Photoshop Album 2.0: Ten Design Principles from Outside the Software Industry

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ABSTRACT

User-oriented fields such as graphic design, product design, architecture, and user interface design share common goals: for example, finding solutions focused on clarity, elegance, and economy of means. User-oriented fields outside the software industry significantly influenced the design of the user interface for the digital photography software application Adobe Photoshop Album 2.0. Ten principles derived from designers and architects outside of the software industry (Paul Rand, Edward Tufte, Robert Bringhurst, Adolf Loos, and Walter Gropius) are enumerated, and their impact on specific design decisions is analyzed.

Author Keywords

Multimedia computing, user interface, browsing, metadata, information visualization, information organization, design, digital photography, user experience.

ACM Classification Keywords

H.5.2. Information interfaces and presentation: User Interfaces.

INTRODUCTION

Clarity and elegance have long been goals of the designer, whether working on transportation vehicles, a graphical user interface, portable music player, or corporate logo. Elegance in idea and execution lead to a solution that is not only usable, but one that people respond to and feel a connection with.

This becomes increasingly important in software aimed at the home market, where people use products because they choose to, and not because an employer requires them to.

Such is the case with designing Photoshop Album 2.0 at Adobe. Photoshop Album is a software application for digital photography aimed at a non-professional market. The first release of the product was in February 2003, and a second release was in October of 2003.

As part of the design process for the second version, ten design principles leveraged from work outside the software industry were employed to guide the design process:

1. Success or failure is in the interpretation of the problem.

2. Make the most from the least.

3. Use symbols and relationships to unlock beauty and elegance.

4. Cut the noise.

5. Prevent graphic style from overtaking the presentation of data.

6. Make the difficult accessible.

7. Avoid long lines of horizontal text.

8. Be disciplined about the use of typefaces.

9. Use ornament cautiously and deliberately.

10. Fundamentally, be concerned with *how*, and not with *what*.

We will start with a statement of the design problem to solve, review the principles employed to solve the problem, discuss the literature from which these principles came, how they impacted the design of the feature, successes and failures, and directions for future work.

PROBLEM TO SOLVE

In consumer photography, the capture date and time of a photograph is seen as a critical piece of information. Even if people cannot recall the exact date of an event, they can

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typically recall either the approximate period in time or the date in relation to whether it was before or after other event. This finding has been reinforced by user research within Adobe as well as in conference papers (for example, [1]). Fortunately, most digital cameras insert the date and time of a photograph in to the metadata of the file at the point of capture, making this information available to software applications.

Photoshop Album provides a number of ways to find photos by date. One that was introduced in version 1.0 of the product was a small non-modal window that would be presented to the user after he or she clicked the appropriate button on the application interface (see Figure 1). The calendar obscured the application window (see Figure 2) and did not resize, which was problematic for people with high resolution monitors.
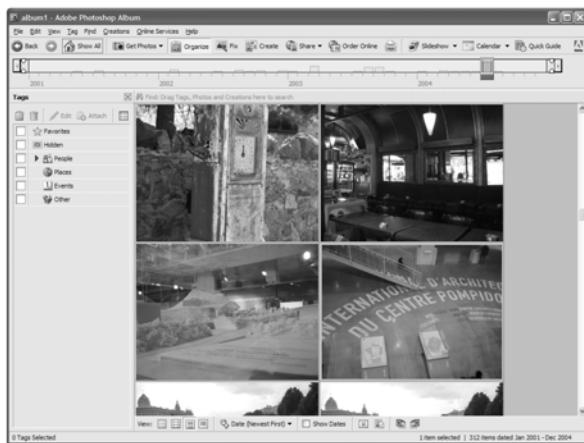

Figure 1. Photoshop Album 1.0 application window

Figure 2. Photoshop Album 1.0 application window with the Calendar

Despite the small size and other functional limitations, the calendar was still a novel part of the application, and for the second release of the product one of the marketing requirements was to make the calendar feature a more prominent part of the application so that it would further differentiate the product from the competition.

Core Team
The team working to solve the stated task of making the calendar feature more prominent included Johnnie Manzari as the User Interface Designer, Michael Mueller as the Visual Designer, and Mary Van Riper as the User Research Specialist. Lance Groody was responsible for the user interface engineering, and Greg Beddow provided the database engineering. Tapan Bhat, Group Product Manager, established the initial market requirement for the feature enhancement.

Project Dates and Duration
Work on the feature spanned between January of 2003 to October 2003.

Methodology
Work began within the design group with concept sketches that were passed to Engineering and Product Management for feedback. The sketches were then turned in to a prototype built using Macromedia Flash so that the behaviors could be experienced. A comprehensive user interface specification was then written prior to implementation. Heuristic reviews and formal usability studies were conducted prior to the release of the product to make enhancements and resolve internal disputes about the relevance of certain behaviors, terminology and functionality.

BACKGROUND
Current thought leaders in the computing industry have made contributions that are formative to the process for designing new features: Donald Normal's notion of natural mappings and affordances [2]; Jakob Nielsen's techniques for evaluating usability [3]; Alan Cooper's approach of using the mental model of the user in the graphical user interface and not the application model that is in the software programmer's head [4]; Clifford Nass and Byron Reeves's discussion of using social psychology research on interpersonal interaction to predict human-machine interaction [5]; B.J. Fogg's work on the ability and potential for technology to change people's behaviors and beliefs [6].

Inspiration and methods are derived from other user-oriented disciplines as well.

The first book this paper's author read that seriously looked at this issue was Terry Winograd's *Bringing Design to Software* [7] published in 1996. The Preface of the book states that it will use input from other disciplines in order to better understand software design:

> Software design is a young field, and we are far from having a clear articulation of the relevant principles. Software design is a user-oriented field, and as such will always have the human openness of disciplines such as architecture and graphic

design, rather than the hard-edged formulaic certainty of engineering design [7:v].

Mitch Kapor uses a specific example of a principle that can be derived from architecture within a reprint of his manifesto in *Bring Design to Software*:

> The Roman architecture critic Vitruvius advanced the notion that well-designed buildings were those which exhibited firmness, commodity, and delight. The same might be said for good software [7:5].

In an effort to extend the ideas presented in *Bringing Design to Software* [7] from Kapor and others, ten principles were distilled from a large body of literature from outside of the software industry to shape the design and design process for the 2.0 release of Photoshop Album.

Recommendations and access to the literature was made possible through recommendations by members of the User Interface Team at Adobe Systems as well as instructors at Stanford University in the Department of Mechanical Engineering and the Department of Computer Science.

TEN PRINCIPLES
While many influences contributed to the design, outlined are a set of key books and writings that has been formative in creating clear, solid design principles that can be used to critique or inform the design. We will specifically look at principles derived from the following: Paul Rand's philosophy on graphic design, Edward Tufte's techniques for information visualization, Robert Bringhurst's guidelines for excellence in typographic design, and Adolf Loos's manifesto on ornament and decoration, and Walter Gropius's principles of Bauhaus production.

Paul Rand
Paul Rand began his career in media promotion and cover design, then moved to advertising design and corporate identification. He was also interested in design education, teaching at several schools, and serving as professor at Yale University from 1956 until 1993. He was a design consultant for major corporations including IBM, Cummins Engine Company, Westinghouse Electric Company and NeXT. Logos for IBM, Westinghouse, United Parcel Service (UPS) and ABC Television are canonical examples of his work.

Paul Rand: A Designer's Art [8], published in 1985 is the basis for the principles we derived from his philosophy.

✿ Principle 1: Success or failure is in the interpretation of the problem.

Underlying Paul Rand's work is a certain wit and sense of simplicity that is an inspiration to do something different, something memorable within the software industry. In a world where software is constantly released and re-released with more and more features on tight deadlines, it becomes challenging to produce something that has the elegance and straightforwardness that makes it memorable and useful.

But as Paul Rand explains, this should not be an excuse to not attempt something ambitious:

> Trite ideas, or unimaginative translation of those ideas, are often the result not of poor subject matter but of poor interpretation of a problem.

> …What Cezanne did with apples, Picasso with guitars, Leger with machines, Schwitters with rubbish, and Duchamp with urinals makes it clear that revelation does not depend upon grandiose concepts [8:45].

As work began on the calendar feature, the design team decided to go in a direction that would not rely on a technical breakthrough to produce. It would be about taking the familiar and interpreting it in an interesting way, not going in a direction that would introduce something unfamiliar as some research in the past has lead to, such as using abstract three-dimensional projections (as exemplified in [9]).

✿ Principle 2: Make the most of the least.

Based on the first principle, we decided early on to avoid a concept that was ostentatious. To keep this decision from unraveling as more individuals became involved with producing the feature, we decided to enforce a second principle, based on Paul Rand's writing:

> The main principle to be learned is that of economy of means—making the most from the least [8:192].

For the calendar feature, it was decided that we would start with four lines—a rectangle drawn on a piece of paper—and only add the elements that absolutely needed to be there. In order to pull this off in a 2.0 application, already burdened with many features and user interface widgets, we decided to create a separate view in to the application that would cut the noise and focus squarely on the calendar. The only consistent elements would be the application button bar and application menus.

This was a departure from the framework strategy of the 1.0 application, where the calendar was simply layered as a new window on top of the existing application window. Layering windows on top of other windows ran counter to the notion of distillation and straightforwardness in presentation.

Starting with a blank rectangle made it easier to focus on a distillation of the problem and a focus on the essentials, rather than starting with a long list of features and attempting to fit them all cohesively within a user interface.

✿ Principle 3: Use symbols and relationships to unlock beauty and elegance.

Adding only the items that are essential will ensure simplicity and a focus on functionalism, but it does not guarantee a successful interface. Thus, we derive a third

principle from Paul Rand, beginning with a focus on beauty:

> Functionalism does not preclude beauty, but it certainly does not guarantee it either [8:213].

The design of the feature needed to be interesting. It needed to bring the photographs to life. For that reason, we decided to go with a calendar appearance that was like a wall calendar, even down to the details of how the dates were listed and the holidays were shown. We had sketches that were perhaps more novel, using various ways of filtering and navigating through time, but the striking familiarity of a simple wall calendar is what ultimately lead us to choose that direction over something that may offer improved performance during a task analysis. Its familiarity is what made it interesting and what made it an attractive symbol to explore:

> Graphic design is essentially about visual relationships—providing meaning to a mass of unrelated needs, ideas, words, and pictures. It is the designer's job to select and fit this material together—and make it interesting [8:xiii].

> It is in symbolic, visual terms that the designer ultimately realizes his perceptions and experiences; and it is in a world of symbols that man lives. The symbol is thus the common language between artist and spectator [8:7].

Additionally, using a large, wall-calendar appearance instead of a design that offered more capabilities, controls, or dimensions of visualization (essentially, more technology focused) allowed us to make a design that was memorable:

> Simplicity implies not only an aesthetic idea, but a meaningful idea, either content or form, that can be easily recalled [8:34].

Paul Rand's influence gave the design group an ability to focus on distilling an idea to its essence and stand firm against the unscrupulous members of the group adamant about producing an overloaded, feature-heavy solution to the problem. His writing challenged the design team to bring to life a solution that was as functional as it was memorable and beautiful.

Edward Tufte

Edward Tufte earned his B.S. and M.S. degrees in statistics from Stanford University and his Ph.D. in political science from Yale in 1968. He has been a Professor of Political Science and Statistics at Yale University since. Tufte has consulted for CBS, NBC (two large American television networks), The New York Times, Newsweek, and the Department of Justice.

Edward Tufte's *The Visual Display of Quantitative Display of Information* [10], published in 1983, played a role in decisions about the balance between the data (photographs)

and the presentation of that data in the calendar feature. The principles pulled from Tufte are reminiscent and complimentary to the writings of Paul Rand.

෨ Principle 4: Cut the noise.

A central tenet of the design team was that the focus must be on the photos, not on the graphical interface that surrounds the photos. Tufte speaks about this as it relates to traditional information visualization:

> Graphics reveal data [10:13].

> The larger the share of a graphic's ink devoted to data, the better… Maximize the data-ink ratio, within reason [10:96].

We knew that the execution of the calendar should let the photos show through and should not shrink the photos by offering heavy borders, ornaments and traditional effects like drop shadows that Adobe Photoshop makes so easy. Essentially we had to cut what Tufte refers to as "chartjunk":

> Sometimes the decoration is thought to reflect the artist's fundamental design contribution, capturing the essential spirit of the data and so on. Thus principles of artistic integrity and creativity are invoked to defend—even to advance—the cause of chartjunk. There are better ways to portray spirits and essences than to get them all tangled up with statistical graphics [10:108].

One other technique we employed to reduce the noise was to only show information when it was relevant. For example, the calendar also has the ability to show photos that are of an unknown month, day or time of day. Initially the calendar was littered with placeholder areas in the interface to show these photos. In order to eliminate the noise, it was decided that these boxes for unknown dates would only appear if there was a photograph to go in it. This allowed us to keep the functionality for those who require it, but not burdening those who don't with additional graphical user interface elements.

෨ Principle 5: Prevent graphic style from overtaking the presentation of data.

Although the priority is placed on reducing chartjunk, we did not want to end up with a design that was stark or bleak. Particularly because we were designing a consumer product we wanted to aim for a design that was inviting and friendly. In discussions around these aesthetic decisions it was useful to reflect on Tufte's explanation of the difference between chartjunk and a graphic style:

> Fortunately most chartjunk does not involve artistic considerations. It is simply conventional graphic paraphernalia routinely added to every display that passes by: over-busy grid lines and excess ticks, redundant representations of the simplest data, the debris of computer plotting, and

many of the devices generating design variation [10:107].

In order to have a design that was inviting and friendly without introducing the graphical elements that take away from the presentation of the data, we decided to introduce subtle hues of cold and warm colors and avoid the use of black lines, opting instead for a dark grey. These subtle changes to the color palette allowed us to avoid over-stylizing the presentation of the data while achieving a softer appearance than Adobe's applications for the professional market (Photoshop, Illustrator, and so on).

☙ Principle 6: Make the difficult accessible.

While not directly related to the details of the user interface solution that we produced or the specific methods that we used, one of Tufte's underlying assumptions that was inspiring was that even large data sets can be made to feel manageable:

> What is to be sought in designs for the display of information is the clear portrayal of complexity. Not the complication of the simple; rather the task of the designer is to give visual access to the subtle and the difficult—that is, revelation of the complex [10:191].

As people accumulate tens of thousands of digital photographs, the design team realized that our solution would only be successful if it could protect people from feeling overwhelmed by all the data.

Visualizations such as a wall calendar are ideal for making a large data set accessible, because the organizing principle is one that people are familiar with. A wall calendar is not the only visualization that can achieve this goal, and this sixth principle will be central to building innovative future versions of the product.

Robert Bringhurst

Robert Bringhust is an American-born poet, book designer, and typographer. He acquired a B.A. from Indiana University in 1973 and an M.F.A. from the creative writing program at UBC in 1975, where he later taught.

His 1992 book *The Elements of Typographic Style* (now in its second edition) [11] covers many of the typographic principles that he has established.

By all means, Photoshop Album 2.0 was not a text-heavy application. Aside from showing dates, keywords and captions, there was not a lot more text that the application would require or display. In the calendar, however, we decided to add a journaling component so that people could use paragraphs instead of just a short caption to describe the events that took place on a particular day. The entry would be tied to the day, and not to a photograph as is typical in photography software applications.

We looked to Bringhurst to help us make the experience of reading and writing multi-paragraph entries as elegant as possible, despite limitations of designing for various screen sizes and using a graphical user interface engine that does not support control for leading, kerning, tracking and other typography settings to enhance readability.

☙ Principle 7: Avoid long lines of horizontal text.

Robert Bringhurst gives straightforward advice for improving readability:

> Even with generous leading, a line that averages more than 75 or 80 characters is likely to be too long for continuous reading [11:27].

We decided to create a fixed column width for the text that would be around 40 characters wide. That text entry area would not resize horizontally across different sizes of the application window. Instead, only the photo would resize and the note would just grow or shrink vertically. We did not want to use a fixed layout that would not take advantage of larger screen resolutions, but we also did not want to let the text to flow in lines that were too long to be easily readable.

Some applications and websites let a line of text flow across the entire application window, as exemplified by Jakob Nielsen's Alertbox articles on the website useit.com, but even Jakob Nielsen himself states that the critical issue is for a liquid layout the resizes along with the application window [12]. The solution of the calendar provides a balance between a liquid layout and Robert Bringhurst's guidelines for readable typographic layout.

(As a side note for the curious reader, formatted using the standard template provided for submissions, this paper follows the guideline in Principle 7.)

☙ Principle 8: Be disciplined about the use of typefaces.

Another frequent topic of discussion during the product release was the use of typefaces. In Photoshop Album 1.0, we were using a system font (Tahoma) for the user interface, but for 2.0 we decided to go with a typeface that was more visually interesting. We decided on Myriad Web because it had a shorter x-height and open letterforms that breathed more easily (see Figure 3).
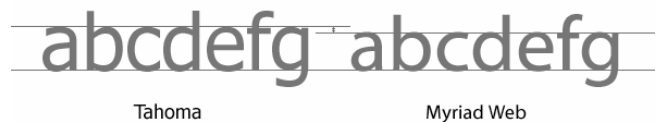

Tahoma   Myriad Web

Figure 3. Comparison of Tahoma and Myriad Web

Because Adobe is also a company that sells fonts, we could have chosen many fonts to include in the user interface. We decided to stick with just one typeface family, using Myriad Web in a large and a small size, with emphasis added using

bold or color changes. This discipline about the use of typefaces can be difficult to maintain because there is a tendency to create font variations to draw attention or separate out different parts of the interface.

Robert Bringhurst explains the benefits of choosing typefaces carefully and not using lots of fonts just because it is easy to do so:

> With type as with philosophy, music and food, it is better to have a little of the best than to be swamped with the derivative, the careless, the routine [11:117].

Adolf Loos

No discussion about a user interface would be complete without mention of the specific execution or styling of the visual appearance. One of the boldest statements with respect to style and aesthetics was made by Adolf Loos in his 1908 paper "Ornament and Crime" [13:19-20]. He was an opponent of the Art Nouveau, which, in his opinion, focused unnecessarily on ornament and decoration.

❧ Principle 9: Use ornament cautiously and deliberately.

Taken literally, Loos is against any attempt or focus on ornament in architecture or design:

> I have made the following discovery and I pass it on to the world: The evolution of culture is synonymous with the removal of ornament from utilitarian objects.

> …We have outgrown ornament. See, the time is nigh, fulfillment awaits us. Soon the streets of the city will glisten like white walls. Like Zion, the holy city, the capital of heaven. Then fulfillment will be come [13:20].

In designing the calendar we wanted to avoid distracting, needless visual artifacts (noted in the previous section on the principles derived from Tufte), but we consciously avoided following the advice of Loos in the strict sense.

Ornament is escapable, but even the lack or ornament dictates a style. And that style, like any other, can become the focal point of the product instead of the specific task at hand. In that light, we felt it would make sense to offer multiple styles such that the person can choose one that best fits the surroundings and aesthetics in their home. (There would still have to be a default style, and we created one that was aimed at broad appeal.) If the feature we were designing truly was a wall calendar for the digital era, it is useful to offer the ability to choose from a number of styles.

The surprise and delight that can come with presenting a unique, personal style is something found easily outside the software industry: mobile phone manufacturers like Nokia offer interchangeable, decorative face plates for their handsets. In version 2.0 of the product, however, there is no

choice. To be clear, that was not because it was seen as the ideal solution but an outgrowth of constraints.

Walter Gropius

Walter Gropius was an architect born in Berlin. He founded the Bauhaus, a design school focused on everything from architecture to theater. Gropius served as Director of the Bauhaus from 1919 until 1928 when, with the rise of Adolf Hitler, Gropius decided to leave Germany and eventually settled in the United States of America, teaching at Harvard University.

His 1926 paper entitled "Principles of Bauhaus production" [13:69-70] established the tenth and most important principle used in the design process of Photoshop Album 2.0.

❧ Principle 10: Fundamentally, be concerned with *how* and not with *what*.

During the process of designing the calendar feature choices about the user interface were made and re-made constantly. Yet the emphasis was less on whether or not a choice was the right choice, but whether the route to making the choice was the right route.

For example, one common point of discussion was whether a specific feature would have an iconic button available in the user interface, or if it would only be available in a context menu. Having the redundant iconic button would make the feature presumably more discoverable, but it also makes the interface more visually complex.

Using a framework that is trustworthy makes this and other specific issues less about a feature and whether or not it has a button, and more about the overall presentation to the user. While people on the product team tend to think about issues on an individual basis, only a holistic approach can lead to a consistent and resolved interface.

In order to prevent decisions from being made haphazardly, the design team tried to be grounded in design principles such as those outlined in this paper to provide the appropriate larger context. If the larger product team can agree to what the principles are, then the other decisions become less of a source of constant argument.

Gropius was able to describe the fundamental tenets of the Bauhaus, just as a product team working on a software application should be able to do so:

> It is only through constant contact with the newly evolving techniques, with the discovery of new materials and with new ways of putting thing together, that the creative individual can learn to bring the design of the objects into a living relationship with tradition and from that point to develop a new attitude toward design, which is:

> … the organic design of things based on their own present-day laws, without romantic gloss and wasteful frivolity; the limitation to characteristics,

primary forms and colours, readily accessible to everyone; simplicity in multiplicity, economic utilization of space, material, time, and money [13:70].

One mistake made in the process of building Photoshop Album 2.0 was that these principles stayed within the design organization and were only tangentially referred to in discussions with other groups. It would be beneficial to attempt a more formal process for coming to and communicating these values to the product team. In the same way that Gropius published his thoughts on the Bauhaus values, the design team needed to take similar steps.

RESULTS

The goal with the entire release, not just the calendar feature, was to do more with less: to clear the noise. The hope was that with each release the program gets simpler, not more complex, because tasks are streamlined. Many other photography software applications are available that feature the ability to use a calendar to find photos by date. Our hope was that a design grounded in principles derived from outside the software industry that are classic and timeless can continue to differentiate the feature.

Figures 4 shows the final design. The calendar is on the left

and an area for a preview of the day's photos and the daily note is on the right.

One measure of the success of this strategy is by noting feedback from the press. The press has grown more attentive to the design of software in recent years, and in the post-release of the 2.0 version of Photoshop Album we received praise for the work that went in to the redesign of the product:

"While other graphic viewers handle at least some of these same tasks, Photoshop Album ($50) is the most powerful, logically designed and flexible that I've found after years of searching," from Peggy Rogers of the Miami Herald [14].

"With Photoshop Album, Adobe has done a remarkable job of addressing the most essential needs of digital photo collectors, while at the same time keeping things simple." from Sue Chastain of About.com [15].

"Adobe deserves great credit for improving and simplifying Photoshop Album in version 2.0 and, in my view, it's the best choice for digital camera owners with Windows PCs," from Walt Mossberg of the Wall Street Journal [16].

As more customers have used the feature, we have received feedback on what is missing and what was successful. One are for improvement is a greater connection between this
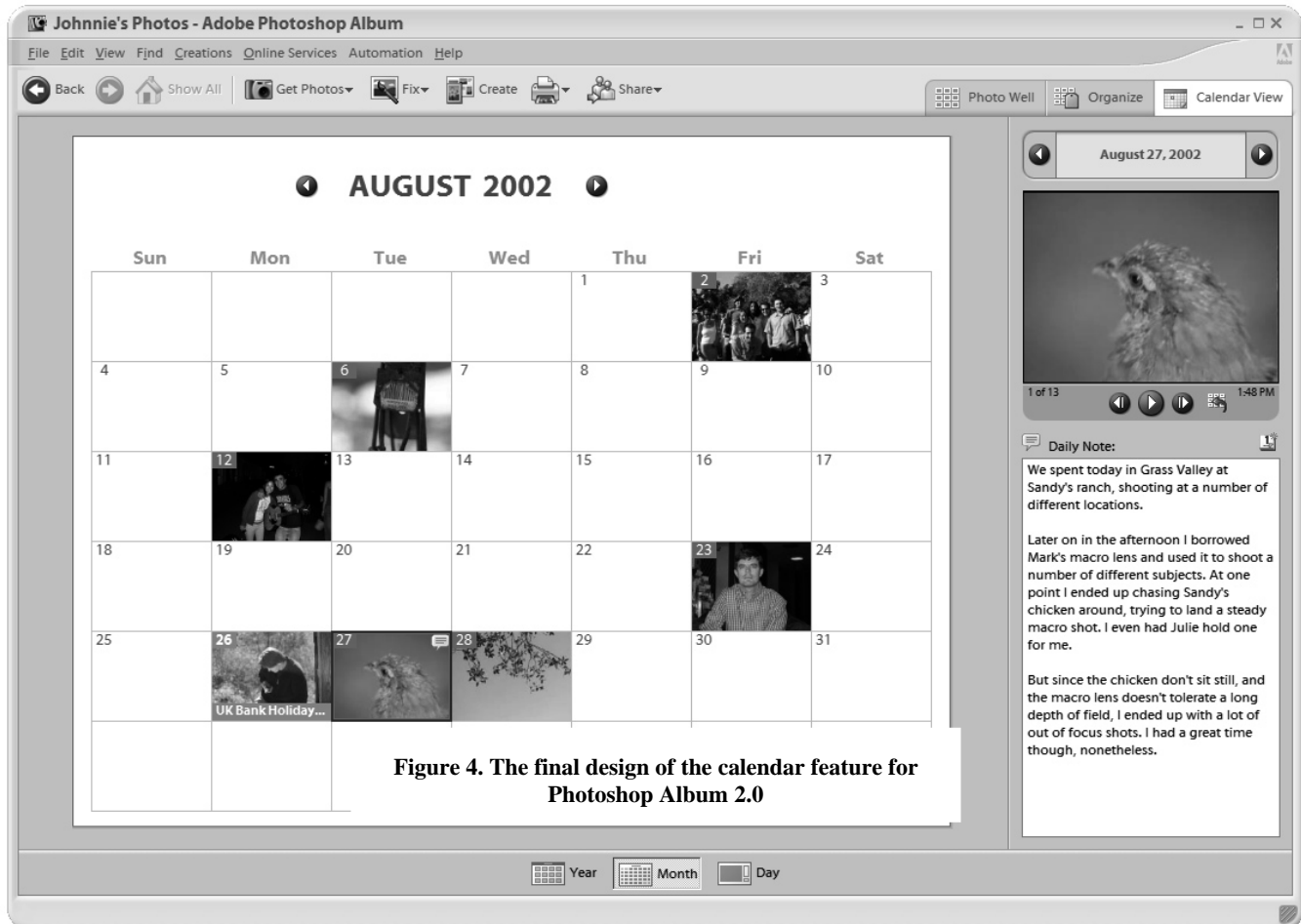

Figure 4. The final design of the calendar feature for Photoshop Album 2.0

feature and other features of the application. For example, doing more with the daily notes, such as the ability to print out journals from the product. Also, one thing that came out of the specific design was that people wanted to pick the top photo that showed up in the month, presumably because there was a particular photo that captured the essence of that day.

FUTURE WORK
In future product cycles the team should attempt to more broadly communicate the process around design principles from outside the software industry, and share the results with groups within the teams such as Engineering and Product Management, but also external groups such as the company executives. Knowing the principles that drive the products reaffirm that the there is a methodology in place to ensure high quality results.

Future design directions should look at more aggressively pulling from industries creating experiences, such as film and entertainment. Furthermore, the design team should also look at business and marketing literature to incorporate principles from those disciplines directly in to the design process as well.

The long-term direction, which is outside the scope of this paper, is to create an environment that fosters holistic design. By collaboratively building a set of principles with various groups in the organization, and looking to other industries, the designers and researchers responsible for the user interface can demonstrate ties to the world of packaging, marketing collateral, product messaging, and so on, such that there is momentum to create an increasingly consistent user experience and identity.

CONCLUSION
The ten principles outlined in this paper provided the user interface team with a framework for testing against the user interface, similar to the role a set of heuristics will play in a heuristic evaluation. Because they are pulled from outside of the software industry they provide an insight and an inspiration that is unique. The combination of traditional heuristic evaluations and formal usability testing with a set of design principles from outside the industry provides a complimentary combination that is more likely to create a successful design.

As the software industry grows it will be increasing important to engage with and refer to other user-oriented disciplines. Twenty years ago software design was not a discipline taught in schools. People were trained in other disciplines, and brought a diverse background to the workplace. However, as human-computer interaction instructional programs grow and mature around the world, it is increasingly important to actively engage with other industries and use literature from outside the software industry to maintain a diverse, broad perspective.

While the success of the calendar design in Photoshop Album 2.0 will ultimately be decided in the marketplace and in a greater context historically, the process by which the design was created, pulling from architecture and design outside of the software industry, was rich and fulfilling. Looking back to Terry Winograd's *Bringing Design to Software* [7], it is exciting to see how far the software design discipline has come and how influential it has the potential to become.

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