An Equilibrium of Value:
Linking Business Decisions and User Benefits

The following essay is based on a chapter from the recently published book entitled

Built for Use: Driving Profitability Through the User Experience *by Karen Donoghue*

Balancing Cognitive Limits of Humans with Marketing Demands

Designing successful user experiences for pervasive, often invisible technologies, require us to find new ways to balance the cognitive limits of end users with the accelerated drive to develop innovative and marketable technology. At the same time,

designs must also address the business goals that contribute to a return on the technology investment. Consider, for example, the implications of paying for drive-through fast food using the E-Z Pass—the device that automatically registers highway tolls that many people already have in their cars. The technology is seamless and virtually invisible to

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the user yet would provide fast food vendors with a more efficient way to serve customers and enhance workers'productivity. In creating these designs we must reduce the potential gap between usability and profitability that can exist in the world of pervasive, invisible computing. At present, users are inundated with experiences that fail to please them and fail to produce returns. Pop-up ads and browser windows that disable the Back button make it easy for users to leave a Web site before making a purchase, in effect creating poor user experiences. As usability professionals, business strategists, managers, designers, and technologists, we'll need to better understand how usability affects business in order to focus our effort and resources on experiences and interfaces that can produce measurable value (1).

The gap between business and design decisions can be seen in the latest generation of handheld wireless devices, such as the new Blackberry 5810 Wireless Handheld™ or the new hiptop™ communicator device, which blend cell phone functionality with PDA features. Telecommunication companies that develop and market these devices seek to make money by adding features that are intended to get people to make more and longer phone calls. However, many of these features are hard to use because they force users to relearn familiar things. Some wireless devices, for instance, require users to adapt to an unfamiliar user interface when dialing a phone number or listening to a call.

Productivity decreases if the user has to spend time on useless actions that undermine successful completion of tasks: The business goals for these devices depend on getting users to make more calls, not fewer.

An Example in Mobile Connectivity: Can You Hear Me Now?

Let's take a look at an example to show how conflicts between the business goals and the end user goals are going to have an impact on the adoption of handheld devices. Consider the example of a fictitious mobile device we'll call "MobileX"—a combination cell phone, Internet appliance and personal information manager aimed at mobile consumers.

As shown in Figure 1, the business goals for MobileX include driving revenue through subscriptions, but it also depend on users making lots of phone calls and sending SMS (short message service) messages.

The MobileX device also features the tiniest QWERTY keypad ever made. From a business perspective, the keypad represents a competitive advantage because it makes the phone smaller and easier to carry. Yet taking a look at the user goals in Figure 1, customers want mobile connectivity they trust and can access anywhere and any time, without being forced to re-learn familiar behaviors. On this new device, users make phone calls using a keypad that looks nothing like a 12-button phone pad—the phone pad is absent in the design because it couldn't be fit onto the surface of the device.

What happens when this product launches? Adoption and usage of the product are likely to be lower than expected because the conflict between the users' preference to have a familiar device, and the business goals of a small keypad, result in a compromised

Figure 1: The business and end user goals for fictitious handheld MobileX. The conflict between business and end user goals can result in a compromised user experience and poor return on investment.

Business Goals	End User Goals
1. Increase subscription revenue	1. Affordable, reliable mobile connectivity any time and any place
2. Increase revenue through phone calls	2. Easy to learn, easy to make phone calls and access the Internet
3. Increase revenue on SMS messaging	3. Be able to learn how to use SMS quickly

user experience. One consequence is that users make fewer phone calls which in turn reduces the overall usage resulting in less revenue. This is a problem when success for the telecommunications company requires users to make a cognitive shift in their behavior to use these devices more.

The important item to note here is that the impact of the user experience extends beyond the actual user interface, or the device itself, to the overall experience of owning and using the device. The user experience will be even more important in a world of pervasive technology. Having a sexy, overdesigned device in hand is a part of the equation for a profitable user experience. A successful user experience will also require telecommunications companies to provide customers with more integration and more reliable connections to the network at anytime and any place than they are now getting. Perhaps customers will then be less likely to put up with poor coverage. Currently, while using cell phones in the United States, we expect to use the question "Can you hear me now?" at least once during a call. We put up with spotty coverage because the promise of mobile connectivity—coupled with being able to show off swanky new cell phone styles with low monthly rates—is enough of a value proposition to get us to carry and use the phones. But it may not be enough for pervasive computing: Imagine if the user experience for the next generation of networked intelligent devices depends on a network that forces one to ask the "internet access" equivalent of "Can you hear me now?"

Great Networked User Experiences Rely on Better Integration

Pervasive user experiences will blend channels and modes of communication— gesture, voice, tangibility, etc—into new and portable devices whose design renews an old challenge in artificial intelligence: to develop a system that can understand a user's intent. As hardware becomes a commodity, it will be the software and services, and their associated user experiences, that add value for customers. And it is these very areas where the contributions of professionals, skilled in the art of designing user experiences, will add tremendous business value, tightening the links between usability and profitability.

It won't be easy to reconcile the conflicts that often arise between business goals and users' goals and needs. The successful user experiences in pervasive computing may be expensive to build and maintain. An example of a well executed, integrated user experience available today is Tellme, which offers contextually sensitive voice recognition capabilities delivered over the phone. A large amount of work went into creating this experience and it provides a benchmark of the level of work involved in creating great user experiences for the next generation of pervasive computing platforms (2). Another example of a great integrated user experience

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LINKING BUSINESS AND DESIGN IN THE USER EXPERIENCE:

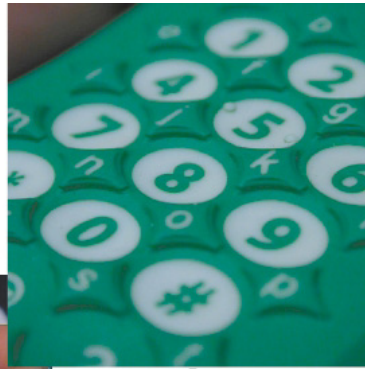| **1.**	**2.**	**3.**	**4.**	**5.**
ONLY ADD FEATURES AND FUNCTIONALITY THAT DELIVER AN EQUILIBRIUM OF VALUE: BLENDING VALUE FOR THE CUSTOMER WITH VALUE FOR THE FIRM.	ENSURE THAT ALL TEAM MEMBERS INVOLVED IN THE PLANNING AND DEVELOPMENT OF THE USER EXPERIENCE— FROM BUSINESS, TECHNOLOGY, DESIGN—CLEARLY UNDERSTANDS HOW USABILITY IMPACTS THE BUSINESS GOALS.	CONNECT FINANCIAL METRICS TO REFLECT CUSTOMER SATISFACTION AND USABILITY METRICS, AND MEASURE THEM REGULARLY.	MAKE THE MEASUREMENT OF SUCCESS METRICS THE RESPONSIBILITY OF ONE PERSON, WHOSE ROLE IT IS TO SHARE THIS INFORMATION WITH THE TEAM AS AN INDEX (OR SET OF INDICES) OF USABILITY.	SHARE KNOWLEDGE AMONG THE DEVELOPMENT TEAM AND CREATE A LEARNING CULTURE SO EACH TEAM MEMBER UNDERSTANDS WHAT OTHER TEAM MEMBERS CONTRIBUTE TO THE USER EXPERIENCE.

Figure 2A: The Fastap™ keypad: designed to make it easier to enter information into a cell phone or wireless device in a small footprint. Figure 2B above shows a close-up of the user interface for the keypad. Raised buttons are comfortably distant from adjacent buttons, and the valleys between them form additional keys. Pressing on any button or in any valley produces a unique output that is clearly identified, and instantly available.
(Photo courtesy of David Levy, Digit Wireless)

without having to fiddle around with buttons or dials while driving. Or they want proactive roadside emergency assistance if they are unconscious after an accident.

On the business side, the revenue sources include subscription fees and usage of ancillary services, such as the roadside assistance service. The user experiences will deliver an elegant equilibrium between value for the customer—the driver of the car—and the car manufacturer. These user experiences will satisfy business goals at the same time as they are answering the goals of the people who use them.

Small Interface Innovations Can Lead to Big Industry Change

We've seen in the past that innovations in user interface design have sometimes been good enough to catalyze explosive growth in the technology industry. Graffiti Handwriting Recognition helped define a new industry when coupled with the Palm

is the new Saab that makes an automatic OnStar phone call to 24/hr assistance if the airbag deploys. The GPS device in the car means OnStar knows where the driver is. If the driver has an accident and is incapacitated, OnStar will know where to send the ambulance. These multi-channel user experiences can deliver real value that consumers—or the manufacturers—will pay for. In the case of Saab, customers want personalized navigation assistance when they are lost—or want to book a movie at the cinema they happen to be driving by—

and Handspring devices; it off-loaded the intelligence of handwriting recognition to the human—in effect forcing users to adapt their behavior to unleash the power of the machine. Similarly, the Web blossomed into a large distributed marketplace full of rich content when a browser came on the market that provided an easy-to-use view onto the Internet.

Some of the inherent conflicts between business goals and design goals will continue to be addressed by new innovations in interface design. The Fastap™ keypad shown in Figure 2 is a good example of an interface

innovation that could help make cell phones more useful for pervasive computing; it integrates the alphanumeric keypad into the same surface area (and consistent key arrangement) of a traditional 12 pad cell phone (3). By making it easier for consumers to make more calls more frequently, or to access the Web to engage in more activities, this interface innovation is an example of how a better user experience can help drive adoption and usage that is needed by businesses.

Ubiquitous and pervasive computing will move us closer to having technology integrated into our lives, without the need for abstractions such as the desktop, mice, and icons. And like the ease of using an E-Z Pass as compared with a desktop computer, transactions will happen invisibly, with little or no effort. The arrival of microelectronics and better, smarter integration between devices and our computers will lead to tiny sensors and wireless embedded devices bringing us experiences that are different from our current method of interacting with technology (using a desktop computer, keys or a mouse.) Instead, these interactions will happen transparently. Some of the experiences will arrive with an increase in tangibility; there will be devices that we hold or interact with physically in new ways. Like having a pacemaker, the actions may happen without us being aware of them.

To really deliver value to users, experience-design for pervasive computing rests on the notion of appropriateness, and, to succeed will depend on several key elements of the experience-design equation:

✦ The need for an integrated underlying infrastructure
✦ Appropriate intelligence and sensing of the experience context
✦ An understanding of how to fit the design of the experience of the user's needs

The orchestration of multiple modes of interfaces working in concert—such as voice recognition and mobile devices—will be the hallmark of new experience architectures. The clicks and bits have to work harder to help the human, with more intelligence embedded in them. Like my colleague's soccer scores being delivered all day to his cell phone so he can surreptitiously see World Cup scores during long and boring meetings—his own personal killer app—we'll have to be more mindful that the experiences we design are built for use. We can measure this by tracking trends about how people feel about these experiences: One measure is how often people are attacking their computers. Indeed, the rise in computer repair shops seeing keyboard, mice, and monitors that have suffered a great bashing indicates that people aren't happy with their machines. If we continue to see this trend when pervasive computing really arrives, we'll know we're doing something wrong.

Karen Donoghue is the founding principal of HumanLogic, a user experience strategy firm based in Boston, and is author of Built for Use: Driving Profitability Through the User Experience, *(McGraw-Hill, 2002), the first business strategy book to link profitability to the online user experience.*

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2. Tellme, Tellme Networks, Inc. See www.tellme.com. Since 1999, Tellme has raised over $238 million in investment and has built a successful technology platform for delivering a business-to-business voice recognition solution for maximizing call center productivity.
3. Levy, David. The Fastap™ Keypad and Pervasive Computing. Presented at the *International Conference on Pervasive Computing*, Zurich, Switzerland, August 2002. See www.digitwireless.com for this paper. ✐