

The Building Blocks of Experience: An Early Framework for Interaction Designers

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ABSTRACT

Design activity has recently attempted to embrace “designing the user experience.” Designers need to demystify how we design for user experience and how the products we design achieve specific user experience goals. This paper proposes an initial framework for understanding experience as it relates to user-product interactions. We propose a system for talking about experience, and look at what influences experience and qualities of experience. The framework is presented as a tool to understand what kinds of experiences products evoke.

Keywords

experience, user experience, interaction design, research, theory

RELEVANCE OF PROBLEM

The past several years have witnessed a growing interest and enthusiasm for “designing the user experience.” These ideas have been embraced by designers and business people, interaction design firms and e-business strategy providers. However, very little has been done to demystify the idea of “designing the user experience” and how interaction design and product design achieve specific user experience goals. In this paper, we attempt to provide an understanding of what user experience is and how to design for one. We hope to clarify some of the current “user experience” market-speak and ambiguous interchange of the terms “experience” and “usability.”

Clearly, there is great interest in this subject, and there have been a few initial efforts to create theories of user experience [1, 6, 11]. However, much more work is needed in order to understand human experience and our efforts to design for it. Designers need a clear idea of what experience is; what its components or elements are; and, perhaps more importantly, whether we can even design or script experience, or simply be content to facilitate it or keep from hindering it. In addition, we need to better understand the principles of how people interact with various types of artifacts, and how those interactions affect the experiences people have. Finally, these theories, to be useful, need to find expression in design processes, materials, and forms.

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As interaction designers and design researchers, we hope to derive a theory of interaction design, rooted in human experience, made complete with strategies for making the theory live in practice. Critical areas of exploration include how interaction designers can talk about experience, and what we mean by an experience; and what connections there might be between product design attributes and experience. A successful and useful theory must directly support the design of products, services, environments, and, possibly, experiences.

APPROACH TO DATE

Our interest in this problem stemmed from early thesis work as master’s candidates in interaction design. Over time, we have been able to put our early theories into practice, studying users over a number of design projects with a variety of qualitative research methods, and trying to discern what the data might tell us about user experience.

We also conducted a workshop at the 1999 Usability Professional’s Conference (<http://www.goodgestreet.com/experience/rep99.html>) to take a critical first step in understanding how designers can think about and support user experience in their work. This forum provided the opportunity to talk to experts from around the world who are working in the area of experience as it relates to design. The workshop is the beginning of what we hope will be a long conversation that will build a shared understanding, a common language, and a map of areas needing further research and practice. What follows is the early results of our work: ways to define experience, how to break it apart, and an initial framework for understanding experience as it relates to interaction design.

WAYS TO DEFINE EXPERIENCE

Often, use of the word “experience” and the concept of “user experience” during product design and development processes represent, at best, ambiguous buzzwords. We wanted initially to create a systemic way to broadly talk about experience. Our understanding of existing theories of experience has led to three ways that we talk about experience: experience, an experience, and experience as story.

The purest form of reference is *experience*, the constant stream that happens during moments of consciousness. Self-talk or self-narration is often the way that people acknowledge the passing of this kind of experience. This definition is based on cognitive scientist Richard Carlson’s theory of consciousness known as Experienced Cognition [2].

Another way to talk about experience is to talk about having *an experience* — what philosopher John Dewey referred to in his book *Art as Experience* [5]. This type of experience has a beginning and an end, and changes the user, and sometimes, the context of the experience as a result. An example of an experience is witnessing a story that allows us to feel powerful emotions, assess our system of values, and possibly make changes in our behavior. The University of Pennsylvania Oncolink web site (<http://www.oncolink.upenn.edu>) has a powerful selection of stories written by those who have experienced cancer themselves, or through loved ones, leading us through an experience as we read them.

A third way to discuss experience is to talk about *experience as story*, an idea that has been discussed at length by Roger Schank, an AI researcher [12]. Stories are the vehicles that we use to condense and remember experiences, and to communicate them in a variety of situations to certain audiences. Experience as story plays an important role in events as diverse as legal testimony and fantasy gaming. Because experience as story is naturally communicative, it has relevance for sharing user findings with a design team of various disciplines.

We know that a singular experience is made up of an infinite amount of smaller experiences, relating to contexts, people, and products. For example, if one thinks of the experience of camping on a mountain, it might be made up of smaller experiences such as the climb to the ascent, interactions with products such as one’s tent and cookstove, and interactions with companions on the trip.

As designers trying to craft an experience, we can only design situations, or levers that people can interact with, rather than neatly predicted outcomes. A product offers a story of use that invites engagement. If the product happens to be encountered in an unfamiliar context for a user, the product may be experienced in ways other than the designer intended. A friend offered a story of finding a Mexican hot chocolate stirrer in a friend’s workroom. He deduced that the stirrer was a part of his friend’s loom, since she is a weaver. Since the product was unknown to him and found out of its usual context (the kitchen), he relied on his own perceptions to create the product’s story of use.

In addition, designers need to realize that beyond personal interpretations of a situation, there are other wildcards, factors that are beyond our control when designing: different cultural backgrounds or prior experience; emotionally aroused states which cause different subjective interpretations of a certain moment; and the element of chance, when events coincide in a random way that seems meaningful to a certain person. For example, a colleague recounted a story in which a cell phone allowed his colleague to make an important business connection without stepping outside of the sauna. The value of the cell phone became escalated as a result of this event, which had happened by chance.

BREAKING EXPERIENCE APART

Armed with a common language for talking about experience, we can now begin to break experience apart. At the present time, we have defined two areas to talk about: influences on experience and qualities of experience.

Influences on experience

The simple way to think about what influences experience is to think about the components of a user-product interaction, and what surrounds it (figure 1).



Figure 1. Influences on experience.

Users represent how people influence experience. Users bring to the moment all of their prior experiences, as well as their emotions and feelings, values, and cognitive models for hearing, seeing, touching, and interpreting.

Products represent how artifacts influence experience. We take Victor Margolin’s definition of products as the “array of objects, activities, services and environments that fill the life-world.” [8] Each product tells a story of use through its form language, its features, its aesthetic qualities, and its accessibility.

In addition, people often impart meaning on particular products; for example, a trophy or a piece of art, a favorite car or a comfortable old pair of slippers. The social scientist Mihaly Csikszentmihalyi studied this phenomenon at length. [3]

User-product interactions take place in a context of use, shaped by social, cultural and organizational behavior patterns. For example, having a coffee break with colleagues at a conference suggests different products, interactions, and conversations than a poetry gathering shared with friends at a coffeehouse. In the context of the conference, the space where the coffee break takes place would need to accommodate large groups of people; the coffee mugs would serve a primarily utilitarian purpose, to hold coffee for people who are balancing laptops, notebooks, and bags. The mugs might bear the logo of the conference. In the context of the poetry reading at the coffeehouse, the space would need to invite interaction between smaller, more intimate clusters of people, and the coffee mugs could extend the message of the space by being hand-thrown, brightly colored, and varied as a set. In each situation, designers need to understand the users, products, contexts, and nature of interactions that may happen. Armed with that understanding, designers can take an active role in making deci-

sions about the relationships between the components of a user-product interaction.

Qualities of experience

In 1994, a panel of judges for *interactions* magazine took a step towards clarifying user-product experience, by creating a set of criteria for assessing qualities of experience of entries for an ACM-sponsored design contest. Alben and her colleagues were interested in how effective interaction design could provide people with successful and satisfying experiences. They defined experience as “the way [a product] feels in their hands, how well they understand how it works, how they feel about it while they’re using it, how well it serves its purpose, and how well it fits into the entire context in which they are using it.” [1] The judges posit that successful and engaging experiences are the ones that are most valuable to users.

More recently, the Harvard Business Review ran an article titled “Welcome to the Experience Economy.” Pine and Gilmore, who wrote a book by the same name, argue that the entire history of economic progress could be captured as a progression from extracting commodities (agrarian economy), to making goods (industrial economy), to delivering services (service economy), and now, to one of staging experiences (experience economy). The article suggests characteristics of desirable experiences that draw heavily from entertainment and customer service, as well as five principles for designing such experiences: theme the experience, fulfill it in all the details, harmonize the impression with positive cues, eliminate negative cues, and mix in memorabilia. [11]

Much of the existing work on qualities of experience centers on a division of user-product experience as either pleasant or easy to use, leading to an obligation for the designer to either create a task/process model of experience, or to create “an experience” which is not well understood. As the price of computing falls, and technology ubiquitously pervades our lives, HCI will shift from creating task and work-oriented experiences to other kinds of experiences. This creates a need for designers to understand how to embody new qualities of experience beyond ones that are merely usable or pleasant.

We believe that some experiences are predisposed to offer certain qualities. At a basic level, whether an experience is routine or new demands a different set of qualities for the person who is experiencing. Elements of chance, emotional state, or context have a great deal to do with what qualities of experience a user takes away from an interaction, and whether they are desirable or undesirable. The Experienced Cognition viewpoint argues that a person’s goals at any given moment affect the content of what is attended to and what affordances of the environment, artifacts, and other people become the most salient. [2] The newness of the situation shapes how much the user “leaves the story” and embarks on seeing and feeling something novel. For example, walking to work in the rain on a gray Monday when you have left the house without an umbrella is certainly an unpleasing experience. By contrast, walking on a country road during a summer downpour, scantily clad, getting soaked to the skin, can be invigorating and fun.

Experiences also have different amplitude, which predisposes certain qualities. Some experiences play heavily on our emotions; some are simply about accomplishing a task with minimal effort. Some experiences we want to repeat and build on (for example, seeing a movie or visiting a painting in an art museum), and some we don’t want to repeat (travel delays or difficult interactions with a nasty clerks). Some experiences predictably happen every day (settling comfortably into the driver’s seat for the morning commute); others are infrequent and special (riding a wobbly incline over the Swiss Alps); and still others may be intentionally uncomfortable, helping us to limit them in length or frequency (for example, passing through the stretch of space between the airport terminal and the door of the airplane).

AN INITIAL FRAMEWORK

We have been working on an initial framework (figure 2) to talk about experience in a way that is meaningful for designers. There are four components in this framework, used to talk about dimensions of experience: sub-consciousness, cognition, narrative, and storytelling. We describe each of these components, and illustrate how looking at shifts between each of them are useful for designers to think about what kinds of experiences they are creating in the design of particular products.

We use the word *sub-consciousness* to represent the most auto-

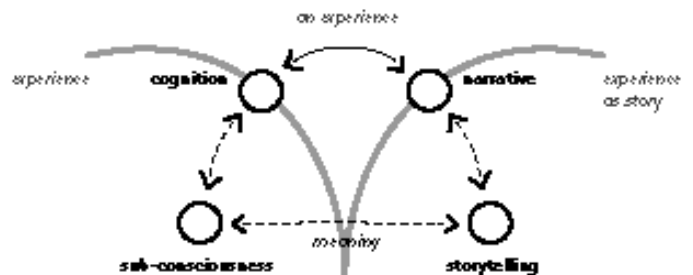


Figure 2. An initial framework of experience as it relates to interaction design.

matic, or fluent, experiences. Examples of sub-conscious experiences include a series of activities that have been collapsed into a routine (for instance, your morning ritual for making coffee upon arising); products that we have used often and are well practiced with (a professional snowboarder who uses the board as an extension of the body); or very usable products (a hat that suggests how it is worn on the head). Sub-conscious experiences are ones that do not compete for our attention and thinking process, but rather, are used “thoughtlessly.” Don Norman talks about products that we only need to learn to use once. [10] These products create sub-conscious experiences.

We use the word *cognition* to represent experiences that require us to think about what we are doing: interactions with new products, interactions with confusing or unfamiliar products and environments, or tasks that require attention, cognitive effort, or problem-solving skills. More and more, cognitive experiences happen simultaneously, especially as computing devices pervade our culture. How many of us have processed email while talking on the

phone at the same time? We anchor the phone between ear and shoulder, causing physical detriment, and run the risk of appearing rude to the person on the other end of the line, while struggling to process two cognitive tasks in parallel. While technologies such as portable CD and MP3 players do a lot to bring entertainment into our everyday experience, looking at all experiences as entertaining ones is not the answer. As designers, we still need to create products that suggest how to accomplish tasks in straightforward ways.

However, we should not think that all cognitive experiences are undesirable ones. A cognitive experience may mean that the product offers the user a learning experience. A user can also conceive of a new and novel use for a product that the designer did not intend. For example, when bread machines were invented, designers did not realize that people would stop the machine's bread-making process and use the dough to prepare other foods such as pizza and pasta. This has led to the creation of devices that take raw ingredients and mix, shape, and deliver fresh and dried pasta.

We use the word *narrative* to represent experiences that have been formalized in the user's head: ones that force us to shift to thinking about and formalizing in language what we are doing and experiencing; or in the world, formalized in an artifact. A product's set of features and affordances offers a narrative of use.

In turn, a user interacts with some subset of features and affordances, based on location in a context, prior experience, and current emotional state, to make a unique and subjective story. We use the word *storytelling* to represent the subjective aspects of experience. A person relays the salient parts of an experience to another, making the experience a personal story. Through these particular and unique interactions, users bestow meaning on situations, creating life stories and stories of product use.

SHIFTS IN THE FRAMEWORK

Looking at the shifts between components of the framework is a useful way to begin to understand types of user-product interactions, how they relate to our ways of talking about experience, and what types of experience we might design for.

Experiences that we repeat again and again, such as reading, tying our shoes, or making the bed in the morning, generally become more automatic as we practice them. These experiences migrate from cognitive ones to sub-conscious ones. The cognitive to sub-conscious shift often means that a product is easily learned, and effortlessly used, hopefully in the way the designer intended it to. Sub-conscious experiences fit neatly into the state of experience; they only change when we are thrown somehow from our practiced routine (for example, putting the milk on the stove and the coffee in the refrigerator during a sleepy enactment of the morning routine).

When an experience shifts from a sub-conscious to cognitive one, it means that a user has encountered something unexpected in his interactions with a product, and is forced to think about it. There may be an aspect of the design that does not match the user's mental state; the use of a product may be interpreted in a way that the

designer did not conceive of. For example, programming the function keys on the office telephone is a task not easily remembered; users usually need to consult the manual for features used less frequently. A shift from a sub-conscious to a cognitive experience could also signal that the user is creating new knowledge, and that learning is taking place.

A narrative experience can shift to a cognitive one, when we are forced to challenge our thinking during an interaction that has been solidified in our perceptions, attitudes, and beliefs. For example, we may watch a commercial telling us about a green earth campaign. As a user, the experience forces us to move behind our current attitudes and behavior in order to conceive of a change.

Shifts from sub-conscious or narrative to cognitive experiences move the user from the state of experience, or the maintenance of a particular type of experience, to having an experience, where the user or context of the experience is changed in some way at the outcome. The user may perceive the affordances of the context of the experience in a new way, or new knowledge may have been created, resulting in learning.

A sub-conscious experience can migrate to a storytelling experience, as we schematize it, communicate it, and add levels of meaning. For example, we might talk about a surfing trip in Hawaii, pulling out different aspects of the story for fellow surfers as opposed to our grandmother. Similarly, an experience can move from narrative to storytelling — a formal experience becomes personalized as it is communicated in a relevant way. For example, we might talk about the new and novel virtual reality game that we played at DisneyQuest, a comprehensive experience that involved learning, using a new product, and an entertainment experience. We may talk about the interface of the game, how it made us feel, or who we played with. This kind of shift means that the user has made the act of interacting with the product his own. Shifts from sub-conscious or narrative experiences to storytelling experiences illustrate the human need to communicate, and to share experience as story. This is particularly relevant for designers learning to understand the user.

THE ROLE OF THE DESIGNER

Armed with this initial framework as a tool, how can designers conceive of designing certain types of experiences? Initially, we can pay attention to particular components within the framework, maintaining a sensitivity for what kinds of user-product interactions and kinds of experiences each offers, understanding what qualities of experience each might be predisposed to create, and how those experiences and qualities might shift over time.

We can realize that a good product is one that offers a good or memorable narrative that the user will engage with, and pass on to others, either by sharing the artifact or by talking about it. To create a good product, it is critical to understand our users. The need to involve the user in the design process has made product design a more complex task. However, designers can no longer

focus solely on the product: a successful design will take into consideration all of the components in the user-product interaction: user, product, and context of use (figure 3).

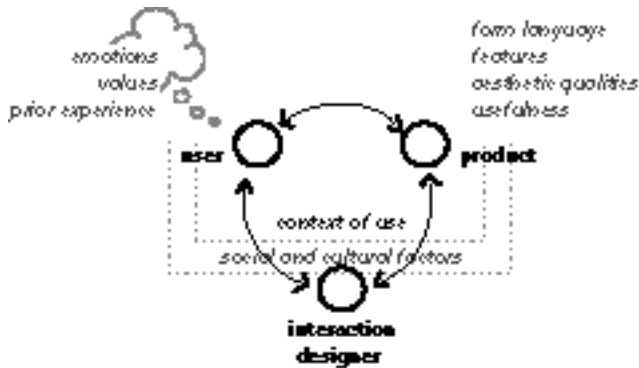


Figure 3. The role of the interaction designer in understanding experience and what kinds might be created.

By collecting and understanding subjective user experiences, and synthesizing them to construct a formalized narrative in the form of a product, we can create beneficial products and experiences. Once we understand experience, designers will be able to use it as a source of information for creating products that improve the quality of life. Perhaps eventually we can help people understand their own experiences and transform them into products that carry personal and social value.

CONCLUSIONS AND FUTURE WORK

Our research has led to a common way to talk about experience, understanding what influences experience and what qualities of experience are, and an initial framework for understanding what kinds of experiences can be created, and how experiences shift over time. Through qualitative user research for the design of new products, we have begun to test and refine this theory.

Future research will further explore how sub-conscious, cognitive, narrative, and storytelling experiences tie back to experience, experience as story, and an experience, as well as the main user-product experiences and qualities of experience relating to each. To do so, we will work at two levels: at a low level, to understand experiences involving basic activities such as reading and interacting with simple artifacts, and at a high level, by working to inform new products involving both physical embodiments and digital and technological components.

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Web sites

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University of Pennsylvania Oncolink Site:

<http://www.oncolink.upenn.edu>