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THE TRANSFORMER

A conversation with …

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Looks Good, Works Well

Taking a user-centric approach and applying a set of standard design principles ensures the development of innovative, highly usable software applications.

By J. Alan Baumgarten | *Ascend* Contributor

Renowned architect Frank Lloyd Wright said it best: "Form follows function — that has been misunderstood. Form and function should be one, joined in a spiritual union."

A building architect seeks to create unity between the form of a structure and the many human activities or functions it must accommodate. This is the foundation of organic architecture — that the union of form and function defines the experience of those who occupy the building.

The same concept applies to information technology, which is designed to accommodate the information-based activities of users. The software interface is where human/computer interaction occurs — the digital equivalent to walls and floors. And in defining the user experience, instead of "form and function," information architects use the terms "design" and "usability."

Benefits of User-Centered Design

User-centered design may seem like it requires a lot of additional time and effort. On the contrary, this process is more efficient and ultimately more cost effective, which can make the software more affordable. By understanding the needs of end users early on and factoring them into the architecture and design of an application initially, programmers spend less time developing unnecessary or unwanted functionality, reworking confusing interfaces, and struggling to create the right look and feel.

Well-designed software provides a number of benefits for airlines:

- It requires less training and far less time on the phone with technical support.
- It integrates well with the user's environment.
- It delivers better results because it fits the processes required to complete the task.
- It can boost productivity, enabling users to perform tasks quickly.
- It can increase job satisfaction.
- It looks more professional and aesthetically appealing.
- It is more engaging.

Defining User Experience

Consider a device that can be used every day: a can opener, a clock radio, a cellular phone, a gasoline pump. If a user of these products experiences confusion, difficulty, frustration or annoyance, it's a strong indication of a failed product — the result of bad design, bad usability, or both. However, if the user experience is simple, effortless, natural and intuitive, the product designer or engineer has followed the principles of user-centered design.

Apple excels in the marketplace through excellent design and excellent usability.

A usable design is an important element of the success of any product, whether a toaster or a software application. One of the most successful new products to be introduced in recent years, Apple's iPod, has shown the value of having a simple, intuitive design that joins form and function, enabling users to maximize its usefulness. Identifying end users and understanding their needs is critical to the design and development of robust technology.

Photo by Yvette Hunt

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HIGHlight

Creating user-centered software is often a recursive process, not a linear one.

Ironically, good usability tends to be transparent. Users are task oriented, meaning they're more focused on the task at hand than the tool or method they use. For instance, when starting a car, the driver turns the key and the car starts; the driver doesn't give a second thought to the ease of the action despite the enormous complexity of today's automobile engines. It's only when the car fails to start that the engine gets the driver's complete attention. Even then, it's not so much the engine they're concerned with as the problem of being unexpectedly stranded.

Good usability may not always stand out, but good design more than makes up for it. Design breathes life into a product, making it more appealing and more memorable. Good design is the essence of branding or differentiating one product from another. While design for design's sake can sometimes interfere with usability, the best design can improve usability by making controls more visible and information easy to locate and read.

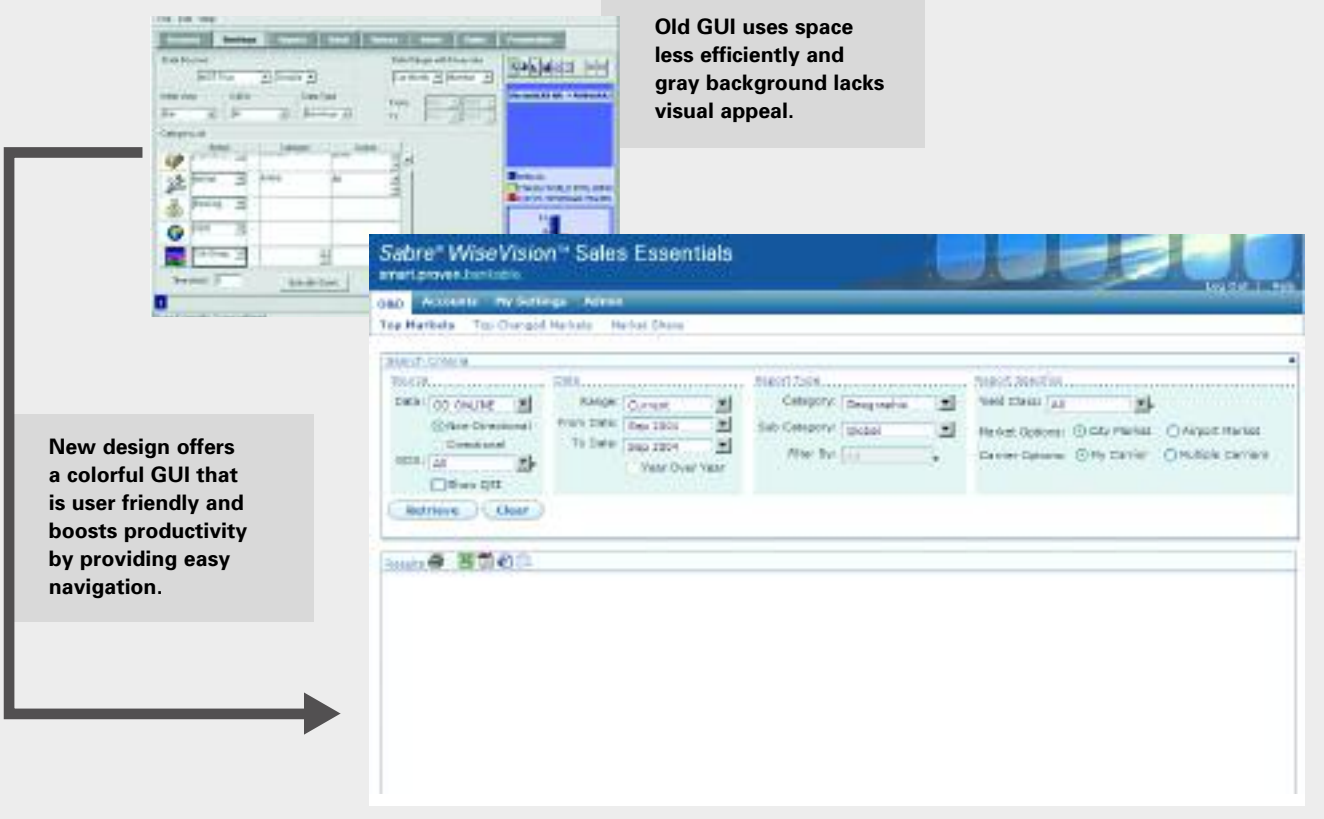
The most successful consumer products pair excellent usability with outstanding design. One example is Apple's iPod, which combines a sleek compact design, intuitive user interface, excellent sound quality and generous storage capacity — all the qualities consumers want. iPod wasn't the first portable music player on the market, but excellent design, a simple interface and user-centered features quickly made it the best-selling device of its kind.

Excellent design makes a product look good. Excellent usability means the product works well and meets real user needs. "Looks good, works well" is the mantra of the new user experience team at Sabre Airline Solutions. It defines the goal of achieving the "spiritual union" alluded to by Frank Lloyd Wright.

Software that Looks Good

The principles of good design pre-date software development by several centuries. Even the Gutenberg Bible had a user interface. The media may have evolved through the years — from stone and canvas to paper and now light — but designers are still interested in the same principles:

- Composition — Involves rhythm, balance, weight, proportion, consistency, harmony, organization and emphasis;
- Color — Used to create visual interest, establish mood or tone, draw attention, apply emphasis, and denote relationships (designers must be aware that color sometimes has certain social connotations that can differ among cultures);
- Type — Includes font selection, size and style, capitalization, color, and spacing con-



The new Web framework features two levels of navigation near the top of the screen, freeing up additional application space below. This has enabled developers to design more robust Web-based applications without negatively impacting usability.

siderations;

- Graphics — Concerns the appropriate use of visual elements to convey information rather than just text or numerical data.

Few programmers, brilliant as they may be, have formal training in graphic design, and many are not up to speed on the intricacies of applying design principles in user interfaces. The simple fact is that programmers don't have time to earn four-year graphic design degrees when they're focusing on learning complex languages and methodologies in a rapidly evolving field. As an unfortunate but predictable result, software interfaces are often bland, uninteresting, unmemorable and difficult to use.

The simple solution is collaboration. Product development teams at Sabre Airline Solutions work closely with interaction designers to ensure that user interfaces adhere to the principles of good design and follow the prescribed look and feel defined by corporate style guidelines (or the guidelines for a particular airline).

Recently, the team completed work on a Web framework, which is essentially a collection of reusable components with pre-defined behaviors that share a common look and feel. Product teams that use the framework don't have to worry about design because the styles and graphic standards are already defined, enabling developers to spend more time ensuring robust functionality of the software. There are several applications within the Sabre Airline Solutions product portfolio that use the Web framework, including *Sabre® AirMax® Group Manager*, *Sabre® CargoMax™ Revenue Manager*, *Sabre® WiseVision™ Sales Analyzer*, *Sabre® AirPrice™* fares management system, *Sabre® AirMax® Revenue Manager*, *Sabre® Reaccommodation Manager* and *Sabre® AirCrews® Operations Manager*. More are in development.

A similar framework is in place for Swing interfaces, which are more traditional applications installed on a client machine rather than hosted on the Web. They include *Sabre® Movement Manager*, *Sabre® AirFlite™ Schedule Manager*, *Sabre® AirCrews® Disruption Control*, *Sabre® AirCrews® Pairing Optimizer*, *Sabre® AirCrews® Resource Manager*, *Sabre® AirCrews® Schedule Optimizer* and *Revenue Manager*.

Software that Works Well

Usability has become an industry buzzword in the past few years thanks to the efforts of seasoned researchers such as Alan Cooper and Jakob Nielson, who have identified and documented a number of interaction design principles. The Sabre Airline Solutions user experience team consolidated the wide body of industry research into a set of 10 principles or heuristics that guide the planning, design and evaluation of product suites.

These principles include:

- Metaphor — The electronic system should align with identical real-world systems. For example, a digital paint program uses tools and icons designed to imitate a painter's studio (airbrush, pencil, eraser, etc.) even though no real paint is used.
- Feedback — The system should show users the status of the system and let them see, hear or know of changes immediately.
- Navigation — The interface should let users know where they are in the system and what other options are available.
- Consistency — Design, colors, buttons, graphics, fonts and all visual elements should remain consistent (e.g., don't use four different shapes and colors for a submit button, and make sure it always appears in the same relative place).
- Memory — Users should not be required to remember data, settings or special commands from one screen to the next; rather, they should be enabled to view, recognize and select what they need.
- Effort — Only the minimum number of steps should be required to complete a process; at the same time, the interface should not be unnecessarily crowded and complicated just to save one or two steps.
- Design — Design elements should facilitate functionality, enhance the visibility of important elements, ensure readability and reflect the brand image. Design must never overwhelm the interface or interfere with usability.
- Recovery — Users must be able to easily recognize, diagnose and recover from errors.
- Error prevention — Whenever possible, the system should prevent users from performing actions that would result in an error.
- Help — System help is immediately available, and the program is well documented; wherever possible, help should be given in context with program functions (i.e., directions are given along the way).

Creating user-centered software is often a recursive process, not a linear one. Like a written composition, each new iteration — each draft of the software — is a learning process that brings developers closer to the ideal solution. Nevertheless, much of the development curve can be circumvented by starting with a clear understanding of the end user, usually through a series of interviews and on-site observations.

The first goal of the user experience team is to determine exactly who the end users are, which is not always readily apparent. The team must understand users' work-related tasks, their level of experience and training, attitudes, and discourse (vernacular or specialized vocabulary). The team must also understand conditions in the workplace, such as time constraints, noise levels, and available hardware and software.

Input from user interviews and observations are compiled into a single document — a "persona" — which is a detailed profile of a typical (not necessarily average) user. The persona acts as a sanity check, a measure by which all other design and development decisions are validated.

As the user experience team collaborates with product development teams, it first attempts to reconcile the user requirements defined in the persona with the functional and business requirements defined by customers, product managers and stakeholders. Once a common understanding of how an application needs to operate exists, the team can begin designing interfaces that meet the many functional requirements and adhere to the 10 principles of usability. User feedback is solicited along the way, and, if possible, formal usability tests of working prototypes are conducted; it's better to know early in the process where users are experiencing difficulties so they can be addressed prior to product release.

Product development and the user experience is an ongoing, iterative cycle. The team continually monitors user feedback, tracks user success, validates assumptions about end users and establishes new recommendations for making Sabre Airline Solutions software look good and work well.

Frank Lloyd Wright had it right a century ago — form and function are one. And through its "looks good, works well" approach, Sabre Airline Solutions is committed to developing well-designed, user-friendly applications that lead the industry.

HIGHlight

Excellent design makes a product look good. Excellent usability means the product works well and meets real user needs.

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