Iterative Mobile Application Design and Evaluation: Gmail Mobile vs. Gmail Desktop Client

Human Computer Interaction

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Executive Summary

Gmail is the most used web-based e-mail client with an estimated 425 million active users. In order to provide smartphone users with a great email experience on the go Google developed the Gmail Android application. Our group evaluated the Gmail mobile application in order to address usability issues found during a heuristic evaluation.

Our group found 21 heuristics violated spanning 5 different areas of design. Collaboratively, we narrowed the list down to the top three violations and began drafting paper prototypes. The paper prototypes were used to show users familiar with the mobile application not only how we addressed the heuristic violated but to elicit feedback and ultimately iterate our design changes.

Our second redesign was made for each of the proposed prototypes. Two of the three redesigns added features to the mobile application that are present in the desktop version of Gmail. The third redesign for the main screen was proposed by the group and submitted in our final presentation. I then consulted Norman’s book “The Design of Everyday Things” and researched current mobile application design to draft a final main screen redesign.

The Gmail mobile application benefits from the iterative design process and hinges on design practices outlined in Norman’s book by making controls and features visible to the user, enhancing natural mappings, and employing touch based and gesture controls.
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Introduction
There is little contention that Smartphones are here to stay and their meteoric rise in popularity since 2010 is projected to grow through the middle of this decade (Google Trends). With the advent of smartphone we’ve witness an onslaught of mobile application (apps) that have been developed to deliver desktop productivity on the go. The Gmail mobile application, based off a desktop client developed by Google, has an estimated download range of 100-500 million in the past 30 days (Google Inc., 2012). Continued growth in smartphone adoption and usage are giving way to new users who expect a more fulfilling mobile experience.

Smartphones have shifted the role of design away from the comforts of a standard monitor and input devices like a keyboard and mouse. Smartphones allow us to interact with touch, motion based gestures, and digital keyboards. These new controls shouldn’t be seen as a “Paradox of Technology” (Norman, 1988) but as a new level to interact with users and provide a more enjoyable experience.

This paper will discuss the iterative design process of evaluating the Gmail mobile application interface and will include rapid paper prototyping, user feedback through an interview process, and redesigns based on that feedback.

Mobile HCI Design
Mobile platforms and mobile applications have different user demands than their home computer counterparts. Smashing Magazine published a listing of the “7 Guidelines For Designing High-Performance Mobile User Experiences.” “Performance from Mobile” (Weevers, 2011) is a topic of interest that highlights one of the cornerstones in mobile application
development stating that, “Mobile applications need to focus on a core utility, and they need to be fast and reliable in order to be valuable in those environments” (Weevers, 2011).

Another interesting piece of information from this article comes directly from one of the seven design guidelines, “Optimize UI Flows and Elements”. Flows and Elements are comprised of both the objects on the screen and the manner in which they’re presented. Optimization isn’t just about speed but about delivery and perceived delivery. The Performance and Optimized UI guidelines are interrelated building a foundation of best practices associated with good mobile design by delivering a utility (application) that is fast and reliable but also perceived by the user in the same fashion.

Our evaluation of the Gmail application takes cues directly from these two design elements. We chose to base our evaluation of the mobile application directly with the desktop version due to its widespread popularity. Additionally, the desktop version existed before the mobile one and has earned the title of most widely used web-based e-mail.

Design considerations must take cultural constraints into consideration due to the ingrained nature of the desktop application preceding the mobile one and people relying on “behavior frames” (Norman, 1988) to dictate their actions. With a prior knowledge of how they should use their email client on a desktop our group focused on providing similar controls in the mobile application. Breaking the boundaries between desktop and mobile platform ensures a seamless user experience and maintains consistency.
Evaluation Practices

A usability study including a heuristic evaluation, based on Nielsen’s Heuristic’s, was used on the Gmail mobile application. This approach was picked due to the existence of mobile application and the fact that is has already been through many design iterations. Working directly with the application on the Android operating system we were able to have our group complete the evaluation in a matter of days with paper prototypes following shortly thereafter.

In total there were 21 heuristics violated spanning 5 categories. The highest severity issues were found in the areas below.

<table>
<thead>
<tr>
<th>Heuristic</th>
<th>Location in UI</th>
<th>Problem Description</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4 – Consistency &amp; Standards</td>
<td>Individual Message Screen</td>
<td>Reply and Forward functions are not visible.</td>
<td>3.2</td>
</tr>
<tr>
<td>H7 – Flexibility and efficiency of use</td>
<td>Inbox / Main Screen</td>
<td>Message selection options (all, stared, etc.) are missing.</td>
<td>3</td>
</tr>
<tr>
<td>H6 – Recognition rather than recall</td>
<td>Message Screen</td>
<td>All typical message options aren’t visible</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Table 1: Top Heuristics Evaluated

The focus of the redesign, based on these violations, addresses user expectations, the applications ability to aid the user, and reduced user frustration. It is worth noting that the most severe violations tie directly back to features available in the desktop version. Norman’s book “The Design of Everyday Things” states that, “Cultural issues are at the root of many problems we have with new machines” (Norman, 1988). While the culture that Norman is referring to is of a different nature the meaning is the similar to our desktop to mobile shift in applications. Gmail is one of many applications that made the leap into the mobile world and
due to this it carries a cultural weight. Our evaluation doesn’t attempt to deviate from these constraints but to embrace them to rectify usability violations apparent in the mobile platform.

**Vision of the Application**

The Gmail mobile application was designed to recreate the desktop email service on a mobile platform. A recent study of Japanese adoption of mobile phones states the shift from using phones for calling to using them for e-mail highlighting that during a 41 minute train ride 37 instances of email were observed and only 4 voice calls, roughly 9 times greater usage (Ito, 2004). It’s imperative to provide mobile convenience by making usable applications to support this shift in demand. Design elements introduced by our group focus on streamlining mobile application usage from a user-centered perspective.

**Prototypes**

**Prototype 1 - H4 - Consistency and Standards – Individual Message Screen**

Our first prototype for the application redesign focused on the highest heuristic violation, consistency and standards. The reply, forward, and reply all (where applicable) are clear differences in the visibility of options available to the user on the desktop client when viewing a message. On the mobile platform only an arrow is present which is meant to represent a reply function. This same option is available on the top right of the desktop version but other common message options aren’t present. Our first prototype seeks to increase the visibility of these options by putting them just below the window title using standard symbols to infer the buttons meaning.
Prototype 2 - H7 - Flexibility and Efficiency of Use - Individual Message Screen
The second prototype redesign addresses an issue with message selection specifically in the trash folder of the application. The trash folder is where old messages are housed before they're ultimately deleted. The organization of this folder is left up to the user but being able to multi-select message for a large deletion is complicated by the fact that a group selection option isn’t available on the mobile platform. The desktop version, shown in figure 1, has a checkbox style button that once clicked introduces message selection options. The checkbox style button is a great affordance because it resembles the checkboxes found next to each messages in the desktop and mobile version that are used to select each message. Our prototype adds this feature directly to the trash screen allowing users to multi-select messages on their mobile device and increases the level of flexibility they have with the application.

Prototype 3 - H6 - Recognition Rather than Recall - Main Screen
The third prototype was meant to address the glaring differences between the main inbox screen on the desktop client to that on the mobile platform. The redesign makes use of the left side panel and introduces folders, groups, contacts, and a compose button similar to that available on the desktop version. Along the top menu you bar additional features are added such as a forward and back button used to navigate individual messages

Prototype Feedback from User Interviews
Design feedback is crucial to an iterative design process. Usability studies suggest that feedback obtained from users can be unreliable and care must be taken to interpret “what people actually do” (Nielsen, 2001) when using a system instead of using information as to what users “may do” (Nielsen, 2001). Our interviews were based on user reactions to our paper
prototypes and questions that were structured to elicit a reaction to how people would use the newly designed features and to disregard emotionally charged ‘nice-to-have’ features that can derail an iterative design process.

**Design Iteration Based on User Interviews**

**Final Design 1 - H4 - Consistency and Standards – Individual Message Screen**
The final design of the individual message screen is largely unchanged from the first prototype. The feedback on the prototype was constructive and helped shape the final design by making text appearing onscreen in a more useful manner. Visible icons are more intuitive by providing better indications as to their function, increasing user efficiency. Maintaining standards for showing message options addresses was another redesign feature. The reply, reply all, and forward arrows, along with the favorites button, and a new feature to “Add to Contacts” are all visible and shown in a single row. These features connect with Norman’s idea that “Single controls often have single functions” (Norman, 1988). The buttons present only having one function, as opposed to the vertical dots that had many functions, ensuring users can make a natural mapping. This redesign addresses user interface concerns while not drastically trying to accomplish more than it set out to do, potentially complicated things.

**Final Design 2 - H7 - Flexibility and Efficiency of Use – Individual Message Screen**
Our second redesign of the trash screen was based solely off of our other redesigns of the main screen. The original addition of the selection criteria from the prototype remains unchanged. The addition of the left side navigation bar along with other menu options became a standard across the application. It is interesting to note that the selection criteria are something that the desktop client uses in every folder where messages are displayed. The checkbox is an intuitive
design feature because a checkbox is shown next to every message. Users who click this button map the function of the button to mean selection. This redesign highlights a cultural requirement for users migrating from the desktop client to the mobile application. The selection feature takes “advantage of physical analogies and cultural standards, leads to immediate understanding” (Norman, 1988). Hinging on this statement we aimed to bring something desktop users are accustomed to for the mobile application. The introduction of the selection criteria is a success but for reasons stated in the Final Main Screen section below the design as a whole fails.

**Final Design 3 - H6 - Recognition Rather than Recall - Main Screen**

The main screen redesign takes cues from the desktop version introducing a navigation pane in the left side bar and other various buttons and navigation features on the top bar of the mobile application. The feedback from the first prototype is based solely on user emotions or dislike for the mobile application and the lack of customization available.

In an effort to express my feelings on the redesign I would like to say that I disagree with it entirely. The main screen is too busy meaning that there is too much information when you take into account the size of current mobile screens. Additionally, using your finger to click some of the buttons now squeezed onto the screen could prove to be very difficult for some users. In total the redesign can be summed up with this statement from Norman’s book, “the spirit was willing but the implementation was weak” (Norman, 1988).

Figure 5 and 6 is my attempt at the main screen redesign which seeks to address “Creeping featurism” (Norman, 1988) through the use of organization in a “divide and conquer” (Norman,
1988) fashion. In essence we’re losing the direct visibility of our desktop conveniences but by placing them in a standard location exploits “natural mappings” (Norman, 1988) creating a separate repository for folders and features. The slide out pane keeps the items on screen to a minimum freeing up more space to view the folder that you’re in and allowing you to navigate through new gesture based controls to a background panel of features.

A second part of this redesign involves a familiar sync option that also exploits natural mappings. Typically, new e-mail appears at the top of the application screen. You can navigate to this area by swiping your finger down to move up. If you were to pull down on the top-most part of the folder you’re in a message appears telling you to pull down to sync. This mapping is similar to the scrolling to the top of the folder and will add new messages if they’re available. This design feature is used throughout iPhone applications so as it gains popularity it will become reflexive for users to sync in this manner.

**Conclusions**

As “people use their mobiles to enhance productivity, comfort and pleasure, everywhere and at any time” (Weevers, 2011) the need for good design in mobile applications becomes vital.

Our initial prototypes, based off of heuristic violations, sought to enhance Gmail’s mobile application by incorporating desktop features on the mobile device. In all of the redesigns we did our best to make controls that are common Gmail functions visible to the users on the mobile application. With the exception of the main screen, I believe that all design changes address usability issues and enhance the user experience. Pictures were used to make the reply and forward function visible and with the help of user feedback we were able to clean up the
layout of the menu bars to make the application flow better. A control was added for message selection that is familiar to users of the desktop client. This change was well received remaining the same through our design iteration.

The main screen redesign I offered improves the flow and organization of key features by taking mobile screen size into consideration and limiting the on-screen clutter. Additionally, touch and gesture controls were added to take advantage of mobile input controls.

The process of redesigning a mobile application through the use of paper prototypes is a quick and easy way to address usability problems. Drafts of potential prototypes can be shared with a wide variety of individuals and through an interview process they can be thoroughly evaluated. More often than not incorporating design changes based on interview feedback requires only a good eraser. Overall, this process is quick and cost effective way to design.
References


   

   

   
   http://www.useit.com/alertbox/20010805.html

   
Appendix

Desktop Message Selection

Figure 1
Message Screen Redesign - Menu Bar

[Diagram of message screen redesign]

Final Design

[Diagram of final design for message screen]

Figure 2

Message Selection Redesign – Trash Screen

[Diagram of message selection redesign for trash screen]

Prototype

Final Design

Figure 3
Main Screen Redesign - Group

Figure 4

Main Screen Redesign – Alex Camara

Figure 5: Redesign of main screen showing slide out sub menu and gesture controls for "closing" the menu
Figure 6: Sync Option Redesign showing a gesture based pull down and release to sync any folder you’re viewing