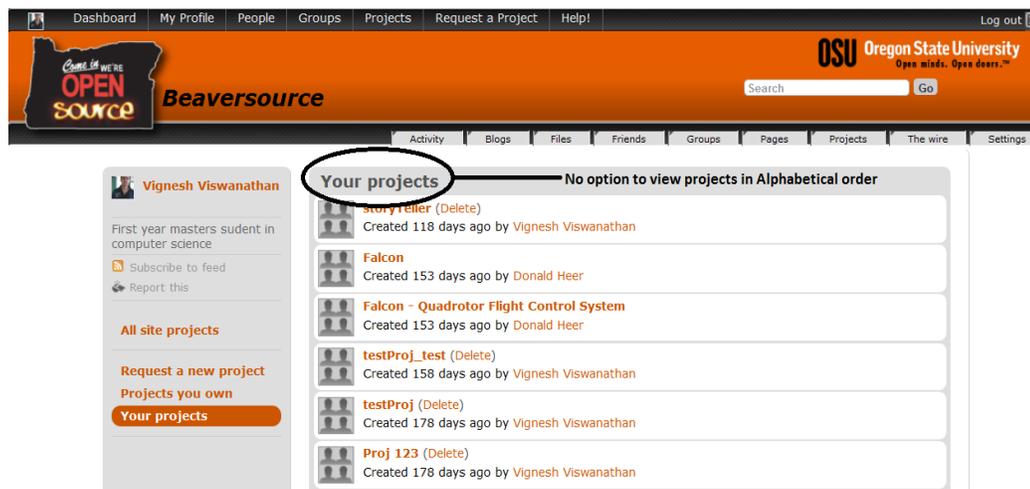


Figure 1.39 Your projects (no alphabetical listing)

Task: Search results

1. Problem: No feedback that the search didn't return any results, just shows a blank page as shown in Figure 1.40.

Heuristic Violated: Visibility of System Status

Severity: 2

Reported in survey: No

Recommendation: display a message saying “No results were found”.

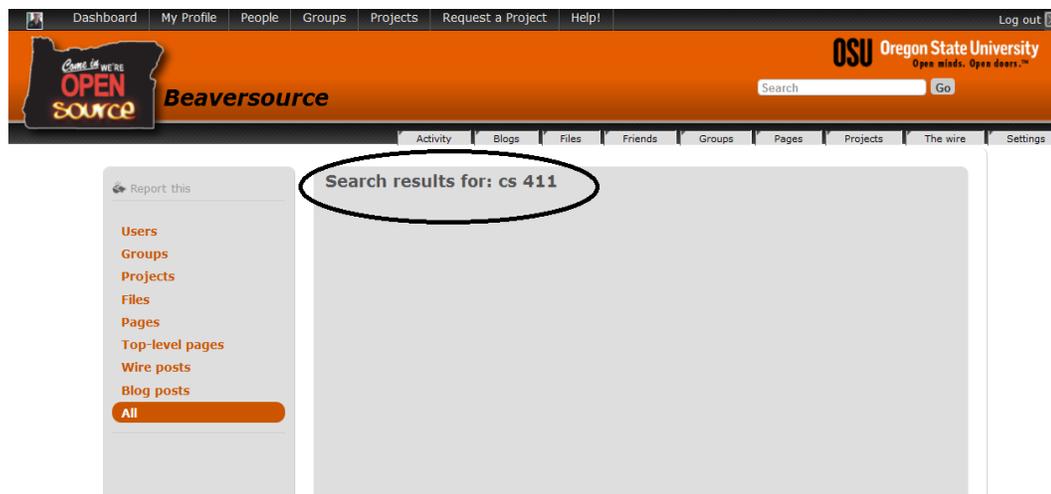


Figure 1.40 Search results

2. Problem: when the search results are displayed as shown in Figure 1.41, it is not clear whether the links on the left are filter options to filter the search results. Also “All” option is at the bottom.

Heuristic Violated: Efficiency of Use

Severity: 2

Reported in survey: No

Recommendation: Consider moving the “All” option to the top and have some text to indicate that the links are for filtering search results and also it would be helpful to display the numbers in parenthesis, for instance consider showing something like Projects(2).

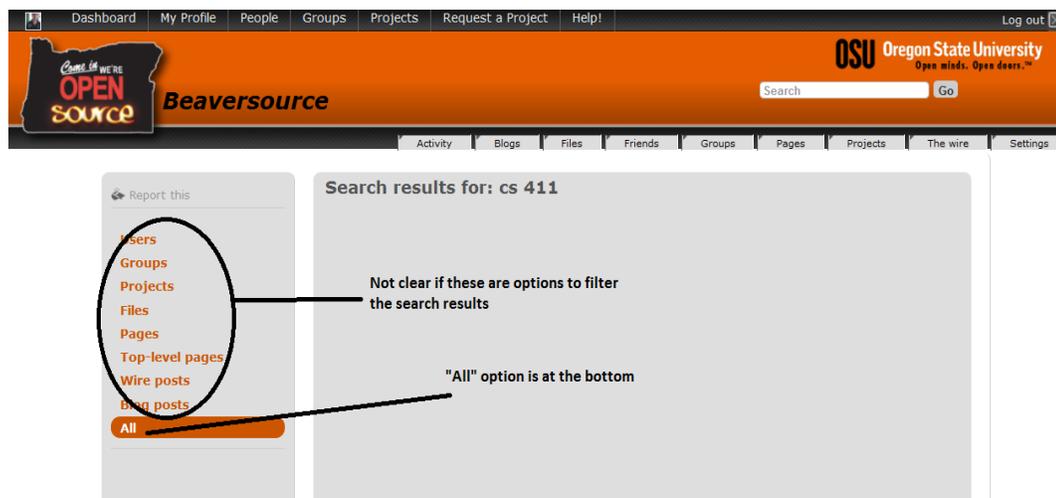


Figure 1.41 Search results (filter options)

Task: finding help

1. Problem: Relationship between “groups” and “projects” are confusing, and they aren’t explained to the user very well

Heuristic Violated: Match between system and real world; Help and Documentation

Severity: 3

Reported in survey: No

Recommendation: elaborate the difference between groups and projects in the “Help” page

2. Problem: help topics are not displayed in the search results i.e. search results are not searchable

Heuristic Violated: consistency and standards

Severity: 3

Reported in survey: No

Recommendation: Make help topics searchable so that user can find information on topics

Task: closing tab and opening beaversource again

1. Problem: Login session is not maintained if tab is closed

Heuristic(s) violated:

Nielsen – Consistency and standards

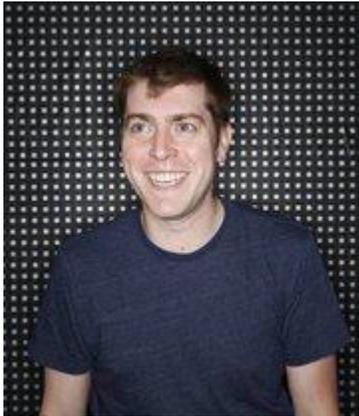
Reported in survey: No

Severity: 2

Recommendation: Consider maintaining the login session even after the tab is closed as this is the behavior across most websites today.

B Appendix 2

Students who use Beaversource for hosting projects



Sean is a senior in the school of EECS at Oregon State University. This is his last year at OSU. He is interested in programming for embedded systems. After graduating he hopes to find a job in embedded software development. He enjoys playing basketball and racquetball. He plays the bass guitar for a local band. He works 10 hours every week as a student worker in the University's Information Technology department. He usually works in the evenings. His work is mostly troubleshooting and attending to tickets filed by students or faculty working in the labs. He is a big fan of Open Source Software and always prefers them for all his needs. He has contributed numerous patches to several small open source software projects. His laptop runs a popular Open Source operating system. He interned last summer in a popular semiconductors company in Portland as an Embedded software intern. He thoroughly enjoyed his internship and learned the latest technology in the embedded systems domain. He is a heavy internet user and has a high speed connection at home. He prefers to work from home and uses the internet for internet radio, homework and projects and for checking scores. He uses social networking websites but not very often. He uses forums and a couple of popular websites to keep up with technology. He uses IRC when he has problems with the code that he is working with.

Sean has used Beaversource many times and is very comfortable using it. He is writing software for a wireless communication device. The code is primarily in C++ with some Python. He chose Beaversource to host this project because of two reasons. Firstly it is hosted in the university and secondly it is open source. Sean is an experienced user of Beaversource who mostly use the project hosting capabilities of BSC. Since most of these projects are important and have huge amounts of code, he expects a high degree of reliability.

Goals

- Host project code
- Checkin/Update code
- Create/edit/close bug reports
- Add/edit project information in the Wiki

Students from other majors who use Beaversource's Group feature to have their own groups/join groups and have discussions



Katie is studying Sociology and minoring in French at OSU. She was introduced to BSC by her friend who is a CS major. Katie usually uses the computer to browse, send email, prepare documents and do research. She enjoys reading books and spends anywhere between four to six hours each day. She has two golden retrievers and a cat. She plans to graduate this year and enroll in a graduate program in the fall. She plans to get a PhD in Women Studies. She uses the internet for two to three hours every day to check email, homework, projects and social networking websites. She uses a search engine to search for information. She uses office applications on her computer for projects and homework. Apart from this she does not use any other software.

She has always been interested in issues concerning women in today's world. She always has discussions with her friends on various topics. She also wanted to connect with other students in OSU who might be interested to discuss social issues in today's world.

Katie primarily wants to use BSC to meet people and have interesting discussions.

Goals

- Create a group to have discussions
- Invite friends to group

Professors who uses Beaversource for a class, and collaborate on projects



Peter is an Assistant professor in the School of EECS at OSU. He has been with OSU for the last 5 years. He received his MS and PhD both in HCI (Human Computer Interaction) from Longroad University. His research interests are in social computing and user interfaces. He is currently researching on Surface computing and Mobile interfaces. He has published a number of papers in leading conferences and journals in his field. He has 6 masters and 4 doctorate students working with him. He was born and raised in California. He moved to Corvallis when he got a job as an assistant professor and has remained here ever since. He supports the college football team and watches all their matches on TV. He is married with two kids. Other times when he is not busy doing research, he spends time with his family. He has an e-book reader and a smartphone and likes to try new technology when it is launched. He also uses the search engine to search for publications and information. Apart from this he also uses the internet to keep track of conference deadlines and latest research in his domain.

The first time he taught an undergraduate class, he was looking for a website where he could post materials for the class. Another professor told him about BSC. Since then he has been using BSC for all his classes. He is familiar with BSC and prefers to use it

for his classes. He also uses Beaversource to collaborate with students on Research projects.

Goals

- Create a group
- Invite students to join the class group
- Post class material and assignments in the group
- Discussions with students
- Upload files to group
- Collaborate with students on projects

Students who uses Beaversource to connect with friends and share data



Sarah is a sophomore in computer science. She is minoring in human factors. She likes user interface design and using Photoshop to create prototypes and icons. She transferred from a community college in California last year. This is her first year in OSU. She is a part of the OSU UI club. She likes music, movies and hanging out with friends. She prefers alternative rock and hip-hop. She works part-time at the café inside the engineering building and does the morning shift working from 9am till noon. A non-profit website based out of Corvallis needed some help with re-designing their website. She volunteered to do the re-design. She plans to complete it the next four months. She has her own website where she displays her work like icons and user

interface designs. She has a smartphone and uses the social networking application quite often. She also has a netbook which she brings to school. She uses a bigger and powerful laptop for doing design work.

She uses social networking websites to keep in touch with friends. She also wants to use Beaversource to share thoughts related to school. She also thinks it would be cool if she could share her status messages, icons and other materials created for the UI club posted on BSC on Facebook. Sometimes she also likes to chat with her friends on BSC.

Sarah wants to be able to use BSC to share messages and icons posted on Beaversource on Facebook.

Goals

- Share information posted in Beaverource on other social networks
- Keep in touch with friends
- Chat with friends
- Share work on Beaversource

C Appendix 3

Sean

Sean wants a place to host his project code. He requests a project in Beaversource. After it is approved, he starts checking in code. He starts putting in the project documentation into the Wiki. Sean is now working on a bug and has found a solution to it. He updates his codebase and then merges his changes into the files and then checkins new files. He then uses the bug tracker to change the status of the bug to 'fixed'. He has modified some behavior with this bug. So he opens the Wiki to modify the documentation. He finds a bug that he had fixed earlier to be still open, so he proceeds to close it. A friend suggests an interesting change that he could make to the project. Sean wants to implement it and creates a bug to track this new feature.

Katie

Katie wants to discuss with others about women issues in today's society. So she asks a friend in EECS to help her with creating a project. Her friend then creates a group for her. She proceeds to invite her friends to her group and has discussions with them online.

Peter

Peter is teaching a HCI class this term. He plans to use BSC for this class. He creates a group for his class. In the first class, he tells students about the Beaversource group and asks them to join it. After the second lecture, he uploads lecture materials to the group. He thinks about an interesting topic for discussion and posts in the forums to have discussions with students. He is also collaborating with some students on a

research project. He creates milestones to track progress on the project. He finds a few issues with the project and opens tickets for them.

Sarah

Sarah wants to share information that she posts in Beaversource on other social networks that she is a member of. She also chats with her friends if she finds them online. She likes creating icons and wants to share them on Beaversource.