Does this not seem to say: "We do not do a good job. We do not care. And you cannot do anything about it."? Who would buy any other kind of consumer product, a TV or a car, with this kind of "warranty"? So why have we put up with this in software products?

Disastrous system development case studies give much more depth to motivating the need for usability and user experience. Marcus and Gasperini (2006) tell of an emergency-response system developed for the San Jose (CA) Police Department, a mobile, in-vehicle communication system for dispatchers and officers in cars. The police had a good working system that they had perfected and customized through years of use, but the underlying technology was too old. Unfortunately, the committee appointed to gather requirements did not include police officers and their focus was on functionality and cost, not usability. No user focus groups or contextual inquiry were considered and, not surprisingly, the mobile response functions and tasks were addressed minimally in requirements.

The resulting system had serious flaws; key information was missing while unneeded information was highlighted. Layouts were confusing and labeling was inconsistent—the typical list you would expect from an early user experience evaluation, only this was in the final system. Officer users were confused and performed poorly to the point of creating risks to their safety in the field.

The lack of feedback channels from initial users precluded fixing problems in subsequent versions. Extensive training was prescribed but could not be given due to cost. In the end, a very expensive new system had led to life-threatening perils for officer users, the situation became highly politicized, emotions ran high, and lawsuits were threatened. Much more money had to be spent in an attempt to fix major problems after the fact. This is a clear story of how a failure to take a user experience-oriented and user-centered approach to design led to truly extensive and awful consequences. A process to ensure a quality user experience that may seem to complicate things upfront can benefit everyone—customers, users, UX practitioners, designers, marketing people, and the public—in the long run.

Contextual Inquiry

Contextual inquiry is an early system or product UX lifecycle activity to gather detailed descriptions of customer or user work practice for the purpose of understanding work activities and underlying rationale. The goal of contextual inquiry is to improve work practice and construct and/or improve system designs to support it. Contextual inquiry includes both interviews of customers and users and observations of work practice occurring in its real-world context.

1.3 FROM USABILITY TO USER EXPERIENCE

1.3.1 The Traditional Concept of Usability

Human–computer interaction is what happens when a human user and a computer system, in the broadest sense, get together to accomplish something. Usability is that aspect of HCI devoted to ensuring that human–computer interaction is, among other things, effective, efficient, and satisfying for the

user. So usability[1] includes characteristics such as ease of use, productivity, efficiency, effectiveness, learnability, retainability, and user satisfaction (ISO 9241-11, 1997).

1.3.2 Misconceptions about Usability

While usability is becoming more and more an established part of the technology world, some misconceptions and mischaracterizations still linger. First, usability is not what some people used to call "dummy proofing." While it might have been mildly cute the first time it was used, this term is insulting and demeaning to users and designers alike. Similarly, usability is not equivalent to being "user-friendly." This is a misdirected term; to say that it is about friendliness trivializes the scope of the interaction design process and discounts the importance of user performance in terms of user productivity, etc. As users, we are not looking for amiability; we need an efficient, effective, safe, and maybe aesthetic and fun tool that helps us reach our goals.

To many not familiar with the field, "doing usability" is sometimes thought of as equivalent to usability testing. While usability evaluation plays a very important part, maybe even a starring role, in interaction design, it is by no means all there is in the interaction design creation and refinement process, as we will see in this book.

Finally, another popular misconception about usability has to do with visual appeal. We know of cases where upper management said something to the effect that "after the software is built, I want the usability people to make it look pretty." While visual design is an integral and important part of usability, it is not the only part of interaction design.

1.3.3 The Expanding Concept of Quality in Our Designs

The field of interaction design has grown slowly, and our concept of what constitutes quality in our designs has expanded from an engineering focus on user performance under the aegis of usability into what is now widely known as user experience. As with most new concepts, it takes a while for even those who embrace the concept to agree on its definition (Dagstuhl, 2010).

Within the evolution of a growing field it is natural to see aspirations for considerable breadth. For example, Thomas and McCredie (2002) call for "new usability" to account for "new design requirements such as ambience or attention." At a CHI 2007 Special Interest Group (SIG) meeting (Huh et al.,

[1]Also sometimes referred to as "pragmatic quality" or "ergonomic quality" (Hassenzahl et al., 2000) and includes such attributes as simplicity and controllability.

2007), the discussion focused on "investigating a variety of approaches (beyond usability) such as user experience, aesthetic interaction, ambiguity, slow technology,[2] and various ways to understand the social, cultural, and other contextual aspects of our world."

1.3.4 Is Not Emotional Impact What We Have Been Calling User Satisfaction?

Some say the emphasis on these emotional factors is nothing new—after all, user satisfaction, a traditional subjective measure of usability, has always been a part of the concept of traditional usability shared by most people, including the ISO 9241-11 standard definition. Also, user satisfaction questionnaires are about how users feel, or at least about their opinions. As Hazzenzahl et al. (2000) point out, at least in practice and as reflected in most usability questionnaires, this kind of user satisfaction has been thought of as a result of how users experience usability and usefulness.

As a result, these user satisfaction questionnaires have elicited responses that are more intellectual responses than emotional ones; they have not traditionally included much about what we call emotional impact.[3] We as a profession did not focus on those aspects as much as we did on objective user performance measures such as efficiency and error counts. Technology and design have evolved from being just productivity-enhancing tools to more personal, social, and intimate facets of our lives. Accordingly, we need a much broader definition of what constitutes quality in our designs and quality in the user experience those designs beget.

1.3.5 Functionality Is Important, but a Quality User Experience Can Be Even More So

All other things being equal, a product that affords a better user experience often outsells ones with even more functionality. For example, take the Blackberry; once a market leader in smartphones but now outclassed by the iPhone, a later entrant into the market with less functional capabilities. There are many factors governing the relative market share of each product, but given comparably capable products, user experience is arguably the most important. The iPod, iPhone, and iPad are products that represent cool high technology

[2]From the abstract of this workshop summary paper: slow technology [is] a design agenda for technology aimed at reflection and moments of mental rest rather than efficiency in performance.

[3]Also sometimes referred to as hedonic quality (Schrepp, Held, & Laugwitz, 2006), perceived or experienced hedonic quality (Hassenzahl, Beu, & Burmester, 2001), or emotional usability (Logan, 1994).

with excellent functionality but are also examples that show the market is now not just about the features—it is about careful design for a quality user experience as a gateway to that functionality.

Most users assume that they are getting correct and complete functional capability in their software, but the interface is their only way to experience the functionality. *To users, the interaction experience is the system.* And plain old usability still plays a role here. Users have an effort threshold beyond which they give up and are not able to access the desired functionality. Larry Marine (1994) puts it this way: "If the users can't use a feature, it effectively does not exist." He describes usability testing of a new version of a system and how users commented that they wished they had a certain feature on the current system and how frequently they would use it. But the current product *already had* that feature and designers wondered why users would ask for something they already had. The answer was clear: *the users did not have it* because it was not accessible to them.

Another instructive example once again comes from Apple. When Apple introduced the functionality for users to backup their data on the Macintosh platform, a seemingly mundane and somewhat boring task for most of us, they did so with a stellar interaction design. They introduced a cool fun metaphor, that of a time machine (also the name of this feature) that users can take to go "back in time" to retrieve files that were deleted or lost accidently. The backup procedure itself was automated for the most part and all the user needed to do was connect a backup medium to their Mac. The interesting thing here is that Microsoft, Apple's competitor, had backup capabilities in their operating systems at least since Windows 95! However, because of poor usability, most users did not know it existed and those of us who did rarely used it. The effort software engineers spent to include the feature in the application functionality was wasted, another cost of poor usability.

Hassenzahl and Roto (2007) state the case for the difference between the functional view of usability and the phenomenological view of emotional impact. People have and use technical products because "they have things to do"; they need to make phone calls, write documents, shop on-line, or search for information. Hazzenzahl and Roto call these "do goals," appropriately evaluated by the usability and usefulness measures of their "pragmatic quality." Human users also have emotional and psychological needs, including needs involving self-identity, relatedness to others, and being satisfied with life. These are "be goals," appropriately evaluated by the emotional impact and phenomenological measures of their "hedonic quality."

Phenomenological Aspects of Interaction

Phenomenological aspects (deriving from phenomenology, the philosophical examination of the foundations of experience and action) of interaction are the cumulative effects of emotional impact considered over the long term, where usage of technology takes on a presence in our lifestyles and is used to make meaning in our lives.

1.3.6 A Good User Experience Does Not Necessarily Mean High-Tech or "Cool"

Often when a new cool and high-tech product is announced, technology enthusiasts and the public alike are impressed and many equate this product sizzle with amazing user experience. Much of the world culture, except the dispossessed, who are excluded from the mixed blessing of new technology, has come almost to worship high technology just because it is so cool. But for actual users the reaction can quickly shape-shift from amazement to annoyance to abomination when a failed interaction design in the cool new device becomes a barrier to its use. Clearly, while it is possible to harness new technology to serve real usability, "cool" and high technology are not intrinsic benefactors of a quality user experience.

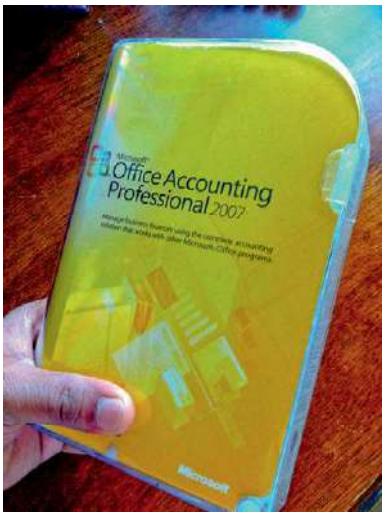

Figure 1-1

A new Microsoft software packaging design.

As a case in point, in Figure 1-1 we show what was once a new Microsoft packaging design for Vista[4] and some Office products, such as this one for Office Accounting Professional 2007.

As posted in a Windows Vista blog, the Microsoft designer proudly proclaims: "With Windows Vista and 2007 Office system, we didn't just redesign the software packages themselves, but are also introducing new packaging for the two products. The packaging has been completely revised and, we hope, foreshadows the great experience that awaits you once you open it." Later in the posting, it says, "Designed to be user-friendly, the new packaging is a small, hard, plastic container that's designed to protect the software inside for life-long use. It provides a convenient and attractive place for you to permanently store both discs and documentation. The new design will provide the strength, dimensional stability and impact resistance required when packaging software today. Our plan is to extend this packaging style to other Microsoft products after the launch of Windows Vista and 2007 Office system."

Other follow-up postings by readers of that blog declare, "It looks really nice and should really stand out on the shelves. Good job folks!" and "This looks awesome, really." And "Wow! I must say, I'm very, very impressed by this; excellent job guys." But these are reactions from people who have only seen a picture of the packaging. The reaction from actual users might eventually cause Microsoft to rethink their plan of switching to this as their "standard" packaging.

A glimpse of the same design from the user's, in this case the opener's, stance can be seen in Joel Spolsky's on-line column "Joel on Software" (Spolsky, 2007).

[4]Now we are delighted to see an updated version of Vista: Windows 7, otherwise known as Hasta la Vista (baby).

In an article entitled "Even the Office 2007 box has a learning curve," Spolsky says: "I simply could not figure out how to open the bizarre new packaging. It represents a complete failure of industrial design; an utter 'F' in the school of Donald Norman's Design of Everyday Things. To be technical about it, it has no true affordances and actually has some false affordances: visual clues as to how to open it that turn out to be wrong." And: "[This] is just the first of many ways that Office 2007 and Vista's gratuitous redesign of things that worked perfectly well shows utter disregard for all the time you spent learning the previous versions." Postings elsewhere by actual users contained similar sentiments.

Looking at these boxes displayed in stores, some of them actually have small instruction sheets on how to open the box taped on the outside. Upon closer inspection, this box design is a victim of a case of false affordances (Chapter 20). With what looked like hinges on one side, the box looked like a book, a shared design convention, but would not open like one—a violation of using shared conventions to explain an affordance. In our informal testing, several people with advanced degrees in computer science had significant trouble opening the box. Furthermore, the box was difficult to stack and wasteful of desk drawer space.

To give the benefit of doubt, we expect that Microsoft attempted to create an extraordinary user experience, starting from the time a user lays eyes on the software box in a store. However, the designer probably forgot that less box-savvy people will have to use this complicated design with curves and hinges. Clearly, even in just packaging, the best user experience requires a balance of functionality, usability, aesthetics, branding, identity, and so on.

In addition to user experience not just being cool, it also is not just about technology for technology's sake. Many years ago our university changed its phone system over to an all-digital exchange. At the time, the new phones seemed cool and powerful; users heard all about the different kinds of things they could do with call forwarding, paging, conference calls, and so on.

However, their initial enthusiasm for all this functionality faded quickly when they saw the 90-page "summary" user manual; no one read it, and by now almost everyone has lost it. No one ever saw or mentioned the presumably larger "full" manual. Loss of enthusiasm turned to rebellion when the university sent out word that they expected everyone to take a half-day training course on using this new phone system. One of the faculty expressed the feeling of many, "I've been using a telephone all my life and I certainly don't need a training course about a telephone now. All I want to do is make phone calls like I used to."

When many complained to the communications services department, they were actually told that they had a "low-end model" and that they might appreciate the new phones better if they had a model with even more

functionality! Surely this is another case where the thing that will likely make the least improvement in ease of use is adding new technology or functionality.

Years later, we still use these same phones almost exclusively for just making and answering ordinary phone calls, and mostly ignore the other blinking lights and arrays of buttons with intimidating labels. When they need to set up the occasional conference call, they follow the button presses and sequences on a label stuck on the bottom of the phone, and those steps were passed down by word of mouth from other co-workers.

1.3.7 Design beyond Just Technology

In this book we consider technology as just one design context, a platform for certain types of design. The design itself is the focus and the reader will feel as much at home in a discussion about principles and guidelines for the design of ATMs or highway signage as about design for high-tech user interfaces.

Design is about creating artifacts to satisfy a usage need in a language that can facilitate a dialog between the creator of the artifact and the user. That artifact can be anything from a computer system to an everyday object such as a door knob.

So do not think of this book as being just about interaction design or design of user interfaces for software systems. The interaction design creation and refinement activities described herein apply more universally; they are about design to support human activities—work and play in a context. The context does not have to include software or even much technology. For example, what we say here applies equally well to designing a kitchen for two people to cook together, to the workflow of the DMV, or to the layout of an electronic voting machine.

1.3.8 Components of a User Experience

Let us start by declaring that the concept of usability has not been made obsolete by the new notions of user experience. All of the performance- and productivity-oriented usability factors, such as ease of use and learnability, are still very important in most software systems and even in many commercial products. Especially in the context of using systems associated with complex work domains, it is just as important as ever for users to get work done efficiently and effectively with minimum errors and frustration. The newer concept of user experience still embodies all these implications of usability. How much joy of use would one get from a cool and neat-looking iPad design that was very clumsy and awkward to use? Clearly there is an intertwining in that some of the joy of use can come from extremely good ease of use.

> *The most basic reason for considering joy of use is the humanistic view that enjoyment is fundamental to life.*
>
> – Hassenzahl, Beu, and Burmester[5]

As a result, we have expanded the scope of user experience to include:

- effects experienced due to usability factors
- effects experienced due to usefulness factors
- effects experienced due to emotional impact factors

[5]Hassenzahl, M., Beu, A., & Burmester, M. (2001). Engineering joy. *IEEE Software, 18*(1), pp. 70–76.

On Designing for the "Visitor Experience"*

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Here I will adopt the definition of "user experience" proposed in this book, that is, it is something entirely in the head of the user. As product designers, we do everything we can to design something that will *result* in a good user experience for our target users. As moving from designing desktop software products to designing for Websites has clarified, the user experience may be impacted by more design qualities than usability alone. As a Web user interface designer, I use the term "visitor experience" and I recognize the need to address at least five different qualities of Websites that will impact the experience of the site's visitors:

- Utility
- Functional integrity
- Usability
- Persuasiveness
- Graphic design

These I define as follows.

Utility

It is easy to overlook *utility* as a quality of a Website design that will impact visitor experience, as it is perhaps the most fundamental. The utility of a Website refers to the usefulness, importance, or interest of the site content (i.e., of

[1]http://drdeb.vineyard.net
[2]http://www.ouxinstitute.com

the information, products, or services offered by the site) to the visitor. It is of course relative to any particular site visitor—what is interesting or useful to you may not be to me. It is also a continuous quality, that is, some Websites will feel more or less useful or interesting to me than others. For example, many Website visitors love to use social networking sites such as YouTube or Facebook, whereas others find these a total waste of time. I will have no need for a Website that sells carpenter's tools, whereas my neighbor might visit and use that site on a regular basis. This highlights an important fact for designers to keep in mind: that a *single* design will result in *multiple* visitor experiences depending on variations in the Website visitors themselves. This is why it is always so important to design for a target audience in particular, based on solid knowledge about that audience.

Functional Integrity

A Website's *functional integrity* is simply the extent to which it works as intended. Websites may have "dead" links that go nowhere, they may freeze or crash when certain operations are invoked, they may display incorrectly on some browsers or browser versions, they may download unintended files, etc. A lack of functional integrity is the symptom of buggy or incorrect—or even malicious—code. Functional integrity is also a continuous quality—some Websites may only have a few insignificant bugs, others may be almost nonfunctional, and anything in between is possible. In addition, a visitor using one browser or browser version may experience a Website's functional integrity differently as compared to a visitor using another browser.

Usability

Usability of course refers to how easy it is to learn (for first time and infrequent visitors) and/or use (for frequent visitors) a Website. A site can have high utility and high functional integrity and still be very difficult to learn or inefficient and tedious to use. For example, the Web you use to submit your tax returns may be implemented in flawless code and be relevant to almost every adult with great potential for convenience and cost savings, but be experienced by many visitors as unacceptably hard to learn or inefficient to use. Conversely, a site might feel very usable, but not very useful to a given visitor or have low functional integrity. It might be very easy and intuitive to figure out how to perform a task, but the site may consistently crash at a certain point in the task flow so that the task can never be accomplished.

Persuasiveness

Persuasiveness refers to the extent to which the experience visitors have on a Website encourages and promotes specific behaviors, which are referred to as "conversions." What constitutes a conversion varies from site to site, and even non-eCommerce sites may be promoting some type of conversion (e.g., newsletter signup, switching to online tax filing, looking up and using medical information). But persuasiveness is a particularly important design quality on an eCommerce Website, and the primary type of conversion in this case is a sale. So in the case of eCommerce sites, persuasiveness refers mainly to the extent to which the visitor's experience encourages and promotes sales.

Two examples of persuasiveness involve the presence, quality, and location of two types of information: *vendor* information (e.g., company name, physical address and contact information, company history, testimonials of past customers, and the like) and *product* information (things such as product color, material, care

instructions, and the like). Visitors look for evidence that they can trust an online vendor, especially if they have never heard of it before. Also, they are often unwilling to order a product if they cannot find all the information they need in order to judge whether it will meet their needs. This is why many people will often look for a product on Amazon.com first because it is a trusted vendor and usually provides comprehensive product information, including detailed reviews by other customers. Note that a Website may be experienced as fully functional and highly usable in terms of task completion and offer just what a visitor is looking for, but if it lacks key aspects of persuasiveness, such as adequate vendor and product information, potential sales may be lost. This is not just a loss for the Website owner, it wastes the time of the visitor and foils their goals as well, that is, it impacts their experience negatively.

Graphic Design

Finally, the "look and feel," that is, the *graphic design*, of a Website can have a significant impact on the visitor experience. The graphic design of a Website—primarily the ways colors, images, and other media are used—invoke emotional reactions in visitors that may or may not contribute to the site's goals. As with other aspects of design that impact the visitor, each visitor's reaction to a given graphic design may be different. You may be bored by soft pastel colors while I may feel reassured and calmed by them. You may find a straightforward and simple graphic design boring while to me it may feel professional and reassuring. I may be put off by sound and animation while you may find it exciting and appealing.

While utility and functional integrity are fairly independent design qualities, the lines among usability, persuasiveness, and graphic design are more blurred. Clearly usability and effective graphic design can contribute to the experience of persuasiveness, and graphic design can contribute significantly to the experience of usability. Nevertheless, it is useful to consider these design qualities separately in order to understand their importance and apply them effectively during design.

Designing for a great visitor experience requires an interdisciplinary team of experts. The age-old profession of *market research* is the relevant discipline to employ to achieve the quality of *utility*. Competent *Web development* professionals are necessary to ensure *functional integrity*. *Software and Web usability engineering* is the expertise needed to achieve *usability*. There is currently a small but growing field of experts with experience applying marketing and *persuasion psychology* to eCommerce Web design. Finally, *graphic design* professionals specializing in Website design provide the design skills and expertise in branding and target audience appeal that Websites need.

The real key here, beyond simply finding resources with the aforementioned skill sets, is to build an effective interdisciplinary design team. Often professionals with these different backgrounds and skill sets are unfamiliar with the other disciplines and how they can and must work together to design for an optimal visitor for a given target audience. At the very least, Website stakeholders need product development team members respectful of the expertise of others and with a willingness to learn to collaborate effectively to achieve the common goal of a design that results in an optimized experience for intended Website visitors. Together, specialists in these different disciplines can have the most positive impact on the success of Websites by applying their different bodies of knowledge to the site design in a way that will invoke a positive visitor experience in the target audience.

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*This essay is a modified excerpt from a chapter called "The Web UX Design Process—A Case Study" that I have written for the forthcoming book *Handbook of Human Factors in Web Design* (2nd ed.) by Kim-Phuong L. Vu and Robert W. Proctor (Eds.), Taylor & Francis, 2011.

To illustrate the possible components of user experience, we borrow from the domain of fine dining. The usefulness of a meal can be evaluated by calculating the nutritional value, calories, and so on in comparison with the technical nutritional needs of the diner's body. The nutritional value of a meal can be viewed objectively, but can also be felt by the user insofar as the prospect of good nutrition can engender feelings of value added to the experience.

Usefulness can also be reckoned, to some extent, with respect to the diner's immediate epicurean "requirements." A bowl of chilled gefilte fish balls just will not cut it for a gourmand with a taste for a hot, juicy steak. And, when that steak is served, if it is tough and difficult to cut or chew, that will certainly impact the usability of the dining "task."

Of course, eating, especially for foodies, is a largely emotional experience. Perhaps it starts with the pleasure of anticipation. The diners will also experience a perception of and emotional response to the dining ambiance, lighting, background music, and décor, as well as the quality of service and how good the food tasted. The menu design and information about ingredients and their sources contribute to the utility and the pleasure and value of the overall experience. Part of the emotional impact analogous to the out-of-the-box experience might include the aesthetics of food presentation, which sets the tone for the rest of the dining experience.

1.3.9 User Experience Is (Mostly) Felt Internally by the User

Most in the field will agree that user experience, as the words imply, is the *totality of the effect or effects felt (experienced) internally by a user* as a result of interaction with, and the usage context of, a system, device, or product. Here, we give the terms "interaction" and "usage" very broad interpretations, as we will explain, including seeing, touching, and thinking about the system or product, including admiring it and its presentation before any physical interaction, the influence of usability, usefulness, and emotional impact during physical interaction, and savoring the memory after interaction. For our purposes, all of this is included in "interaction" and "usage context."

But is user experience entirely felt internally by the user? What about the performance-related parts of usability? Certainly the user experiences and feels internally *effects* of performance-related parts of usability, such as increased productivity. However, there are also externally observable manifestations of usability, such as time on task, that represent a component not necessarily felt internally by the user and not necessarily

related to emotion. The same holds for usefulness, too. If usability and usefulness are parts of the user experience, and we feel it is useful to consider them as such, then technically not *all* user experience is felt internally by the user. It is nonetheless convenient to gloss over this exception and, as a general rule, say that:

- usability and usefulness are components of user experience
- user experience is felt internally by the user

When we use the term "usability" by itself we usually are referring to the pragmatic and non-emotional aspects of what the user experiences in usage, including both objective performance measures and subjective opinion measures, as well as, of course, qualitative data about usability problems. In contrast, when we use the broader term "user experience" we usually are referring to what the user does feel internally, including the effects of usability, usefulness, and emotional impact.

1.3.10 User Experience Cannot Be Designed

A user experience cannot be designed, only experienced. You are not designing or engineering or developing good usability or designing or engineering or developing a good user experience. There is no usability or user experience inside the design; they are relative to the user. Usability occurs within, or is revealed within, the context of a particular usage by a particular user. The same design but used in a different context—different usage and/or a different user—could lead to a different user experience, including a different level of, or kind of, usability.

We illustrate this concept with a non-computer example, the experience of enjoying Belgian chocolates. Because the "designer" and producer of the chocolates may have put the finest ingredients and best traditional processes into the making of this product, it is not surprising that they claim in their advertising a fine chocolate experience built into their confections. However, by the reasoning in the previous paragraph, the user experience resides within the consumer, not in the chocolates. That chocolate experience includes anticipating the pleasure, beholding the dark beauty, smelling the wonderful aromas, the deliberate and sensual consumption (the most important part), the lingering bouquet and after-taste, and, finally, pleasurable memories.

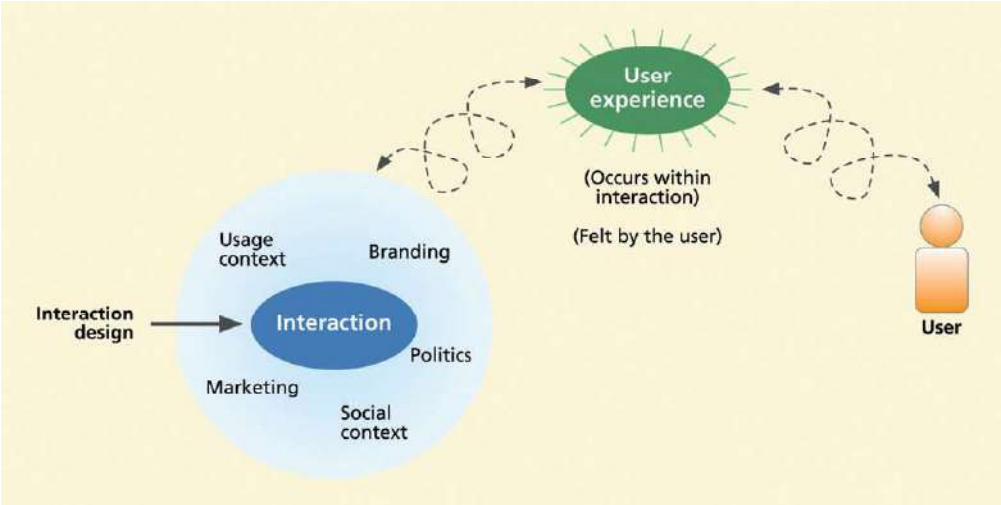
When this semantic detail is not observed and the chocolate is marketed with claims such as "We have created your heavenly chocolate experience," everyone still understands. Similarly, no one but the most ardent stickler protests when BMW claims "BMW has designed and built your joy!" In this book, however, we wish to be technically correct and consistent so we would have them say, "We have created sweet treats to ensure your heavenly chocolate experience" or "BMW has built an automobile designed to produce your ultimate driving experience."

To summarize our point in this section, in Figure 1-2 we illustrate how an instance of user experience occurs dynamically in time within an instance of interaction and the associated usage context between design and user. It is almost like a chemical reaction that gives off a by-product, such as caloric[6] or an extra neutron.

Almost everything in this book depends on this simple, but enormously important, notion of the user experience being the result of a user's interaction with, and usage context of, a design. Although the meaning of this diagram may not be clear at this point in your reading, we hope that these concepts will unfold as you go through this book.

Figure 1-2

User experience occurs within interaction and usage context.



[6]Introduced as the very substance of heat by Lavosier in the 1770s to debunk the phlogiston theory, but you knew that.

1.3.11 Role of Branding, Marketing, and Corporate Culture

In some cases, the user experience goes even beyond the response to usability, usefulness, and joy of use. There are times when social, cultural, marketing, and political aspects, hardware choices, and the like can influence user experience. Users can get wrapped up in the whole milieu of what the manufacturer stands for, their political affiliations, how the product is marketed, and so on. What image does the brand of a product stand for? Is it a brand that uses environmentally sustainable manufacturing practices? Do they recycle? Consequently, what does the fact that someone is using a product of that particular brand say about them? These factors are more difficult to define in the abstract and more difficult to identify in the concrete.

Clearly these kinds of emotional responses are evoked by more than just product design. For some companies, many of the factors that contribute to this level of user experience may be part of the corporate DNA. For such companies, a quality user experience can be a call to action that aligns all roles toward a common mission, lived through their daily practice.

For example, consider the case of Apple. The culture of designing for user experience is so deeply engrained in their corporate culture that everything they produce has a stamp of tasteful elegance and spectacular design. This kind of fanatic emphasis on quality user experience at Apple extends beyond just the products they produce and even seeps into other areas of their company. When they make an employment offer to a new employee, for example, the package comes in a meticulously designed envelope that sets the stage for what the company stands for (Slivka, 2009b).

Similarly, when Apple sent call center technical support employees a T-shirt as a gift, it arrived in a carefully designed box with the T-shirt folded in a way that inspires a sense of design emphasis (Slivka, 2009a). From the time one walks into an Apple store to the sleek industrial design of the device, everything comes together in one harmonious whole to ensure that users love the device. (NB: We are agnostic in the PC vs. Mac religious wars, so please consider this objectively.) And, again, it is all about design for the user experience. A *New York Times* article (Hafner, 2007) extols the enchanting aura of Apple stores, "Not only has the company made many of its stores feel like gathering places, but the bright lights and equally bright acoustics create a buzz that makes customers feel more like they are at an event than a retail store." The goal of one new store in Manhattan was to make it "the most personal store ever created." This carefully designed user experience has been very successful in generating sales, return visits, and even tourist pilgrimages.

BMW embodies another corporate example of the importance of designing for emotional impact as part of a company's worldview. The makers of BMW cars have elevated the user experience to new heights in the industry. While this manufacturer could stake their reputation on the engineering aspects of these fine machines, instead their top claim to the world (BMW AG, 2010) is "Joy is BMW! More driving pleasure." And their follow-up statement really shows that it is all about user experience: "What you make people feel is just as important as what you make. And we make joy. Joy is why we built this company; joy is our inspiration. At BMW, we don't just make cars; we make joy."

We mention emotional response in the user experience as part of a corporate culture for completeness here, but it is beyond the scope of this book to say how to build this kind of emotional ambiance surrounding the company and the product. In this book we have to focus on the things we can do something about with the guidelines and processes—and that is design, mainly interaction design.

1.3.12 Why Have Such a Broad Definition?

Why do we want to include so much in our definitions of usage context and user experience? We believe that the user experience can begin well before actual usage. It can start as early as when the user beholds a system or product and its packaging or presentation. It does not necessarily end with actual usage. After usage, the pleasure, or displeasure, can persist in the user's mind. This perspective of what the user experiences about the product includes initial awareness of the product, to seeing its advertising, to visiting the store, to viewing it and buying it, to taking it out of the box, to using it, to talking with others who have used it—in other words, it is about a broad cultural and personal experience.

When we put forward this definition at conferences and workshops, sometimes we get criticism that such breadth makes it difficult to enforce, operationalize, and take ownership of user experience-related practices and responsibilities in an organization. But that is exactly the reason why the definition needs to be broad: it needs to implicitly recognize the need for multiple roles to work together, to collaborate and communicate, and to work synergistically to ensure a quality user experience. It frames the efforts toward designing for a user experience in an interdisciplinary context, where everyone from hardware engineers, to visual designers, to branding experts, to interaction designers *need* to collaborate and coordinate their efforts to define and execute a shared design vision.

1.4 EMOTIONAL IMPACT AS PART OF THE USER EXPERIENCE

The emotional aspects of user experience are just what the term implies. We are talking about pleasure, fun, aesthetics, novelty, originality, sensations, and experiential features—the affective parts of interaction. In particular, it is about the emotional impact of interaction on the user.

> *Users are no longer satisfied with efficiency and effectiveness; they are also looking for emotional satisfaction.*
>
> – Shih and Liu[7]

1.4.1 The Potential Breadth of Emotional Impact

Sometimes a user's reaction to a system or product is extremely emotional, a user experience with a deep, intimate, and personal emotional impact. At other times a user might be mildly satisfied (or dissatisfied) or just a bit pleased. Not all user experiences evoke throes of ecstasy, nor should they. Often just being well satisfied without it rising to a personally emotional level is all a user can afford in terms of emotional involvement with a software system.

But, of course, we all live for the moments when the user experience hits the high end of emotional impact range when we experience amazingly cool products (software systems almost never reach these heights). We are talking about a product for which the user experience sets the product apart from the rest in the hearts and minds of discriminating users. Have you ever had something that you really loved to use? Something that had a beauty *earned* by its amazingly beautiful design?

While other similar products may have an equally usable and useful design, they just do not have that something extra that sparks a deep emotional chord of affinity. The others do not have that indefinable something that transcends form, function, usability, and usefulness, something that elevates the usage experience to pure joy and pleasure, something akin to the appreciation of well-crafted music or art.

Buxton (2007b, p. 127) relates an entertaining and enlightening story of his experiences with personal orange juice squeezers, where subtle design differences made enormous differences in his usage experience. He really likes one above all the rest and the difference is something that, as Buxton (2007b, p. 129) puts it, "sets a whole new standard of expectation or desire." The

[7]Shih, Y.-H., & Liu, M. (2007). The Importance of Emotional Usability. *Journal of Educational Technology Usability, 36*(2), pp. 203–218.

differences in the product are not necessarily something you can capture in a diagram, specifications, or even photographs of the product. It is something you have to *experience*; as Buxton again puts it, you "just can't use it without a smile." But you can be sure that the difference is the result of deliberate and skillful design.

There is an interesting story from General Motors about product passion. In October 2010, the board of directors quietly discontinued the Pontiac car from the GM line of brands. Of course, the direct cause was the transition through bankruptcy, but the beginning of the end for Pontiac started 26 years earlier.

Before that, Pontiac had its own separate facilities for design, production, and manufacturing with its own people. Owners and wannabe owners were passionate about Pontiac cars and Pontiac employees had been devoted to the brand. The brand had its own identity, personality, and cachet, not to mention the notoriety from custom muscle cars such as the GTO and the Firebird TransAm in *Smokey and the Bandit*.

In 1984, however, in its great corporate wisdom, GM lumped the Pontiac works in with its other GM facilities. The economically based decision to merge facilities meant no separate ideas for design and no special attention to production. After that, there was really nothing to be devoted to and the passion was lost. Many believe that decision led to the decline and eventual demise of the brand.

So what constitutes real emotional impact in usage? While most of the emotional impact factors are about pleasure, they can be about other kinds of feelings too, including affective qualities such as love, hate, fear, mourning, and reminiscing over shared memories. Applications where emotional impact is important include social interaction (Dubberly & Pangaro, 2009; Rhee & Lee, 2009; Winchester, 2009) and interaction for cultural problem solving (Ann, 2009; Costabile, Ardito, & Lanzilotti, 2010; Jones, Winegarden, & Rogers, 2009; Radoll, 2009; Savio, 2010).

Social and cultural interactions entail emotional aspects, such as trustworthiness (especially important in e-commerce) and credibility. Design for emotional impact can also be about supporting human compassion, for example, in sites such as CaringBridge.org and CarePages.com.

Although there were earlier academic papers about emotion in the user experience, Norman (2004) was one of the first to bring the topic to light on a broad scale, relating it to his theme of everyday things. There are conferences dedicated specifically to the topic, including the biennial Conference on Design & Emotion, the goal of which is to foster a cross-disciplinary approach to design and emotion. Also, the topic is definitely blossoming in the academic literature

(Hassenzahl, 2001; Shih & Liu, 2007). Boucher and Gaver (2006) introduce the notion of ludic values, aimlessly playful qualities such as joy, surprise, delight, excitement, fun, curiosity, play, and exploration.

Attractive things make people feel good

– Donald A. Norman[8]

[8]Norman, D. A. (2004). *Emotional Design: Why We Love (Or Hate) Everyday Things*. New York: Basic Books.

Connections That Make "Spirit" a Part of UX

Elizabeth Buie, Luminanze Consulting

UX work speaks to the human spirit. Now, before you think I have gone all woo-woo on you, let me explain: By "human spirit," I mean the part of us that seeks connection with something larger than ourselves. This "something larger" can be different things to different people or to the same people at different times and in different contexts. It can be as mundane as nature, a cause, or being a parent; it can be as mystical as God/dess, the Universe, or even, if we stretch it, the Force. It is whatever evokes in us a sense of deep connection, and the human spirit is the part of us that feels this connection.

Let me illustrate with three stories from my own experience.

THE CONNECTEDNESS OF MUSIC

I sing in a group that performs Medieval and Renaissance polyphony—Catholic *a capella* music from the 13th to the 17th centuries. Now, I am not by any means traditionally religious (and I have never been Catholic), but this music just speaks to me. The several independent voices in these songs weave in and out to create complex harmonies that are deep, ethereal, and glorious.

For someone raised in the 20th century, learning this stuff is just plain *hard*. A month in advance of the first rehearsal for each concert, our director sends out learning files in Musical Instrument Digital Interface (MIDI) format. I import these files into music notation software, make my part a French horn played loudly, and make the other parts different instruments played more softly. This allows me to pick out my part easily and in context. I save the results as MP3s, load them onto my iPod, and play them in the car.

One morning I was driving to a client meeting, listening to my learning MP3s. The date was close enough to the performance that I knew my melodic lines fairly well (if not the words) and was singing along. In the middle of the Washington, DC rush hour (one of the worst in the United States), my spirit *soared*. I have since realized that the

connection I felt that morning—that sense of oneness with everything around me—was part of my user experience of these technologies . . . and so is the even deeper joy I feel when we perform this glorious music together for an audience. Creating this experience involves three pieces of equipment (four, if you count the car) and three software applications, and this soaring of spirit is part of my UX of all of them.

It is, in fact, for me their *primary* purpose.

THE DISCONNECTION OF ABSORPTION

The flip side is, of course, disconnection. These technologies can be absorbing and engrossing—to the point that if we are not careful, they can create distance and disconnection between us and those we care about. For example, I spend a lot of time in front of the computer, what with working mostly at home and not having a TV. I answer the phone that is by my desk, and it is exceedingly difficult for me to tear myself away from the screen to attend properly to a call. Most times I divide my attention somewhat, and I am sure my callers can tell.

My mother never seemed to take offense at this; she was proud of my work and always thought she was interrupting something important. One evening some years ago, she called. After a few short minutes she asked, "Are you on the computer?" I apologized and turned away from the screen; and we talked a brief while. I resolved to do better.

Three days later, however, she had an auto accident. Although she eventually regained consciousness, she had suffered a severe traumatic brain injury and was never her old self again. Seven months after the accident, she died.

So my last conversation with my mother was colored by this disconnection. I do not feel guilty about it—I did spend a lot of high-quality time with her in those months—but I do feel sad. And yet, I continue to find it inordinately difficult *not* to divide my attention between the phone and the screen.

Disconnection, too, can be part of the UX of technology.

THE SERENDIPITY OF NEW PROJECTS

In the winter of 2011 I started working on a project that provides information and exercises to support sexual health in cancer survivors. Two Websites—one for women and one for men—will supply the service. I conducted usability testing on the women's site which was still in beta and undergoing a clinical trial with cancer survivors, to see how well it helped improve their sexual health. I'm optimistic that my findings and my recommendations for design change will help both of these sites to improve their users' lives.

This project has special meaning for me. In fact, when the client told me what it was, I had to stop and catch my breath.

Ten years earlier, you see, my husband had died of prostate cancer. Antonio and I had lived with this disease for almost 10 years, and the hormone therapy that had worked so well against the cancer for several years had also destroyed his libido. You can imagine what kind of challenges *that* brings to a relationship.

So this project has a deep special meaning for me. I feel a profound connection with this user population, even though they are unaware of it. Most UX professionals can develop empathy with most user populations, but it is extra special when you have *lived* the problems that your users face. It is too late, of course, for this program to help Antonio and me, but I used my UX knowledge and skills to help make it easier for people in similar situations to address their problems.

UX IS WORK OF THE SPIRIT

Like many UX professionals, I got into this field because I want to help make people's lives better. Sure, I find the work challenging and fascinating; if I did not, I probably would have found some other work. But for me the key is knowing that what I do for a living *matters*. That it helps connect me with my users, my clients, and my best self. That it is larger than myself.

Life is about connection, and UX is no different. I submit that our work needs to nurture our own spirit and those of our users. Even when we are working on a product that has no obvious component of connection, we will serve our users best if we keep the possibility present in our minds.

Maybe the best illustration of the difference between utilitarian product usability and real user experience packed with emotional impact is demonstrated by Buxton's pictures of mountain bikes. He begins with a beautiful picture, his Figure 32, of a Trek mountain bike, just sitting there inviting you to take an exciting ride (Buxton, 2007b, pp. 98–99).

But the next picture, his Figure 33, is all about that exciting ride (Buxton, 2007b, pp. 100–101). A spray of water conveys the fun and excitement and maybe a little danger to get the blood and adrenaline pumping. In fact, you can hardly see the bike itself in this picture, but you *know* it is how we got here. The bike just sitting there is not really what you are buying; it is the breathtaking thrill of screaming through rocks, mud, and water—that is the user experience!

1.4.2 A Convincing Anecdote

David Pogue makes a convincing case for the role of emotional impact in user experience using the example of the iPad. In his *New York Times* story he explains why the iPad turned the personal devices industry upside down and started a whole new class of devices. When the iPad came out, the critics dubbed it "underwhelming," "a disappointment," and "a failure." Why would anyone want or need it?

Pogue admits that the critics were right from a utilitarian or rational standpoint: "The iPad was superfluous. It filled no obvious need. If you already had a touch-screen phone and a laptop, why on earth would you need an iPad? It did seem like just a big iPod Touch" (Pogue). And yet, as he claims, the iPad is the most successful personal electronic device ever, selling 15 million in the first months. Why? It has little to do with rational, functional, and utility appeal and has everything to do with emotional allure. It is about the personal experience of holding it in your hand and manipulating finely crafted objects on the screen.

1.4.3 Aesthetics and Affect

Zhang (2009) makes the case for aesthetics as part of an emotional or affective (about feeling or emotion) interaction. The movement from functionality and usability to aesthetics takes us from a utilitarian to an experiential orientation, from a cognitive paradigm to an affective-centric paradigm (Norman, 2002, 2004; Zhang & Li, 2004, 2005).

Interaction design can "touch humans in sensible and holistic ways" (Zhang, 2009). The term aesthetics is used to describe a sense of pleasure or beauty, including sensual perceptions (Wasserman, Rafaeli, & Kluger, 2000).

Zhang presents a theoretical linkage between aesthetics and affect. Aesthetics, a branch of philosophy and often associated with art, is considered an elusive and confusing concept (Lindgaard et al., 2006). A key issue in studies regarding aesthetics is objectivity vs. subjectivity. The objective view is that aesthetic quality is innate in the object or the design and is known by certain features or characteristics regardless of how they are perceived. This means that objective aesthetic qualities can be evaluated analytically.

The subjective view of aesthetics is that it depends on how they are perceived. Aesthetics has different effects on different people and must be evaluated with respect to users/people. It is all about perceived aesthetic quality.

However, operationally, things are still a bit fuzzy. It is difficult to state goals for aesthetic design and there is no standard for measuring aesthetics: ". . .there is a lack of agreement and a lack of confidence on how to measure aesthetics related concepts" (Zhang, 2009). It is typical to think of one-dimensional metrics for aesthetics, such as subjective ratings of visual appeal.

Lavie and Tractinsky (2004) draw a distinction between classical aesthetics—defined by orderliness in clean, pleasant, and symmetrical designs—and expressive aesthetics—defined by creativity, innovation, originality, sophistication, and fascinating use of special effects.

In any case, it is agreed that the result of aesthetic design can be affect, in the form of a mood, emotion, or feeling. The assessment of affect is tricky, mainly relying on subjective assessment of an individual's perception of the ability of an object or design to change his or her affect.

Zhang is interested in the relationship between aesthetics and affect. In particular how are the objective view and the subjective view connected with respect to design? How can the aesthetics of a product or system evoke a change in the person's/user's affect? Norman (2004) proposes a three-level processing model for emotional design, making connection between aesthetics and emotion explicitly:

- Visceral processing requires visceral design—about appearance and attractiveness, appeals to "gut feeling"
- Behavioral processing requires behavioral design—about pleasure and effectiveness (usability and performance)
- Reflective processing requires reflective design—about self-image, identity, personal satisfaction, memories

Kim and Moon (1998) describe emotions, the immediate affective feelings about a system, in seven dimensions:

- attractiveness
- symmetry
- sophistication
- trustworthiness
- awkwardness
- elegance
- simplicity

As Zhang notes, these dimensions are "non-basic" as compared to basic emotions such as joy and anger and can be domain specific. They also seem a bit arbitrary and could allow for quite a few other alternatives. In the end, it is not clear if, or how, these criteria can relate aesthetics in the design to affect in the users.

Zhang's example convinces us that the relationship is, indeed, subjective and that perceived aesthetic quality does determine affective reaction. She describes a beautiful pop-up ad on the Internet, with pleasing images and music. And you experience a feeling beyond just pleasantness. It gets your attention and activates your mind. You have an affective reaction and perceived affective quality is positive.

Now consider exactly the same ad, still *inherently* beautiful and musical, but because of other factors—for example, you are focusing on something else, trying to solve a problem—the ad is irritating and annoying. You feel distracted; your attention stolen away from the task at hand, and you try to shut it out. You might even get a little angry if you cannot shut it out. The ad has the same objective aesthetic quality but it has a different effect on your affect. Your mind's alert level is still high but you are annoyed; you have a negative effect.

The point of Zhang's example is that the same aesthetics can lead to different user experiences depending on perceived, or subjective, aesthetic quality.

1.4.4 The Centrality of Context

Context has always been important in interpreting the meaning of usability in any situation. Now, context is even more important, essential and central to the meaning of emotional and phenomenological impact in situated usage.

As an example of how anticipated usage context influences how a product is viewed, consider the Garmin GPSMAP 62st handheld GPS device. In *Field and Stream*, a hunting magazine, an advertisement stresses an impressive list of features and functionality, including such esoteric technology as "3-axis tilt-compensated 100K topo mapping, Birds-Eye Satellite imagery, and quad helix antenna." The message for hunters is that it will get you to the right place at the right time in support of the goals of hunting.

In contrast, in *Backpacker* magazine, apparently catering to the idea that the typical backpacker is more interested in the enjoyment of the outdoors, while the hunter is more mission oriented, an ad for the same device appeals strongly to emotion. In a play on words that ties the human value of self-identity with orienteering, Garmin puts presence in life style first: "Find yourself, then get back." It highlights emotional qualities such as comfort, cozy familiarity, and companionship: "Like an old pair of boots and your favorite fleece, GPSMAP 62st is the ideal hiking companion."

Presence

Presence of a product is a kind of relationship with users in which the product becomes a personally meaningful part of their lives.

Because the resulting user experience for a product depends on how users view the product and strongly on the usage context, designers have to work hard. So, in general, there is no formula for creating an interaction design that can be expected to lead to a specific kind of user experience. That is a factor that adds much difficultly to designing for what we hope will be a quality user experience. However, the more designers know about users and usage context, the better they will be equipped to create a design that can lead to a desired user experience.

1.4.5 What about Fun at Work?

Emotional impact factors such as fun, aesthetics, and joy of use are obviously desirable in personal use of commercial products, but what about in task-oriented work situations? Here usability and usefulness aspects of user experience are obvious, but the need for emotional impact is not so clear.

It is easy to think that fun and enjoyment are just not a good match to computer usage for work. Some, including most Vulcans, say that emotions interfere with the efficiency and control needed for work.

But there is evidence that fun can help at work, too, to break monotony and to increase interest and attention span, especially for repetitive and possibly boring work, such as performed in call centers. Fun can enhance the appealingness of less inherently challenging work, for example, clerical work or data entry, which can increase performance and satisfaction (Hassenzahl, Beu, & Burmester, 2001). It is easy to see how fun can lead to job satisfaction and enjoyment of some kinds of work.

It is also obvious from the fact that emotional and rational behaviors play complementary roles in our own lives that emotional aspects of interaction are not necessarily detrimental to our reasoning processes for doing work. For example, software for learning, which can otherwise be dull and boring, can be spiced up with a dose of novelty, surprise, and spontaneity.

However, fun and usability can conflict in work situations; for example, less boring means less predictable and less predictable usually goes against traditional usability attributes, such as consistency and ease of learning (Carroll & Thomas, 1988). Too simple can mean loss of attention, and consistency can translate as boring. Fun requires a balance: not too simple or boring, but not too challenging or frustrating.

Some work roles and jobs are not amenable at all to fun as part of the work practice. Consider a job that is inherently challenging, that requires full attention to the task, for example, air traffic control. It is essential for air traffic controllers to have no-nonsense software tools that are efficient and effective. Any distraction due to novelty or even slight barriers to performance due to clever and “interesting” design features will be hated and could even be dangerous. For this kind of work, task users often want less mental effort, more predictable interaction paths, and more consistent behavior. They especially do not want a system or software tool adding to the complexity.

Certainly the addition of a game-like feature is welcome in an application designed primarily for fun or recreation, but imagine an air traffic controller having to solve a fun little puzzle before the system gives access to the controls so that the air traffic controller can help guide a plane heading for a mountain top in the fog.

1.5 USER EXPERIENCE NEEDS A BUSINESS CASE

Ingenious by design; hassle-free connectivity

– On a Toshiba satellite receiver box

1.5.1 Is the Fuss over Usability or User Experience Real?

As practitioners in this field, one of the frequent challenges we face is getting buy-in toward user experience processes from upper management and business stakeholders. So what is the business case for UX?

That computer software of all kinds is in need of better design, including better user interaction design, is indisputable. Mitch Kapor, the founder of Lotus, has said publicly and repeatedly that "The lack of usability of software and the poor design of programs are the secret shame of the industry" (Kapor, 1991, 1996). Those who know the industry agree. Poor user experience is an uncontrolled source of overhead for companies using software, overhead due to lost user productivity, the need for users to correct errors, data lost through uncorrected errors, learning and training costs, and the costs of help desks and field support.

Charlie Kreitzburg, founder of Cognetics Corporation, tells of chaos, waste, and failure, which he attributes this sorry state of software development primarily to software development practices that are "techno-centric rather than user-centric." He recommends the industry to "rethink current software design practice to incorporate user-centered design" principles.

These critical assessments of the software industry are not based on personal opinion alone but on large surveys conducted by groups with strong reputations in the software industry. The Standish Group (Cobb, 1995; The Standish Group, 1994, 2001) surveyed 365 IT executive managers from companies of small, medium, and large sizes and found that the lack of attention to user inputs is one of the most important reasons why many software projects were unsuccessful. This translated to costing corporations $80 billion a year.

Some estimate that the percentage of software projects that exceed their budgets is higher than 60% (Lederer & Prasad, 1992). According to May (1998), the average software development project is 187% over budget and 222% behind schedule and implements only 61% of the specified features.

A posting by *Computer World* (Thibodeau, 2005) declared: "Badly designed software is costing businesses millions of dollars annually because it's difficult to use, requires extensive training and support, and is so frustrating that many end

"UX"

"UX" is an almost ubiquitous term that we use to refer to most things that have to do with designing for a high quality user experience. So this means we will use terms like the UX field, UX work, a UX practitioner, the UX team, the UX role, UX design or UX design process.

users underutilize applications, say IT officials at companies such as The Boeing Co. and Fidelity Investments." Keith Butler of Boeing said that usability issues can add as much as 50% to the total cost of software ownership.

Such startling reports on the dismal performance of the software development industry are not hard to find. Kwong, Healton, and Lancaster (1998) cite (among others) the Gartner Group's characterization that the state of software development is chaos: "25% of software development efforts fail outright. Another 60% produce a sub-standard product. In what other industry would we tolerate such inefficiency? As Kreitzburg has put it, imagine if 25% of all bridges fell down or 25% of all airplanes crashed."

1.5.2 No One Is Complaining and It Is Selling Like Hotcakes

It is easy to mistake other positive signs as indicators that a product has no user experience problems. Managers often say, "This system has to be good; it's selling big time." "I'm not hearing any complaints about the user interface." This is a more difficult case to make to managers because their usual indicators of trouble with the product are not working. On closer inspection, it appears that a system might be selling well because it is the only one of its kind or the strength of its marketing department or advertising obscures the problems.

And, sometimes, project managers are the only ones who do not hear the user experience complaints. Also, despite demands for an improved user experience, some users simply will not complain.

If you wonder about the user experiences with your own product, but your users are not complaining, here are some indicators to watch for, characteristics of prime candidates for having problems with usability and user experience:

- Your users are accessing only a small portion of the overall functionality your system offers
- There are a significant number of technical support calls about how to use a particular feature in the product.
- There are requests for features that already exist in the product.
- Your competitor's products are selling better even though your product has more features.

This book can help you address these issues. It is designed for those who have been struck by the importance of a good user interface and who want to find out more about what a quality user experience means, how to ensure it, and how to know when you have it. This book is especially aimed toward practitioners—people who put theory into practice in a real-world development environment.

The methods and techniques described here can be used by anyone who is involved in any part of the development of a user interaction design for a user interface.

1.5.3 A Business Strategy: Training as a Substitute for Usability in Design

"It might not be easy to use right off, but with training and practice, it will be a very intuitive design." Sounds silly and perverse, but that is what many people are really saying when they suggest training as a way to fix usability problems. Unfortunately, the following real-world example is representative of many.

A very large governmental organization serving the public sometimes attempts to solve user experience problems by "instructional bulletins" sent to all field users. These are real user experience problems that increase the time to do tasks, introduce significant opportunities for errors, and require users to remember these special-case instructions for each particular situation. Also, these bulletins are issued only once and then their complicated contents become the responsibility of the users, including those hired after they are issued and, therefore, have never received them.

In one such case, the relevant situation arises when an applicant, a client outside the organization, calls in on an 800 phone number. The call is answered by an agent working for the organization, the actual system user, acting as an information intermediary for the client/applicant. If the applicant requests certain information, to which access is not allowed, the request is denied and policy based on law requires that an explanatory written notice be sent via regular mail.

Screens referred to in the "instructional bulletin" about this kind of interaction are used to make a record of the request and the information denial decision, and to automatically generate and send out the notice. The opportunities for errors are abundant and the applicant will not receive the legally required notice if the user, the agent using the computer, fails to follow these instructions to the letter. We are told, without perceptible nodding or winking, that most agents should understand the jargon. The essence of the main part of the bulletin states:

> The 800 Number LDNY System is a 2-screen process. It issues an electronic form #101A, annotates the LPFW worksheet with a record of the closeout action, and automatically purges the lead when the closeout expires based on data propagated to the LPFW. However, the LDNY screen must be completed properly in order to propagate the current date to the REC field and "INFORMAL

> DENIAL" to the REMARKS field on the LPFW screen. If this data is not propagated to the LPFW, *the applicant will not receive the notice.* IMPORTANT: To get the REC date and the REMARKS to propagate to the LPFW screen, you must remember two things:
>
> 1. On page 2 of the LDNY, you must answer YES to PRINT NOTICE, otherwise the REC date and REMARKS will not propagate to the LPFW.
> 2. When you press ENTER on page 2 of the LDNY screen, you are returned to the LPFP screen, a screen you have already completed. You must ENTER through this screen. This will return you to the 800 Number screen. Do NOT use the normal procedure of using the PF3 key to return to the 800 Number screen because it will prevent the appropriate "INFORMAL DENIAL" from propagating to REMARKS on the LPFW screen.

Will a user remember all this, say, a few months after it was released? Multiply this situation by many other functions, forms, situations, and "instructional bulletins" and you have a formula for massive scale errors, frustration, lost productivity, and underserved clients. Training as a substitute for usability is an ongoing per-user cost that often fails to meet the goals of increased productivity and reduced risk, errors, and cost. The question that sticks in our minds is how could someone send out this memo with a straight face? How could the memo author not see the folly of the whole situation? Perhaps that person had been part of the bureaucracy and the system for so long that he or she truly believed it had to be that way because "this is how we have always done it."

1.6 ROOTS OF USABILITY

It is a matter of debate exactly when computer usability was born. It was clearly preceded by usability work for non-computer machines in industrial design and human factors. We know that computer usability was a topic of interest to some by the late 1970s and, by the early 1980s, conferences about the topic were being established. No field exists in isolation and ours is no exception. Human–computer interaction in general and usability in particular owe much of their origin and development to influences from many other related fields.

> *Human factors is about making things work better for people. For example, think about building a bridge: You use theory, good design practice, and engineering principles, but you*