

Excellence in Ease of Use with Rich Functionality

How Enterprise Software Applications with rich functionality can be built to excel in Ease of Use.

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Abstract. In this article, we will review the procedures and techniques used to significantly improve the ease of use of enterprise software applications in the framework of a small company with limited resources. We will present the achievements and lessons learned from applying these techniques to the development process at Tumbleweed Communications, a moderate-sized Silicon Valley company that builds secure messaging applications for enterprises. We will conclude by showing examples of screens before and after implementing our user-centered design approach.

Keywords: UI Design, UI Standards, Usability, User Experience

1 Introduction

Historically, software products designed for the IT industry put more focus on feature-richness than on ease of use; the assumption being that IT professionals were expert users who should be able to figure out the functionality of the application regardless of how complex or poorly designed the user interface was. As a result, budding tech companies poured their limited resources into engineering teams that could build as many features as possible in a short time frame.

As the industry has matured, there has been an increasing shift in focus towards ease of use. This is due in part to the general trend of maturing markets, where competing products eventually offer similar feature sets and, thus, ease of use, and the overall user experience of the product, becomes an increasingly important differentiator and key buying factor. However, products for the IT industry include additional important drivers for ease of use. Given the importance of applications such as email and other internet communications to an enterprise's success, enterprises cannot afford to have these applications down or mis-configured; if email stops, business stops. Similarly, enterprises are subject to increasingly strict governmental regulations regarding the securing of internet communications and other data sources. Failure to secure this data can lead to large fines, not to mention damage to the enterprise's credibility for exposing their customers' sensitive information to malicious sources. Thus, the proper

setup and on-going management of these applications is critical to the enterprise. As a result, ease of use is no longer a luxury, but is a critical necessity for many IT products.

To investigate the challenges and achievements of designing easy to use products for the IT industry, we will use Tumbleweed Communications as our test case. Tumbleweed serves as an excellent test case for the following reasons:

- Tumbleweed provides critical software to enterprises around the world for securing internet communications into and out of the enterprise.
- Tumbleweed's customers require applications that are feature-rich and yet very easy to install and manage. The applications must allow users to easily manage and scale complex networks stretching across the globe that process millions of email messages a day while ensuring no security holes, malicious intrusions nor system downtimes.
- Tumbleweed has made ease of use a company-wide priority and, despite its modest size, is committed to building a strong user experience program.

In this article, we will review the procedures and techniques used to significantly improve the ease of use of enterprise software applications within the framework of Tumbleweed's development process. We will present the challenges, achievements and lessons learned. We will conclude by showing examples of screens before and after implementing our user-centered design approach.

2 Roadmap

In evaluating the requirements to significantly improve the ease of use of applications, five fundamental axes have been identified as essential.

- Top management commitment.
- User understanding and testing.
- Reliable user-centered design procedures.
- User Interface standards and guidelines.
- Promotion and user awareness program.

2.1 Top Management Commitment

Dramatic user experience improvements are possible when usability becomes a core part of the company culture (A.Mollaem, 2005). In creating such a culture and awareness, top management involvement is a key to success. Experience shows that without strong commitment from top management, and without their understanding of user experience and the resources and support a user experience program requires to succeed, it is hardly conceivable to see any significant user experience gains in the products. This is even more important in smaller companies in which financial

resources are limited and there is a continuous struggle to make sure that resources are allocated appropriately. In this case, top management must realize that investment in usability creates a culture that leads to the success of its product in the market place.

2.2. User Understanding and Testing

In order to provide functions that are easy to use in addition to being rich in functionality, we need to understand the users. This understanding helps us design better products as well as evaluate their effectiveness and enjoyment by users. The importance of user research in creating good user-centered products is largely documented and researched (Hackos & Redish, 1998). Even though techniques to collect user data are often abandoned in smaller companies with short product release cycles and limited resources, it is always valuable to spend time on user studies even when everything seems to be planned for the short term.

2.3 Reliable User-Centered Design Procedures

In the user-centered approach, the user's needs, priorities and behaviors must be determined at the early phase of the project and should form the context and inspiration for all design activity throughout the project. This understanding can help guide early designs and product requirements before rough prototypes can be tested by users. Finally, one must perform a more extensive assessment and evaluation test at the late phase of the design cycle, ideally with a fully interactive product. The practice of gathering information from users, and involving them in the iterative design process, is the only way to design products based on the user's mental model and behaviors, rather than the developer's, which may differ greatly from the user perspective.

2.4 User Interface Standards and Guidelines

By identifying common UI principles that have proven to help the usability of a given product, we can apply them globally and, thus, contribute to the usability improvement of all products in the product suite. Standards and Guidelines:

- Ensure consistency throughout a product and/or an entire product suite, which significantly adds to the learnability of the product and maximizes the efficiency and satisfaction of its users.
- Facilitate the transfer of information about common UI standards and usability principles across the company. The same principles apply to every product, where having a common vocabulary makes communication much easier.
- Simplify prototyping tasks in that the wheel does not have to be reinvented with each new design, but rather new designs can reference the

common standards. This allows designers to then focus on the unique aspects of the design and spend more time on user evaluation.

- Allow for greater delegation of minor designs to junior User Experience professionals or developers while still maintaining a high level of quality and consistency.

Due to aggressive project schedules and limited resources, smaller companies tend not to create and implement reliable UI standards and guidelines (SAP, Oracle, Apple, Microsoft, accessed 2006). However, regardless of the size of a company, constructing a proper set of standards and guidelines will inevitably save time and contribute significantly to the overall user experience of your products.

2.5. Promotion and User Awareness Program

Promotion of your user experience program, and its findings, within your organization is critical to its success. Providing user insights and customer feedback to members of your organization helps them realize the positive impact of their work and provides them with valuable information to make their work more customer-focused. “In a company with a usability culture, professionals are trained to think about users and ease-of-use throughout the product life cycle. This cultural change not only extensively improves the ease of use of products and services, and consequently improves user and customer satisfaction, but it is also the most cost-effective way to significantly improve the usability of all products and services. The time of experienced professionals, ultimately reduces heuristic review time, and reduces development time” (MOALLEM 1995).

It is equally important to promote your user experience program externally, especially to existing or potential customers. By creating a user experience participant program along with building extensive communications with customers through user conferences and informal conversations, not only do we communicate our effort in creating user-friendly applications but we also invite them to help us in this endeavor.

3. Results

To extensively improve the usability of all products at Tumbleweed Communications we followed the above steps. Below, we will present the challenges, achievements, and lessons learned.

3.1 Building a Usability Culture

As mentioned earlier, the most important first step in building a usability culture is getting senior management involved. In our case, there was already a lot of support there and a recent sales survey and industry survey, highlighting ease of use as one of the top 3 buying factors across our customer base and the industry as a whole, helped re-enforce the importance of building a strong user experience program. However, we did find that usability does not mean the same thing to everyone. For some, usability seemed to imply mostly a good looking interface and many others did not have a full

understanding of what it takes to significantly measure and improve the user experience of our products. Thus, it is important to communicate a fuller picture of what user experience involves and what it takes to improve it. Only then can you build a common vision for the user experience of your products that the entire company can fully support and contribute to.

Next it is important to reach out to all customer-facing departments in the company such as Sales, Sales Engineers and Support. Given that they interact with customers at different stages, they each have unique, invaluable insights into different aspects of our customer's user experience. Through discussions with these groups, we also found easy mechanisms that we could tap into to keep better in touch with customer issues such as being able to listen in on Sales or Support calls and view common trends in usability-related Support calls.

Finally, it is very important to reach out to those departments who have an affect on the product such as Development, Quality Assurance and Technical Writers. By providing them with more insights into our users as well as sharing the UI Standards and Guidelines with them, we not only inspired them to build better products for our users, but also exponentially grew the number of eyes we had looking for usability problems and inconsistencies in designs. Usability was no longer just the responsibility of the User Experience team, but of the entire Engineering team as a whole.

3.2 User Studies Key to Success

Though it often seems that there is not enough time to do user studies and testing, with some prior planning and creative thinking, you will find it is possible and extremely worthwhile. In the early project phase, we held personal interviews and group discussions to get a solid background understanding of our users and establish contacts to follow up with later in the project for user tests and targeted questions. We were able to hold most of these discussions over the phone, with the assistance of web conferencing tools to help share information and view configurations on their systems. These conversations with users, who were often at far geographic locations, were extremely helpful and took little time out of our day. The time spent with users served to inspire us, focus our efforts and help bond the project team as a whole, for it was no longer my idea versus yours, but rather the customer's words that we focused on and worked collaboratively to address.

The biggest challenges for us in terms of time sinks were getting access to relevant, day-to-day users, setting up test and recording equipment and constructing the interactive tests. To address these challenges, we first established a User Volunteer program that allowed interested users to sign up to participate in design reviews and evaluations. We found this to be more effective than having to go through Sales every time to find leads, which was slow and sometimes led to being connected with upper management, rather than day-to-day users of our products. We then established an inexpensive User Experience Lab, using primarily existing equipment we had in store, to provide a plug and play environment for doing remote tests and recorded phone interviews. This helped cut down on configuration time for each test and also served to increase our User Experience presence in the company. Finally, to save time on

constructing interactive tests, we built a common web-based framework and survey mechanism that could easily be adapted for individual usability tests.

By following the methods outlined above we were able to integrate significant user feedback into very tight project schedules. In addition to improving our designs, it encouraged team members and built excitement in our customers who left our user studies energized and anxiously awaiting the next release.

3.3 Get Involved Early

Without question, in the software industry, major usability principles are not taken into consideration in product design unless they are part of the product roadmap and are applied early in the design cycle (Mayhew, 2003). One of our major achievements and success factors was early involvement of user experience professionals in the design cycle. We found it useful to form a core group of four individuals at the outset of the project representing Product Management (market requirements), Project Management (schedule and scope management), Architect (technical feasibility and time estimates), and User Experience (user perspective and design). Building this core group allowed us to quickly assess the value and cost of features being considered for the release at a high level and come up with an achievable plan that still met market requirements and provided significant value to customers. It also built consensus early on, between these historically contentious groups, which reduced obstacles downstream in the project.

Our early involvement in these discussions empowered us to introduce major design changes that extensively impacted the ease of use of the product. This included changes to the information architecture from being featured-based to task-based as well as tying together disparate features into larger holistic features based on user's goals and tasks. By working with project management early on, the required time was allocated in the project schedule for UE involvement in conceptual design, interactive prototyping, evaluation and final design.

3.4 Building and Enforcing Standards

Not having user interface standards and guidelines to establish consistency posed a serious challenge at the beginning of our design process. Therefore, we created a UI standards document that included standards for overall design and layout as well as common objects and widgets. We evolved this in parallel with the project cycle as new design challenges emerged. The example below shows the standardization of a common table's behavior and its look and feel. Creating a consistent look and feel for the table was achieved by introducing standard labeling conventions and common features such as export capabilities. This consistency ensured the same user experience for users when viewing any table in any applications across our product lines. (Figure 1a and 1b)

Virus Sender	Infection	Junk	Bulk	Legit	Total
u10024p9hba3726aj.com	1	3	0	3	6
u10094p9mav9fqc7nq.com	1	5	0	1	6
u10148p9tj1j1k37y.com	1	4	0	1	5
u10179p9tj1m9v35.com	1	7	0	1	8
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	5	0	1	6
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	4	0	2	6
u10224p9v0jvt_jm6t.com	1	6	0	2	8
u10224p9v0jvt_jm6t.com	1	4	0	2	6
u10224p9v0jvt_jm6t.com	1	5	0	3	8
u10224p9v0jvt_jm6t.com	1	7	0	1	8
u10224p9v0jvt_jm6t.com	1	3	0	2	5
u10224p9v0jvt_jm6t.com	1	4	0	1	5
u10224p9v0jvt_jm6t.com	1	3	0	2	5
u10224p9v0jvt_jm6t.com	1	5	0	2	6
u10224p9v0jvt_jm6t.com	1	2	0	1	3
u10224p9v0jvt_jm6t.com	1	5	0	3	8
u10224p9v0jvt_jm6t.com	1	4	0	1	5

Before

Row	SPAM Recipient	Junk	Bulk	Legit	Virus	Total
1	u12646@perf.elab.tumbleweed.com	1241	18	578	17	1837
2	u12646@perf.elab.tumbleweed.com	1241	18	578	17	1837
3	u10486@perf.elab.tumbleweed.com	1236	19	587	13	1838
4	u10486@perf.elab.tumbleweed.com	1231	19	594	18	1837
5	u10619@perf.elab.tumbleweed.com	1231	11	597	14	1837
6	u10619@perf.elab.tumbleweed.com	1229	11	593	10	1838
7	u10619@perf.elab.tumbleweed.com	1224	11	590	79	1838
8	u10619@perf.elab.tumbleweed.com	1224	15	609	18	1838
9	u10619@perf.elab.tumbleweed.com	1222	19	599	10	1838
10	u7206@perf.elab.tumbleweed.com	1221	20	666	99	1838

After

Figures 1a and 1b Widget Standards: Standards for behaviors and the look and feel of the table allow users to have a consistent user experience. The example above shows the table before and after applying standards.

To aid in the usage and enforcement of standards, we developed a prototyping environment in Macromedia Dreamweaver that leveraged a central style sheet and common UI objects, and allowed anyone to easily construct a standards-compliant prototype using a drag-and-drop interface. This significantly improved prototyping efficiency and allowed us to delegate more minor design tasks to others.

3.5 Help Promote Usability Improvements

We found that we could also contribute to the promotion and effectiveness of marketing campaigns for product releases by getting involved. First of all, by engaging customers during the design phase, we helped build excitement and anticipation in their organizations about the upcoming release, as participants left our tests excited and optimistic about the upcoming product. We also found that we could help at the end of the project to summarize the key value points of the new release and highlight major usability achievements that could then be leveraged in marketing campaigns and sales initiatives. One effective way of communicating this was via an interactive before and after demo of some of the major changes to the product.

3.6 Before and After Design

By implementing our user-centered design methodology and following the principles covered in this article, we were able to extensively improve the ease of use of Tumbleweed's applications. Summarized below are some of the improvements to the newest release of Tumbleweed's MailGate application.

3.7.1 Installation wizard

The first experience of using an application is the installation of the product. Thus, providing a concise, polished, easy to use installation process is key to getting the user experience off on the right foot. We redesigned the installation wizard to

minimize the number of steps, provide ample user feedback and error forgiveness, and improve the visual appeal. (Figure 2a and 2b)

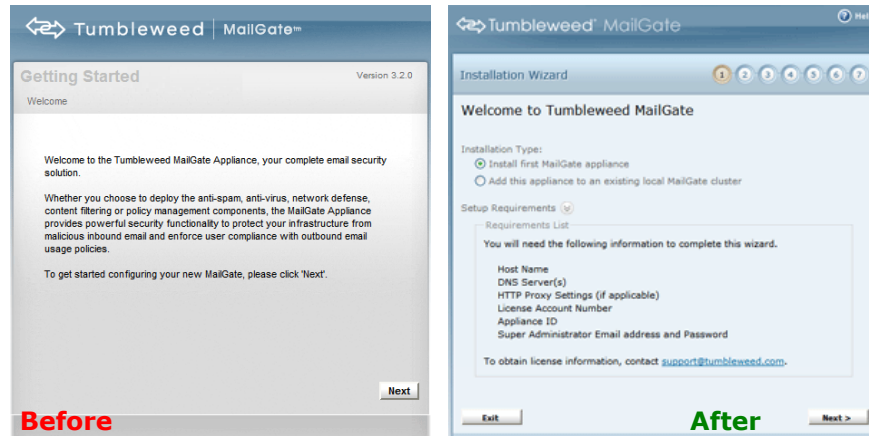
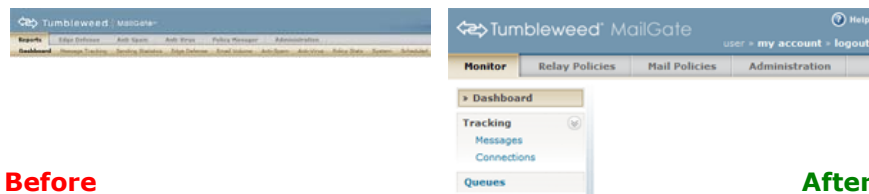


Figure 2a and 2b: The new Installation Wizard provides feedback on the number of steps, informs the user about information needed to install, and its labeling and visual appeal are extensively improved.

3.7.2 Intuitive Navigation System

The navigation system is a key usability feature of any software application. By transforming the navigation system from a featured-based approach (where menus were organized according to features and modules) to a task-based approach, we allowed users to complete common tasks in one place and get sufficient feedback when the data was entered. Usage of non-technical terminology and consistent labeling also proved to improve user performance in completing tasks. The breadth in navigation was preferred to depth in hierarchy, thereby allowing user's access to pages with fewer clicks. (Figure 3a and 3b)



Before

After

Fig. 3a and 3b: The Navigation System was changed to the top and left with a task-based information architecture. The navigation system helps the user rapidly access a page and get sufficient feedback on where the user is in the hierarchy.

3.7.3. Design Templates

In order to help developers use predefined design patterns, we designed several common templates. Using the design templates increased the speed of prototyping and also allowed developers to use them without changing the design component of the page (layout, color palette, Widget properties) when they needed to prototype without the User Experience team's involvement. This allowed for conserving precious time from the UE group, without having to sacrifice quality. Two common design templates for searchable tables and forms are shown in Figures 4 and 5.

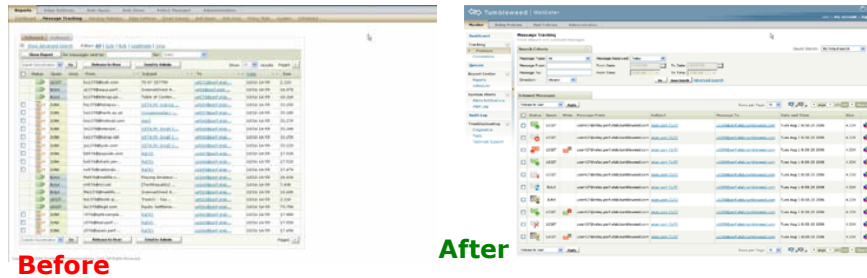
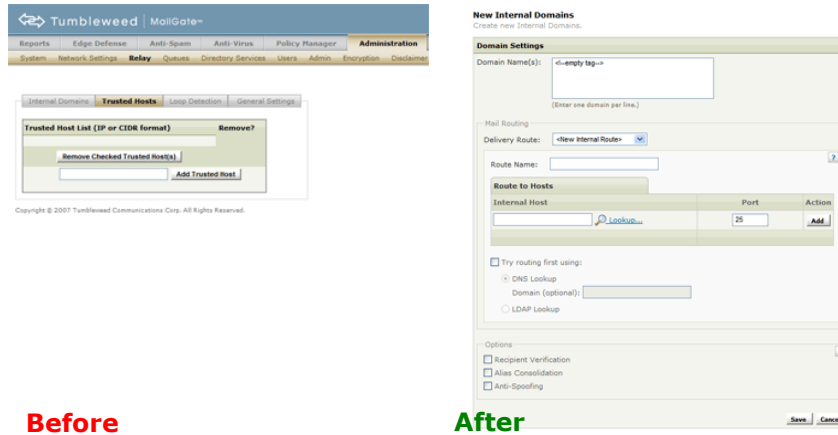


Fig. 4a and 4b: The Design Template for a search page. The page provides distinct search and result sections. All search pages offer the same affordances to users



Before

After

Fig. 5a and 5b: The Form Page Design Template offers a consistent look and feel, and organization. Rational grouping of the information and consistent behavior of the widgets and terminology offer a better user experience to users.

5. Conclusion

Early feedback from customers on the most recent redesign covered in this article has been extremely positive. The results of this approach also motivated the developers and marketing and sales professionals, which resulted in their increased interest in collaborating with the User Experience Team.

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