RTHINKING ONE TO MANY COMMUNICATION AT OLIN
The Exciting Tale of Team ONLY

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**Problem Statement**

College students use many methods of communication, including email, instant messaging, phone calls, and mailing lists. From preliminary user interviews, it was found that college students tend to be subscribed from anywhere from just a couple of mailing lists to over a dozen, with the traffic from those lists constituting anywhere from 15% up to 90% of the volume of their received emails.

While the individuals interviewed placed a different level of emphasis on each of the following goals, the overall primary goals of mail list users are the following:

- **Keep up to date** about the culture and people’s interests.
- **Discuss** things with people who have similar interests.
- Learn about **events** get people to come to my events.
- **Help** other people, so if I need help people will listen to and help me.
- Build **community** around personal hobbies.
- Get information from the “**experts**” on a certain topic.
- **Advise** others with the ultimate goal of increasing one’s reputation.
- Find people who share certain **common interests** or traits.
- **Avoid feeling silly/embarrassing** myself in front of others.

After having explored when and how college students use mailing lists, it was the goal of this project to adapt mailing list technology to better serve its users, putting an emphasis on the ways in which community may be built and information may be quickly obtained, and taking care to make this process as easy, intuitive, and straightforward as possible for all users. This is necessary to shorten the time it takes for new users to feel comfortable enough to actively contribute to a list.

**Solution Overview**

To meet these user goals, we propose a web based system for managing mailing list subscriptions. This system shares much of the functionality of the existing Mailman system, but reorganizes it in a way that will make it much easier to manage all aspects of users one-to-many communication goals. The redesigned system makes it easier to find interesting new lists, subscribe and unsubscribe from lists, browse the archives of lists, search for posts across all lists, and make connections with other users with similar interests. We have also added the concept of “smart lists” – lists whose membership is automatically defined to be all people sharing some characteristic, like a certain floor in a certain residence hall, or enrollment in a particular class.

Details of our design, including specific notes about each page as well as ways in which it could grow in the future are included below. In section five, we discuss how our design evolved, including some very promising design ideas that we chose not to pursue, but that we still believe have some promise.

**Personas and Scenarios**

As a result of our interviews, we developed two scales to define the user pool. The main differences between the users of the mailing lists system are largely based upon the experience they have with technology, and their social comfort. Based upon these two primary distinctions in the users, the following conceptual user space was developed.
From our experiences in the interviews, the high-tech and high-social region of this graph seems to be fairly desolate, as does generally technically inexperienced users. We felt like each of the resulting areas represented an important class of users with unique needs, and made sure to fit our personas into those general zones. The first letters of each of our personas names are placed in their respective zones.

**Lara**

Lara is a junior who does well in classes and is involved in Olin culture. She is the social butterfly who surrounds herself with people and likes talking to people when the opportunity arises but she’s usually pretty busy with classes and meetings. She is part of SAC and SERV. She wants to make Olin livelier.

Lara knows about lists and uses them for committees and to find and announce social events and concerts. Finding new lists isn’t a priority nor is the creation of a new list. Lara is a member of 7 lists that she is completely aware of and is sure to at least skim the e-mails that come from the lists for pertinence.

Lara really wants to be a mechanical engineer and is really interested in mechanical based classes but has developed an interest in design as well. Although Lara likes getting some breadth in her classes she’d rather get more mechanical classes if possible. She likes to keep on top of her academic work and although she does sometimes procrastinate she tries not to. Lara is part of the Baja project and enjoys learning more about the design, planning and manufacturing of the entry for the competition.

Lara is a proud Texan; she has the lone star flag outside her door and always brings her favorite brand of salsa to put on her huevos rancheros during weekend brunches (she often doesn’t get up quite early enough to order eggs during the week). In her free time, Lara enjoys dancing (specifically clubbing) and music in general. She loves up-and-coming artists and loves to listen to emerging bands and go see their concerts whenever she can. Lara is quite the weekend warrior and lives by the axiom, “Work hard. Play hard.”
Zoë

Zoë grew up in a small town of about 30,000 people in Kansas. She was reasonably involved with high school activities, but had the most fun outside of school with her church’s youth group. Her mother is an avid cook, and passed on that passion to Zoë, who often prepares meals for the family at home, as well as for larger groups of people through youth group. Her mother also taught her to sew at an early age, which she has recently started doing more of in her free time.

Zoë is now a freshman at Olin College. She’s pretty shy in person, and has a little bit of a hard time meeting new people, but she opens up a lot when she gets to know someone better. In general, she’s most comfortable when talking about interests she shares with someone, so she tries to remember what interests she shares with everyone else on campus. While her main hobbies in high school were cooking, sewing, and youth group, she’s excited to get involved in new activities and organizations at Olin, and signed up for tons of different mailing lists at the club fair. She’s not actively involved in most of them, but she feels good keeping tabs on what kinds of things are going on around campus and offering to help out with things when she feels like she has the time and expertise needed. Her best friends are people she’s met through events organized on lists – mostly through cooking events. Zoe’s especially enjoyed being on Carpe-diem and the Cooking Club list because it means she can hear about cooking related events and meet people interested in either eating food or helping prepare food. She finds this makes conversation a lot easier, and some of her best friends are people she’s met doing cooking related things. While she has yet to post to Carpe-diem, after a few months with the cooking club she’s sent that group a couple of emails – one time asking for help when she was making a cake and realized she had forgotten to buy vanilla, and the other time she sent out a savory recipe that many of the cooking club members had asked her for.

Academically, Zoë is excited to be at Olin. She had a fantastic math teacher in high school who showed her the beauty of numbers and rigorous proofs. This was always an aspect of her personality that she could never really express around her high school friends, and so being at Olin has been a liberating experience for her. She’s slowly warming up to engineering in general, but her high school preparation was pretty good, and she’s generally confident that she can succeed. She’s more worried about social success than academic success.

Her biggest social fear is looking silly or being embarrassed. There are a lot of cultural elements of Olin that are very different from home, and she’s had a hard time adjusting. She’s generally not that confident with technology, and is shy about asking for help and worried about making technical mistakes in front of other people. She actually picks stuff up pretty quickly, but lacks the self-confidence to stop worrying about making mistakes.

Geoff

Geoff’s a sophomore. While a quiet person, he enjoys communicating electronically or in person with his friends about their common interests. He enjoys taking the time to stop and talk with someone who is having problems (which he calls “challenges”, not problems) getting Matlab to perform optimally or sorting out a Linux detail. While he’ll take the time to stop and talk about something – he finds himself most frequently engaging in intellectual discussions, and rarely a casual chat.
The quiet aspect of his personality still does not mask the confidence he has in his computer skills. He has followed lists for long enough that he has a certainty that when he does share something through a list it will either help other people out or they will find it interesting. Science and math classes have always captured his attention, although they have never really been his passions. His involvement in FIRST was a huge motivating factor in his life. Although it’s a program targeted at high school kids, because his older brother was involved in it, he followed him to it after school and started participating while in 7th grade. The desire to show up his older brother was and to some extent still is a motivating factor in his life.

Right now he’s really into his girlfriend, an Olin student also in her sophomore year, from Texas. She spends a lot of time doing homework and hanging out in his room (his roommate is from Natick and is always spending time there with his family or in Boston with his girlfriend so he doesn’t mind). He considers himself lucky and happy to have found someone who shares some of his interests and is an intellectual peer. While quality time with his girlfriend and the xBox in the lounge takes priority, in his free time he goes for an occasional run. Putting on weight has never been a concern for him – he runs occasionally because he knows he should. Running is as of lately taken a seat on the back burner as he is busy applying for internships for the upcoming summer, hoping for one in Texas.

**Final Interface Description**

Our mailing list system is built around three main objects – people, lists, and threads. For each of these main objects, we have a page that shows a high level of detail about a single object, and a page that shows little detail, but shows many of those objects at once. For example, a search results page shows many threads, and clicking on any of those threads zooms in and shows all the posts in that thread. This felt like a natural way to tightly link these objects together in a way that would make it easy to browse through the system. This system is shown below. Pages that show more than one of an object are in red, and pages that show detail views of an object are in blue. Detailed descriptions of the functionality of each of these pages are shown below.
We also introduce the idea of “smart lists” – mailing lists whose membership is automatically generated based on certain details about people. For example, the west-hall list would contain everyone living in West Hall. Smart lists encompass various categories of information, including class membership, year of graduation, residency, and gender. Membership in smart lists is required and inflexible – it isn’t possible to subscribe to or unsubscribe from a smart list. Other than the way in which the membership lists are generated, smart lists look the same and behave the same as any other list.

We leverage membership in smart lists as a way of understanding the implicit connections between people in the form of the network panel. The network panel shows how an arbitrary group of people are connected through their smart lists. This reveals important patterns, like where on campus people with similar interests live, what classes are popular for subscribers to a certain list, etc. These patterns are an important way to build social awareness and discover other lists or people that someone might be interested in interacting with.

Individual Page Descriptions

Front Page (multi-list view)
This page is the heart of the system. It shows all lists and provides an interface for filtering them. Lists are organized into a table, showing the list name, number of posts per week, the name of the list administrator, and a link to subscribe to the list. When the user is logged into the system, it also shows their list of current subscriptions. For each list the user is subscribed to, they can change list settings or unsubscribe from the list.

Interactions The list filtering system provides a range of preset queries that the user can make to focus the displayed lists section. First, the option to include/exclude lists designated as dormant or private is provided through a pair of checkboxes. Clicking on either of these immediately updates the list. When dormant or private lists are shown in the main Displayed Lists table, an icon is prefixed to the list name to designate their status. Users can also filter lists based on list type (all, all lists, all smart lists) or by specific keywords (eg clubs, discussion, classes, etc). These filters combine with the include/exclude dormant/private checkboxes discussed above. Selecting any item in the combo box immediately updates the Displayed Lists section.
Links The title of each list in the Displayed Lists section of this page links to the appropriate list detail page. Each administrator name links to the administrator’s personal profile.

List Detail (single list view)
This page is designed to serve two purposes – help users decide if they want to subscribe to this list, and make it easier for current subscribers to get to other subscribers and archives. With this in mind, this detail page provides four important types of information; the list description, the member list, recent threads, and a keyword list.

Interactions This page is largely just a synthesis of available information. If users want to subscribe and are logged in, there is a “subscribe to this list” link here, as well as a mailto link that emails the list itself.

Links This page is loaded with links that make it easy to browse through other lists, people, and threads. The keywords section links back to the multi-list view, showing only lists with the same keyword. The recent threads section has a link to the list archives, as well as short blurbs from recent threads on the list, with links to the thread detail. The member list shows the first 14 members, with the administrator called out separately and a link to a multi-person view displaying all the members of the list.

Thread Detail (single thread)
The contents of a single thread, which is composed of a series of posts displayed linearly, are displayed in the thread detail view. Each post is displayed with its author, post-date, post content, and a series of buttons (reply, reply to list, forward) that operate on that specific post. The thread subject is displayed at the top of the page. A “Network” panel is provided to allow the user to quickly identify the kinds of people involved with this particular thread.

Interactions The network section allows users to explore the relationships between the authors on this thread. The top of the panel includes the names of all the
people who posted to this thread. The bottom of the panel shows all the smart lists shared by more than one member of the list. If the user mouses over one of the people links, the names of the smart lists that user is part of are highlighted. The reverse is also true – if the user mouses over any of the smart lists, the names of authors who are part of that smart list are highlighted. In this way it is easy to explore what facets are shared by people involved in this thread.

**Links**
The author-names of each post link to that person’s detailed profile. A link back to the list that this thread appears on is also available. The network section also links to individual profile pages, as well as to list-detail pages for the included smart lists.

**Archives/Search (multi-thread view)**
This page is used to support generic queries, to explore the archives of a single list and to search for threads across many lists. In both cases, it shows previews of each of the threads that meet the criteria. In the current system, it is only possible to view all threads on a certain list; search algorithms are not included. These previews are formatted the same as on the list detail page.

**Interactions**
There are no special interactions on this page, though there would be room for another network-style panel here to show relationships between the threads, e.g. shared authors between threads and then their shared smart lists.

**Links**
Each thread summary contains a link both to the original author’s profile page, as well as to the detail view of the thread.

**Member List (multi-person view)**
In the current prototype, this is very barebones – it includes only the complete member list for a specific list. In principle, it could be used more generally for any instance in which it makes sense to browse through a list of people, e.g. search results from profiles, etc. It could also include more columns of relevant information about the person, for example number of subscriptions, average posts per week, most active list, and so on. It would be valuable to be able to sort this table as well.

**Interactions**
In the current prototype, there is very little interaction here. As in the archives/search page there is room for a network panel here too that would operate in exactly the same way as on the thread detail view.

**Links**
The names of each person link to their profiles. In an expanded version of this page, mentions of their post frequency could link to all their recent
posts, or the name of the list on which they are most active could link to
that list.

Profile Detail (single person view)
This page contains all relevant information about a single person. In our current
prototype, information is arranged into three columns. From left to right, these columns
are – smart list subscriptions, recent posts from this person, and public subscriptions.
In general, our prototype of this page is missing lots of potentially exciting features.
Providing more fine-grained information about which subscriptions this person is most
active on (in posts / week) would be valuable, as would a network pane with links to
people with similar subscriptions both in lists and smart lists.

Interactions For now, there are no major interactions on this page, only links to other
detail views. In future versions, it might make sense to add a “watch this user”
feature, which could subscribe to this user's posts.

Links Each column links to its appropriate detail views. For each subscription,
the link goes back to that list's detail view, and each of the “recent
threads” links goes to the appropriate thread. Also, the numbers in
“started 42 threads and 17 responses” are linked to search results pages
that show all threads or all responses from this person.

Log In Bar
This bar appears on all pages within the mailing list system. It provides access to the
log-in page as well as access to search functionality.

Interactions When logged out, the bar shows a log in link and a reminder that to
(un)subscribe to any list, they must log in. This link takes the user to a
separate (secure) page where they would enter their password. When
logged in, the log in link is replaced with a log out link. For now, the
search button links to a static search results page, but were search
actually implemented, it would search for lists/threads/people containing
the words in the search field. It might also make sense to add radio
buttons to set the context of the search, eg “within this thread” or “across
all threads.”

Links A link back to the main page is always included in the log in bar. Future
versions might also include some sort of bread-crumbs here as well.

The product that we have developed is a great way to start approaching the problem of creating a
better mailing list, though there are still many features and improvements that could be made to
our design.

Future Work

Networking
On the thread view page, the networking idea enables the user to connect smart lists
and users, by either highlighting a smart list and seeing which users are subscribed to it,
or by highlighting a user to view their smart lists.
On that same thread view page, we may wish to consider in the future adding the regular lists to the networking panel, such that a user may also view what other interests the authors of the thread share. Whether this feature would truly be helpful to the users is unknown; implementing it and interviewing users would provide us with that information. Also, adding networking features to the multi-person view (such as the listing of all of the members subscribed to a current list) would provide the user with access to more information.

Further advanced development of the networking idea would include a visualization of the way in which people, threads, and lists connect. For example, perhaps loosely following the fundamental ideas of http://musicplasma.com/, a dynamic diagram could be displayed. Perhaps a given list could be selected. Within this list diagram, all actively participating members could be shown as spheres, appropriately linked by the topics of the threads conversations they share. Alternatively, perhaps the list names could be the main spheres of a diagram, connected by lines of people who share membership to those lists, with thicker lines showing more shared membership. In either of these scenarios, the size of the spheres could perhaps reflect either activity (in the case of people and their posts) or number of members (if the lists are displayed as the focus of the diagram), and the color and color intensity could convey other information about the data. Users could click on any of the displayed data to shift their focus or obtain more information about the data displayed.

During the course of the project, our team periodically fantasized about various possibilities of displaying large quantities of information through such visual methods, but never did we concretely establish how this would be done, as the other more traditional ideas of our project always ended up taking precedence, especially since those ideas were easier to convey and very readily accepted by users. The effectiveness of this idea was hence never explored, but if in a future semester other students wish to build upon our work, developing this idea has the potential to make the mailing lists an amazingly powerful tool.

Searching and Archives

Both of these features were, at face value, added to the design of the site. However, in both cases there is very limited functionality and much room for improvement.

Ideally for searching, the user could either look for a term anywhere within any of the publicly available lists, or make use of advanced search features to select a given list, genre of list, date, or user to narrow down search terms. This basic model of searching has been effectively done on many well-used websites, so this design would be largely based on existing working models applied to our system.

For archives, currently only a long list of previous threads is given, such that in an actual application of this idea, navigating through the archives of a list would be a challenge. Archives could be sorted in some way (using a format described in the search section), or at the least a certain maximum number of results would be displayed at a given time on the screen to not overwhelm the user.

Security Issues

In terms of security issues, the currently developed system is only appropriate for the Olin community. How to involve people outside of the immediate Olin community,
including even just cross-registered students is unclear. If the mailman usage requires a
domain name and password, those individuals would need to be given access to such
things.

Furthermore, it’s important to prevent spammers from harvesting email
addresses from the site. Email addresses would need to be hidden from non-subscribed
people who are using the site to prevent acquisition of addresses for spamming
purposes.

**Graphic Design Work**

Generally speaking, over the development of the list site, much progression was made
on the appearance of the website. However, the style sheets and many specific
formatting decisions are good but not yet optimal. Determining ways to tweak the
appearance of the website to optimize its readability and navigability is an important area
of further work.

**Table Sorting**

A great tool that was not implemented but that we did discuss early in the project was a
way to sort tables. In our initial paper prototypes, users approved of the idea of being
able to click on a column heading of a table to be able to sort the table by that piece of
information. This design idea is largely based upon our interactions with Outlook and the
ways it provides to sort emails.

**Tools**

Because we were modeling a service that was currently a website, it made sense to use
HTML and CSS to manage the content and layout of our interface. The specific
technologies we used to present the prototypes evolved over time. We started with
purely static pages rendered in HTML with CSS with some JavaScript to provide very
responsive interactive features. In the second and third prototypes, we shifted to a
database (mySQL) and scripting system (PHP) to provide the system depth that was
necessary to let users really get a feel for the system.

The experience of working with the tools has been generally positive. Existing
tools like Dreamweaver have made editing both HTML and CSS pretty easy for both
people experienced with HTML and CSS as well as those new to both. We’ve also done
some work with emacs on the server. JavaScript is extremely powerful, and more than
capable of providing the interactive functionality we need. It’s easy to invest as much
effort as is appropriate into the prototype – we can stop with a page at the HTML level,
or add preliminary CSS, or polish the CSS. We’ve made extensive use of phpmyadmin
for easy database management. The combination of mySQL and PHP is very well
documented on the web, and are a great combination of languages for prototyping.
Features and pages were added in a very organic process with a “just make it work”
attitude towards code planning and coordination. Towards the end of the project, the
code felt more and more clunky and convoluted, but it never became so crufty as to
substantially slow development.

We developed the prototype for a single browser platform (Firefox), so we
avoided most of the classic interoperability frustrations that people have with this toolset.
Still, development has not been without frustrations. The Dreamweaver tools are nice,
but because IT wouldn’t turn on SMB or FTP or WebDAV on the fsweb server, none of Dreamweaver’s collaboration functions will work. This means there is always the danger of overwriting someone else’s changes. This was particularly problematic when we made the move to PHP/mySQL which made it was necessary to run all code on the server. We didn’t have any serious conflicts, but we had to be very careful about it at all times.

Javascript played a much larger role in earlier prototypes than later. We had a vision for a highly dynamic site in the spirit of Gmail or Google Maps using extensive JavaScript. As we progressed into the second and third prototypes, it became increasingly clear that this was not feasible for a prototype, nor did it yield a substantially better user experience. Once the database was added, it would have been necessary to wrap the database with a web service that could run queries, and build a JavaScript application into the page that could run requests and run XML transforms. While attractive for a final product, this would have been miserable to do for a prototype. For low volume local use, database queries, posts, and gets run fast enough to provide nearly instant feedback to the user with substantially less development work. The only JavaScript we ended up using was to do timely reloads on the main-page when filter settings were changed, and to manage the interactivity of the Network panel on the thread detail view.

**DESIGN EVOLUTION**

**Metaphor Explanation**

The collective goals of our imaginary users could have been met through any variety of different systems that include both discussion and announcement-based communication. In this initial design ideas phase, one of the main objectives was to develop fundamentally distinct approaches to accomplish the same user goals. Two possible metaphors to meet the goals of the personas were explored. The general functions in both of the designs are essentially the same, but the metaphors used and the way of displaying the functions differ.

The first of these methods, the Mailing List / Subscription metaphor, allows control of both discussions and announcements through the same interface. The second of these methods, Using Physical Metaphors for Different Types of Communication, has separate interfaces for discussions, spontaneous announcements, and announcements for planned events. The discussion interface takes the form of informal discussion tables in a cafeteria. Planned events are represented through a bulletin board metaphor.

**Idea 1 - The Mailing List/Subscription Metaphor**

The current mailman implementation uses a mailing list metaphor which we would keep in our design. Each mailing list is something like a magazine subscription, where you can choose to receive the issues or not.

This design revolves around this main page. From the main page one can get descriptions of clubs, see moderator names, and see recent e-mails. After arriving at this page, the user can authenticate or search using links on the top bar. If the user has already logged in then a link to the user’s options would be displayed. The username and password would be the student’s domain user name and password so that they don’t have more settings to keep track of.
The search bar would be to the right of those text boxes on that same bar. Searching can be done throughout all lists or in specific lists. This specific bar will be visible throughout the user’s time in the lists site.

The list of lists would populate and sort alphabetically by default. The sort variable can be chosen to be something else and can be ascending or descending, similar to the interface in Outlook for sorting e-mails. The rightmost column would have checkboxes so that users could click to subscribe instantaneously and easily. When the user has been authenticated, clicking on the subscription check box will (un)subscribe – there are no confirmation emails or confirmation boxes. As the project evolved, user subscription methods changed significantly. We originally thought this feature was one of our most exciting and innovative, but ultimately it was entirely reworked.

There would be a short description of the list in a small pane at the bottom left of the screen. This information corresponds to the list selected above (the selected list will be shaded to show it’s selected). Next to that would be another pane showing who the moderators are as well as, depending on the list, most active members and recent mailings to the list. Included in this information will be links for more detailed member and recent mailing information. During the development of the design, this feature ended up being removed as it duplicates information on other parts of the site. Also, while the preview pane idea was familiar in client-side applications, it was largely an awkward thing for users when it appeared in a web application.

On the right side of the screen would be more information about the currently selected list and what keywords it has. This is where one would find out if the list has been dormant for a certain length of time, whether it is a club, class, or other type of organization as well as whether anyone can join the list. By default, all of the clubs would be displayed and this box could be ignored by novice users. However, very quickly users could notice that (un)checking the boxes gives them more control over the properties of the lists they are viewing. As the project developed, this feature was implemented and found confusing, so it was later simplified such that only one keyword at a time may be viewed.
Idea 2 - Building Physical Metaphors for Different Types of Communication

This idea was only developed in the first stages of the project, and then abandoned to enable our group to more deeply explore Idea 1. This design idea contains 3 major components, each of which is designed to meet the needs of users wishing to communicate a certain type of information. (A more detailed description of this idea may be found on our team website.)

- The Cafeteria
- Spontaneous Announcements
- The Bulletin Board

The Cafeteria

The purpose of the cafeteria is to organize discussions. Like in a real cafeteria, the user may decide where he would like to sit down and participate in discussions. This metaphor of organizing discussions as discussion tables in a cafeteria works in many ways.

- The tables are labeled with the name of the topic being discussed (like the cards used to label specific tables in the cafeteria).
- When you have identified yourself to the system (authentication), you can see which tables you are sitting at / in which conversations you are participating.
- The size of the table shows you how many members are at it; intuitively, larger tables are needed for discussions in which more people are participating.
- Clicking on a table allows you to “Zoom in”, giving you more information:
  - The administrator, who “sits” at the head of the table.
  - The specific people sitting at a table.
- The colors of the tables may correspond with the type of discussions if the tables are categorized.
- The intensity of the color of the table represents the traffic – more active discussions are displayed in a brighter hue.
- Private discussions will have a “reserved” sign on the table. That notice may be clicked on for more information about the nature of that discussion group, why it is private, and who you can contact for more information about it.
- Like in a real cafeteria, you can see where people are sitting. For the interface, you can type in the name of someone to view in which discussions they are participating.
- It is possible to eavesdrop. Here, eavesdropping is the option to look at recent emails from the discussion group and peruse the archives.
- There is an empty chair at each table labeled with something like “Join this Discussion!” inviting people to participate by clicking on that chair.

Spontaneous Announcements

Spontaneous announcements require their own special form of delivery. Often, special announcements need to be made in a timely manner for a quickly approaching event (maybe a movie in the lounge or a trip to Wendy’s Drive-Thru) and may not interest the entire student body.

Defining which students may be interested in the nature of a special announcement being sent out is difficult. To deal with this problem, this system initially
emails *all* new students with the spontaneous announcements. In the footnote of the message there are several links present:

- Do not send me more announcements with activities at this time in the week for the rest of the semester.
- Do not send me more announcements about this type of activity.
- Do not send me more announcements from this sender.
- View my personal announcement receiving preferences.

Each of these links takes the user to a page where (for the first 3 options) their new preferences will be automatically filled in and will take effect upon the user clicking “Ok” or (for the last option), the user may view which preferences she has already set. These set preferences will determine whether or not the user receives a future announcement email.

Spontaneous announcement emails are composed differently than normal emails. The time of the event is entered into a special field. This way, should the receiver of the message not be able to attend for scheduling reasons, she may select the link in the footnote labeled "Do not send me more announcements with activities at this time in the week for the rest of the semester" to avoid receiving more messages for activities scheduled at that time. Tags are also entered for the event (examples might be "clubbing", "Boston", "food", "movie", etc), so that if the receiver of the message is not interested in this type of event, this preference may easily be noted. The interface for composing these emails will include tools for discovering the appropriate vocabulary for describing your announcement, so emails are consistently tagged.

**The Bulletin Board**

The Bulletin Board is a way to inform the student body of general happenings. It is not discussion based like the cafeteria, nor does it contain spontaneous announcements. Organized, pre-planned events – such as a student social, a study break, a Habitat for Humanity Build date – would be announced using this tool.

There is a Bulletin Board website on which someone wishing to make an announcement can post a “flyer” with the basic event information, a short description, and an expiration date.

With a frequency specified by the user (by default once per week), an email is sent to students containing the current Bulletin Board flyers. The body of the email contains all of the flyers, and clicking on a specific flyer will open up a window containing the additional information about the event. If students wish to view the Bulletin Board more frequently, they may always go to the Bulletin Board website to view the latest version.

**Metaphor Selection**

After fleshing out these ideas, we considered both options and decided to pursue Idea 1 for the following reasons:

- Idea 1 is based on an idea that already exists. The primary list page we are developing is similar to the format of Outlook and this familiarity will be welcomed by the users; Idea 2 would require a bit of an adjustment in how the system is viewed.
• The physical metaphors were clear, but they force users to make conscious decisions about which kind of communication they were doing. While we could easily categorize all communication into the categories described in the previous phases, users were happy to mix their metaphors and use the same system (mailing lists) to meet a variety of different communication goals. While there was some frustration from our early interviews about not being sure how a specific list was being used, users were also happy that lists could be fluid and move from one mode to another easily without a conscious decision to switch modes.

In retrospect, we still feel we made the right decision. Even small changes to the mailing list subscription metaphor (like smart lists) were met with some confusion and frustration by new users. Forcing users to totally change the way in which they categorize communication would have been substantially more risky. It also would have been harder to deliver a finished product that met all the users needs. It's unlikely that we could have done a parallel design process on all three elements of the physical metaphors idea, and any single one alone would be missing many of the needs met by mailing lists. By choosing the mailing list/subscription metaphor, we were able to address all of our users goals with one piece of software.

**Evolution of the Mailing List/Subscription Metaphor**

**Low-Fidelity Prototype**

In this phase, a couple of major features of this selected Idea 1 design had been altered, prior to constructing and testing the low fidelity prototype.

Previously, Idea 1 had the two main components being a list page (containing more or less the current mailman functions) and a tagging feature (having tags be assigned to community members in such a way to facilitate the emailing of groups).

Prior to this phase, the idea of a tagging feature was poorly developed. Our initial thoughts were to create a type of page that, when various groups (classes, age, halls of the dorms, etc.) are selected, the groups would appear as circles in a Venn diagram. The user could then select which part(s) of the Venn diagram they would like to email (perhaps women over 18 and males over 21 in West Hall). The diagram seemed like a great way to visualize the groups of individuals being emailed and selecting them would be simple.
The initial Venn Diagram Idea

In this phase we then discussed what our personas would be using the tagging feature for most of the time – emailing their class about a homework question, emailing their floor about a studybreak, or perhaps emailing their hallway about how to better share the public nook. We realized that in the vast majority of the examples in which a persona would employ this tagging feature, the persona would be emailing just a simple group. Or, the persona would want to email a group with the exception of one or two (such as emailing a MatSci class but not the professors; emailing a hallway about a surprise party but not the person having the birthday).

In light of this discovery, we realized it was necessary to simplify our existing idea of the tagging feature system. The Venn diagram feature would really only be useful in situations where there were more than 2 groups that overlapped in some ways, so this feature that we before thought would be the center of the page was now considered a low priority if one at all. Therefore, on this tagging system page, we thought perhaps the diagram might be minimized by default and would only appear when multiple groups were selected. We realized though that this would generally leave a lot of whitespace on the page as there was not that much other information to display (only the Boolean logic for the group being emailed, and the names contained within that group). From this, we questioned whether the tagging system needed its own page at all – would our personas really want to take the time to navigate to the page, or would they just spend another half minute searching through their outlook folders to find an email previously sent to the group they wished to email? Based upon this train of thought, we realized that the easiest way to implement the tagging feature would be to add it to the email client. Currently email clients already “guess” at a name you are trying to type and allows you to select that name. With these added tags, after typing in a couple of names, the client could also suggest a group that you want to email, that the names you have typed in have in common. A suggested group could then be selected to be emailed, or it could be ignored. This would make the discovery of the feature incredibly simple, and the familiarity of the users with their existing mail client would likely make them very comfortable with the feature.

In pursuing the idea of integrating the tagging with the email client, the idea of being able to combine groups with Boolean logic that would be infrequently used by the personas was dropped. During the low fidelity prototype user interviews, the various
users seemed thrilled with the abilities to email a tagged group or a tagged group minus several individuals. We were satisfied that the users – even the very technologically comfortable users – were content with the concept of emailing a tagged group or a tagged group minus several individuals – they did not suggest in any way that the system was incomplete because it did not provide the complicated Boolean logic ideas that our group previously considered.

Our low fidelity prototype takes the mailing list subscription metaphor from the previous phase, and incorporates some of the changes discussed above.

The Main List page.
The Main List page is divided into boxed regions. Across the far upper bar, log in and search functions are provided. In the upper left box, the names of the various lists, the number of members in the list, the posts/week (traffic), and the subscription status of logged-in user were displayed. Clicking on the number of members of a given list or the posts/week of a list brought up pop-up boxes containing more detailed information pertaining to that category of information for that list. The lists displayed could be sorted by any of these categories by clicking the top label bar (following the method of email sorting used by Outlook).

The upper right section of the main list page contains display options. By default, all types of lists (courses, co-curriculars, clubs, etc) are displayed, except for private and dormant lists. These check boxes allow the user to see what they want, filtering out unnecessary information.

The bottom portion of the main lists page contains more detailed information about the list currently selected. This information includes a description, a brief list of
most active members (this is a link to open a pop-up for more information), and links to view recent club threads (these threads are links to open a pop-ups for more information).

The Log in option is available at the top of every screen, and pop-up boxes with information about members and traffic are available.

By either clicking on the “view recent threads” option for a list or by searching for a given topic, a list of threads may be viewed. Clicking on a specific thread allows you to view just that thread. This page also has a couple of special features on the right hand side of the page. There is the tab to “view shared author tags” and the tab to “view similar threads.” Each of these tabs appeared while the mouse is over it. Moving the mouse around over the “view shared author tags” tab dynamically displays which tags correspond to the name over which the mouse rests, or displays which names involved in the thread conversation are included in the given tag over which the mouse rests. More detailed diagrams of these features are found on our team website in the Low-Fidelity Prototype section.

The ability to use the tags to send emails in Outlook was tested using the printout of a blank Outlook email. The users were asked to slowly handwrite in the characters of the names to which they’d be sending the email. After a couple of letters appeared, we would then have a small box come up, enabling them to arrow down to select one of the names if they desired (this feature already exists in Outlook). After a couple of names, the same type of box would appear, only the box would contain the groups that these individuals had in common. The user could then arrow down to the appropriate group to email or ignore the box which would disappear as the user types or clicks elsewhere on the screen. When selecting a group to email, the user also could click on the right arrow, to view the option of emailing the group minus some individuals from that group.

In general, we identified two major kinds of problems from the low-fidelity prototype testing. There was a long list of small specific elements of our design that confused users. For example, most of our testers tried to click on words that were not links, and failed to notice other words that were links. We collected lots of feedback about wording issues that obfuscated our design intent. Users also found major holes in our design, like our failure to appropriately model the actual emails that the system would be sending back and forth to users.

After testing the entire system, users had extremely insightful things to say about the organization of the system as a whole. In preparing the prototype, we struggled with the flow and how to present information. We settled on pop-ups as a reasonable first draft, and this was met with general dismay by advanced users. They wanted to be able to open links in new tabs, many at a time. Using pop-ups to display information interrupted their normal browsing flow. We needed to develop a new method for moving through the application that saves state of the main window, but allows users to use the system the way they use other web applications. Eventually we just had this information come up in another page, rather than come up in a pop-up.

Users also identified general problems with the list/preview layout. While you can see the number of list subscribers and some traffic data about each list, it still doesn’t tell you what it’s about – which is the most important data to the user. We need to develop a way to show more information without requiring a click to bring up the preview. More
specifically, we need to understand what happens when you click on a list-name. Is that the same page that shows up in the preview pane?

Our last interviewer also pointed out that the system was extremely impersonal. There was no sense of “me” anywhere in the system – no way to view one’s own subscriptions and threads, change one’s own options, set accessibility of public data, etc. We will probably need to reorganize the site around this idea for the next phase. This idea developed into the “Me” page with the specific user information, though in the final iteration, it just became a “Me” section on the front page to simplify the interface.

Finally, we gathered fascinating observations about how people used the tag email features. The bottom line is that the metaphor is pretty muddy. Users grasped the idea quickly (“Oh, I can email lots of people at once without knowing exactly who’s in that group!”), but got bogged down pretty quickly in the details. How are these different from lists? Do they show up in the list browser area? Will the email client auto-complete non-tagged lists? Can you type in the tag name instead of waiting for it to auto-complete after two names? Our final user also brought up excellent questions about how flexible we will allow tags to be. Can users change their membership in tags? Can it be hidden? How do we handle users like TA’s who aren’t “in” a class, but want to get its emails? Can users not create new tags, but can change their membership? Will that devalue tags entirely? We didn’t have answers for these questions at this phase, but they were important issues to consider as we made changes to the system in the subsequent prototype.

**Heuristic Evaluation Feedback and Changes Made**

The feedback our group received from the heuristic evaluation was a combination of details we were already aware of and did not have time to implement in the first iteration of the prototype, and comments on the existing features of the website that we needed to consider changing.

The Preview Pane on the main page was too distracting and it was confusing what the effect of clicking on the list name was (clicking on the list name brought up the list webpage whereas clicking next to the list name only brought up the list in the preview panel). Based on this feedback we have removed the preview pane from the front page. Clicking on the list name on the front page still brings up the list webpage; but there simply no longer is the preview pane of this same list webpage, eliminating that confusion. Eliminating the preview pane has also just simplified the front page of the website, allowing more lists to be viewed on the screen at a time. To do this, we executed a ground-up rewrite of the front page, fundamentally changing the way list display filtering works, as well as merging in the functionality of the “My Page.”

The Subscriptions / Me Page was altered; our system was actually viewed as “almost too simple” because people aren’t used to just checking a check box and having that setting changed. Therefore instead of having checkboxes, we now have subscription buttons on the main list page and on the individual list pages. Per suggestion of the heuristic evaluators, the current subscriptions are also displayed in a separate category on the top of the main page, eliminating the need for a separate “Me Page”.

Sets become “Smart lists” in this phase. Sets, which we intended to serve as pre-generated lists, became “smart lists” to make their functionality more immediately apparent to the user. We’re hoping to play off a familiar iTunes distinction between playlists (manually edited) and smart playlists (automatically composed according to
some criteria). Even if users are not familiar with this particular metaphor, we feel that using the word list consistently is important (as discussed by both evaluators and users) and “smart” evokes the right general ideas about how the system works.

The format of displaying lists was changed. There were both advantages and disadvantages to using either an “and” or an “or” algorithm in displaying multiple lists – for example, when displaying those lists that are “announcements” and/or “external.” To completely do away with this confusion it was decided that only one category could be displayed at a time through a pulldown menu. While the check boxes allowing the user to select various “and” or “or” combinations of the lists was viewed as cool, it was also deemed by users to be an unnecessary feature.

**Pilot Usability Studies**

The results from the testing fall into two distinct categories. We obtained results concerning the display of links (the focus of ours study) and also received general feedback about other aspects of the site design. The feedback received on the display of links was basically unanimous for the three users tested. The hover feature (displaying the background of a linked word in gray while the mouse cursor is over it, rather than the white background of the rest of the site) was well accepted by all users interviewed. Users liked how it was good to know that you were clicking on the proper link when a number of links were displayed close together, and that in general it was an easy way to confirm where the links on the page were located.

The users were much less receptive to the traditional display of links, in which the text was underlined and there was no hover-over feature. Because on some pages, such as the main list page, there were many links displayed, users commented that the traditional underlining of the links made the page unnecessarily harder to read and cluttered.

Other results that were obtained from this set of interviews included some formatting issues. On our general list page, users commented that perhaps having more space between the sections or some sort of boxes delineating the sections would be helpful. Positive feedback regarding the display of threads was received.

Prior to the interviews, our team had discussed what the best way was to denote which lists are “dormant” and which are “private.” This topic came up during the interview too, and we discussed with the users ways in which this could be done, including color alterations. From this feedback, we are likely changing the “dormant” or “private” notices to be displayed in colors to make them stand out more. When the users were performing the tasks, they had the common problem that skimming the long list for the “dormant” or “private” lists required too much effort and this alteration would help that process in the future.

One of the larger faults of our prototype became very obvious during these interviews. On the main list page, our side pulldown menu enables the user to select which types of lists or smart lists are being displayed. At the time of the creation of this pulldown menu, we had still been thinking in terms of lists and sets (the former name of smart lists), so displaying either all of the lists or all of the sets were convenient menu options. In changing the name of sets to the more appropriate name “smart lists”, our naming system failed as our option “display all lists” did not really do what the name implies – it displays all of the lists but not of the smart lists. Therefore, our group has
since realized that we need to add some adjective or other way to distinguish the regular lists from the smart lists, so perhaps the pulldown menu will include the options “display all lists” (including regular lists and smart lists), “display regular [or some other adjective] lists” (showing all of the normal lists and none of the smart lists), and “display smart lists” (showing solely the smart lists).

Our display of lists was also questioned by a very technologically comfortable user that we interviewed. It was pointed out that the pull down menu was acceptable, but that it would be better to always be able to see the options that could be displayed, and that going over to the pulldown menu takes more time for a superuser. At this time we’re not sure to what extent this feedback will be incorporated, but we will be considering simply displaying the contents of the pulldown menu on the screen rather than in the pulldown menu.

**Evaluation Techniques Reflections**

During the course of the project, the techniques of low-fidelity prototyping, heuristic evaluations, and pilot usability tests were used. While applying these techniques to the projects of mailing lists, we found advantages and disadvantages to each technique.

Low-fidelity prototyping was incredibly valuable. It gave us a clear sense early in the process of what ideas would be accepted by users and what ideas would need to be changed. Most importantly, this information was obtained through simple paper models that did not require a lot of time to produce. The early acquisition of such information enabled us to later spend our time working on more detailed aspects of the design. However, the low-fidelity prototyping did not give us the most complete picture of how users would react to pieces of data as it was done only with the sketched paper models. Some users were able to easily make the connection of how the low-fidelity model would be converted into a computer model, whereas for others, this leap may have prevented them from being able to articulate the feedback we were looking for. Specifically for this project, the low-fidelity prototype interviews with potential users were most valuable in helping our team to consider a wider variety of scenarios. When users attempted certain combinations of functions that we had not considered or, when speaking allowed, informed us of what they thought a button ought to do (but did not necessarily do), the layout, terminology, and functionality of many aspects of our design were questioned and then more deeply developed.

Heuristic evaluations provided us with another opportunity to learn how to improve our design. In the case of heuristic evaluations, the information obtained was much more detailed as the design at that point in the project was much further developed. Some of the website features that we had been debating about were addressed by our evaluators, including the presence of the “preview panel” to show list information at the bottom of the main index page and the confusion between lists and sets (which later became smart lists because of this evaluation advice). In a way, the heuristic evaluations were slightly more valuable than the low-fidelity prototype interviews as the heuristic evaluators were other students from the HFID class with similar experiences with interface designs and identifying common usability problems with them. Because of this, the feedback from the heuristic evaluations was much clearer (the evaluators did not have to struggle to find the exact vocabulary to describe problems, as was sometimes the case with users interviewed with the low-fidelity
prototype). On the other hand, the more specific and well developed project curtailed some of the creative suggestions received from the low-fidelity prototype interviews.

The Pilot Usability Study was done such that a rigorous comparison between two similar designs could be tested. We studied the way in which linked text on the website appears. When two strong ideas are in competition and which is better to use is not clear, a Usability Study is a clear way to find a solution. In our case, however, the value of the Pilot Usability Study was somewhat diminished by the fact that our website was not as polished as it could have been, possibly distracting the users from what we were hoping to learn. The Pilot Usability Study was also not done sufficiently rigorously to give valuable results given the small number of people interviewed, and the lack of quantitative data (such as exact number of keystrokes to complete a task) collected.

For the development of mailing lists, the low-fidelity prototyping proved to be the most valuable tool that our team used. It enabled us to dynamically receive feedback from users that we could immediately incorporate into upgrades of the paper prototypes. Seeing the quality of the feedback that was received from this technique, in retrospect it is clear that much more information could have been obtained from it. Given a more ideal, time constraint free world, testing our other initial design metaphor (of the cafeteria and the bulletin board) would have been valuable in this phase. While we used good logic in deciding to stick with the more traditional and familiar pre-existing mailman metaphor, soliciting more feedback from users on the less-traditional mailing list metaphor could have pushed us to develop a more revolutionary (and better?) product, rather than a good product that improves upon classic examples.

**APPENDIX**

Our final presentation can be found here:

http://fsweb.olin.edu/courses/engr3220/sa2004/engr3220-yellow/FinalDocuments/FinalPresentation.ppt

The vast majority of the work in this phase was done by Ann Marie and Drew. This included all the technical work on the website, updating the presentation, and the vast majority of the writing/editing/compilation of this document. Chris worked mostly on providing database content like names for users and example threads. He also found/made the icons used on the site.