

# DELOREAN

## Mail

A blast from your email past

Create a visual timeline of your  
email relationships.

School of Information Final Report  
May 2012

A M.A.S.T. production....

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# table of contents

<b>The Product</b>	<b>2</b>
<b>Table of Contents</b>	<b>3</b>
<b>Executive Summary</b>	<b>4</b>
<b>Getting Started</b>	<b>5</b>
<i>Project Management</i>	6
<b>Research and Analysis</b>	<b>6</b>
<i>User Research and Analysis</i>	7
<b>Finding “The Idea”</b>	<b>8</b>
<i>Concept Generation</i>	8
<i>Idea Iteration and Concept Testing</i>	10
<i>Selection and Definition</i>	11
<i>Refinement</i>	11
<b>Implementation</b>	<b>11</b>
<i>Technical Implementation</i>	11
<i>UX/UI</i>	12
<i>Design Considerations</i>	13
<i>Final Product</i>	13
<b>Challenges</b>	<b>15</b>
<i>Process Challenges</i>	15
<i>Schedule Challenges</i>	16
<i>Technical Challenges</i>	17
<b>Looking to the Future</b>	<b>18</b>
<b>Conclusion</b>	<b>19</b>
<b>Thanks!</b>	<b>20</b>
<b>Appendices</b>	<b>21</b>
<i>Appendix A: Market Research</i>	21
<i>Appendix B: Academic Research</i>	22
<i>Appendix C: User Needs</i>	24

# executive summary

The central focus of this project was twofold. The MAST team agreed to: a) use the design process to both discover user needs and then ideate a solution, and b) actually develop a working product based on our design concept. From start to finish we used an iterative development process to address user needs.

To understand user needs in the “life balance” problem space, the team conducted 20 user interviews. Each interview was analyzed individually. Then, the data from all the interviews was further explored using affinity diagrams, empathy maps, and mindmaps. This detailed discovery led to a list of 20 user needs; we focused on three for the development of Delorean Mail.

Users need to:

- Get perspective on their lives and have a testament to their accomplishments
- Feel a sense of progress or moving forward, and
- Explicitly reflect on high-level time management and priorities.

Using these needs as a foundation, we brainstormed more than 60 concepts. From these 60, we chose six to develop further. We spent a week refining and researching the concepts, but at the week’s end we were still not satisfied with the how these six ideas were progressing. We chose to hold a second round of ideation. From a smattering of new concepts we honed in on two in particular. Concept testing with users and peers allowed us to finally converge on one single idea: creating visual stories with an infographic based on archived email data.

Implementation started as soon as the final idea was selected. Our team used a variety of technologies to build our product. These include: Google App Engine to host our site, the Context.io API to retrieve email data, d3.js to generate infographic visualization modules, and Adobe Fireworks to create visual assets. GitHub was used as a code repository.

Our design focused on the concepts of “fun” and “play.” This theme is visually represented by the bright colors and simplicity of our design. We worked hard to prevent our infographic from becoming a productivity-focused dashboard. To ensure that we developed a narrative for each user, we created a balance between high-level contextual content and granular memory-evoking content.

Future development on this project would require improvements in privacy controls, identity management, and user engagement.

# getting started

It all began with wine.

Enticed by a wine-related project idea Sebastian had shared, the team met for the first time on October 21, 2011. Aided by a bottle of red and a packet of post-its, we discussed our product goals, process objectives, and our visions of success. We communicated clearly and quickly established common ground. By the end of the meeting we'd determined our expected process, captured our primary product goals, and defined what success would look like at the finish line.



Figure 1. Our first meeting

We agreed to use the design process to find a problem and then to solve it. Specifically, we decided that the solution should stem directly from user needs and that we wouldn't converge on solutions without fully understanding those needs. After ideating a solution, the team

Figure 2. Team goals



agreed we'd develop a functioning product. This product should have an aesthetic of fun, meaning, simplicity, beauty, ease-of-use, play, and inspiration. Whatever we designed should feel "magical."

We brainstormed topic ideas ranging from wine, to fashion, to the

environment. In the end we mutually agreed to focus our research towards "life balance." This was still a broad topic area so we decided to conduct a first round of interviews to learn more about the problem space.

## PROJECT MANAGEMENT

To maintain the collaborative and fun working environment we experienced at our first few meetings we developed some project management tools to help us build a common working framework.

- **Roles and Responsibilities:** We determined the primary team roles and clarified the related responsibilities.
- **Code of Conduct:** The team established baseline expectations in the areas timeliness, meeting protocol, and decision-making.
- **Communications Plan:** MAST identified the stakeholders we should update on our progress, how often we should touch base with them, and the best communication channels for each.
- **Budget:** Each member contributed a hundred dollars to cover any common expenses, including server space, domain names, meeting snacks and beverages, and social team activities.
- **Risks Matrix:** The team brainstormed possible risks and developed contingency plans for those identified as most threatening. This exercise brought explicit attention our team's biggest concerns (specifically those related to lack of time and lack of sufficient technical resources) allowing us to work on solutions to these problems early on.
- **Task List:** We all committed to keeping a central task list, which we would keep updated with all outstanding and completed tasks. This tracker gave us a reference point to maintain accountability.
- **Project Schedule:** We developed an initial, high-level schedule to provide a rough guide for the iterative and flexible design process.

Some of these Project Management Tools played a larger role in our project than others. Specifically, the budget, task list, and schedule received regular updates and attention. The hours of work put into these tools at the beginning of our project gave the four of us a solid foundation for open communication and shared understanding.

## research and analysis

*Labor gives birth to ideas. -Jim Rohn*

User, market, and academic research informed our design decisions. Market research is covered in [Appendix A](#); academic research is summarized in [Appendix B](#).

## USER RESEARCH AND ANALYSIS

The team conducted two rounds of interviews. In the first round we interviewed 8 people and focused on the topics of scheduling, time management, life focus/priorities, and stress. After reviewing the insights revealed by our analysis of this research, we refined our goal statement. This initial statement focused on personal time management:

**How might we create an easy and fun way to assist people realistically forecast, prioritize, and manage their time.**

In our second round of interviews (12 more) we asked targeted questions about people's typical activities/commitments, goal-setting habits, decision-making practices, forecasting techniques, privacy considerations, and archiving tendencies. We observed users performing their time management tasks and asked about their use of different tools and technologies.

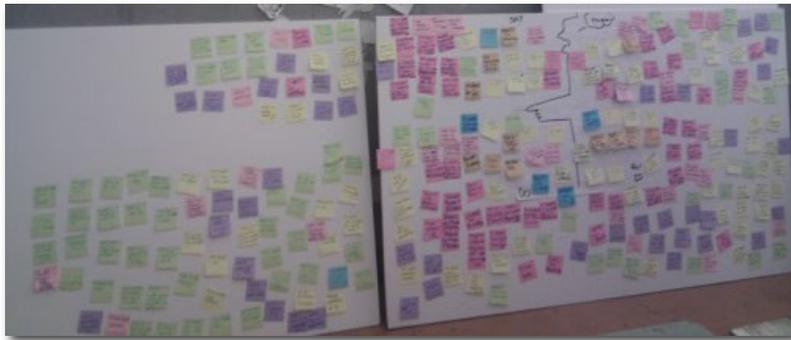


Figure 3. Empathy map

The rich information generated from our second round of interviews took our team multiple work sessions to analyze. First, we documented each salient finding on a post-it note and created an empathy map, categorizing the post-its by what users say, think, feel, and do. After spending hours developing the map, we discovered that

there were just too many findings to identify salient user trends in this manner.



Figure 4. Finishing the affinity diagram

In our next work session we changed tack and moved our post-it findings into an affinity diagram, merging these findings with those from our first round of interviews.

Affinity diagramming our large number of findings was unexpectedly complicated. We

quickly discovered that the process gets exponentially harder the more findings (post-its) one has. At this point we'd been through the data twice and had a good understanding of our key findings, but we still couldn't easily wrap our heads around the relationships between these findings.

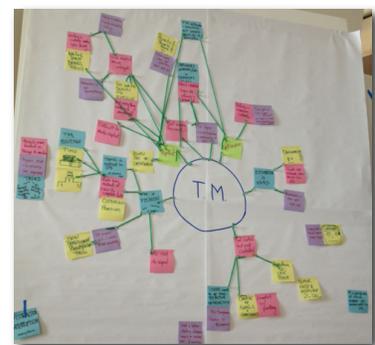


Figure 5. Mind map

In an attempt to find patterns and connections in our data, we created a mindmap. This further organized the topics from our affinity diagram. We identified a hierarchical structure for the topics as well as relationships between the groupings. After this last exercise, we finally felt familiar enough with the data to identify the user needs.

We identified both explicit and latent user needs. To narrow in on a product focus we prioritized our list of 20 needs based on 1) the team's understanding of what seemed most needed as well as 2) our personal preferences. (See [Appendix C](#) for the full list of user needs.) For our final prototype and product we ended up focusing on three user needs.

## USER NEEDS

- Feel a sense of progress or moving forward
- Get perspective on their lives and have a testament to their accomplishments
- Explicitly reflect on high-level time management and priorities

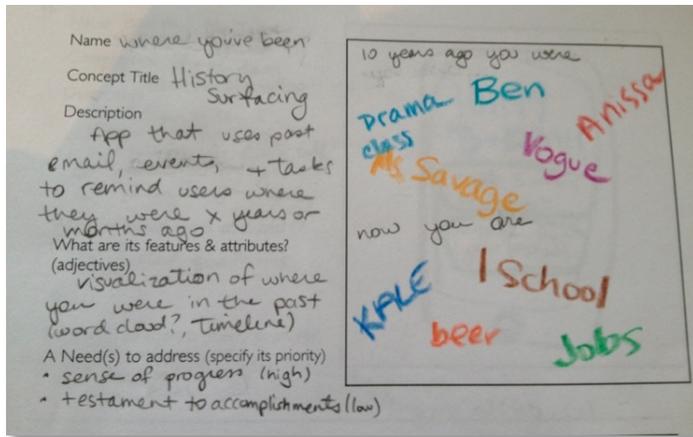
# finding 'the idea'

## CONCEPT GENERATION

*The way to get good ideas is to get lots of ideas, and throw the bad ones away. -Linus Pauling*

The findings uncovered by our analysis gave us both a good understanding of our users as well as a common language for discussing their needs. Although we'd spent a lot of time discussing and defining user's problems, we had not yet discussed solutions as a team for fear of jumping on an idea prematurely.

In our next phase we began to generate solution ideas based on our user needs. When we finally allowed ourselves to discuss potential solutions together, the team's energy and momentum started to build.



**Figure 6. Sample Product Idea**

together. The team then looked at each grouping in greater detail. We identified which concepts could be standalone products and which ideas were supporting features of a larger product idea. We then voted on the remaining concept groups based on product viability and personal enthusiasm.

Our voting resulted in a list of six possible concepts. Before converging further, we decided to do some market research on each one to better understand the concepts at play and existing competitors (see the [Appendix A: Market Research](#) for details).

In our next meeting, armed with research and fresh perspective, we tackled the ideas again. To make the weeding out process as diplomatic as possible, we created a decision matrix and scored each idea on ten criteria. Using a scale from one (worst) to five (best), we rated each concept on:

1. **Cool** – was it something we'd want to tell our friends about?
2. **Ease of explanation** – could we easily explain the product?
3. **Sustainable** – could people use it without network effects? Would it need to be maintained post-graduation?
4. **Desirable** – was it something users actually wanted?
5. **Emotional design** – could we design it in a way to evoke positive emotional responses from users?
6. **Feasible** – could we complete it by the end of the semester?
7. **Unique** – had a similar product already been built?
8. **Fun** – would people enjoy and actively want to use the product?
9. **Personal excitement** – were we personally interested in working on the idea?
10. **Full product** – was the idea meaty enough to be a full product, or was it just a feature?

Based on these criteria, our votes narrowed the list of six to three ideas:

1. **Did U?** – An accountability tool to help users assess whether they actually attended events or meetings on their calendars.
2. **Shake It Up** – A whimsical mobile app that pulled random digital memories from your digital archives when shaken.

3. **Reality Check** – A monthly summary of last month’s priorities (based on time spent) and future planned priorities, as calculated based on digital information (email, calendar events, tasks, etc.)

## IDEA ITERATION AND CONCEPT TESTING

We worked with these ideas for about a week. We developed storyboards and discussed them with advisors and users. After a week it became clear that the team still wasn’t comfortable choosing one of these concepts and moving forward. We then made the difficult decision to stop working with these ideas and to do another round of brainstorming.

In this round of brainstorming we focused on two interesting behaviors we’d seen and heard about in our interviews.

1. The first was that many users kept archives or logs of their activities or lives. They felt a sense of comfort and security in knowing that these journals, activity logs, diary’s, or archives were there if they ever needed to refer to them. But interestingly enough, they *didn’t* refer to them. Many users kept fastidious records with no specific plan to ever analyze or review their data.
2. The second behavior was that users wanted to feel a sense of progress in life—sometimes towards a particular goal, but often they simply wanted some validation that their lives were somehow moving forward. To recognize this forward progression they needed a testament to their accomplishments—something tangible that showed explicit growth and gave them a perspective outside their day-to-day lives. For example, after the interview many users expressed their thanks for an opportunity to explicitly talk about their priorities, goals, and decision-making processes with us. Our interviews allowed them to reflect on overarching goals, priorities, and methods, providing them with perspective on their lives.

In our second round of brainstorming we focused on these two needs. We each brought two-three new or updated product storyboards to our brainstorming session and followed the same ideation process we had used the first time around.

It worked! We ended the day focused on one idea: visual storytelling based on email archives. The initial concept was to create an automated [Mad Libs](#) for email; essentially we would write an algorithm that filled in the blanks of a text-based story using a user’s archived email data.



Figure 7. One idea

## SELECTION AND DEFINITION

Armed with a single concept, we each broke into small groups and designed a few rough prototypes. We discussed these amongst ourselves and chose two to refine and develop. Then we sponsored a school social gathering (I School's I Tea) where we asked our peers how they felt about our different ideas.

Their feedback helped us converge on one prototype. People gravitated to the concept of a story, but they didn't actually want to read through the text. This insight led us to our final concept and allowed us to write our solution statement:

**We are building an application that will help give people perspective by explicitly and meaningfully surfacing digital history.**

This solution wasn't exactly in line with our original problem statement (which focused more on time management and productivity). But this pivot was a prime example of the discovery possible through the design process. Our research in one area uncovered needs in an adjacent field.

## REFINEMENT

Once we agreed on a solution we jumped into refining our concept. Over the last two weeks in March, the team churned out half a dozen paper prototypes, five [Balsamiq](#) prototypes, and countless draft infographic layouts, color palettes, and information visualizations. Each draft, blueprint, and visual was shown to teammates and users, generating a solid stream of feedback to inform following versions.

# implementation

Our original timeline had a separate prototyping and design phase prior to the implementation phase. Because of delays in concept selection, we had to start development in parallel with design refinement. We found that working on these things in parallel wasn't a hindrance since different group members worked on different aspects of the project. To keep the team working toward the same goal, we worked in short weekly development cycles, syncing up three times a week at short SCRUM meetings. After each weekly cycle we discussed user feedback and then incorporated it into the next cycle.

## TECHNICAL IMPLEMENTATION

We used a variety of different technologies to implement our concept.

**Back end.** On the back end we used [Google's App Engine](#) to run the application, host our site, and store the data. All team members knew basic Python, so the free App Engine was an easy choice.

We focused on [Gmail](#) (email archives) to simplify our data set. Gmail's recent popularity and our familiarity with the product made it our top choice. After some research, we found that accessing Gmail archives was more complicated than we'd anticipated. Google's documentation recommended using a 3<sup>rd</sup> party API by [Context.io](#) to access Gmail archives. Context.io had a detailed and more accessible API than Google's. We worked closely with Context.io's developers to get this back-end component working.

**Front end.** For the site scaffolding we used [Twitter Bootstrap](#), a site template that provides a basic starting point for HTML, CSS, and JavaScript. Modifying existing templates instead of starting from scratch saved us considerable time.

It was important that users be able to delete data they didn't wish to see from their infographic. We used [Isotope](#), a framework that facilitates dynamic page layout, to reorder elements on the infographic if users choose to delete a piece of information.

Our infographic visualizations are constructed using [d3.js](#), a popular JavaScript framework for "manipulating documents based on data." Learning d3.js was a time-consuming process, but its flexibility allowed us to build our visualizations exactly as we wanted.

Visual design layout was done in [Adobe Fireworks](#). Fireworks' UI makes it easy to design based on pixels. We used [Adobe Illustrator](#) for some of the more graphically demanding assets such as the banners and the logo.

**Content management.** For document sharing and versioning (of documentation, designs, logos, etc.) we used [Dropbox](#), [Google Docs](#) and [MS Office Word](#). We used [GitHub](#) for code assets. These systems were chosen because of their version control capabilities and the group's familiarity with them.

## UX/UI

Given our design philosophy, we wanted to create something fun that would elicit an emotional response from our users. When considering the UX and visual design we wanted to lean toward play rather than utility. To achieve this goal we used storytelling devices such as characters and

## USER TESTING

For the first couple weeks of implementation, we attempted to run concurrent user testing to have continuous prototype feedback. The testing initially was planned around paper prototypes, since a working site wasn't yet up. As the weeks went on it became clear that a working prototype wasn't a simple feat. There was a huge amount of development to be done. The user feedback we got was incredibly useful, but we couldn't realistically implement it all by our deadline. Because we couldn't iterate fully on working prototypes as originally planned, we decided to halt user testing and to focus on developing a working product based on the backlog of feedback we already had.

a narrative in our design. The two people whose email relationship the infographic details are the main characters. To create a narrative we used anchor points in the story (e.g. the first, middle and last emails sent between the contacts). We also strove to achieve a balance between aggregate information (e.g. total number of emails) and more specific and evocative information (e.g. first few pictures exchanged).

The visual design was an important part of setting the mood for the narrative. We chose to style the infographic after rolled ink block prints. Block prints are often made in small batches for particular events or occasions. They are both personal and tangible. These are all qualities we wanted to evoke in our final design.

## DESIGN CONSIDERATIONS

**Initial user experience.** Designing a user's first-time experience was complicated by the amount of time it takes collect email metadata via Context.io's API. It takes approximately 20 minutes to return the information necessary to create interesting information visualizations. We needed a way to:

- a. Engage or entertain users who wanted to wait on the site,
- b. Provide progress information for users who want to periodically check the status, and
- c. For users who close the window or tab, notify them when the process is done.

In an attempt to address all three cases, our design includes:

- a. A dynamic loading panel that flashes email metadata (date, from, to, subject) as the site fetches it,
- b. A progress bar showing the approximate status of the process, and
- c. An email notification for users who closed the browser screen.

**Infographic content.** As we brainstormed and designed the content that would populate our infographic story, we found that we tended to choose high-level aggregate information (e.g. the average time of day one sends email). User testing confirmed that this aggregate data, although often easier to calculate and display, gave our design a dashboard-like feel—a design aesthetic we specifically wanted to avoid. This feedback helped us refocus our efforts and include more specific email information (e.g. a sampling of congratulations emails) to help spark user memories of particular events or life periods.

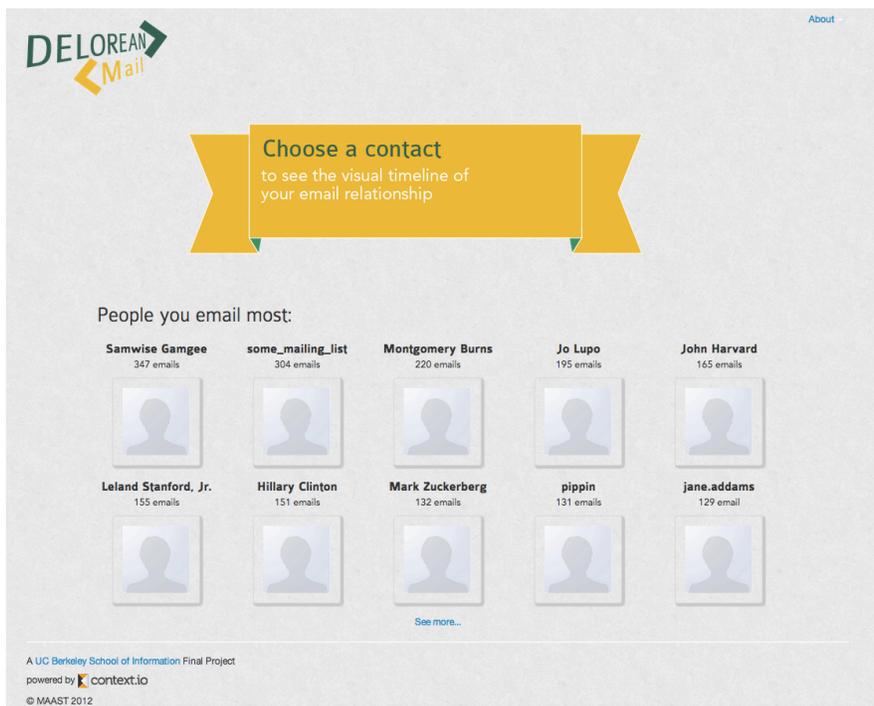
## FINAL PRODUCT

Our final product is a simple site with only a few pages. This matched our original objective of keeping the interface simple and easy to use. There are three major pages in our site:

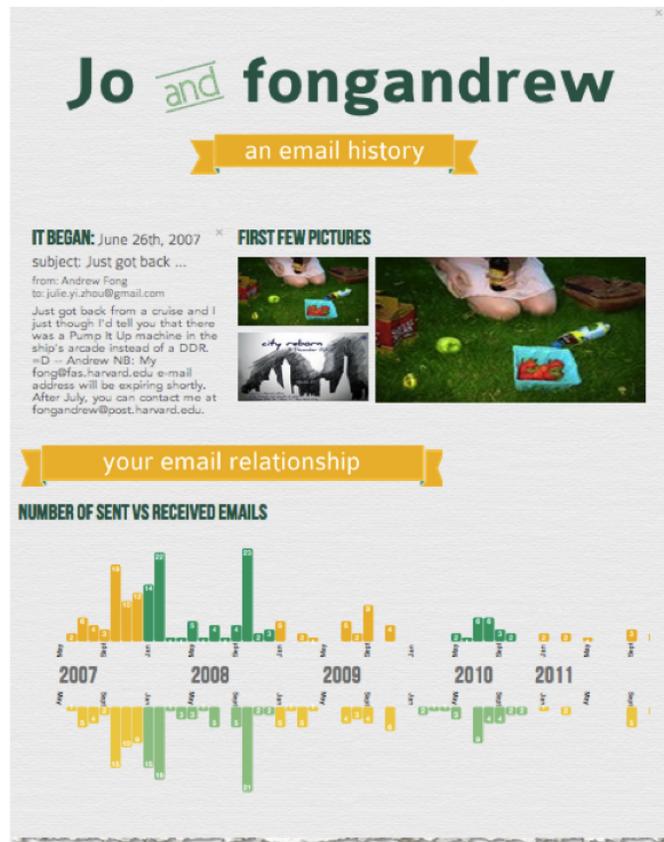
- The [home page](#) gives a brief description of our product and a way for users to either sign up (if new) or sign in (if returning). Based on user feedback, we included prominent infographic samples to show users what to expect after signing up.



- The [top contacts](#) page serves as a user's logged in home page. This page displays the user's top ten contacts (and their pictures) in order by volume of email sent. We felt that email sent (by the user) would best reflect the social proximity of a contact. This page is intended to be a landing page from which users can choose an infographic to view.



- The last page is the **infographic display**. We plan to keep this page simple with the infographic as the main focus. Users may: a) edit the infographic, deleting particular modules they wish to exclude, b) print the infographic, and/or c) share the infographic via email.



The site link is: [www.deloreanmail.com](http://www.deloreanmail.com).

# challenges

## PROCESS CHALLENGES

**Not enough time.** Even before our initial risk analysis, we knew time would be an issue. Most other final project teams began with a fixed idea; we started with only a broad topic area. Along the way we had to scope and modified our processes to ensure we met our priorities by the due date.

**Concept selection.** Selecting an idea we all cared about was a challenge. Each person had his or her own favorite ideas and concepts and so we had to carefully compromise and negotiate with each other to select our final idea.

**Too much process.** Excited by the prospect of experiencing the design process, our team jumped right in; we planned each meeting, tried each tool, and analyzed our research “by the book.” While tools and frameworks were helpful, halfway through our project we began to experience process fatigue. After experimenting with a week of “no process,” we quickly migrated to a less structured way of working. The removal of mini-deadline pressures and process chores made our meetings more enjoyable. It also allowed us to act on instinct and move forward quickly on easy decisions. We used the structure and processes we now were so keenly schooled in only when needed.

## SCHEDULE CHALLENGES

*Methinks I see the wanton hours flee,  
And as they pass, turn back and laugh at me.  
-George Villiers*

At the end of our project we revisited our original planned schedule and compared it with the schedule that had played out.

**Schedule - Planned**

Task	December	January	February	March	April	May
User Research	█					
Research Analysis			█			
Concept Generation/Ideation			█			
Idea(s) Selection						
Concept Testing & Design Iteration				█		
Implementation					█	
Evaluation						█

**Schedule - Actual**

Task	December	January	February	March	April	May
User Research	█					
Research Analysis			█			
Concept Generation/Ideation			█			
Idea(s) Selection				█		
Concept Testing & Design Iteration				█		
Implementation					█	
Evaluation						█

Comparing our original plan to our actual schedule helped clarify a few lessons learned:

**Analysis is complicated.** Analysis of user research proved more complicated and time consuming than anticipated. We sometimes found that a discussion planned for a few hours spanned multiple days. This delay drained some of our energy and momentum.

**One round of ideation was not sufficient.** We were not ready to converge down to one (or even three) specific concept after one round of ideation. Multiple sessions were needed to reach a concept we all liked.

**Hope creep is ever-present.** Hope creep is the concept that individuals allow what they “hope” they can accomplish to influence their time estimates. This was especially prevalent in our implementation/development phase. Originally, we planned for four development cycles, one week each, with a finished prototype at the end of each. As it turned out, accomplishing just one full development cycle in the full month was hard enough. Our goal of four complete prototypes was clearly overly ambitious, especially given that our UX and UI design weren’t incomplete when we began development.

## TECHNICAL CHALLENGES

Our main technical challenge was in loading user email data expediently. A survey of about 30 fellow I Schoolers revealed that on average, users had about 3-4 gigabytes of archived Gmail data (the numbers ranged from just a few hundred kilobytes, to over 20 gigabytes). Given Google’s API access limits, we estimated that downloads could take upwards of 30 hours to process! This wasn’t the user experience we were hoping to provide.

After thinking about possible options, we decided to scope the data capture down to return only email metadata (e.g. to, from, cc, date, subject, etc.). We would return full body information for only a few select emails. We lost data richness with this decision, but it was a good choice given the costs and benefits. The information can now be loaded in approximately 20 minutes—still a long time, but orders of magnitude faster than our original estimate.

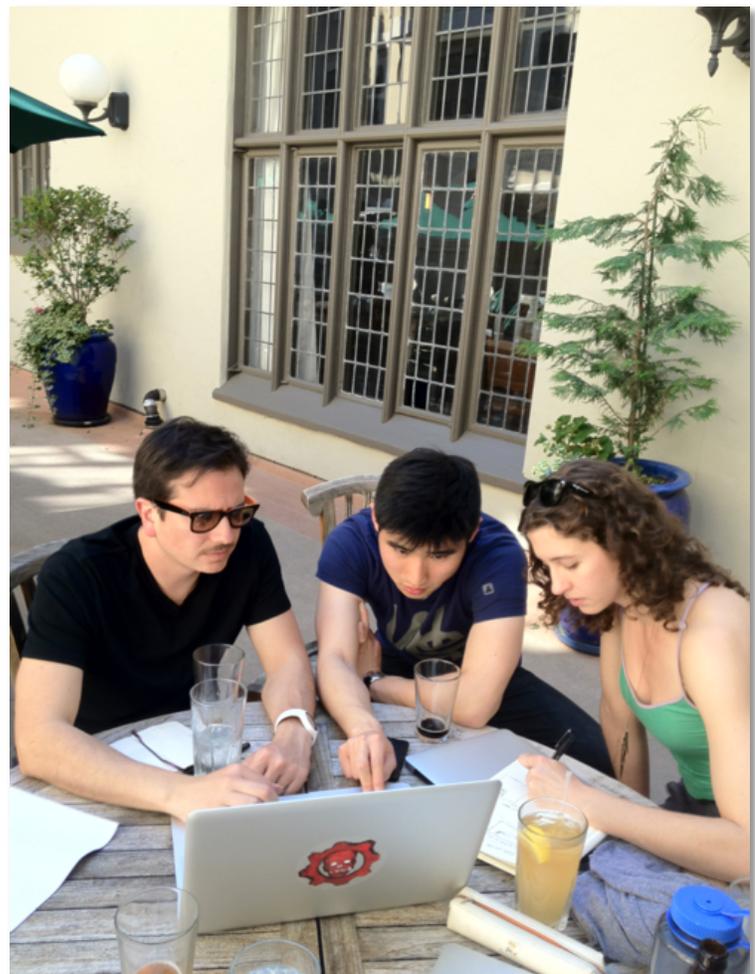


Figure 8. Outdoor work session

## looking to the future

With more time we would have liked to focus more on the following:

**Privacy.** We did some user and academic research (see [Appendix B: Academic Research](#)) related to privacy concerns and we took this research into account when designing the system (e.g. placeholder for privacy statement, removal of Facebook connection), but given the personal nature of users' email archives, we believe this area requires more attention. If Delorean Mail were to become a consumer product, privacy is one of the areas that would need a considerable amount of work.

**New user experience.** Technical limitations prevented us from designing a completely seamless user sign-up experience. As it is, the system requires approximately 20 minutes to create an account. Ideally this process would take a fraction of that time. Future work might focus on ways to streamline this process. We could refine our algorithms for incremental improvements or rebuild the product cutting out third parties for faster access to the data.

**More data.** The current Delorean Mail product pulls email metadata. Email bodies are not retrieved except for a few specific cases. Our content analysis and infographic modules could be richer if certain analyses (e.g. topics over time) were performed on the full email text rather than just the subject lines. This additional text would also open up possibilities for further analysis, like people you talk about (as opposed to *with*), length of emails, slang used, or writing style.

**Sharing.** Related to privacy, we would like to explore more options to allow users to share these infographics with friends. We want users to share memories and reminisce as they would with a photo album, but we also must balance the constraints of privacy. Sharing methods we'd like to explore include

- Linking to a published infographic on the Delorean Mail site
- Posting the infographic on Facebook
- Emailing the infographic to a friend, and
- Printing (and potentially framing) the infographic as a keepsake.

**Settings and identity.** Users indicated that they'd like to be able to modify their settings to block particular contacts (perhaps an ex), or otherwise modify their accounts. Additionally, many people have more than one email address. It would be nice to allow users to aggregate accounts by the individual. Likewise the users themselves may want to sign in with multiple Gmail accounts, aggregating their resulting infographics.

**Sustainability.** One of our future tasks is to figure out how to regularly draw people back in. To make Delorean Mail more sustainable, MAST considered adding multiple infographic templates. These templates might apply to a particular type of relationship (romantic, familial, work, etc.) or simply cater to a particular event or holiday (anniversary, birthday, etc.). We have also considered modularizing these templates so that users could add and rearrange infographic content. To keep contact with our user base, we may create branded events called

“eversaries”—an anniversary of your first email contact with a particular person. Delorean Mail could send users a customized “eversary” message when momentous dates come up with particular contacts, like your 800<sup>th</sup> email or the “eversary” of your first email.

## conclusion

Our team achieved our goal of successfully using the design process to create a working product. We started with nothing but a problem space, discovered user needs, ideated a solution for their needs, and implemented a working product. To top it all off, we had fun. We feel encouraged by the viability of our final product and are excited by the opportunity to test it with users’ actual data and see their responses. A lot of research has gone into the design thus far, but user testing with valid data will allow us to evaluate user’s emotional responses to the data. This research is invaluable if Delorean Mail’s is to evolve into a consumer product.

To continue with the project, there are many decisions the MAST team must make regarding privacy and infographic sharing, technical refinement, account settings and options, as well as a business model for sustainability. Despite these remaining considerations, MAST is confident that our broad research, iterative thinking, and hard work has brought us to a creative and unique solution. Delorean Mail transforms the chore of email into a source for reflection, reminiscence, and fun. You can now playfully explore your abundant email archives to gain perspective from past to present.





thanks!

First and foremost, we would like to thank our fifth teammate [Andrew Fong](#), without whom we would not have a functioning product. Andrew contributed perspective, insight, enthusiasm, humor, and abundant technical expertise—not to mention dozens of hours of hard work.

Next we want to thank our advisor [Deirdre Mulligan](#) and our design coach [Clark Kellogg](#). They have each given us invaluable feedback and direction that has fundamentally shaped our process and product. Each has seen us through times of peak excitement and given us hope in our most frustrated moments.

[Kay Ashoulu](#) and [Adriane Urband](#), trustworthy members of our parallel INFO213 team “MUST,” helped with many hours of user research and testing, concept development, product design, and prototype development. Many of our important findings were based on work and feedback given by them.

[Jennifer Wang](#) and [Ryan McAdam](#) consulted on visual design.

And last, but certainly not least, we want to thank the many [users](#) and [interviewees](#) who provided us with ample feedback, allowing us to craft a responsive design.

# appendices

## APPENDIX A: MARKET RESEARCH

We had three phases of market research. Initially we each looked at a few mobile and web applications in the productivity tool landscape. Our objectives were to get a feel for the field, develop an understanding of what worked and what didn't and identify potential gaps in the market.

After identifying user needs and brainstorming a few concept ideas, we did a second round of market research. This time we looked at possible competitors for each of our brainstormed concepts. We found that the majority of existing products and ideas in the prioritization, management, and goal-setting arena were work-focused. We realized that neither the ideas we had generated as a team nor the ideas already in the market embodied our design goals of "fun" and "magic." This realization drove us back into another brainstorming stage to refocus our product ideas.

### Market Research - Round 2

- Pomodoro Technique
- Productivity Games
- Accountability Tools
- Goals / Productivity Tracking
- Capturing Digital Memories
- Surfacing Digital Memories

After a good deal of work on concept generation and selection, we settled on a solution of visual storytelling through email archive data. As we refined this concept, our last round of market research happened organically.

We looked at examples of email dashboards such as [Muse](#), [Graph Your Inbox](#), [Gmail Meter](#), [Tout](#), and [Stephen Wolfphram's personal email analytics](#). These tools showcased many creative ways to display aggregate email information. But none embodied our particular vision of uncovering specific memories or elicit emotional responses.

We also looked at dynamic Infographic visualizations such as Visual.ly's [Twitter Faceoff](#). This also informed our final design direction. This design taught us how to create a successful story even without a clear picture of the narrative it will tell.

## APPENDIX B: ACADEMIC RESEARCH

Our academic research explored a few main topic areas:

**Themail.** We identified the closest system match through our academic research. The Themail system was built in 2006 by an MIT research team<sup>1</sup> Instead of making an infographic, this system used a single visualization to “[portray user] relationships using the interaction histories preserved in email archives.” The key qualities Delorean Mail’s design has that Themail does not are:

- A goal of story in the design
- Simplicity and play
- Multiple smaller visualizations collected into a larger infographic
- Intended for sharing
- Stored on the web (versus locally)
- A consumer focus

While Delorean Mail aims to be simpler and more story-focused than Themail, the underlying goals remain similar, allowing us to draw valuable findings from this study.

Themail’s user feedback was particularly helpful. Given MAST’s tight development timeline we were unable to include user testing on a working product, and therefore could not hear user responses to their own actual data. Without this personalized content, it was difficult to gauge emotional responses or meaning. The user responses shared in the Themail study suggested that reminiscing over email archives was a positive experience and that users were excited to review a “portrait of their past conversations.” This feedback validates our concept—a system run on email archives can indeed provide users with life perspective. Additionally, this study gave us insight on potential problems that may lie ahead for us technically if we were to continue the project (e.g. finding meaningful email content and text parsing obstacles).

**Digital Memory.** The piece “Delete: The Virtue of Forgetting in the Digital Age” by Viktor Mayer-Schönberger<sup>2</sup> gave an interesting perspective on digital memory. Digital memory (as opposed to human memory) refers to a record preserved by digital archives. The paper discusses the inherent biases in digital memory: 1) we only digitally record stuff when we’re motivated to do so (communications, tasks, events, pictures we want to share), and 2) certain important information cannot be easily captured digitally and is therefore omitted (e.g.

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<sup>1</sup> Viegas, F. B., Golder, S., & Donath, J. (2006). Visualizing Email Content: Portraying Relationships from Conversational Histories. *CHI 2006 Proceedings* (pp. 979-988).

<sup>2</sup> Mayer-Schönberger, V. (2009). *Delete: The Virtue of Forgetting in the Digital Age* (pp. 92-168). Princeton University Press.

thoughts or feelings). Remembering via digital memory is therefore different from remembering using human memory. The largest differences relate to a) one's power over their personal information (digital information can easily be replicated and distributed), and b) how time affects human versus digital memory differently (human memory degrades and evolves over time while digital memory does not).

**Translucence.** Thomas Erickson's research on designing visualizations of social activity point to the importance of system translucence (as opposed to transparency).<sup>3,4</sup> Translucence refers to the ability to see a certain amount of data—but not all data—such that all relevant information to accomplishing a design goal/purpose is met without exposing more. In addition to conservative data exposure, translucence allows for ambiguity in a system. The design principle of ambiguity mimics the ambiguity found in life's physical interactions—people are used to this ambiguity. Translucence and ambiguity recommend surfacing actions, not interpretation, thereby empowering users to impose their own meaning. This concept played a large role in our design.

**Information overload.** Information overload refers to the degradation of cognitive processing power due to an overabundance of information. The whole emailing process is fraught with information overload problems.<sup>5</sup> We did not want this frustration flowing into Delorean Mail. Research on this topic and the benefits of limiting choice sets<sup>6</sup> influenced our design and helped us streamline our experience down to a simple interface with limited options for customization.

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<sup>3</sup> Erickson, T., Halverson, C., Kellogg, W. A., Laff, M., & Wolf, T. (2002). Social translucence: designing social infrastructures that make collective activity visible. *Communications of the ACM*, 45(4).

<sup>4</sup> Erickson, T., & Kellogg, W. A. (2000). Social translucence: An approach to designing systems that mesh with social processes. *Trans. Computer- Human Interaction*, 7(1), 58-83.

<sup>5</sup> Whittaker, S., & Snider, C. (1996). Email overload: exploring personal information management of email. *HCI 1996 Proceedings* (pp. 276-283). Lotus Development Corporation.

<sup>6</sup> Botti, S., & Iyengar, S. (2006). The Dark Side of Choice: When Choice Impairs Social Welfare. *Journal of Public Policy and Marketing*, 25.

## APPENDIX C: USER NEEDS

- Feel a sense of progress or moving forward
- Get perspective on their lives and have a testament to their accomplishments
- Explicitly reflect on high-level time management and priorities
- Feel part of the big picture
- Reassess and change priorities
- Make tasks explicit
- Have aspirations
- Have things in one place
- Feel in control, but not controlled
- Find easier ways to estimate
- See the light at the end of the tunnel
- Trust their systems
- Take care of repetitive or hygienic tasks
- Plan for the long term
- Have fresh starts
- Have flexibility and personalization in their planning tools
- Access planning tools easily
- Manage distractions and interruptions

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<sup>i</sup> All quotes in paper from <http://www.quotegarden.com/ideas.html>