Designing for Experience:
An Approach to Human-centered I

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Abstract

My thesis attempts to understand experience as it is relevant to interaction design. Based on the work of John Dewey, Mihalyi Csikszentmihalyi, and Richard Carlson, I identify two types of experience in user–product interactions: satisfying experiences and rich experiences. A satisfying experience is a process–driven act that is performed in a successful manner. A rich experience has a sense of immersive continuity and interaction, which may be made up of a series of satisfying experiences.

Based on this definition, I identify a set of design principles with which to create products that evoke rich experiences. These principles are intended to encourage designers to think about how to create user–product interactions that suggest values and communicate meanings that enrich the quality of life. Narrative plays a key role in these design principles. Our series of life experiences form a narrative; the values that designers impart in an object form a narrative which is elaborated by a user to satisfy his specific needs. The interaction between an individual and a product is a juxtaposition of narratives. A rich user–product interaction forms a narrative that meshes with the series of experiences that make up one's life story. It evokes an experience which becomes one of the extended experiences that shape our lives.

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For my family, friends, and colleagues

I. Introduction

My friend was born and raised in the country in Italy and emigrated to the United States as an adult. He continued the agrarian habits of his youth by starting a small landscaping business. Looking at his tool shed, I am impressed to see that he has created tools in response to his needs and the opportunities of his working environment.

Modified hoe.

For example, he has modified a hoe whose angle was too sharp by carving a curved tree limb to replace the handle with one with a less drastic angle. He told me that this modified hoe resembles a tool he used as a boy. He added bumpers to the inside of long handled pruners to protect his knuckles when cutting thick branches. He's woven wire supports through rakes to make them more rigid and more effective.

He has also created and modified tools inside the home, reflecting what he learned at his job as a suit presser in a clothing factory. He fashioned a wire support to lift the cord of the iron out of the way, long before it became a standard feature on domestic irons. He also built a pressing table to press suits at home, fashioned after the pressing machine he used at work.

Pruners with bumpers.

This resourceful man modifies the design of a product to increase its usability specifically for him. He is able to increase his productivity by altering available products to mimic products he used successfully in the past. He also customizes products to perform tasks in an efficient and satisfying way. This man has created unique solutions to his problems with products — problems that, in the case of the iron, were latent needs of a larger group of users.

Home made presser.

This story is an example of a subjective user−product interaction. I have noticed these types of interactions anecdotally in observing how people interact with products, in my own interactions with products, and most importantly, as a designer who crafts the interactions between people and products. In the case of the gardening and ironing tools, the products were modified to make the experience of using the product not only efficient, but desirable. Professor Dan Boyarski summed it up well when he

said, "Research in cognitive psychology determines how products become useful and usable. But design addresses how the use of a product becomes desirable."[1] The design of a product should yield not only a usable product, but an interaction which is a satisfying, if not a rich experience. When I use the term rich experience, I mean an experience that has a positive and pleasing value for the user, allowing him to perceive beauty in the product and its use. A rich experience can be composed of groups of smaller tasks or activities. For example, the experience of horseback riding consists of a number of smaller tasks: preparing the saddle, placing it on the horse, and leading the animal out of the stable. Some designers have called these smaller tasks transactions, or process-driven acts that are component parts of a larger experience.[2] These tasks, when completed in an efficient manner, are satisfying experiences, which build to a rich and enduring experience. For example, the rich experience of camping in the mountains is comprised of several smaller activities: navigating to the chosen spot, using well-constructed hiking shoes; pitching the tent for shelter, which is hopefully a task of minimal effort resulting in a sturdy structure; and surrounding oneself with the amenities needed for a safe and comfortable experience on the mountain — devices to prepare food and purify water. Although these individual activities are work in and of themselves, they become satisfying experiences that contribute to the rich and enduring experience of camping.

How can products yield satisfying and rich experiences for individuals when they are designed for market segments of similar users? Only after my friend had modified his gardening tools in a very personal way did they work satisfactorily for him. Mediated by tools he created himself, gardening became a rich and enduring experience.

While marketing research shapes the design of products to satisfy the needs of specific markets, designers cannot ignore the subjectivity of product use. In the case of design that is poor or unclear, individual inter-

[1]Daniel Boyarski, personal communication.
[2]Shelley Evenson, "Designing for experience," lecture at Carnegie Mellon University, February 1997.

actions with products can be dreadful, resulting in injury and even death. Is this to say that all product experience is subjective and design need answer only to the individual? I believe that good design can answer the paradox of designing for both individual and common experiences by providing the "raw materials" for experience that pertain to the values of both individuals and user groups.

In my personal experience as an artist and a designer, I have tried to create meaningful experiences through user–product interactions. I have always been fascinated by the subjectivity of experience. For example, it has been clearly illustrated to our research group studying moving, or kinetic, typography, an expressive form of communication enabled by time–based digital media.[3] We noticed that when looking at animated sentences, people bestow a subjective meaning on the text that is displayed. In such a situation, readers invent a story, based on their own prior experience, through the communication of the message. Although commonly understood by the act of reading, the experience of the reader allows for a personal and emotional meaning to unfold. Past experience is recalled, situated in the present, and a new experience is created.

While these instances center around the communication of a message with dynamic text, products can be understood in a similar sense. A product communicates to the user through its situation in an environment. Effective design of the interaction between people and products should provide individuals with a successful, satisfying, and even rich, experience. Well–designed products can maintain a sensitivity towards individual experience while affording members of a user group a common experience. The designer, or team of designers, must understand the needs, tasks and environments of the people for whom the product is designed.[4] Attempts at designing for the individual are evidenced by modular ergonomic chairs which conform to our bodies and by software plug–ins that allow us to customize our computer applications. Experience is a

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[3]For more information, see Shannon Ford, Jodi Forlizzi, and Suguru Ishizaki, "Kinetic Typography: Issues in time–based presentation of text," *CHI 97 Conference Extended Abstracts,* p. 128.
[4]Lauralee Alben, "Quality of Experience," *interactions,* Summer 1996.

topic that is often discussed, but designing for individual experience, where a user is a unique member of a larger market segment with similar needs, is a relatively new idea that merits discussion.

The challenge of this thesis is to suggest how designers may shape user–product interactions to create rich experiences for both individuals and groups. Good design, shaped by an understanding of users and how they experience products, can answer this task. In order to do this, designers must understand experience and narrative. Experience can be broadly defined as the series of conscious events that make up an indi-vidual's life. Narrative, the formal representation of this series of events, and storytelling, the informal recounting of these events, are valuable tools for designers. Since design is a social, collaborative activity, commu-nication with users and other members of the design team is essential. Communicating with and understanding users is facilitated through the use of narrative and storytelling.

The second section of this thesis explores the theme of experience through the work of John Dewey, a philosopher; Mihaly Csikszentmihalyi, a social psychologist; and Richard Carlson, a cognitive scientist. This choice of readings enables the comparison and contrast of different views of the fundamental aspects of experience, and the activities of experiencing and specifying information about the self.

In the third section, *A Theory of User–product Experience,* I define two types of user–product experiences: satisfying and rich. A satisfying experi-ence is a goal–driven act that is performed in a successful manner. A rich experience is continuous and allows for interaction between internal infor-mation and information in the environment. It may be comprised of a number of smaller activities which are in and of themselves satisfying experiences.

In the fourth section, I explore existing approaches to user–centered design, to understand the approach to experience that user–centered design principles offer. I briefly examine the work of cognitive psychologist Donald Norman, an important figure in the short history of user–centered

human–computer interaction design; Lucy Suchman, an anthropologist who argues that the situation of use is important in user–centered design; and Philip Kotler, a marketing expert who has recognized the importance of defining human needs and values through product development. This study of these user–centered design and marketing principles provides readers with a better understanding of how satisfying experiences are evoked by useful, usable products, how these experiences may differ for individuals rather than user groups, and how groups of experiences combine to form a rich experience.

In the fifth section, *Narrative, Design and Experience,* I elaborate on narrative as a natural approach to understanding how to design rich user–product interactions. Both narrative and design are communicative activities; both involve the testing of values in the form of stories or products. The testing of values involves a user referencing his past experiences and continually forming new ones.

In the final section, I discuss some principles for designing for experience, and provide some examples of products that evoke rich experience. I hope that designers will use these principles to better understand how to create products that evoke rich and satisfying experiences for both individuals and user groups. Narrative plays a key role in these principles. Our series of life experiences form a narrative; the values that designers impart in an object form a narrative which is elaborated by a user to satisfy his specific needs. The interaction between a user and a product is a juxtaposition of narratives. A rich user–product interaction forms a new narrative that meshes with the series of experiences that make up one's life story. It evokes an experience which becomes one of the extended experiences that shape our lives.

II. What is experience?

To design for rich experience, we must know what an experience is and how it comes to be. Designers need to understand how interpretation takes place when people interact with products. How do people make sense and meaning of the world? How is the intent of a person shaped by

an interaction, and how does the subjective interpretation of the interaction become an experience? Historically, literature and the fine arts have placed value on interpretation, the act of conceiving and making meaning in the light of individual beliefs. Interpretation has an equally important place in design and day-to-day interaction with objects. The philosopher John Dewey believed that the continuity of aesthetic experiences can be found in everyday surroundings. He felt that a person's interaction with an expressive object, carried to the full, yields *an* experience, a narrative which is unique to both the maker and the perceiver of the expressive object.

John Dewey: Having an Experience

Dewey proposed a theory of aesthetics which sought to recover the continuity of aesthetic experience with the normal processes of living.[5] He believed that life has been compartmentalized into areas for business, religion, morals, politics and art, and that people moved mechanically through these compartments of life, rather than relishing each and every event. In daily life, Dewey said, we do not really see, hear or touch; these activities are shaped by the course of completing tasks. Rarely does the eye perceive instead of sense; rarely is passion aroused from our surroundings. Since daily life devalues senses and experience, Dewey proposes "going back to experience of the common or mill run of things to discover the aesthetic quality such experience possesses."[6] To understand experience, and to discover how aesthetic experiences occur, we must look at everyday life, not just works of art in a museum.

Dewey describes the essential conditions of life which determine the nature of normal experience. Living creatures exist in an environment with which they constantly interact. Experience is created through the interaction of an organism with its environment. The conditions of life carried to the full lead ultimately to communication: "Nature and man interacting with each other yield experience, the result, sign and reward of that interaction of organism and environment, which, when carried to the full, is

[5]John Dewey, *Art as Experience* (New York: Perigree Books, 1980), p. 10.
[6]Ibid, p. 11.

the transformation of interaction into communication."[7]

However, the process of change shapes the flow of experience into *an* experience. All of life is a succession of loss and recovery of temporary equilibria, want and fulfillment, doing and not doing. Changes over time bear a new state of harmonious balance. When an organism returns to stability, after having passed through a phase of disruption, Dewey feels the conditions for an experience are in place. A starting point and an ending point define *an* experience, which is shaped by an aesthetic rhythm, and a unity of action, feeling, and meaning. We have *an* experience when "the material experienced runs its course to fulfillment." Experience in the degree to which it is *an* experience is heightened vitality. It signals alert and active commerce with the world. An experience is whole; it has a beginning and a sense of closure. A piece of work is finished; a situation, such as a dinner party, is rounded out so that its close is consummate and not an abrupt end. There is a single quality that pervades the experience in spite of the variation of its parts. There are pauses and places of rest, but they serve to give rhythm to the quality of the whole.

Experiences have common aspects, no matter how they are formed. Every experience is the result of an interaction between a live creature and some aspect of the world. An experience has pattern and structure, because it is doing and undergoing in a harmonious relationship. The action and its consequence are joined, and unified by emotion. Regardless of the materials that bring form to an experience, it "has a satisfying emotional quality," since "emotion is the moving and cementing force. It selects what is congruous and dyes what is selected with its color, thereby giving qualitative unity to materials externally disparate and dissimilar."[8]

According to Dewey, an "impulsion" — the movement of an organism as a whole — is the beginning of a complete experience. The impulsion identifies a need which can only be satisfied through interactions with the environment. Interactions do not occur freely, but encounter obstacles

[7]Ibid, p. 22.
[8]Ibid, p. 42.

which must be converted into favorable purpose. This allows the flow of experience to be shaped by intent and purpose. Intent allows for checking and reflection on prior experiences as new ones are brought to life. Dewey views an impulsion as the catalyst that converts an activity into an act of expression, which is carried by a medium, whether it be a sound, something in nature, or a man–made object.

Dewey uses the cry of a baby as an example. Initially, the cry is just an utterance. Then the baby begins to understand the effect that his cries have on people who surround him. He learns that crying on purpose will get him the things he needs, like food and a clean diaper. The consequences of doing are incorporated as the meaning of subsequent cries because the relationship between doing and undergoing are perceived. With intent, the baby can turn his utterances into meaningful, expressive communication, much like a painter can turn pigment into a means of expressing imaginative experience.

The baby's cry is an expression that yields action and result. When the expressive act is embodied in an object, such as a painting or a piece of pottery, how is the act of expression understood? Dewey says that there is a difference between something that is expressive (an expression) and something that is not (a statement). Statements are general; like a highway billboard, they merely point us to an experience. An expression does not generalize; rather, it has a personal and unique meaning. It *is* an experience. When something is expressed, excitement and arousal result, stirring up emotions and past experiences. Dewey believes that the act of experience allows emotions to become conscious.

An expressive object and the expression of its maker are organically connected. Like wine that has been pressed from grapes, an expressive object is created from the action of making and the intention of the maker. Dewey states that this meaning is subjective for both the maker and the perceiver of the object: the maker has his personal intent, and the perceiver has unique channels of response that have been molded by former experiences.

Since expressive objects communicate through situation in an environment, they have a language, in spite of their intrinsic medium. Dewey says the language results from "what logicians call a triadic relation. There is the speaker, the thing said, and the one spoken to. The external object, the product of art, is the connecting link between artist and audience."[9] Both maker and perciever of the expressive object interact with it in a personal way. The interaction and resulting interpretation are active events, in which something new and not previously existant in a person's experience is created.[10]

Products are expressive objects that have been shaped for special uses. These objects are crafted from materials that are arranged in a purposeful, whole relationship. When a designed object not only performs a task but evokes an immediate and vital experience, Dewey says that the product is not merely useful but aesthetic. Design means adding both purpose and arrangement to material in the world. To understand how to design a product, one needs to know the purpose the object is intended to serve and how its various parts fit that purpose. The result of good design is an object which unifies shape and function, allows for personal and useful interaction, and arouses an emotion which unifies a satisfying experience.

Dewey finds the potential for experience and aesthetics to be present all around us. Through a process of action and reflection in an environment, individuals are active creators of experience. Impulsions signal the initial stage of the experience, and shape it with intent. Intent allows for a connection to past experiences and a giving of life to them. Emotion shapes the experience and gives it qualitative unity. When a product evokes an experience, the design and substance of the product falls away, and all that is evident is its form. The form of an experience is determined by a medium. Whether it is a baby's cry, a dinner in a fine restaurant, or a poem or painting, an expressive object bestows on the maker and perciever *an* experience. It is a communicative activity which is characterized by a richness of action, feeling and meaning.

[9]Ibid, p. 106.
[10]Ibid, p. 108.

Mihaly Csikszentmihalyi: The meaning of products

John Dewey views experience and interaction as active pastimes. An inter-action between a person and an object occurs because the object is the result of an expressive activity of the maker, an arranging of materials for an intended purpose.

With this in mind, my study of experience shifts from the activity of inter-action to the object in the interaction. How does a product or work of art shape a person's intent and allow for an experience to take place? Is a person changed as a result of that experience? In the words of Mihaly Csikszentmihalyi, "To understand what people are and what they might become, one must understand what goes on between people and things."[11] Only a personal involvement with an artifact will enable it to convey meanings and experience for its owner. This is the thesis of Csikszentmihalyi's research, a social psychologist who determined how and why people attach meanings to certain things.

What Dewey calls *an* experience is similar to what Csikszentmihalyi calls a transaction. The transaction consists of two parts: cultivation, the active formation of meanings, and flow, resulting energy from the activity between person and product. While Dewey's experience stresses the activity of the interaction between an organism and an environment, Csikszentmihalyi's transaction stresses the person and the things sur-rounding the activity. A communicative process involving the thing as a sign unfolds, resulting in more knowledge and meaning for the person.

For example, Csikszentmihalyi would describe a baby's cry as something that specifies information about the self. The cry begins as a sensory experi-ence, and coalesces into a particular pattern. As dim awareness is trans-formed into consciousness, the infant learns to connect the activity of crying with the satisfaction of needs. By attending to his intentions, the child dis-covers and strengthens the self, the source of wants from which his inten-tions occurred. He sees the power of the self to affect the environment.

[11]Mihalyi Csikszentmihalyi and Michael Rochberg-Halton, *The Meaning of Things* (Boston: Cambridge University Press, 1981) , p. 1.

Csikszentmihalyi defines a person as an aware being, in control of his existence and able to direct it towards purposeful activity. A person attends to and experiences something because it suits his goals and strengthens his sense of self. Concrete goals are symbolized by meaningful objects in a person's life. Goals motivate the process of interpretation known as cultivation, but cultivation is limited by the capacities of human attention. In addition to personal goals, people must attend to maintaining the interactions of a social system. In an ideal social system, people's goals will be synchronous.

Csikszentmihalyi defines a thing as any bit of information that has a recognizable identity in consciousness. A thing is a sign standing for something else that is intimately related to a person's character and past experience. For example, a king's crown represents the principles for which he stands. Often, man–made things (products) play a double role in consciousness; they owe their existence to the attention and the intention of the maker and owe their interpretation to the subjective experience of the user. By actively appreciating an object, the owner joins in the act of creation, and it is this active effort, rather than the creator's effort, that makes an artifact important in a person's life. This is similar to Dewey's belief that an expressive object is created from the intention of the maker and the act of making. No one part — the making or the perceiving — is complete in and of itself.

The process of attaching meaning is a communicative act involving the thing as a sign. It is easy to understand how a wedding ring or a crucifix functions as a sign. Csikszentmihalyi believes that products are signs in the same way, because of the many meanings that they contain, on personal, cultural and social levels: "The objects people use, despite their incredible diversity and sometimes contradictory usage, appear to be the signs on a blueprint that represent the relation of man to himself, to his fellows, and to the universe."[12] For example, a television set is a utilitarian product that a person could certainly live without. However, a large television, marketed as an "entertainment center," can be a status symbol in the home, a means of

[12]Ibid, p. 38.

obtaining information, and a pastime that the average American spends a significant amount of time attending to. As a sign, the television has levels of personal, social, and cultural significance.

Meaning is interpreted in the context of an individual's past experience. Emotion plays a part in the interpretation, much as emotion is the unifying element of Dewey's experience. A thing often symbolizes emotion, like the joy symbolized by a trophy sitting on a mantel. The trophy is a symbol of the experience of winning, and it makes the owner feel joy to behold it. In this way, the trophy symbolizes joy — the emotion communicated as the result of an experience.

Things also symbolize the essence of a group or culture. This is a common realization of anthropological research. In almost every culture, objects are chosen to represent the power of the bearer.[13] In today's society, high–tech anodized aluminum bicycles and well–designed sports cars are, for many, desirable possessions. Vast amounts of money are spent on advertising campaigns that portray the status and power that owning such objects will bring us.

Csikszentmihalyi identifies two modalities within personal, social and cultural interpretation. Products that act as symbols of the self *differentiate,* or stress the unique qualities of the owner in his social context. Products may also *integrate,* or represent dimensions of similarity between the owner and others of similar, ethnic origin, religion, or lifestyle. We see a peculiar relationship between individual and group. Things develop individual meaning, but also integrate us in the shared meaning of culture. According to Csikszentmihalyi, attempts to reconcile the dichotomy of differentiation and integration are seen in behaviors such as gift–giving and bartering. Shared objects expand or restrict a person's thoughts and actions, sometimes forming a bridge between one person and another.

New products change the way people organize and experience their lives, first individually, then on social and cultural levels. Consider how products such as television, birth control pills, and rollerblades have changed soci-

[13]Ibid, p. 26.

ety. Objects affect what a person can do either by expanding or restricting action, thought, and experience. Through shaping actions, behaviors, and values, meaningful objects direct goals and shape life stories. Goals, though flexible and easily modified, shift with age towards objects and meanings that convey the continuity of a person's experiences and preserve one's past self. Goals shift from personal needs in childhood to social interaction in adulthood, articulating values and relationships that have been formed with others. The objects that best symbolize our goals are given meaning. These objects store and order experiences, which can be recalled in the form of stories during future interactions with the object. Special objects such as photographs and mementos personify qualities of other people, keeping the series of experiences that become a life story vividly alive. These experiences pervade life and culture.

Like Dewey, Csikszentmihalyi agrees that an aesthetic experience is a potential result of an interaction between a person and a product. When situated in a context, something aesthetically complete can arise from an interaction between a person and and object. These aesthetic qualities "are neither mental or physical, subjective or objective, but belong to specific situations or contexts and form consummations of transactions between the organism and the environment."[14] Csikszentmihalyi suggests that we conceive of aesthetic experiences as a way that we learn to become objective, in the sense of coming to recognize the pervasive qualities of the environment. The merging of action and awareness yields an enjoyable experience and a state of heightened perception in the environment.

How can Csikszentmihalyi's work be of use to designers, the conceivers and makers of products? Csikszentmihalyi believes that good design is a visual statement that maximizes the life goals of the people in a certain culture, drawing on a shared symbolic expression for the ordering of such goals.[15] The more universal the language of a designed product, the more

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[14]Ibid, p. 177.
[15]Mihalyi Csikszentmihalyi, "Design and Order in Everyday Life," *The Idea of Design: A Design Issues Primer,* ed.

likely the design is to be judged as good across time and cultures. Products that become popular help shape and define a culture, as we have seen. However, successful and widely accepted products often begin as the feelings of a small minority struggling to formulate its experience in terms of an unfamiliar symbol. One's first experience of a thing is subjective and unique. Csikszentmihalyi feels that people create a private set of references among products that they use, products that are able "to provide tangible, enduring, and vitalized signs that can communicate the continuity of one's experiences, relationships, and values."[16]

Csikszentmihalyi's work allows that products create subjective meaning and experience for individuals and shared meanings for groups and cultures. He informs us about personal, social, and cultural values, and the modes of integration and differentiation. His research shows that the meanings that objects take on for individuals changes as we become older. As babies and children, we order the diverse information of the world in a personal way, then in a social way, and finally in a cosmic way. People take a designed object and redefine it for themselves, varying the meanings over the course of many transactions, changing in response to increasing age, emerging goals, and situations of use. It is not the design of an object that makes it special, but what a person does with it — the interaction — that makes it special. A well–designed object must have the capacity to offer interaction, express deep human needs, and form relationships. Well–designed objects are the catalysts for interaction and experience, speaking of values that are accepted across time and cultures, enabling shared expression and common goals among members of a community of use.

The challenge to create well–designed objects with values that are judged good by individuals and various cultures is a complex one. How can it be done for tools like hearing aids, educational materials that work with complex amounts of information, or software that entertains 9–11 year old girls? Artifacts designed for any of the above scenarios are designed for

[16]Mihalyi Csikszentmihalyi and Michael Rochberg-Halton, *The Meaning of Things,* p. 224.

specific contexts and audiences. For the values of these products to speak across communities and cultures, basic assumptions must be made about an audience. A simple guideline might be to assume that each person is intelligent, curious, and perceptive, as well as intuitive, emotional and unique.[17] One can also assume that all people experience conscious mental states and that although subjective, these mental states result in a series of experiences that dynamically changes each person and shapes his life story. For this reason, it is beneficial for designers to understand how consciousness and learning are experienced by the individual. I will turn to the field of experienced cognition for further insight.

Richard Carlson: Experienced Cognition

Cognitive science has made many attempts to define the roles of experience, consciousness, and learning in human beings. Richard Carlson, a cognitive scientist, has introduced the theory of experienced cognition, which defines the roles of consciousness and learning as experienced by the individual. Consciousness is defined as primary awareness or the fundamental experience of a self experiencing and acting in an environment.[18] Central to the notion of consciousness is subjectivity; to be conscious is to have a unique point of view.

Carlson's work is based on the theories of J.J. Gibson, who originated an ecological view of perception.[19] Gibson argued that perception is the direct guidance of action in an environment and that objects in a person's environment are *affordances* that allow for action. In Gibson's view, perception always accompanies and guides action, and the concept of agency, or self as cause, is central to primary awareness.

Carlson's theory is based on the cospecification hypothesis, where "the central feature of consciousness is that an experiencing self and experienced objects are cospecified in arrays of available information."[20] For

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[17]Inspired by Eric Gould, "Respect Thy Audience," *Interactivity,* December 1996, p. 66.

[18]Richard Carlson, *Experienced Cognition* (New York: Lawrence Erlbaum Associates, forthcoming).

[19]J.J. Gibson, *The Ecological Approach to Visual Perception,* (Westport, CT: Greenwood Press, 1979).

[20]Richard Carlson, *Experienced Cognition.*

Carlson, everyday experience is comprised of goal-directed activity in an information–rich environment. Information in this sense does not mean words or pictures, but any patterning in the energy that allows the senses to perceive. The environment is perceived by exploration and resampling of continually available information. A person's activity, driven by intent and the need to accomplish a goal, changes his viewpoint, over time, from which the environment is perceived. A state of self–awareness gives a person unique control over what he experiences, by continually linking activities with changing goals.

Much of our experience involves the routine use of well–earned cognitive skills. Conscious activity is the experiencing self controlling the flow of mental states. Cognitive skills, such as mental arithmetic, rule–based puzzles, and physics problems embody knowledge and are often the focus of study of cognitive scientists. Problems that test these skills are alike in that they involve the manipulation of symbols — letters, numbers and words. However, when skills are situated in the context in which they happen, rather than in a laboratory, they can become a blend of both conscious and cognitive. The task of brewing morning coffee is perhaps more conscious than cognitive, since it is fluent and well–learned. But should we happen to put the coffee in the refrigerator and the milk on the stove burner, we are startled into a cognitive state. These kinds of tasks involving products used in a conscious rather than cognitive manner are important studies for designers. Observing a product which is situated in the context of use and affords an interaction which becomes fluent over time may suggest that the information that the product and its interaction offers is a good match for what is in the person's experience. Interactions with products that change in fluency with practice change the affordances of the products to the user, affecting his role of consciousness, and changing the opportunities for experience.

Some acts of consciousness — symbolic awareness (reading and simple math), perceptual–enactive awareness, and emotional awareness — happen continuously. Perceptual–enactive awareness is awareness supported by information in the environment and by our activities, rather than by

a mental representation. Perceptual–enactive states, formed on the condition of satisfaction, can fail to be satisfied. For instance, I might believe that there is pizza in the refrigerator for dinner, and plan my activities on the basis of that belief, finding later that my belief was false. Similar behavior happens with products. I believe the VCR will record my favorite show, but, in fact, it recorded snow. The belief in my mind functions in virtue of the actual thing, in my inability to interact with a product in the way that the designer has conceived of.

Emotional awareness consists of arousal that affects the rate at which a person specifies information about his environment. Carlson states, "Just as a visual point of view determines the aspectual shape of visual experiences — the 'angle' we have on the objects we see — emotionality determines the aspectual shape of cognitive contents."[21] Emotion serves to make our point of view more subjective. Mood is a long–term, less–emotional experience that changes self–specific information over longer time spans. Intense emotion makes our point of view more subjective. For example, if you are feeling angry and sitting in your office, you are likely to feel provoked more readily by what goes on around you. Emotion also helps control our activity, especially when we form intentions and make decisions. This view of emotion is in contrast to Dewey's, who views emotion as a binding and unifying element of an experience; states of experience colored by a similar emotional state may form *an* experience.

Experienced cognition allows us to recognize the continuity of consciousness in all aspects of experience. The cospecification hypothesis realizes that the series of conscious mental states we experience becomes the extended experience that constitutes our life story. When there is compatibility between information that specifies the self, and that which specifies the environment, we have rich experience. Understanding experienced cognition — how people are conscious, how they build cognitive skill, and how their emotional states affect what they experience — can help interaction designers to provide better products with which to craft experience.

[21]Ibid, Ch. 6.

Many authors have discussed the fundamental aspects of experience. I have summarized three different approaches: Dewey's theory of aesthetics, Csikszentmihalyi's research in the social sciences, and Carlson's theory and research in experienced cognition. Based on these perspectives, I propose a theory of user–product experience and discuss how interaction designers can create products that evoke rich experiences.

III. A theory of user–product experience

How do interactions with products evoke rich and satisfying experiences? I suggest that a satisfying experience is evoked by a product that performs a task in a way that the user responds to favorably. A light switch gives a clear indication of how to manipulate it to fill the room with light. The button at the gate to the parking garage sinks under my finger when I press it and issues a ticket as the gate opens and allows me to enter. Since these kinds of products and related tasks may be encountered repetitively by the user, functionality of the product is a key factor in generating a satisfying experience.

I suggest that a rich experience is one that has a sense of immersive continuity and allows for interaction between internal information and the environment. A rich experience can be made up of a series of satisfying experiences. The gardening tools discussed earlier performed in a satisfactory manner that gave way to a rich experience. To enjoy the rich experience of horseback riding, one must saddle the horse (all buckles and straps on the saddle must be in order) and lead the horse from the stable (suggesting a door that is wide enough to accommodate the horse). A rich experience has a sense of continuity that surrounds the user; the individual aspects of a satisfying experience blend and become one. A woman cited the act of bathing her baby as a rich experience. Soap, bathtub, and towel performed their tasks, combining to form the totality of experience of the bath and the interaction between mother and child.

A rich experience may be the result of an interaction with a product that not only performs a task in a satisfactory manner, but has a high symbolic profile. A doorknob created from ornate crystal might suggest some-

thing about what a person will experience as he turns the knob and enters the room. The door knob is part of an interaction that generates a rich experience. The user looks at information in his environment (the doorknob) and matches it to subjective information (his past experience of doors and doorknobs), synthesizing and creating a new experience, situated in the present.

A designer cannot really craft an experience, but can only provide the raw materials as values through which interaction and experience take place. From objects and situations, the user creates a set of experiences that becomes a narrative. While a well–designed product should make objective and subjective conditions equal, designers should allow and expect that the raw materials they provide can and will be used in unimagined ways. As we have seen, the subjective view of the user and the amount of information he takes in varies through his changing point of view in the environment and affects the experience that is evoked.

IV. User-centered design and experience

The relatively short history of user–centered design has offered designers information on crafting interactions with products. In the introduction to *User Centered System Design: New Perspectives on Human–Computer Interaction,* the authors suggested that designers adapt artifacts to their users and environments: "The computer can be viewed from the experience of the user, a view that changes considerably with the task, the person, the design of the system."[22] Norman and Draper were some of the first researchers to propose the idea of considering the user as central in the design process. There have been diverse approaches to user–centered design. Founded in sociology, psychology and anthropology, they attempt to understand the user, to affect values and beliefs of the user, and to study interactions between users and products in context.

Although these approaches come from the fields of psychology, anthropology, and sociology, the kind of experience they allude to is a satisfying, rather than a rich one. These design principles conceive largely of a prod-

[22]Steven Draper and Donald A. Norman, *User Centered System Design* (New York: Lawrence Erlbaum Associates, 1986), p. 1.

uct as filling a niche or completing a task, rather than providing raw material from which a rich experience is built. I will examine these approaches briefly.

Donald Norman and the design of everyday things

Donald Norman, a cognitive and experimental psychologist, has proposed in his book *The Design of Everyday Things* design principles based on perception, cognition, and problem–solving. People accomplishing tasks and people cooperating with machines guide his design principles. They are best viewed as describing the cognitive behavior of a user group, rather than an individual.

In summary, Norman's principles state that well–designed products should have visible cues to tell people how to use them, should have a good mapping between parts and what each part actually does (for example, knobs on the stove are in the same position as the burners), and should provide feedback continuously as a result of an interaction with a user. Feedback is given through *affordances,* the cues of what a product affords its user through human interaction. These design principles rely on environmental information, but interactions with products are a combination of "what is in the world" and "what is in the head." Norman acknowledges that users work under constraints — physical, logical, and cultural — which give them a unique perspective on product use. He urges designers to take advantage of physical constraints in the environment to allow users to rely less on cognitive processes.

Norman believes that when we rely on personal experience to achieve our goal rather than the logical deduction of cognitive processes, mistakes occur. This happens because what the user encounters does not really match anything in his experience, even though he might believe that it does.

When experiences with products rely on information in the environment, rather than subjective information, they are successful and satisfying. This is what Norman calls the design of everyday things — of VCRs that can be programmed, of dashboards of cars that can be operated with

ease. These are experiences that are crafted with cognitive processes in mind, predicting reliable results over larger groups of users.

Lucy Suchman: Plans and situated actions

Lucy Suchman, an anthropologist and social scientist, proposes an alternative approach to human-computer interaction. Like Norman, she is concerned with getting things to work right, but looks at the individual situated in a context of use to achieve a satisfying experience.

In *Plans and Situated Actions: The problem of human machine communication,* Suchman explores the relation of knowledge and action to the particular circumstances in which knowing and acting occur. She describes interactions between people and products as planned, purposeful actions that are situated, meaning that they take place in the context of concrete circumstances. Cognitive science tells us that plans are located in a person's head, defining the behavior that the user will take to accomplish a goal. Suchman argues that these internal plans are modified by a person's material and social circumstances and are shaped by the accomplishment of action. Hence, plans become dynamic through a user's interaction with a machine in a specific situation.

Suchman sees language as a central resource in situated actions. Conversation allows for joint action through participants' continuous interactions in an alternating sequence of action and response. Conversation also accommodates unforeseeable circumstances as they arise, locates and remedies the troubles in communication, and maintains control over the turns and direction of subject matter. Suchman draws a comparison between the nature of conversation and the relevance of action in human–computer interaction. Just as a conversation is conditional in that what one person says will generate a range of responses from another, so is the relevance of action in human–computer interaction.

Suchman suggests that the user model, a preconceived representation of the user, should be replaced with observation of the user situated in an environment of use. This "real–time user modeling" recommends the following design strategies: diagnosis based on differential modeling, which

takes the actions of a novice user into account as well as an expert user; detection of diagnostic inconsistencies, which provides for the likelihood of misdiagnosis and repair; and effective trouble usage, which makes errors accessible to the user so that they can learn from them.[23]

Designing for trouble means that the designer uses the wider social setting in which a product is embedded as a resource to remedy troubles that individuals have in understanding a product. For example, if there is more than one understanding that will produce the same action, detecting an individual action does not necessarily mean that the understanding is at hand. If a skill can manifest itself in any number of actions, the absence of an individual action does not mean the absence of the skill. Interactions with the environment of a product help designers to provide enough product actions to remedy inconsistencies in human behavior.

Suchman sees the experience of product use in terms of the individual. She realizes that a person's life story, as well as the context in which a product is situated, shapes an individual's expectations about a product. Although her design principles allow that there is a fundamental difference between people and machines, the experience that the human-machine interaction generates is a satisfying rather than a rich one. However, Suchman's ideas move towards regarding a person in the interaction as an intelligent, communicative being, rather than a system component with faulty memory and limited attention span. In this way, her work is a step towards understanding a rich experience. Her work has become a framework for other HCI research which moves closer to the actual practices and behaviors of people, and the higher level behaviors and values that are important to them.

I have briefly reviewed two seminal approaches in the history of user–centered design. These approaches to user–centered design describe what I call satisfying experience, rather than providing the raw materials for rich experience. Early user–centered design principles conceived of people as another component in the system diagram, a homogeneous component

[23]Lucy Suchman, *Plans and Situated Actions: The problem of human machine communication* (Boston, MA: Cambridge

that behaved in a predictable way. Suchman's work was among the earliest research that recognized the user as an individual, rather than a system component. Conceiving of the user in this manner initiated robust research on interaction design principles, resulting in criteria such as those presented by *interactions* magazine in 1996 on the quality of experience.[24]

However, several aspects of marketing research have also considered people as agents who hold unique values and beliefs. This may be surprising to designers, who have traditionally viewed marketing as something that distances designers from the audience. George Nelson, in his essay *Ends and Means,* elaborates: "It is not often that a designer finds himself in a position free from pressures... he is subject to budgets, technical limitations, marketing problems, [and] conflicting demands from many people."[25] User–centered design allows a satisfying experience to take place through interaction with a product. Social marketing allows communication to occur about a product — creating context, expectations, feelings, and values about its use, and evoking a change in behavior that is an immersive, often rich, experience. Social marketing describes the use of a product in a way to advance change behavior of individuals and groups.

Philip Kotler: Design of values through communication

Social marketing uses products or activities to advance social behaviors or causes: the Trojan Man character positions condoms as acceptable purchases for women, to prevent pregnancy and sexually transmitted disease; an Australian traffic safety campaign instilled the ethical values of driving responsibly on television viewers.[26] Social marketing integrates planning, communication, marketing skills, and approaches to social change to maximize users' responses. Communication, often about how a product is used, is the means for changing behavior.

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[24]Lauralee Alben, "Quality of Experience," *interactions,* Summer 1996.

[25]George Nelson, *Problems of Design* (New York: Whitney Publications, 1957), p.35.

[26]Jorge Frascara, "Communications for Change: Strategies and Difficulties," *Design Issues,* 12, No. 3 (Autumn

Social marketing programs are structured around the needs of particular segments of a particular audience. A "target population" is defined by unifying characteristics, including age, social class, and income; psychological profiles, such as values and beliefs; and behavioral characteristics, such as buying and decision–making habits. However, group characteristics begin at the level of the individual, first through beliefs, then attitudes and values. A belief is a conscious or unconscious proposition inferred from what a person says or does. An attitude is an organization of beliefs around an object or situation, and a value is a type of belief centrally located in a personal system of behavior.

Kotler recognizes that individuals have selective attention, in that they do not notice everything; selective distortion, in that they hear only what they want to hear; and selective recall, in that they can only retain a small part of a message in memory. When communication takes place, the current image held by the individual is replaced by the desired image of the communicated message. Kotler's communications model shows change taking place on three levels: cognitive, affective and finally, behavioral.[27] At the cognitive level, a user of a socially marketed product gets a new image in his head; at the affective level, the user's attitude is changed, and at the behavioral level, the user will act differently.

A product has a strong potential to change the beliefs, attitudes, and values of its users. The audience is persuaded to adopt a belief demonstrated or suggested through the product. The purpose of this persuasion may accomplish one of several goals: it may induce the audience to take action, it may educate the audience, or it may exhibit values to the audience for approval or disapproval.[28] When a product satisfies a need no other product does, or satisfies a need that is currently not being addressed, it becomes a desirable product that is adopted first by individuals, then by social and cultural groups, changing and becoming an integral part of daily life.

[27]Philip Kotler and Eduardo Roberto, *Social Marketing* (New York: Macmillian, 1989), p. 24.
[28]Anne Tyler, "Shaping Belief: The Role of Audience in Visual Communication," *The Idea of Design: A Design Issues*

Kotler's communications model suggests that the experience evoked by socially marketed products is often both satisfying and rich. New products are designed and marketed to exceed user expectations and change beliefs. Users are immersed in a process whereby a carefully designed product changes their current behavior to a new and better one. Products like birth control pills and nicotine patches change beliefs and values centered around a way of life. Something more happens after a product "does its job" — values are affected through gradual change. The product may even take on a symbolic meaning. For example, a plastic recycling bin becomes a symbol of the attempt to save the earth's resources.

Early user–centered design principles have made some contributions to understanding how products evoke satisfying experiences. Norman's design of everyday things, Suchman's situated activity theory, and Kotler's social marketing theory employ differing social science disciplines to bring knowledge to the product development process. User-centered design principles help detect and resolve problems in how products are conceived and made. In deciding on the placement of features, widgets, and buttons, tasks are performed efficiently, resulting in a satisfying experience of product use. The application of marketing principles gives insight to the career of products — how they will be positioned and advertised, possessed, used, and enjoyed. However, it is the responsibility of the interaction designer to conceive of the user as an active participant in interaction, and to determine the qualities of products that provide the raw materials for rich experience. To assist in this process, I suggest that designers explore storytelling and narrative, natural ways for people to communicate.

V. Narrative, Design and Experience

This section of my thesis explores storytelling, the recounting of life's events by one person to another, and narrative, the formal representation of such a series of events. Storytelling is a natural way of communicating; it has been put to use in the design process to evaluate and understand the user.[29] However, I suggest that narrative plays a larger part in the

[29]Thomas Erickson, "Design as Storytelling," *interactions* (July/August 1996), p. 32.

design process. Beyond serving as a communicative tool in interviews between users and designers and in scenarios between clients and designers, narrative can be understood as a formal representation of both a user's and a product's life.

Although unnamed as such, the formal representation of narrative is apparent in the writings on experience. Carlson believes that a series of extended experiences form a "stream of consciousness" that make up our life story. Czikszentmihalyi believes that objects which create meaning and experience for the self become an important part of our life history. Dewey states that expressive objects which evoke experiences have their own language, which is unique to both the maker and the perceiver of the object. In these narrative situations, the individual is both the subject and the object of his own discourse. Ideas and images privately addressed to the individual make meaning and evoke experience. Rhetorician Kenneth Burke believes: "A man can be his own audience, insofar as he, even in his secret thoughts, cultivates certain ideas or images for the effect he hopes they may have on him."[30]

Much as our series of conscious experiences form an extended life experience, or narrative, which we recount in bits and pieces to others as stories, a product is also a narrative, a formal representation of values and beliefs of the designers who created it. When the primary goal of a product is rich experience, its design exhibits, through expression and formal qualities, particular values for the audience to consider. The product narrative references and tests the user's existing beliefs and past experiences through a deeply engaging communicative process. Often, the story takes on a particular aesthetic. It is directed to a specific audience holding particular cultural beliefs, understandings, and experiences.

How is the narrative of a product transformed into a rich experience for the individual? The designer strives to make a rich experience tangible through the giving of form. George Nelson views design as a social activity, where the exploration of a design should be carried out with truth and

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[30]Kenneth Burke, *A Rhetoric of Motives* (New York: Prentice, 1950), p. 38.

emotional intensity.[31] If an experience results from an organism interacting with its environment, Nelson sees design as mediating the activity, for Nelson believes that good design achieves unity or wholeness in a balanced relation to its environment.[32] The series of decisions made during the design process provide the product with a narrative. Users shape their series of life experiences to form a narrative. In a user–product interaction, these narratives are juxtaposed, creating a tension where values are tested and experience takes place.

Roger Schank, Director of the Institute of Learning Sciences at Northwestern University, explores narrative in the book *Tell Me a Story.* For Schank, narrative and storytelling function in numerous ways in helping people order, communicate, and remember experiences.

According to Schank, when we tell a story, we condense experience into a gist, or a distilled memory structure. Gists are rich with information; they contain information about the goals attained and the lessons learned from an experience. When someone chooses to tell a story, he elaborates on the gist, adding details to make the story concrete and pertinent to the listener.

The way a gist is elaborated is subjective. Through the communication of a story, both the listener and the speaker come to simplify and abstract a complex experience. If a listener is open and curious about an experience, or if the story does not fit with his existing knowledge structure, hearing a relevant story can help him learn. This process of communication and discovery allows both storyteller and listener to come to new realizations. Through the juxtaposition of stories, a tension may be created that allows for reasoning and change to take place. Walter Fisher, who views humans as storytelling creatures, concurs: "the world as we know it is a set of stories that must be chosen among in order for us to live life in a continual process of re-creation."[33]

[31]George Nelson, *Problems of Design,* p. 6.
[32]Ibid, p. 7.
[33]Walter Fisher, *Human Communication as Narration: Toward a Philosophy of Reason, Value and Action* (University of

A product has similar communicative properties. Depending on the individual, its narrative tells the user a different story of use. My friend's tools not only recalled his experiences as a boy in Italy; he used one tool to do a number of jobs. The hoe he designed was used both to turn soil and lift sod off the lawn. One product can communicate to two users very differently. My accountant likes the hard line a mechanical pencil offers him; I dislike that line quality when I am writing and drawing. Products can communicate to users in new ways when they are open and curious about interacting with them. Often, this is how "advanced" features are discovered by users in software programs.

When the narrative of product use and the series of experiences that form one's life story mesh compatibly, rich experience is the result. Through a juxtaposition of narratives of product design and product use, both designer and user can gain new insights about interactions with products. Storytelling makes the experience of users explicit, and in turn, better user–product interactions can be designed.

The conjunction of stories allows us to communicate naturally. We assume similarity and build bridges over different communities, cultures, and areas of knowledge. The process of storytelling is an instrument for making meaning that dominates life, from bedtime stories to testimonies in courts of law. Fisher defines narrative as a means for recounting or accounting for human choice and action. Recounting takes the form of history, biography, or autobiography. Accounting for takes the form of theoretical explanation or argument. Recounting and accounting for constitute the stories we tell ourselves and each other to order our experience. Stories are rhetorical in the sense that they are composed and presented to influence beliefs and actions. The storyteller believes that his themes can be accepted as the true and right way of conceiving of a matter. When a designer is the storyteller, these themes are expressed through the form of a product.

Designers and researchers have realized the usefulness of storytelling. Thomas Erickson of Apple Computer has recognized storytelling as an integral part of the design process. Rick Robinson of E-lab recognizes the

use of storytelling as a process of evaluation and making meaning: "...how well does something tell the story it is expected to tell? Can people tell better stories with the new artifacts than with the old ones? Do the kinds of... narratives they create with artifacts enable them to have a more complex understanding of the world?"[34] Stories, while informative or phatic, are warrants for accepting the advice that they communicate. The basis for telling a story is bound to a value. We discern if the value is appropriate to the nature of our decision or belief that the story concerns, and consider the effects of adhering to the value in regard to our concept of self and our relationship to others and society.

The formal representation of narrative is useful when designing for individual experience, since individuals judge a story on personal criteria for belief and action. Stories appeal to various senses simultaneously: reason and emotion, intellect and imagination, fact and value. What a product offers to a user is a narrative. It allows a user to maintain, test, or transform his values. Product narratives are elaborated specifically by each user, for each situation and context; the same product communicates differently to each user. New ways of using the product are also discovered.

VI. Recommendations for design for experience

This section of my thesis lists some principles for design for experience, and illustrate them with examples. These principles are not prescriptive or process–oriented, but are statements to assist with thinking about and conducting the design process. By no means comprehensive, these principles are intended to encourage designers to think about how user–product interactions test values, make meanings, and enrich the quality of life.

Every user–product interaction is an experience. However, certain products have a rich experience as the primary communication goal — maintaining, testing, or changing values. The design of these products attempt to persuade the audience to adopt a belief or value suggested through the product. I call this display of values the

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[34]Rick Robinson, "What to do with a Human Factor," *ACDJ* 7, p. 66.

"raw materials" that a product offers for a user to consider.

Designing for rich experience:

> means that designers understand the user as an intelligent, unique, perceptive, curious and emotive being. Users have subjective, frequently–changing points of view. Users enhance the information that defines them as individuals when they interact with products.

> means that a user–product interaction is an activity where the values a product offers are carefully considered.

> bestows an ethical responsibility on designers in the choice of values a product displays, and the type of interaction it offers.

> relies on the use of narrative to understand the user and the context of use, and to conceive of the product and how it might be used.

A product that evokes a rich experience

> reflects the wisdom of user–centered design principles; that is, all the repetitive tasks involved in using the product are done in a satisfying way, so that these tasks are minimized in the creation of a rich experience.

> meshes information about the self and the environment of use compatibly; an enhanced self is the result. Subjective and objective conditions are equal. Objective conditions cover a wide range — what is done by the product and the way that it is done, and the social environment in which it is engaged.

Teapots.

I first choose a teapot as an example of a product which is designed for experience. A teapot's function is simple, but the product has a high symbolic profile. In using teapots, meanings are formed on a number of individual and cultural levels that groups of people share. I have a "London Bus" teapot that recalls fond memories of London; the British and the Japanese have sets of culturally accepted behaviors centered around the brewing and drinking of tea. Individual and cultural meanings surrounding

a teapot can also serve to differentiate or integrate a person among his peers. I have a whole collection of teapots and pitchers which I enjoy displaying in my home. Often visitors ask me where I found them or what I know about them. I provide the explanation in the form of a story that I make concrete for the listener at the time. An acquaintance of mine can perform a Japanese tea ceremony; this might serve to integrate him into the Japanese culture.

The form that a teapot takes expresses something about the status of its environment. One would probably not expect to see a fine china teapot like a Meissen in a working class British home. A teapot we would see in such a home might be thick, coarse china, chipped and worn, with a grimy tea cozy. Yet it performs its teaholding function in a satisfactory way and offers an afternoon ritual to the members of its home. The design of the teapot, while affording the function of brewing and pouring tea, does much more. Its form and expression serve as a gist for a whole series of experiences. The teapot becomes raw material with which a user can interact, specify information about himself, and evoke a unique, rich experience. In the commonplace exists the potential for a rich experience.

A teapot is one of a number of long–existing eating objects which are usually imbued with meaning. It is fairly easy to see how the form and expression of the teapot suggest aesthetic and social values which become meaningful when a user interacts with and experiences a product.

Colors **magazine.**

Social values are also suggested in products where the communication of a message is the goal, such as posters and web sites. *Colors* magazine is a controversial magazine founded by the clothing company Benetton, which bears a slogan on the cover which reads "A Magazine for the Rest of the World." Rather than a traditional magazine which features the work of different writers, *Colors* is like a series of textbooks on different themes — AIDS, unemployment, and wealth. Much of the communication is delivered through images; the existing text is published in a multilingual format — Spanish and German, or English and French.

The purpose of *Colors* is to display a belief for the reader to experience. The formal devices of the magazine allow for a deeper engagement by the individual: the harsh graininess of documentary photojournalism, placing the viewer as a voyeur in a culture in which he is unfamiliar. The viewer becomes an active participant in the testing of values and the creation of experience. At an individual level, he is forced to think, comparing the experiences of his culture with those of other cultures, and synthesizing them to form a new experience. On a social or cultural level, he may act to change his behavior and the way in which he influences others. As a result of interacting with the product, the series of experiences that forms his life story is changed.

In–line skates.

New or breakthrough products also test values. Whether a product is adopted or ignored is a statement of whether users accept or reject the values it suggests. In–line skates are an example of a breakthrough product which has become widely popular and has spawned the production of numerous other products such as safety equipment and accessories related to the activity of in–line skating. In–line skates allow users to perform a familiar activity in a new way. With practice, the use of the product becomes more fluent, resulting in unimagined uses such as traversing stairs and performing stunts. Innovative products such as in–line skates, beepers, and cell phones undergo continuous transformations, resulting in newer, more powerful, and more usable products. Consumers accept the ones that have agreeable values and ignore the ones that do not. New products enable users to change their behavior in appealing ways. As the use of a product becomes fluent, new product features may be discovered and integrated into existing product designs. In extreme cases, new industries may unfold.

We have seen what kinds of rich experience are evoked by these products. Teapots are long–extant products imbued with meaning; communication pieces such as *Colors* magazine force readers to challenge their thinking and their experience of life as they know it; breakthrough products such as rollerblades offer ways to experience life in new and previously unconceived ways. How is meaning attached to digital products

such as software games, CD ROMs, and products with interfaces, where both the designer and the user may be immersed in creating and using a product that is entirely new? Digital media is in its infancy and designers have had little practice in designing users' interactions with it. The market currently bears as many poorly–designed digital products as well-designed ones. When a user interacts with a poorly–designed digital product, and cannot use it successfully, he will not have a satisfying, much less a rich, experience. The components of the product must be learnable and usable, to provide the raw materials for a rich experience.

*You Don't Know Jack.*

The Neverhood.
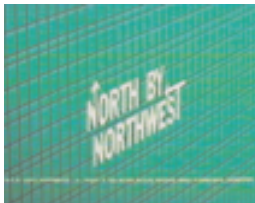
Software games such as *You Don't Know Jack* (Berkeley Systems) and *The Neverhood* (Dreamworks Interactive) are examples of digital products that offer rich experiences. Although the content of the game is prepro-grammed, it is presented to the user in a highly responsive, almost unpre-dictable manner. The design of navigational and interface elements is well structured and logical, so that the repetitive tasks involved in using the software are done in a satisfying manner. As a result, the user is immersed in an experience to which he gradually gives in. The result is a rich, expressive, emotional experience.

Another kind of digital media product which successfully provides the raw materials for rich experience is motion graphics, which are becoming more and more popular in film, television and advertising. The addition of time and motion to traditional typographic forms such as font, style, color and size allows for a message to be conveyed in an expressive, emotional way.

North by Northwest.

The film title for the Hitchcock film *North by Northwest,* designed by Saul Bass in 1959, is an example of a motion graphics piece that offers engaging interaction. Animated movement is used to achieve a range of psychological and emotional effects unobtainable with static typographic forms. More recent works in the same genre include film titles for *Mission Impossible* and *Seven,* done by the firm R/GA studios. In the *Mission Impossible* title, letters rush across the screen, creating a tension that suggests an impending explosion. The *Seven* titles give the viewer a sense of uneasiness, of something that is psychologically askew.
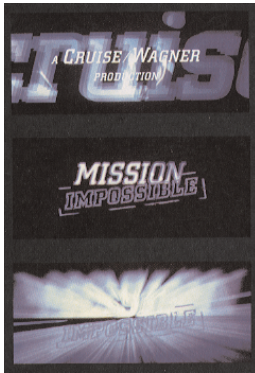
Mission Impossible.

Although these examples evoke a rich experience for the viewer, little is understood about how this type of experience happens. I reason that the motion of the typographic forms is compelling to the viewer because it suggests a value with which we can all identify — the value of human life. A rich range of experiences can be achieved by varying the combination of typographic forms. A viewer may experience a character, a motion innate to a living thing, or an emotion. The past experience and culture of the viewer influence the reading of the message and the personal meaning that is made of it. An emotional, co-communicative process results from the interaction.

To develop my principles for designing for experience, I have created a personal essay using time–based digital media. In its finished form, I hope this essay will stand as an example of these principles in action, offering a narrative that is adaptable to many different individuals. In addition, I hope this work builds on the work of other interaction designers, by adding another narrative to the series of user–product interactions and experiences. The challenge for interaction designers is to offer richer ways for people to evoke experience.

VII. Conclusion

In this thesis, I have attempted to understand experience as it is relevant to interaction design. Based on reading and theory, I identify two types of experience in user–product interactions: satisfying experiences and rich experiences.

Based on this definition, I have described some principles for designing for experience. These principles are based on my explorations in my work as an interaction designer. Rather than prescriptive rules or methods, these principles are intended to encourage designers to think about how to create user–product interactions that suggest values and communicate meanings that enrich the quality of life.

I have begun to initially develop these principles through my own experimental designs during my graduate study. It is important to further develop these ideas through application of these principles to real–world prod-

uct design. Ultimately, I hope that my principles will exist and grow through their use by other interaction designers, evidenced by products that offer new and better ways of life.

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