BRAINSPACE

An Online Virtual Learning Environment

Team 4
Peter Harmon
Lindsey Avery

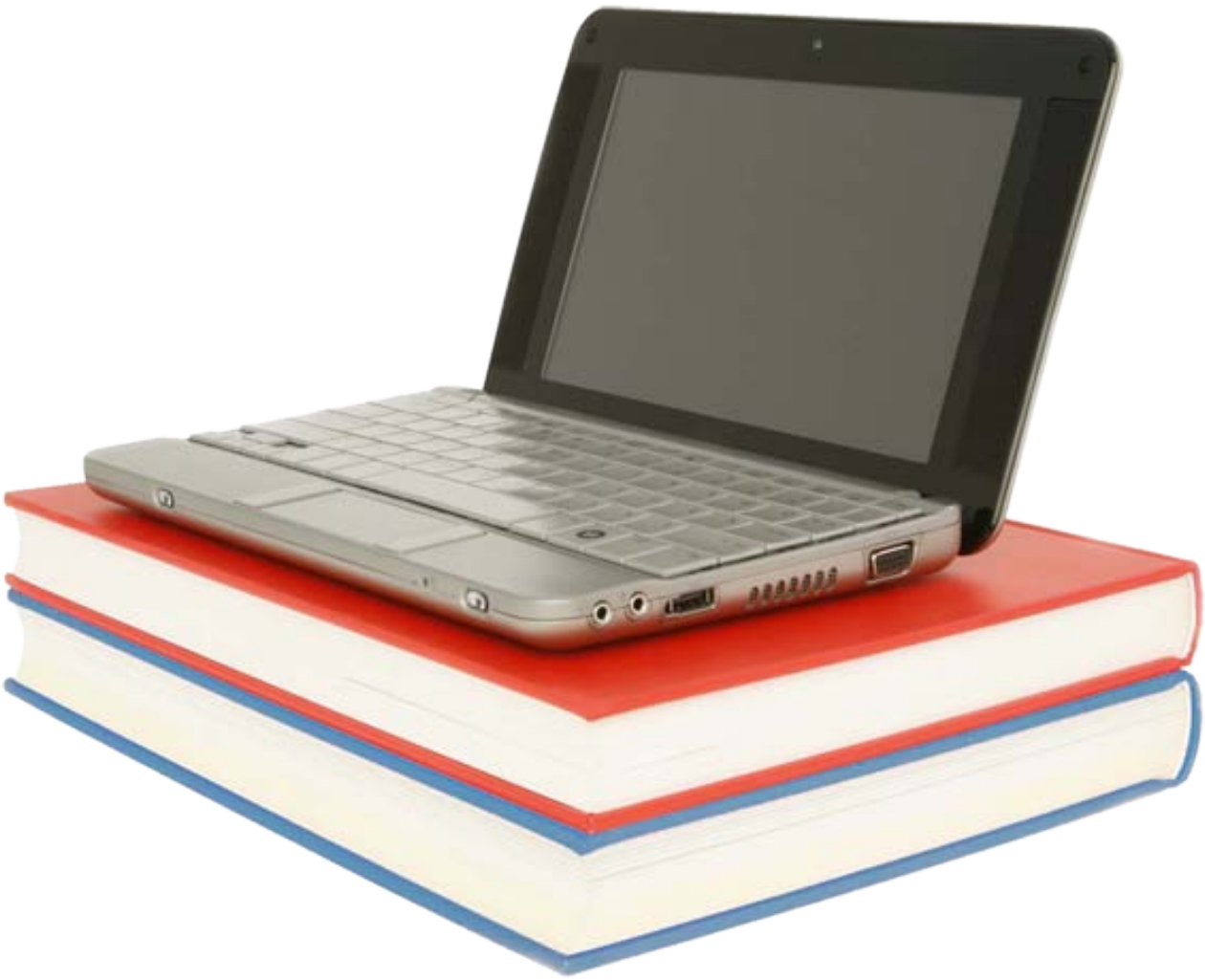


Table of Contents

Introduction

The growing ubiquity of the internet has changed the educational landscape greatly. Top academic and industry professionals can now share their knowledge and experiences to a broader demographic of eager minds despite time or place. Instructors can leverage a vast network of current multimedia resources to engage their students and make sure they stay up to date on industry trends and expectations. Recent statistics indicate that in 2009, 73% of colleges and universities report an increased demand for online course offerings (http://www.sloan-c.org/publications/survey/pdf/learningondemand.pdf). Inherent in this growing prevalence of online courses is the issue of accommodating a wide variety of users with diverse backgrounds and varying circumstances of interaction. BrainSpace is a new concept in online learning and seeks to facilitate the evolution of the online learning experience.

Problem to Solve for the User

Most models for online education have often followed an asynchronous approach as the online environment is well-suited for this. However, this leads to difficulty replicating valuable student-instructor and peer-to-peer interactions, found in traditional classroom environments, that create a greater sense of community and support and helps to reinforce learning. This can leave students feeling isolated in online classes because the online environment lacks an effective way to facilitate these traditional classroom interactions. Being able to hear and see an instructor's response to students' questions and discussions is, traditionally, only possible during synchronous online classes where everyone is participating live.

There are other technical challenges to overcome as well. Many current online learning environments are built on proprietary systems and lack the flexibility to adapt to the changing needs of instructors and students. Instructors lack an easy way to update course information and integrate multimedia content directly in to the learning material. Students often have to dig through ever expanding forums to follow a class discussion and have to download or play media related to the class in separate software.

Description of the Designed Application

BrainSpace is a new concept in online learning that incorporates the educational needs of efficiently delivering information with the benefits of community interactions present in current online social networking sites such as Facebook. BrainSpace's flexible, adaptable and content rich environment will be designed for collegiate level and higher learning. The underlining platform will be based on industry standards to provide educational institutions with options for further development and expansion of the learning experience in the future. Students and instructors will be able to access the environment through a standards based web browser on any computer.

This new environment will allow for many types of multimedia to be integrated directly into course content easily by the instructor and can be consumed by students without the need for any external software outside of the target platform requirements. Discussion areas will be more closely integrated with the course material and will offer a more cohesive way for students and instructors to engage and participate in class discussions. Students will be able to easily bring their own multimedia content in to discussions. Topics and threads for discussions will be easy to follow and contribute to. Course material and discussions will be accessible to students after the course has concluded. Students and instructors will have a central place to manage not only their educational courses and resources from, but also be able to engage with classmates, other students and instructors socially.

Target Audience Description: Faculty

Detailed target audience description

The target faculty audience for BrainSpace will cover a wide range of individuals from those that have had very little experience with online courses to those with much more. Some faculty will be adjunct where others will be tenured. Overall though, faculty tend to gravitate toward similar aspects of teaching regardless of teaching experience.

To interact successfully in a dynamic online course environment and make students feel welcomed, an online course Instructor must be computer savvy.

Most online faculty users fall within the following demographic:
- Male: 50% Female: 50%
- Age: 30 to 45 (45%)
- Ethnic Background: Caucasian (77%)
- Tenure Status: Tenured (71%)
- Technology Skill Level: Course Developer Proficiency (66%)

Research on target audience (for more see Appendix A)

The target faculty audience for BrainSpace will cover a wide range of individuals from those that have had very little experience with online courses to those with much more. Some faculty will be adjunct where others will be tenured. Overall though, faculty tend to gravitate toward similar aspects of teaching regardless of teaching experience.

Table 2
Faculty Perceived Usefulness of Features Found in the CMS

Feature	Useful	Somewhat Useful	Not Useful	Never Used
Course Documents	96%	4%	0%	0%
Announcements	88%	8%	0%	4%
Assignments Feature	71%	13%	0%	17%
Gradebook	58%	8%	8%	25%
Discussion Board	50%	13%	0%	38%
Staff Information	33%	21%	4%	42%
Digital Drop Box	29%	21%	4%	46%
Group Pages	29%	13%	0%	58%
Chat	13%	17%	8%	63%
Survey	13%	13%	4%	71%
Glossary	4%	8%	4%	83%

Factors Influencing Faculty Use of Technology in Online Instruction: A Case Study (2006)
http://www.westga.edu/~distance/ojdla/spring121/osika121.html

Target Audience Description: Student

Detailed target audience description

To participate successfully in a dynamic online course environment and community, an online student must be computer proficient.

Most online student users fall within the following demographic:

- Male: 48% Female: 52%
- Age: 18 to 34 (41%)
- Ethnic Background: Caucasian (61%)
- Children: Has no children (aged 0 – 17) (64%)
- Annual income: $30-60k (31%) / $60-100k (31%)
- Education level: Has had some college (42%)

Research on target audience (for more see Appendix B)

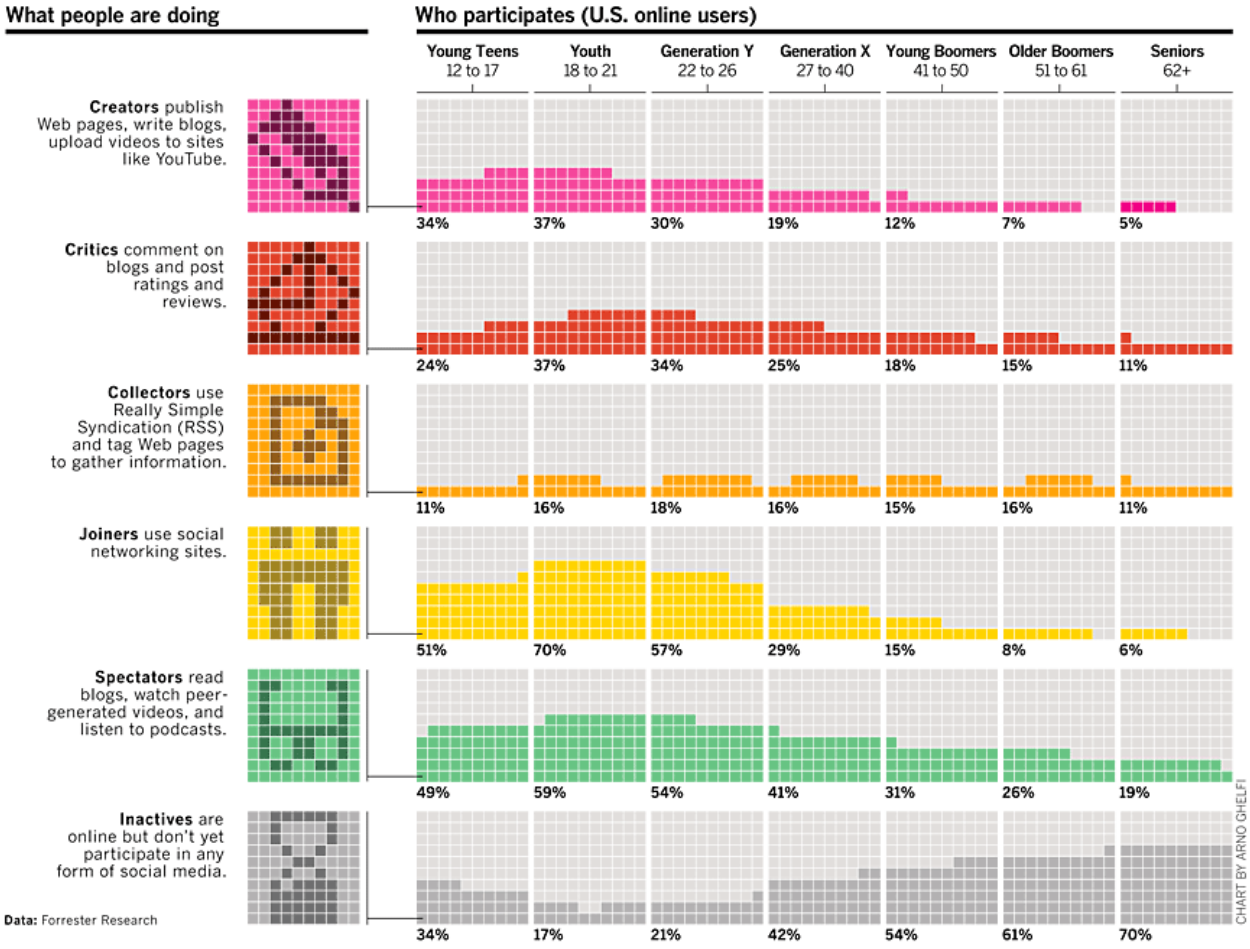
Our primary target audience is young professionals working on post baccalaureate education with a secondary audience being young adults working on their on their first post-secondary degree. These audience groups cover a wide demographic range with a variety of interests. Our age demographic has grown up with computers in the home and more recently internet access. They are not only are heavy consumers of online multimedia, but also heavy involved in creating, posting and commenting on online multimedia.

Top web properties for this audience:

- LinkedIn
- Facebook
- Flickr
- Youtube

Target Audience Description: Student

Research on target audience - continued (for more see Appendix B)
Some features chosen for this target audience include:
multimedia consumption and creation, social communication.



BusinessWeek (2007)
http://www.businessweek.com/magazine/content/07_24/b4038405.htm

Target Platforms

Operating systems
Web site will be supported by all major operating systems including Windows XP, Windows Vista, Windows 7, Mac OS X 10.4 and newer.

Visual configuration
Web site will be full color, and will support a screen resolution of 1024 x 768 and above.

Browsers
Web site will be supported by all major browsers including Internet Explorer 7.0 and higher, Firefox 3.5 and higher, Safari 4.0 and higher.

Plug-ins
Adobe Flash is a multimedia platform for adding animation and interactivity to web including videos and rich internet applications.

Internet connection speed
Internet connection speed will be a broadband connection (256 kbps and higher).

Web Application Objectives

Overall Objectives

BrainSpace is a new concept in online learning that incorporates the educational needs of efficiently delivering information with the benefits of community interactions present in current online social. This is accomplished by the allowing multimedia content to be integrated directly into course content by the instructor and can be viewed by students seamlessly. Discussion areas are integrated with the course material to allow students and instructors to engage and participate in class discussions. Discussions are also easy to follow and contribute to, allowing students to integrate their own multimedia content as well. All of this is accessible from a central place that allows students and instructors to manage their educational courses and resources. Course material and discussions will also be accessible to students after the course has concluded.

BrainSpace offers both synchronous and asynchronous methods including: live workshops and lectures, videos and tutorials, downloadable readings and media, and discussion boards with file sharing.

User Goals and Needs

To provide a online system that provides a flexible and content rich environment for learning that is easily accessible and interactive for both students and faculty and is comparable or superior to the traditional classroom environment. Faculty users will be provided with the tools they would normally need to successfully teach typical on-campus courses, plus additional features necessary to translate such courses successfully to the online environment.

Needs include:

- 24/7 accessibility
- Easy to use interface
- Social networking functionality
- Diverse multimedia capabilities
- Support for all types of learning including: visual, aural, written and hands-on
- Asynchronous and synchronous software

Stakeholders and Their Needs

Direct stakeholders and their goals

- Faculty and Students - Being able to access/edit course content, view/edit work and grades, communicate with classmates and faculty both synchronously and asynchronously, upload/download files.
- Education institution employees - Access to class materials for human resource needs. Site Developers and Hosting Provider - Be able to maintain and upgrade the site as needed, keeping disruptions to ongoing classes to a minimum.

Indirect stakeholders and their goals

- Competitors - Provide them with competition to promote development and advancement in the marketplace.
- Online Stores - Facilitate faculty and students in purchasing required textbooks and course materials.
- Other linked web sites - Traffic and bandwidth provided by external links and maintaining those links.

Usability Objectives

Users will have various computer skill levels, to accommodate requiring:

- An Intuitive design, with simple, easy to follow instructions, and noticeably visible links and actions.
- Courses will need to have a cohesive look, making it easy to locate and access all elements of the course.
- Communication among classmates and professor(s) will need to accommodate different schedules, time zones, for both synchronous and asynchronous communication.
- Deadlines for faculty and students will need to be clear, trackable and enforceable with requirements for both student and faculty participation.
- Error prevention will need to be handled effectively to prevent errors since changes are in real time. The system will also offer a way to undo or edit an action after the change has already been complete. There will also be a mechanism for submitting appropriate errors to site administration so they may be addressed in a timely manner.
- Both asynchronous discussion boards/file posting and synchronous applications for use in meetings, workshops, critiques, etc. and provide the moderator the means for: application sharing, displaying files for discussion, audio and video and instant messaging chat for communication, participant lists, and recording of the session.

Functional Specifications

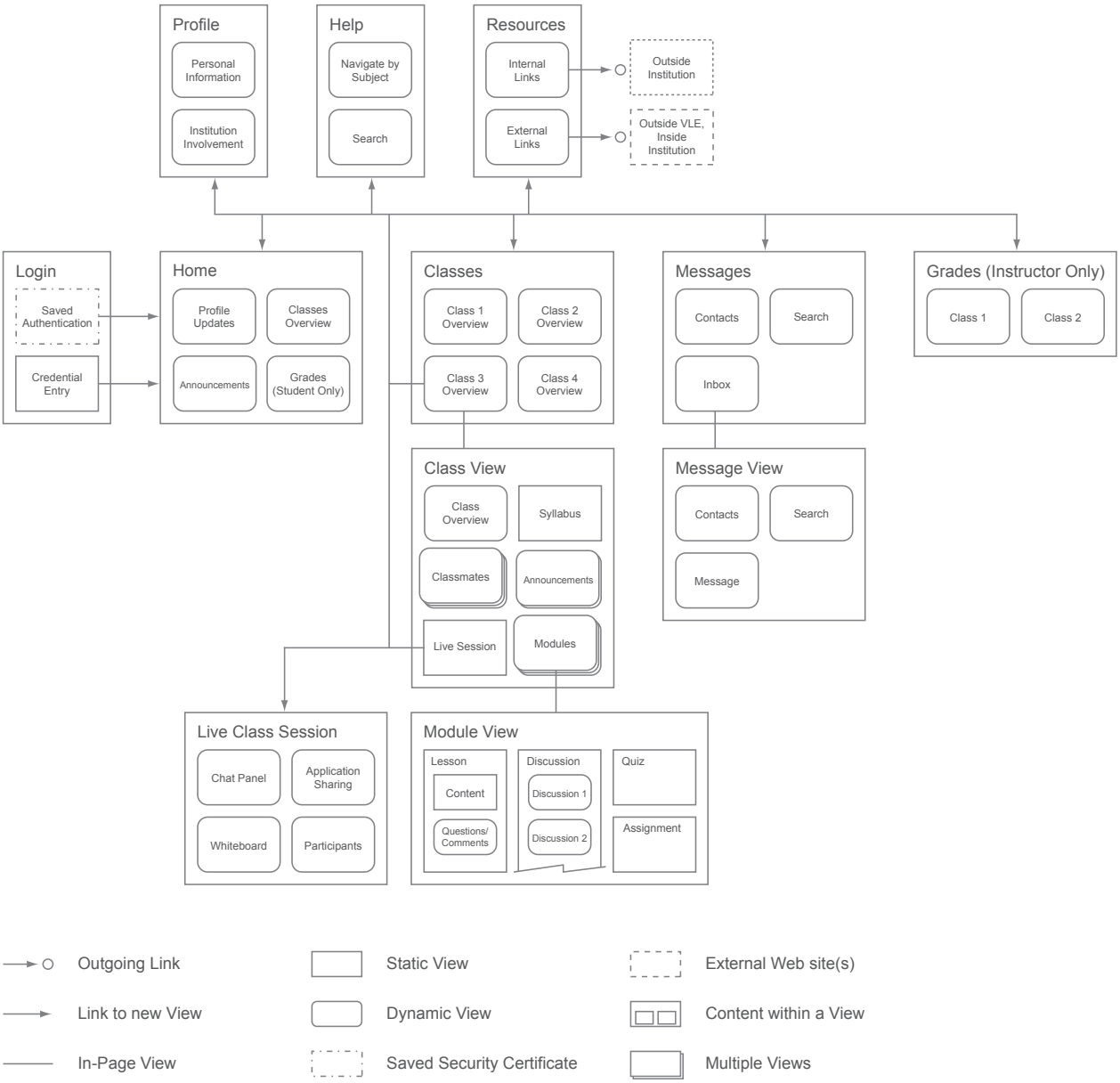
All Users:

- Prevent, display and correct errors
- Provide discussion areas with multimedia capabilities
- Clearly communicate time based announcements, assignments, closing date information and other asynchronous communications.
- Interactive, information and multimedia rich course content Class and course management functions
- Provide a means for classmate and faculty communication
- Multi-platform functionality and 24/7 availability
- Clear and efficient inter-site navigation
- Synchronous applications allowing application sharing, display files for discussion, use microphones/teleconferencing or chat window to communicate, see the names of students in the live session, record the session, view the recorded session.

Faculty:

- Course creation and maintenance materials and guides.

Site Diagram



Task Analysis List

The following tasks are organized by user: those both faculty and students will perform, tasks only faculty will perform and those students will perform.

General Tasks (for full Task Flow Diagrams see Appendix C)

- Log in to system – System will determine if the user has logged in before and whether the credentials were saved. If saved, the user will be taken to the "Home" screen. If not, the user will enter login credentials and then be taken to "Home" screen.
- Enter a class – A user chooses which class to enter.
- Post to a discussion – From within a class, a user posts a new message to a discussion group.
- Reply to a post in a discussion / Reply to comment or question about class module content – A User replies to a post in the discussion area.
- Manage profile (classes, and personal info) – User creates/edits their own user profile.
- Send a private message to student / faculty – User sends a private message to another user.
- View / reply to private messages – User views/replies to received private messages from other Users.
- Find / view help – User views the help area for assistance with website.
- View someone's profile – User views a user's profile.
- Create Group – Students will occasionally create a group within the class for group work.
- Participate in Group – User will participate in sub-groups within their courses for group work.
- Participate in Instant Messaging – Users will be able to connect with other logged-in users via instant messaging.

Task Analysis List

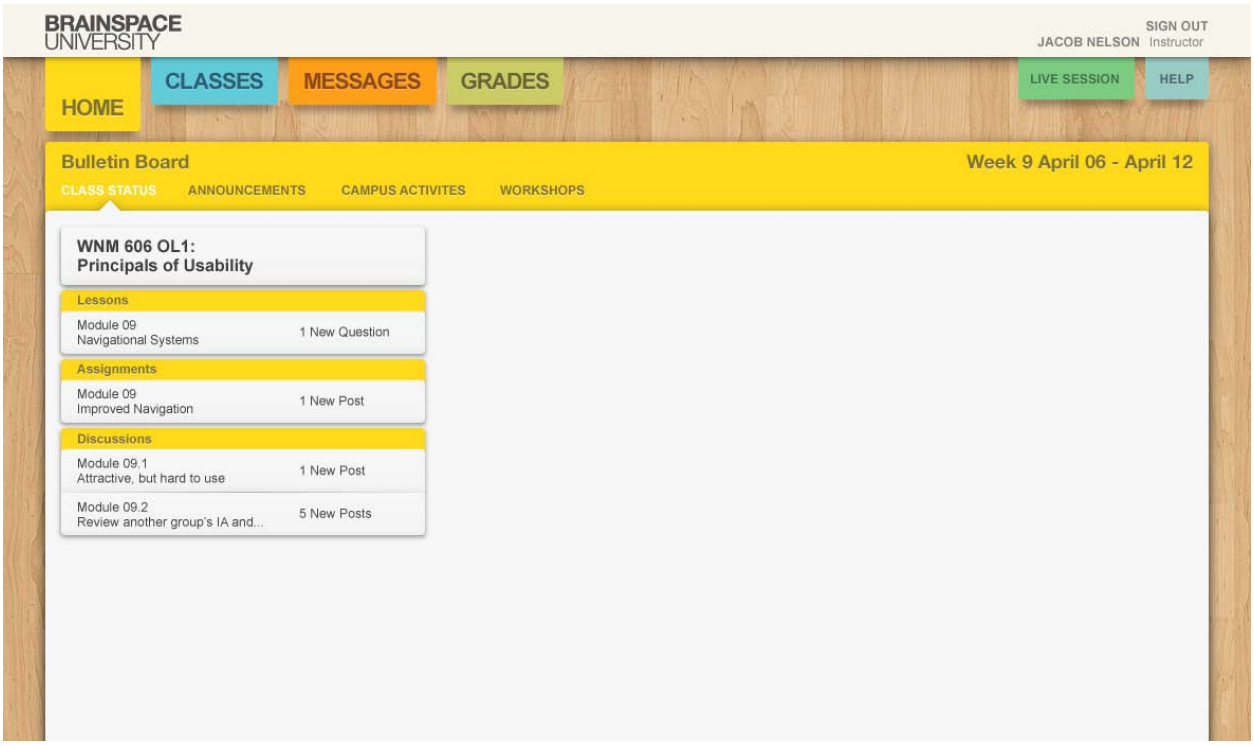
Faculty Specific Tasks (for full Task Flow Diagrams see Appendix C)

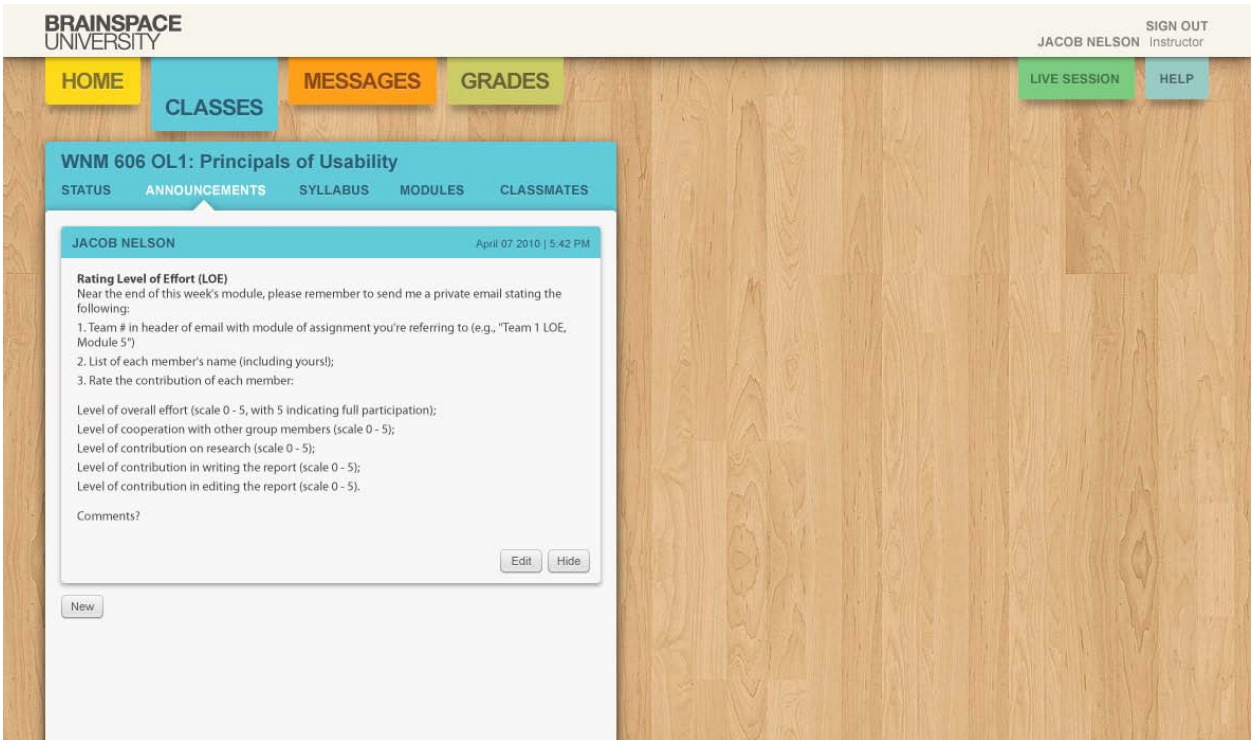
- Build a class module – A user with sufficient privileges creates a new class module in an empty class shell setup by a system administrator.
- Edit class module content – A user with sufficient privileges edits a class module, time lines or syllabi.
- Post an announcement – A user with sufficient privileges posts a new announcement to students' "Home" screen, a single class or multiple classes.
- Build a quiz – A user with sufficient privileges, after choosing the appropriate class, creates a new quiz or test that covers content on one or multiple class modules.
- Grade an assignment – A user with sufficient privileges enters the "Grades" section and then chooses which class they would like to add grades for. From there, they choose the cell in the grade book that corresponds with the assignment and student to be graded.
- Start a synchronous session – Faculty user starts a (live) synchronous session and selects options to assist in moderating the session. Members join session. Faculty user moderates/conducts session (choosing from optional tools), then ends session.

Student Specific Tasks (for full Task Flow Diagrams see Appendix C)

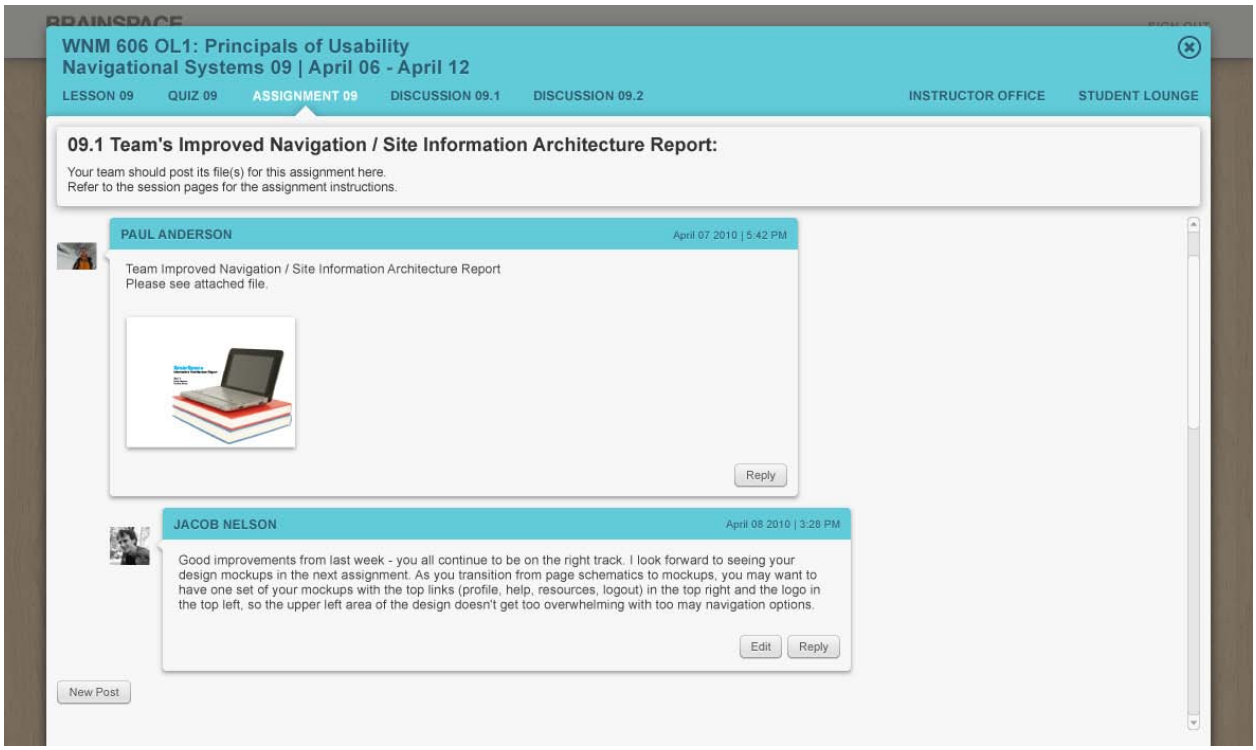
- Go through class module content – User will read content, listen to audio and watch video.
- View general course information (syllabus, time line, announcements) – Students will look at the course time line, syllabus and announcements from a central location.
- Take quiz / test – Students will take a quiz or test.
- Look at grades with comments – Students look at their grades and written or video / audio feedback.
- Enter a synchronous session – Students will enter a live session to interact with instructor /classmates and / or listen to demo instruction.

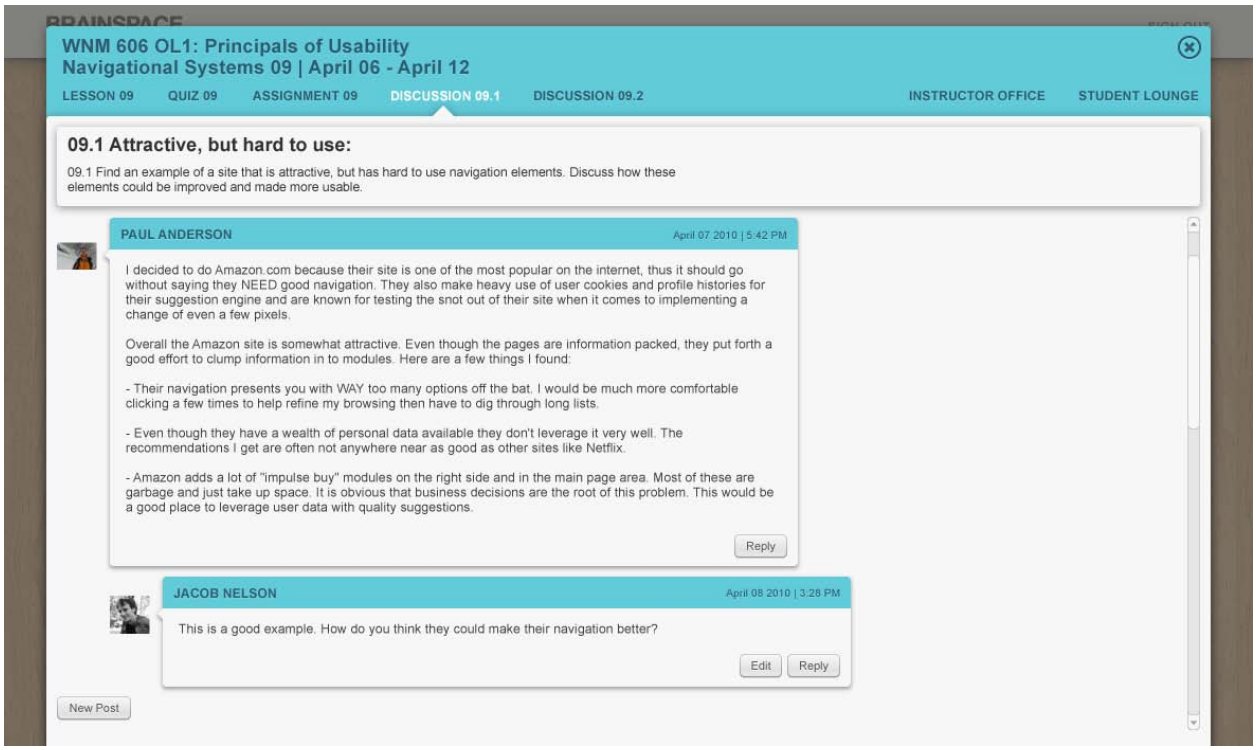
Design Mockups: Faculty



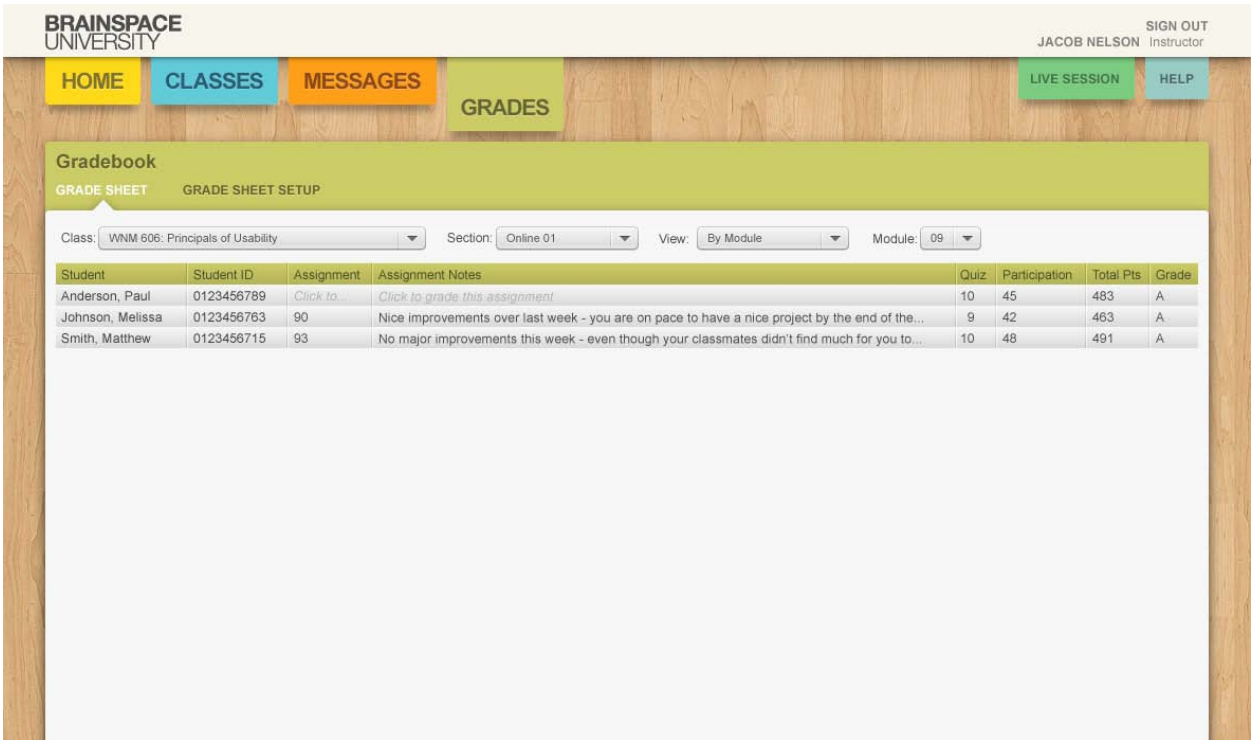


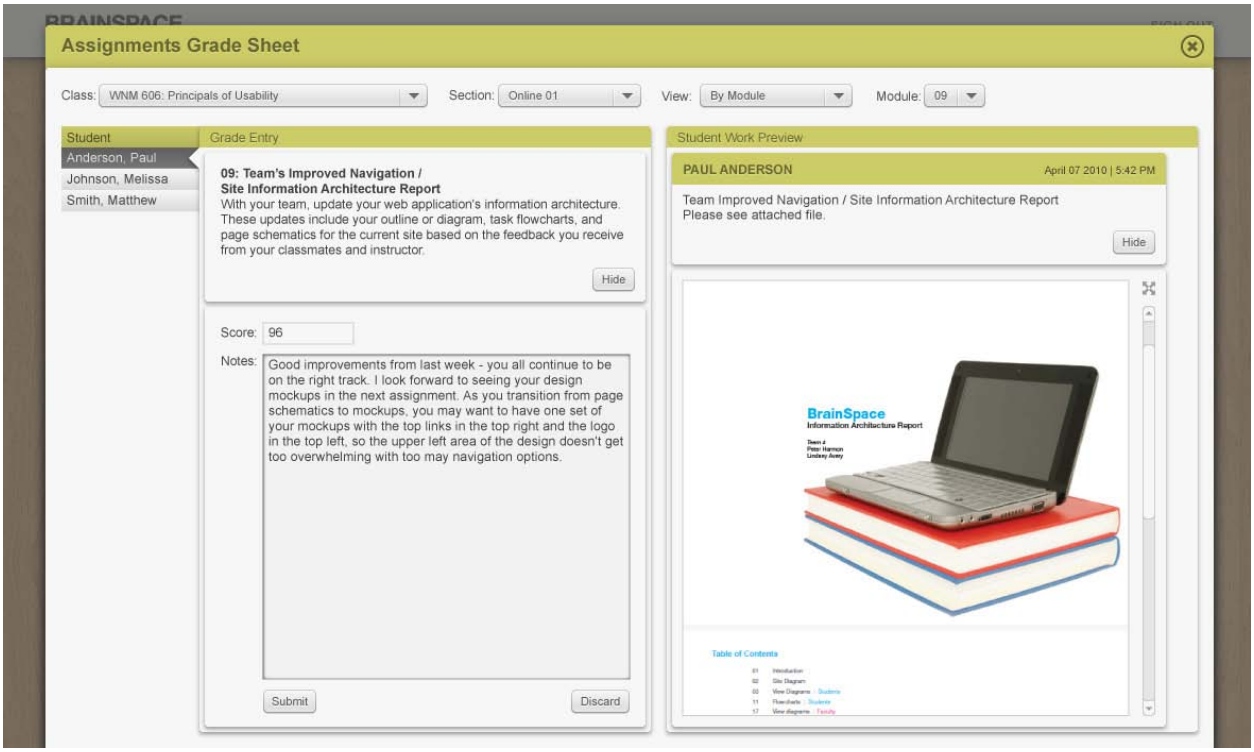
Design Mockups: Faculty



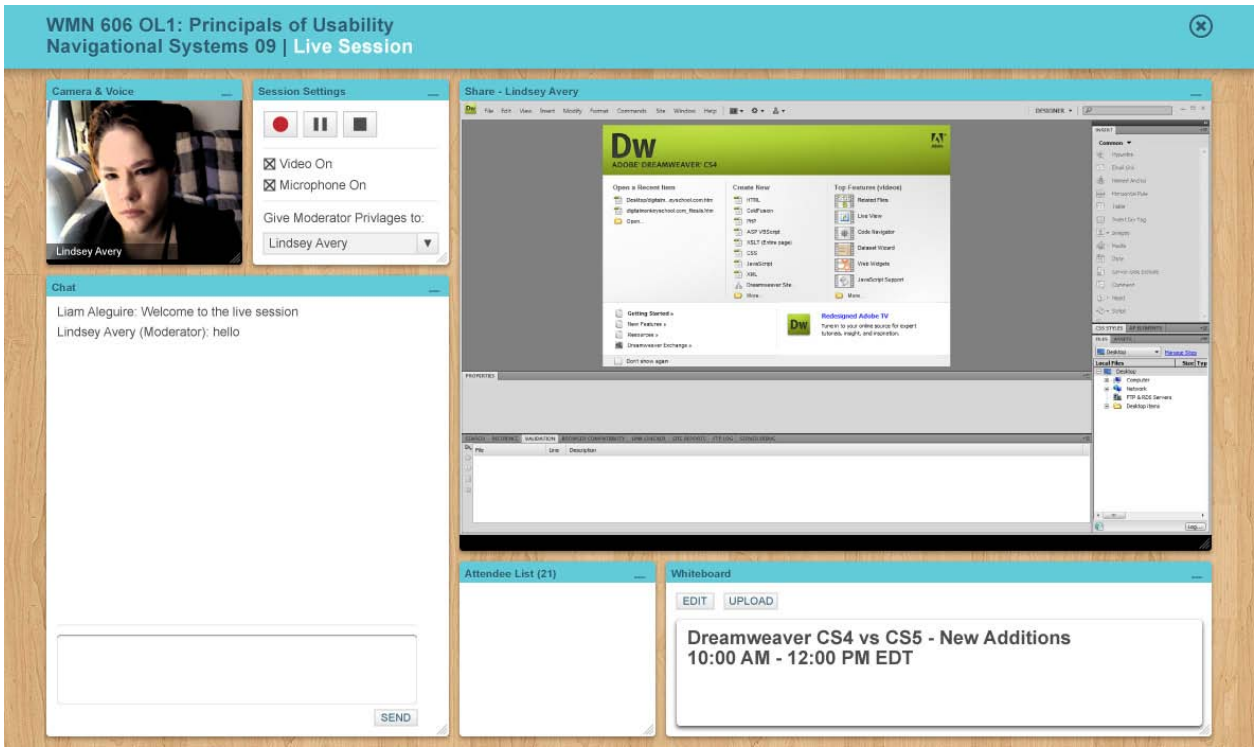


Design Mockups: Faculty

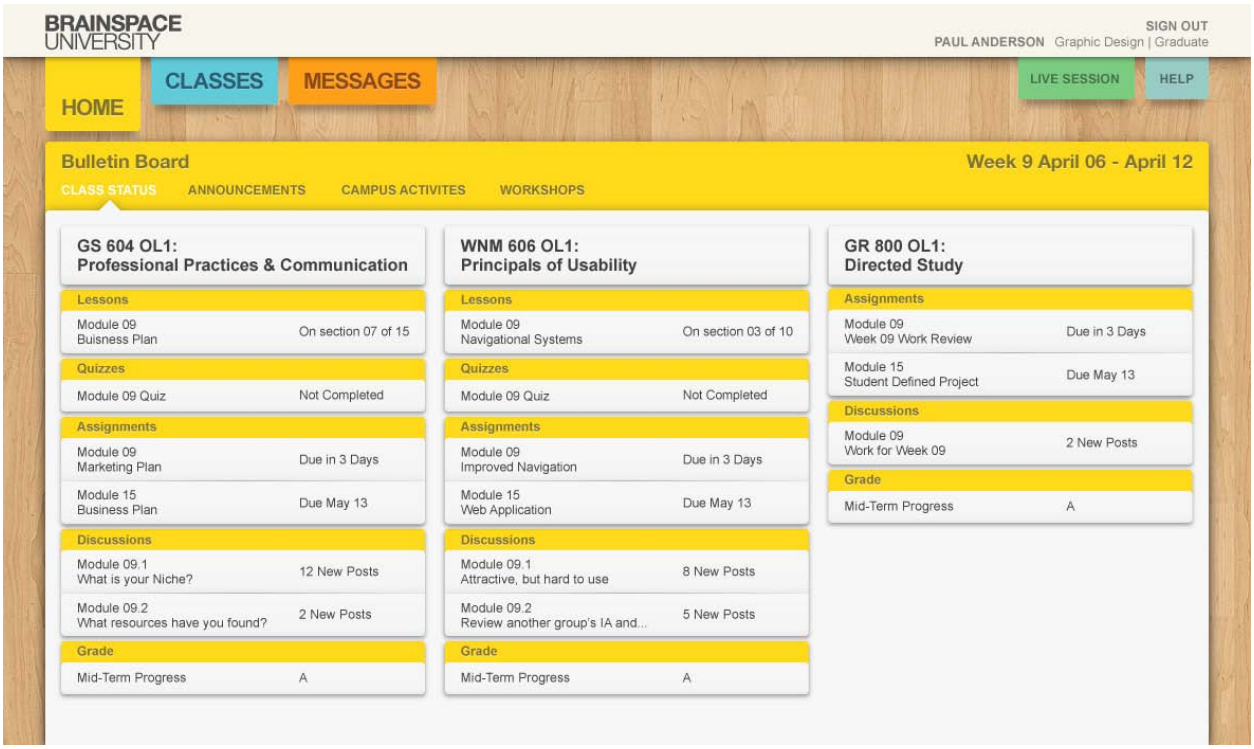


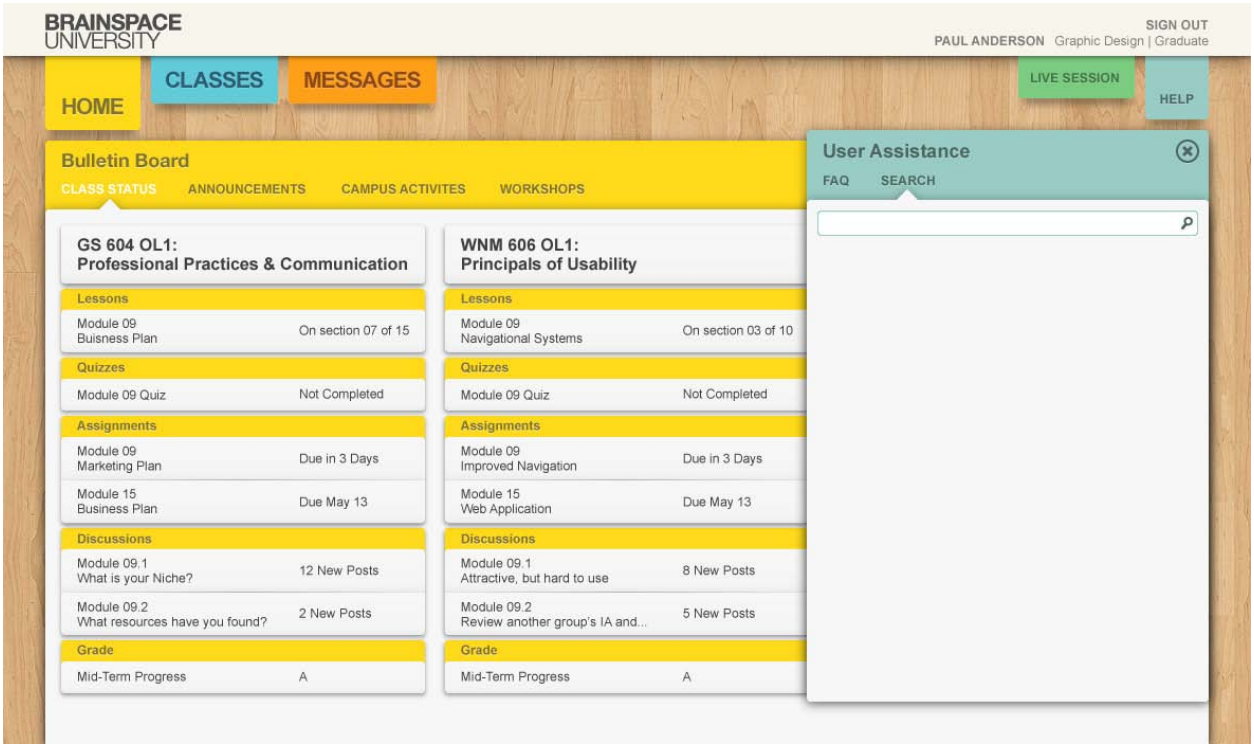


Design Mockups: Faculty

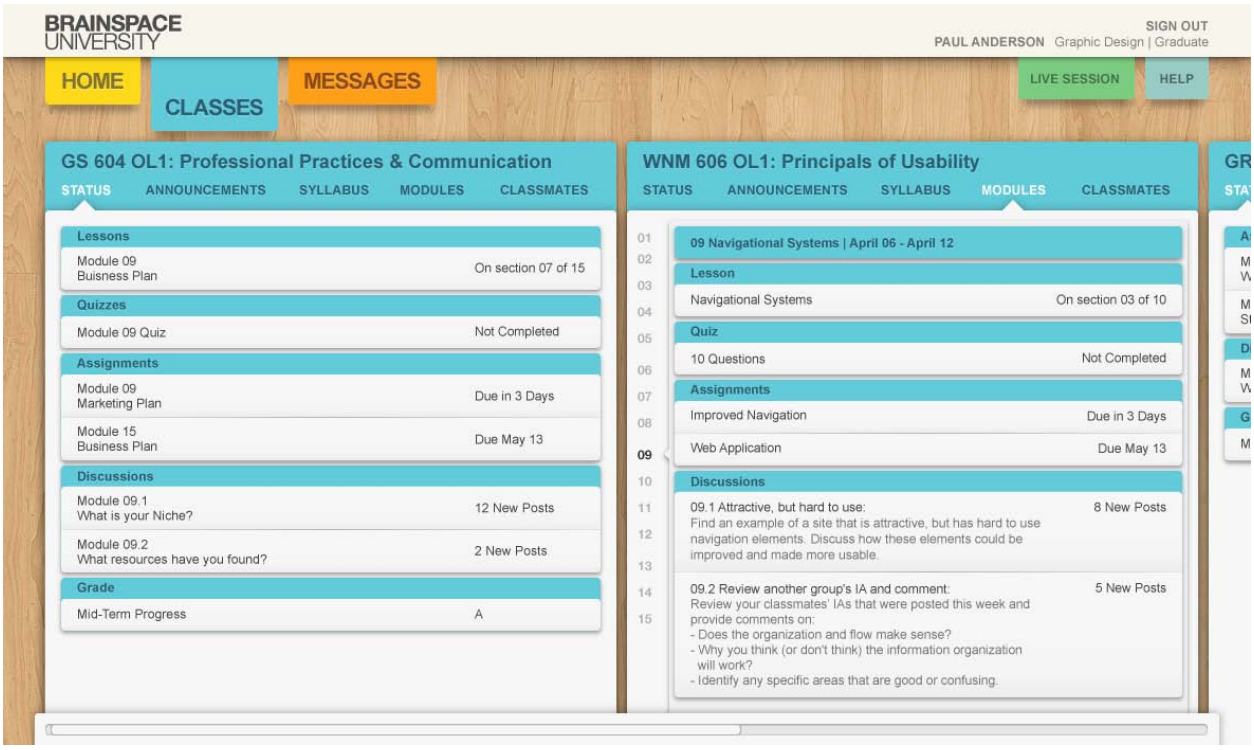


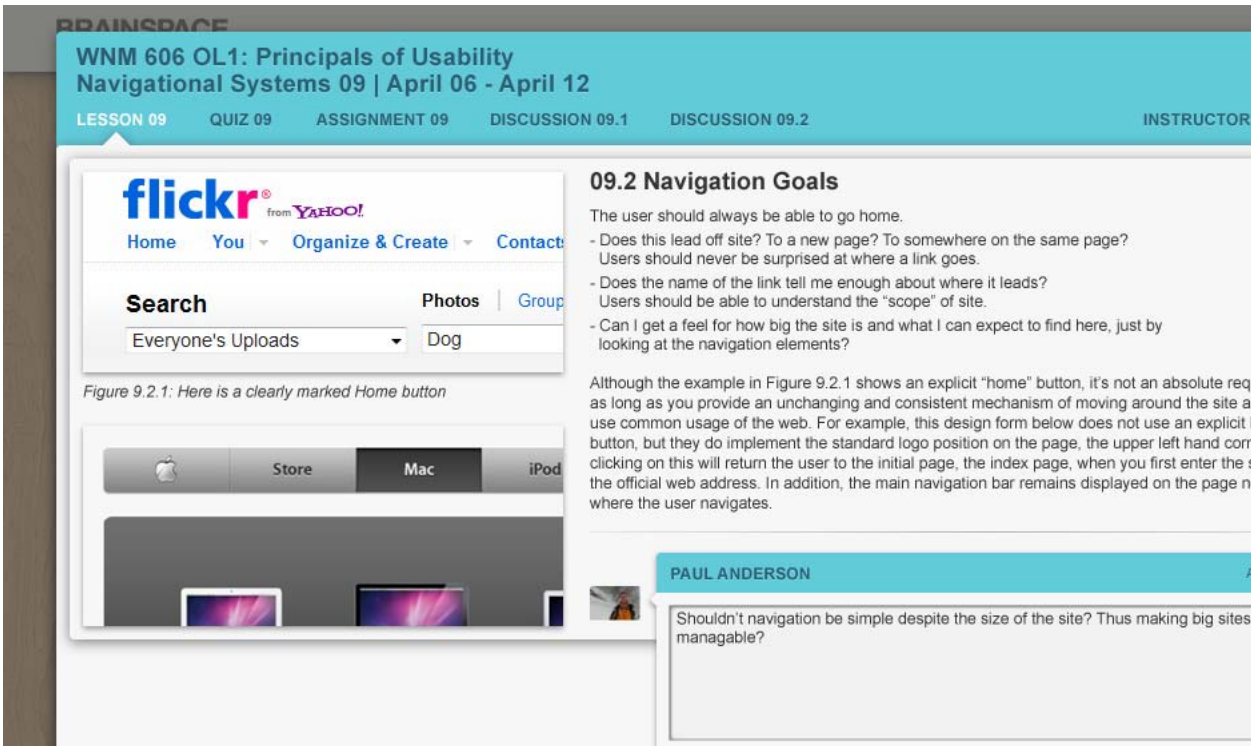
Design Mockups: Student



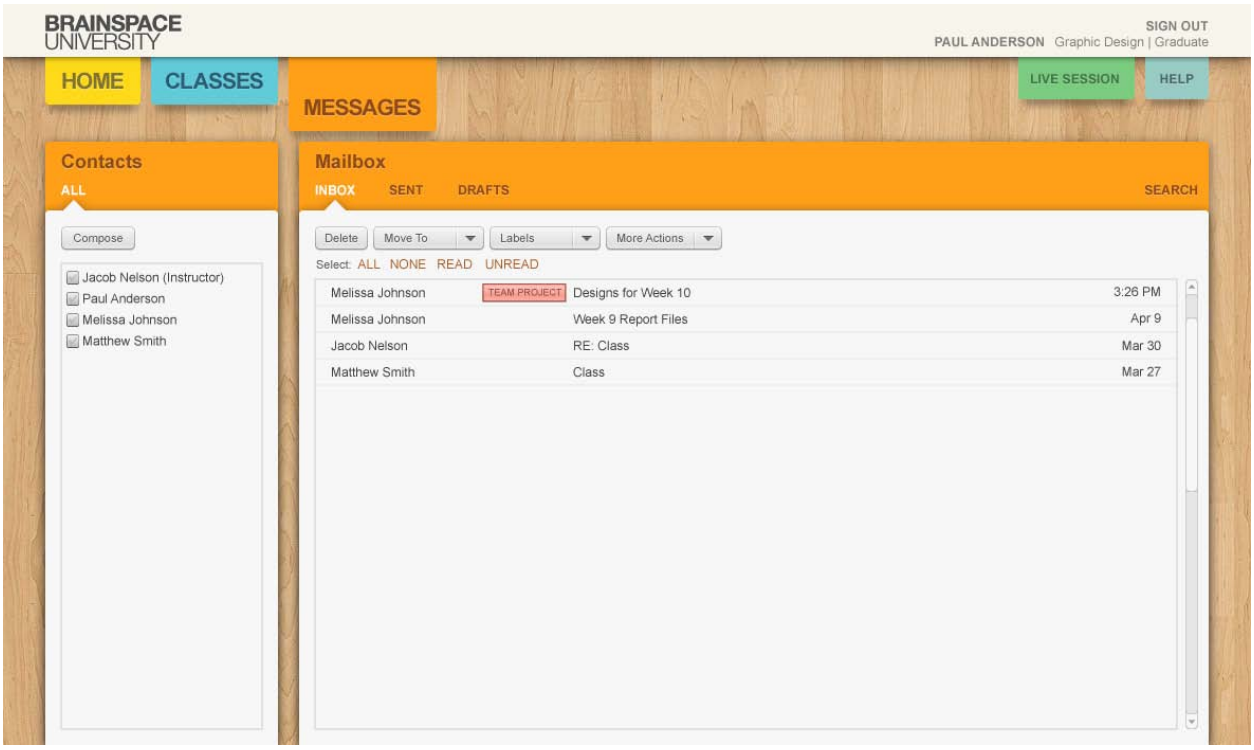


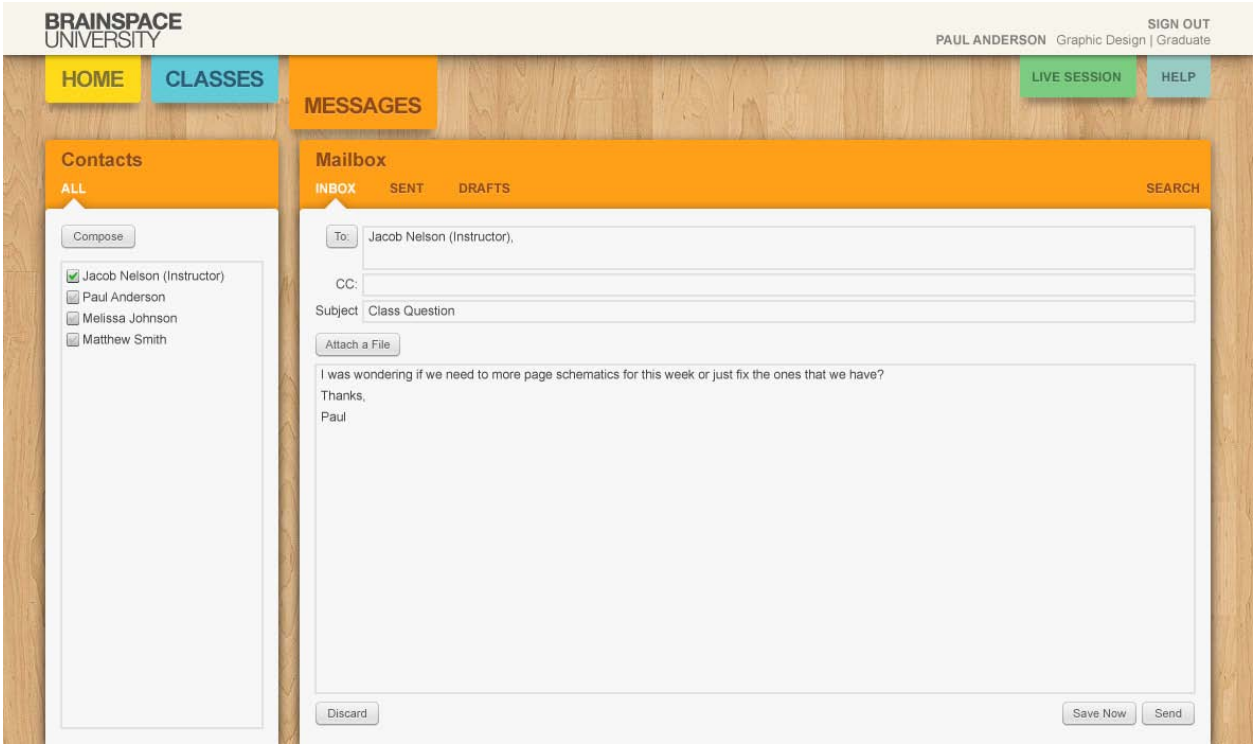
Design Mockups: Student





Design Mockups: Student





Prototype Information

Also included is an interactive PDF, which simulates the functionality of particular sections of the BrainSpace software. The PDF represents some of the most common goals either a student or faculty user might need to achieve. The goal of the prototype is test the mental models used and determine how they may be improved. All applicable text fields in the prototype are “pre-filled” with information to put less emphasis on the process of entering data and more on the mental model employed.

Testing Results and Changes

The nine tasks chosen represent the top user goals for BrainSpace. The prototype was presented as an online, unassisted user test that consisted of the a student perspective interactive PDF, a faculty perspective interactive PDF and an instruction sheet with the task list and post task questionnaire.

After receiving feedback from each tester, it was realized that the tester's common predisposition to a very specific mental model became a challenge when the mental model employed in the prototype for a specific task was not the same as the testers. The high fidelity of the prototype also presented a challenge as tester's expectations for interactivity were greater than what the prototype provided. Beyond these two observations, the following changes were deemed to be necessary to improve the usability of the software.

- Changed the look and placement of the "Ask a Question" button in the *Lesson* section of a class to make it more visible and recognizable.
- Changed the location of the "New Post" button in the *Discussion* and *Assignment* sections of a class to make them more noticeable.
- Made a greater distinction between the *edit* mode and *display* mode for a post by making the *edit message text box* more apparent.
- Added an "Attach a file" button to a post's *edit* mode when they were missing.
- Added another way to add contacts to the "To" field of a message.
- Changed the location of the "New" button after an announcement is posted.
- Changed the look and placement of the "New Post" button for faculty users in the *Lesson* section of a class.
- Added hint text in the grades section for students who still need to have a grade assigned by faculty.
- Changed the way faculty users edit a currently posted grade to reduce the error of it being deleted by accident.

Conclusion

Through our research, you can see the potential for developing an online learning environment that can harness today's growing socially networked culture, instant access to information and multimedia centric learning. BrainSpace seeks to provide a platform where academic and industry professionals can share their knowledge and experiences to a broader demographic of students despite time or place. BrainSpace equipped institutions provide a wealth of capabilities to their instructors. Who can now leverage a vast network of multimedia resources to engage their students more effectively with higher content retention, ending in greater student success and growing future enrollment.

Appendix A
Target Audience Resources: Faculty

Table 2

Skills Needed to Teach Online in 2010

Response Options	Number of Respondents	Response Rate (%)
Course developer	355	66.4
Facilitator or moderator	352	65.8
Subject-matter expert	298	55.7
Instructor or lecturer	273	51.0
Student counselor or advisor	193	36.1
Technology Trainer	162	30.3
Program coordinator or developer	153	28.6
Other	17	3.2
Subtotal	535	96.4
No response	27	3.6
Total	562	100.0

The Future of Online Teaching and Learning in Higher Education:
The Survey Says…(2006)
http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolumTheFutureofOnlineTeachingandLe/157426

Appendix A
Target Audience Resources: Faculty

Category	Number	Percentage
Gender - male	168	63.9%
Gender - female	94	35.7%
Age = < 30 years	20	7.6%
Age = 30 - 45 years	117	44.5%
Age = 45 - 60 years	90	34.2%
Age = > 60 years	35	13.3%
Rank - Full Professor	126	47.9%
Rank - Associate Professor	74	28.1%
Rank - Assistant Professor	47	17.9%
Rank - Instructor	16	6.1%
Status - Tenured	186	70.7%
Status - Untenured	74	28.3%

Perception Differences About Participating in Distance Education (1998)
http://www.westga.edu/~distance/ojdla/spring51/schifter51.html

Appendix A
Target Audience Resources: Faculty

ies NATIONAL CENTER FOR EDUCATION STATISTICS | U.S. Department of Education, Institute of Education Sciences

NewsFlash | Staff | Contact | Site Index | Help | KIDSZONE

NCES GO

Publications & Products | Surveys & Programs | Data Tools | Tables & Figures | Fast Facts | School, College, & Library Search | Annual Reports | What's New | About Us

DIGEST of EDUCATION STATISTICS

2008 Tables and Figures | All Years of Tables and Figures | Most Recent Full Issue of the Digest

◀ Previous Page

Download Excel (37KB)

Table 264. **Percentage of full-time instructional staff with tenure for degree-granting institutions with a tenure system, by academic rank, sex, and control and type of institution: Selected years, 1993–94 through 2005–06**

Academic year, control and type of institution	Percent with tenure														
	Total			Professor			Associate professor			Assistant professor			Instructor	Lecturer	No aca-demic rank
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1993–94															
All institutions	56.2	62.6	42.7	91.9	92.8	87.7	76.8	77.5	75.1	14.4	13.6	15.5	38.3	10.8	26.0
Public institutions	58.9	65.4	45.6	92.6	93.6	87.5	80.8	81.6	78.9	17.1	16.1	18.5	45.5	7.2	28.6
4-year	56.3	63.5	39.3	94.3	94.7	92.0	80.4	81.2	78.4	13.8	13.0	14.8	4.4	5.4	6.1
Doctoral[1]	54.5	62.1	35.0	94.2	94.7	90.1	81.3	82.1	79.2	7.3	6.7	8.3	2.8	2.1	5.4
Master's[2]	60.5	67.7	46.1	95.4	95.5	95.0	79.3	80.0	77.7	23.0	23.0	22.9	6.4	11.7	11.0
Other	51.1	56.3	40.0	88.4	88.8	86.4	76.5	77.3	74.8	22.7	22.8	22.6	4.6	15.0	6.4
2-year	69.9	75.4	63.0	80.7	83.7	75.5	84.2	86.4	81.5	47.7	51.1	44.6	68.9	39.9	65.7
Not-for-profit institutions	49.5	56.0	35.5	90.3	90.8	88.1	67.6	68.1	66.5	9.0	8.7	9.4	6.1	21.9	18.9
4-year	49.5	56.0	35.4	90.3	90.8	88.0	67.6	68.1	66.5	9.0	8.7	9.4	5.5	21.6	15.7
Doctoral[1]	47.6	53.5	31.9	90.5	90.8	88.5	62.5	63.4	60.0	3.7	3.7	3.7	8.9	29.2	15.4
Master's[2]	51.8	59.2	38.2	90.8	91.1	89.8	71.3	72.2	69.6	13.4	13.6	13.1	2.6	0.7	10.5

Digest of Educational Statistics (2006)
http://nces.ed.gov/programs/digest/d08/tables/dt08_264.asp

Appendix B
Target Audience Resources: Student

The following statistics were taken from a Quantcast.com.
While these demographic numbers can be used to support our assumptions regarding the target audience specification, they do lack accuracy insofar as they represent all traffic to a site and not strictly student users.

Quantcast - Academy of Art (2010)
http://www.quantcast.com/online.academyart.edu

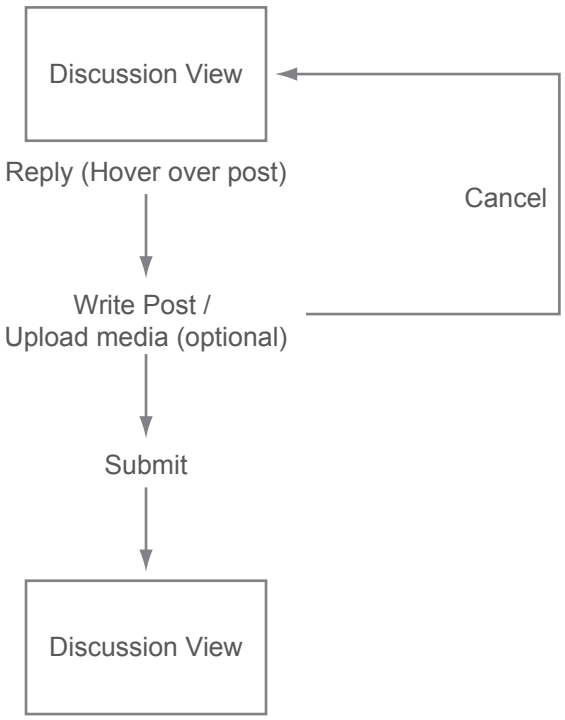
Appendix B
Target Audience Resources: Student

The following statistics were taken from a Quantcast.com.
While these demographic numbers can be used to support our assumptions regarding the target audience specification, they do lack accuracy insofar as they represent all traffic to a site and not strictly student users.

Quantcast - Stanford (2010)
http://www.quantcast.com/scpd.stanford.edu

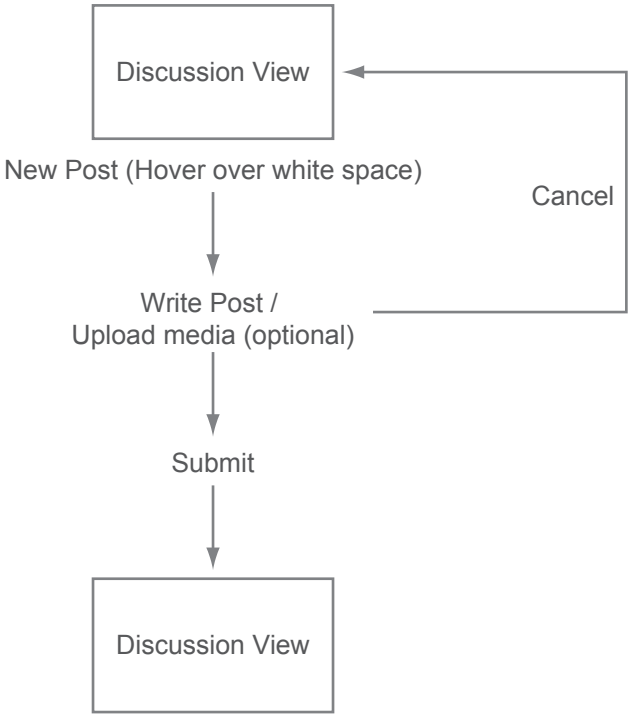
Appendix C
Task Flow Diagrams

Student
Discussion Post Reply Flowchart



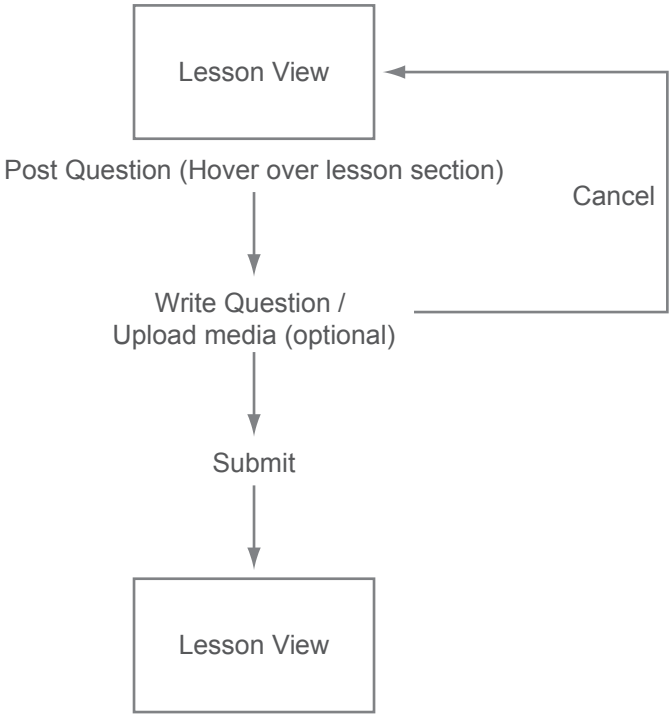
Appendix C
Task Flow Diagrams

Student
Discussion New Post Flowchart



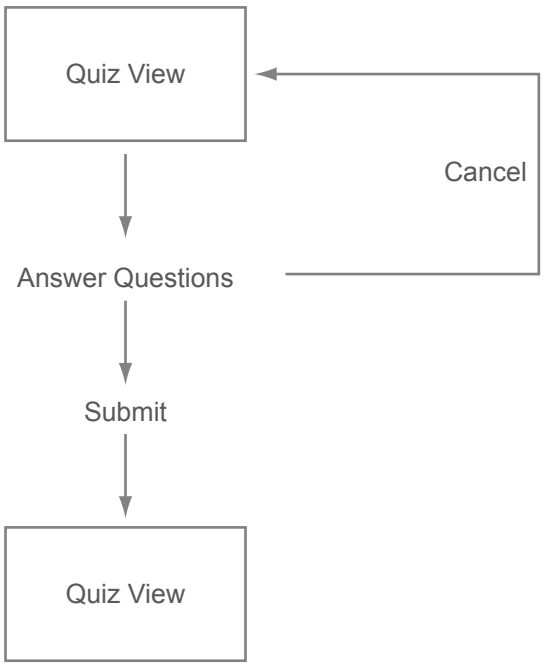
Appendix C
Task Flow Diagrams

Student
Module Lesson Question Flowchart



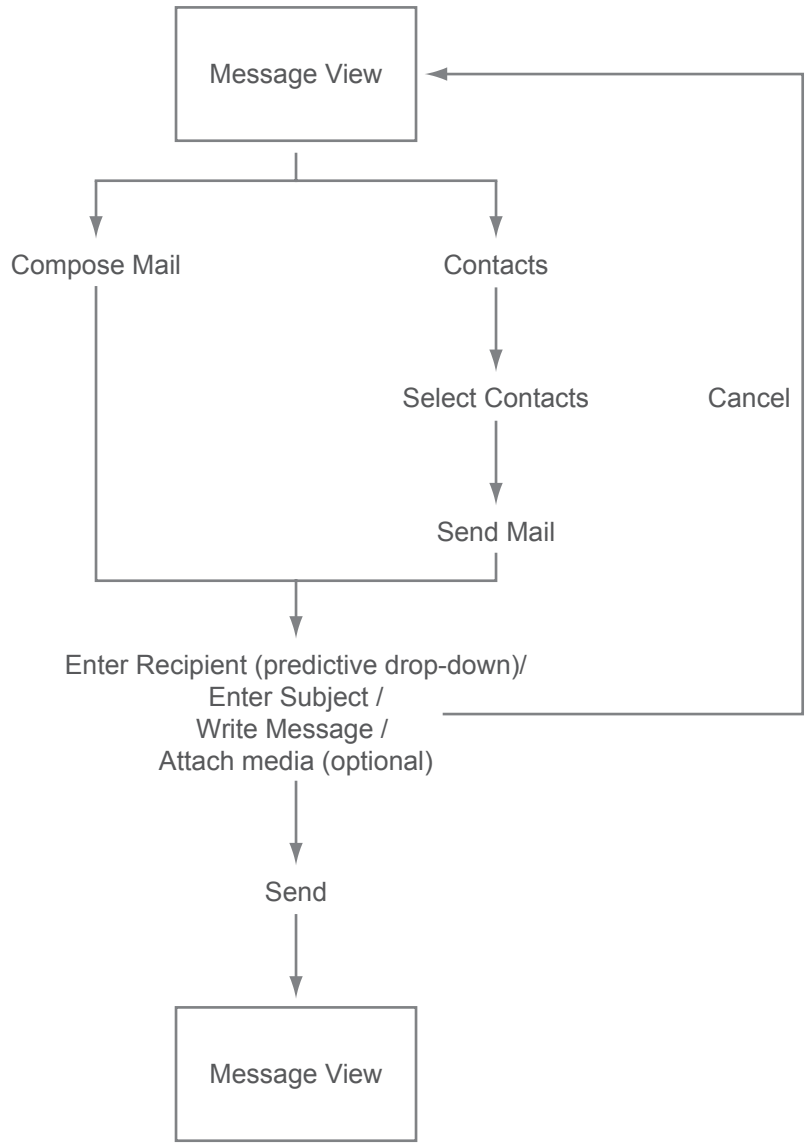
Appendix C
Task Flow Diagrams

Student
Take Module Quiz Flowchart



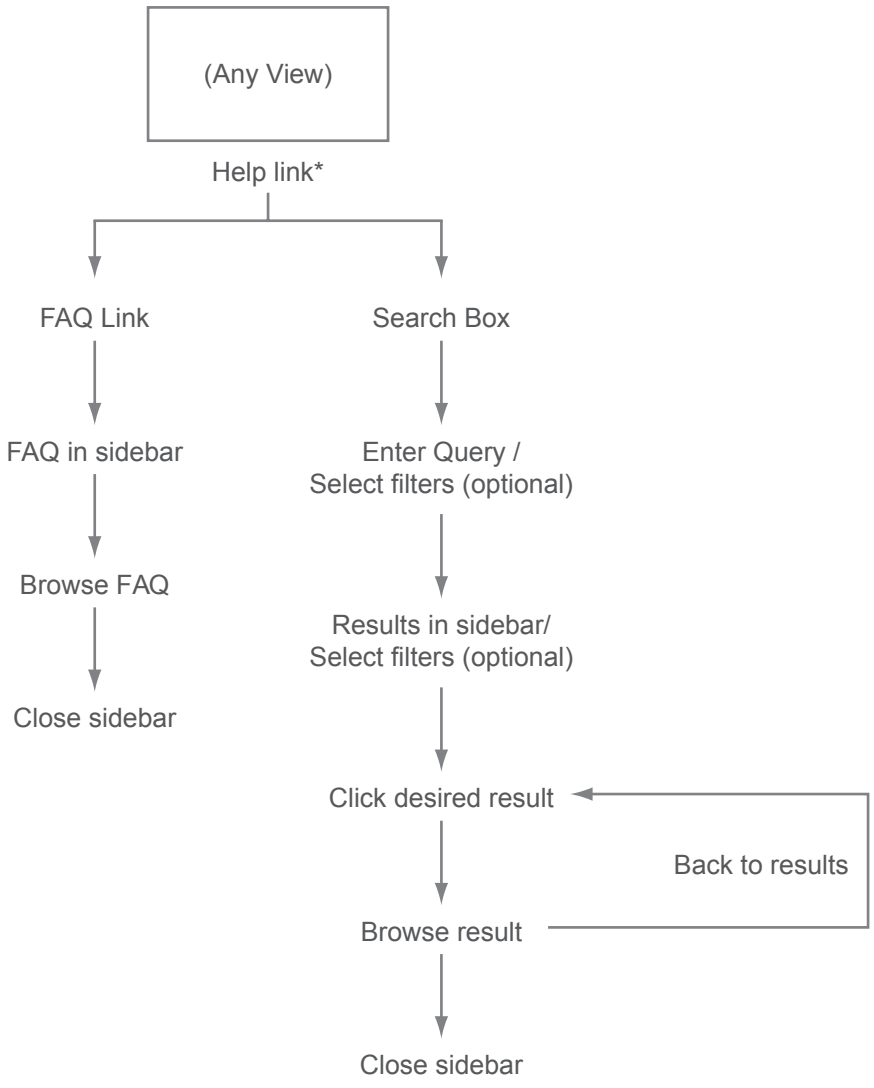
Appendix C
Task Flow Diagrams

Student
Send a Message Flowchart



Appendix C
Task Flow Diagrams

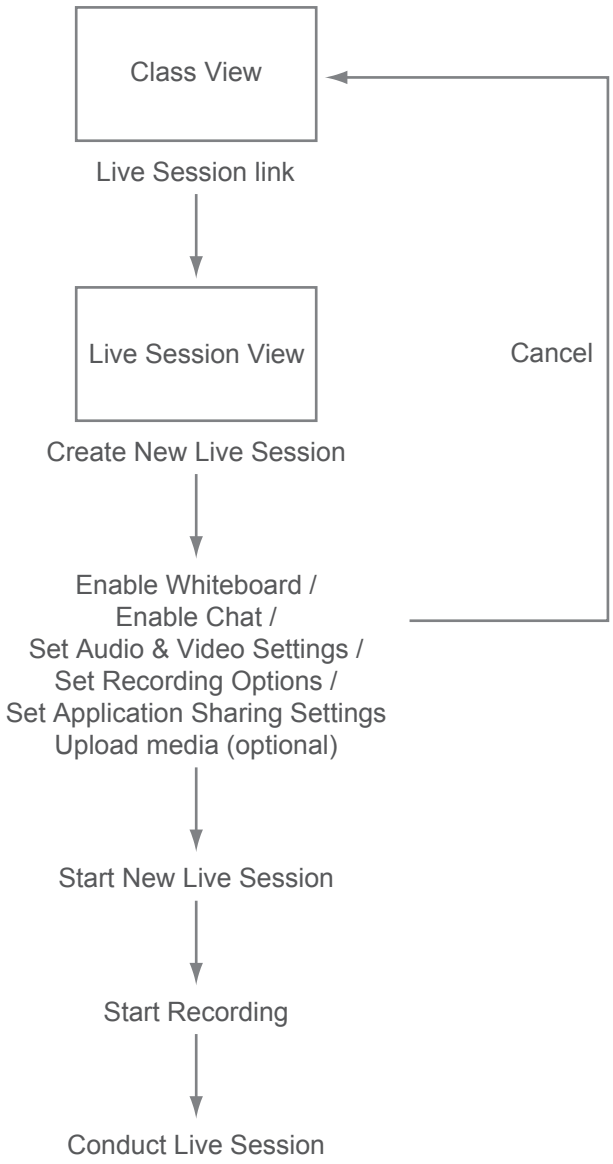
Student
Find Help Flowchart



*User may cancel help at any time by closing the sidebar

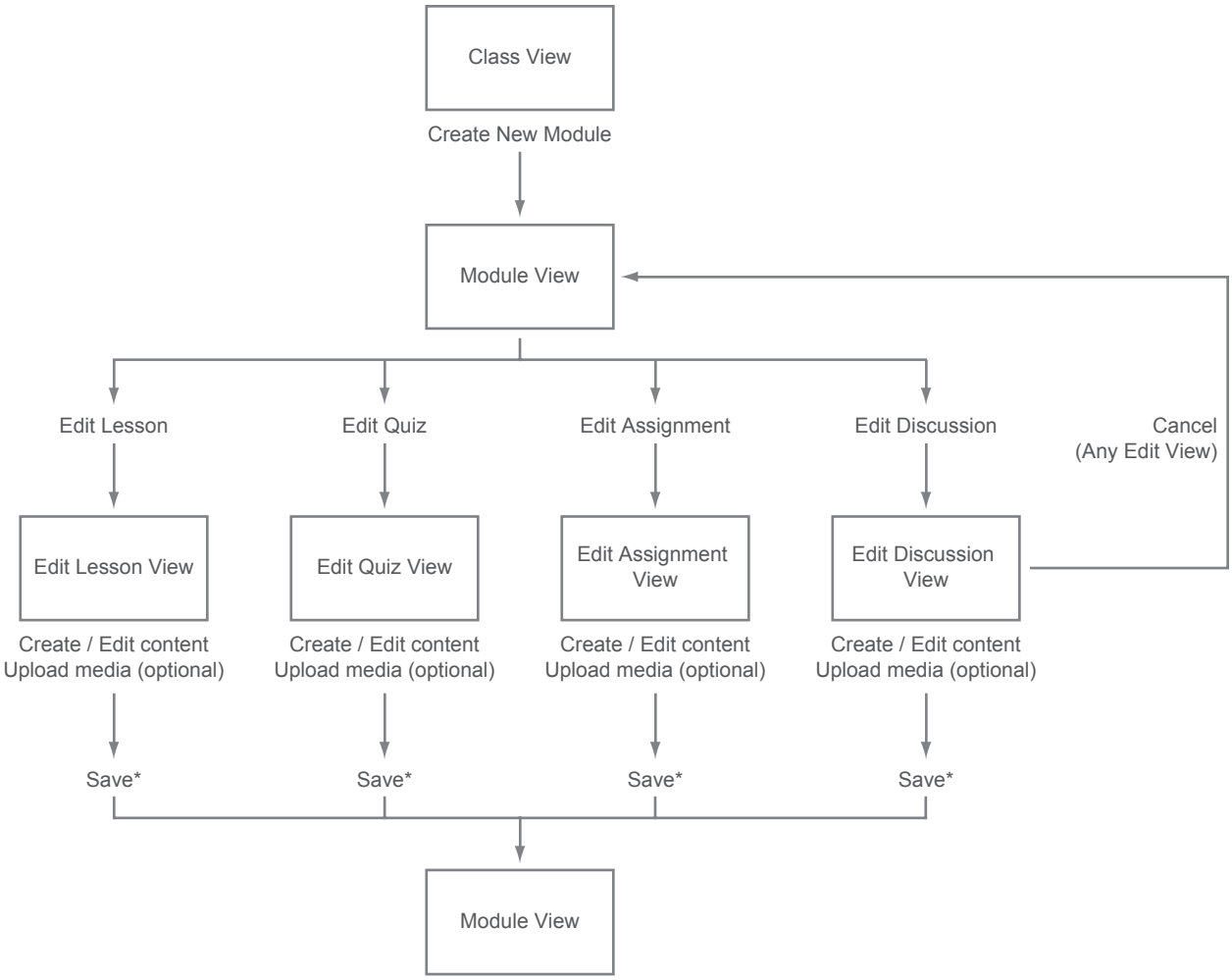
Appendix C
Task Flow Diagrams

Faculty
Start New Live Session Flowchart



Appendix C
Task Flow Diagrams

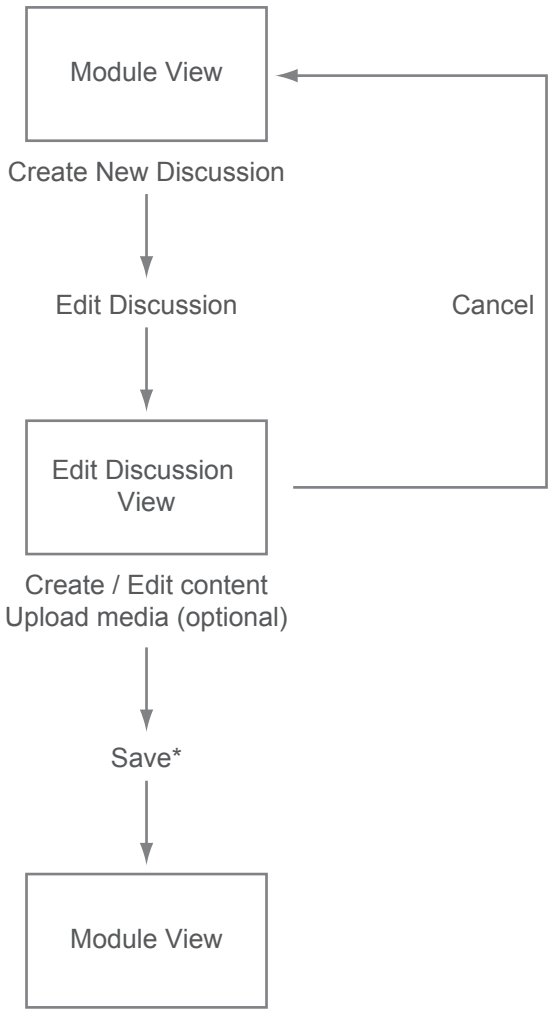
Faculty
Build Class Module Flowchart



*System autosaves after a set interval to prevent loss of data

Appendix C
Task Flow Diagrams

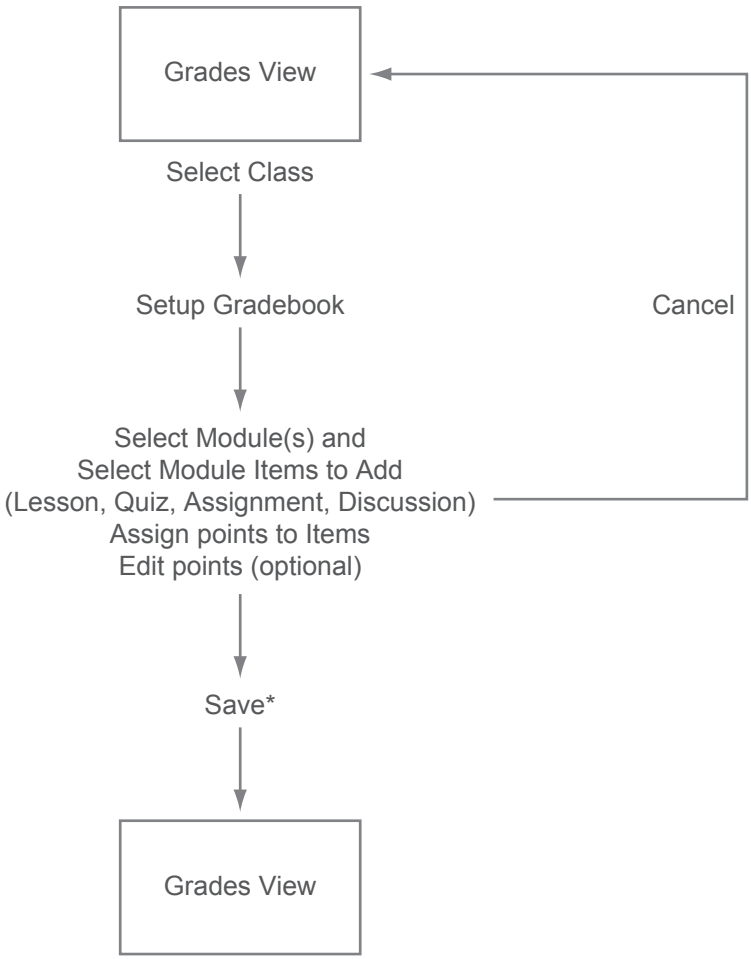
Faculty
Add Another Module Discussion Flowchart



*System autosaves after a set interval to prevent loss of data

Appendix C
Task Flow Diagrams

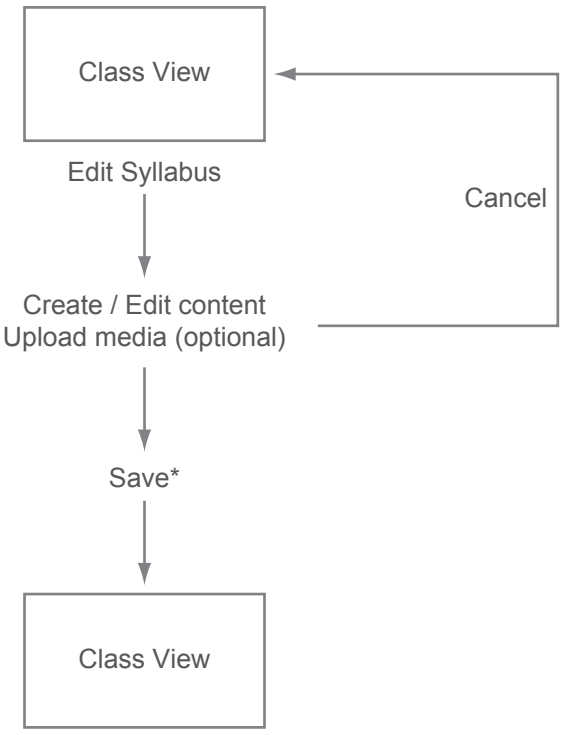
Faculty
Setup Gradebook Flowchart



*System autosaves after a set interval to prevent loss of data

Appendix C
Task Flow Diagrams

Faculty
Edit Syllabus Flowchart



*System autosaves after a set interval to prevent loss of data

Appendix C
Task Flow Diagrams

Faculty
Post Class Announcement Flowchart