

THE EXPERIENCE EVOLUTION: DEVELOPMENTS IN DESIGN PRACTICE

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IDEO

Designers today have opportunities to design much more than simply static objects. We are designing integrated and dynamic interactions with objects, spaces and services and helping companies with more strategic decisions. Expanded opportunities have spawned developments in traditional design practice.

First are developments relating to awareness of people's experience. Design- and user-research methods are evolving. Combinations of projective techniques and empathic exercises are more holistic in scope and yield results that can be more viscerally understood.

A second development is in representing multiple dimensions of people's experience through modelling tools used to explore design ideas. Video scenarios and enactment enable explorations, in more dynamic ways, of what it will be like to interact with new designs.

Finally, both design teams and client groups involve professionals from multiple disciplines and business functions. Tools such as experience prototyping are being developed to promote shared visions and to enable the communication of experiential design ideas in compelling ways.

BEYOND DESIGN OF THINGS

A few years ago it was simpler. Designers just designed things: objects like lamps, chairs, computer mice, cars, buildings, signage, page and screen layouts. Of course we knew that the things we designed affected people's experience. But still, it was enough to design the thing. The work of designers was to bring skills, creativity and insight to 'designing things right'.

Now, as many products have become more similar in technology, functionality, price and quality, companies are turning to design to more radically differentiate their offerings from those of their competition and to create stronger emotional connections with their customers. As designers, we are now challenged explicitly to help companies explore and visualize directions for their future offerings that evoke and support specific qualities of

experience. So the work of design today is increasingly to bring skills, creativity and insight to determining 'what's right to design' in support of business objectives.

This expansion of opportunity for design is due partly to advances in technology that impact people's behaviour and experience beyond specific individual objects. Increasingly we find ourselves designing for complex interactions that integrate hardware and software, spaces and services. A design project today is likely to involve connected products such as mobile digital devices, or systems of linked design elements, such as those comprising a train journey or a remote banking transaction.

The expansion is also due to a maturing confidence in the human-centred design profession. Designers now often challenge the wisdom of a focus on designing individual artefacts - the 'thing' as an isolated object - when people's interactions can be better supported by thinking more holistically about their activities and processes (see Figure 1). It is also partly a result of new business strategies in which companies seek competitive advantage through more integrated offerings. Companies are regarding design as a way to develop more consistent expressions of their brand through the interactions that customers encounter at

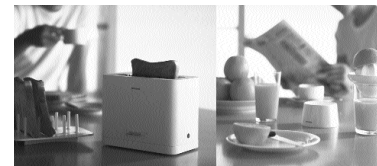


Figure 1: These breakfast concepts for Matsushita support the rituals and experience of making and consuming breakfast. Innovations to the products derive from a focus on human activities - stacking toast before eating it, drinking from a glass - rather than upon the objects of 'juicer' and 'toaster' themselves.

multiple points of contact. In any case, designers are being invited to influence not just the look and feel of individual things, but the quality of experience that people have as they live their lives through time and space, encountering the designed world.

DESIGN FOR EXPERIENCE

This concept - of designing to influence the quality of experience that people enjoy - is a very useful one to describe the expanded opportunities for design. As a result, phrases like 'design of experience', 'user experience' and 'customer experience' have become popular in both design and business communities. Pine and Gilmore (1998) represent the design of experience as a new kind of economic offering, distinct from the design of products and services. They identify Niketown and Disney World as examples of staged branded environments achieved by integrating multiple designed elements including

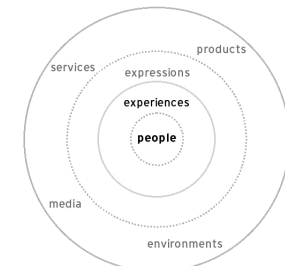


Figure 2: Conceptually putting people and their experience at the centre of our attention is a simple way of organizing and integrating ideas about design expressions of multiple kinds. While we cannot control people's subjective experience, we can adjust design expressions - the formal and behavioural qualities of design - to influence emotions and experience appropriately.

architecture, media and personnel. But even in these highly controlled situations it is too much to talk of 'designing experience'. Experience itself is personal and, though designers can influence it, it cannot be designed. Indeed many aspects of experience - those affected by people's internal states, moods, and idiosyncratic associations or by context - are independent of designers' control. But experience is also influenced by factors that designers do control: the formal sensory qualities, sound, smell, mass and texture and behavioural qualities, feedback, rhythm, sequence, layering and logic - all the expressive qualities inherent in the products, environments, media and services we design (see Figure 2). These formal and behavioural qualities influence people's experience in complex ways as they are interpreted through various filters of personal, social and cultural meaning. In fact, these factors influence people's experiences anyway, whether or not in the ways that are intended. For this reason it is critical that designers strive to understand as much as possible about personal, social and cultural influences and interpretations of design elements and their expressions. Only in this way can we be confident that we express design qualities and elements that appropriately shape and support people's experiences in intended and desirable ways. For example, to promote delight in the experience interacting with a simple product, designers can draw upon an awareness of people's ability to recognize and associate visual and kinaesthetic cues, carefully configuring elements and materials to lead people to behave in enjoyable and effective ways: see Figure 3. With more complex and sustained interactions too, a hospital emergency visit for example, designers need to develop the same kind of awareness of how design expressions can positively guide and influence people's behaviour and perceptions. This power to influence effectively people's experience through the quality of

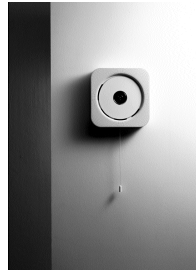


Figure 3: Designers' awareness of subtle details, cultural patterns and learned meanings in people's everyday behaviour can inform the design of intuitive and inviting interactions. A gentle tug on the cord of this CD player for Muji sets the disc in motion. The design expresses formal qualities and behaviour - its configuration, colour, material, visible spinning motion and pull-cord power switch - that build upon people's previous, but perhaps unconscious, interactions associated with extractor fans common in Japanese and European homes.

their interactions with the broader designed world is the great opportunity for designers today.

EVOLVING DESIGN PRACTICES

As with all new opportunities there come new challenges. Here are three key areas that are prompting developments within the practice of design as we take on this broader influence:

Understanding what matters. As outlined previously, to design with people's experience in mind we need to better understand what qualities matter to the people we are designing for and the ways that design can enhance their experiences. This involves learning about a broader range of activities, thoughts and feelings than when designing singular objects. Designers need to be more broadly aware of people's goals, aspirations, rituals and values; personal,

social, cultural and ecological contexts; the processes and interrelationships between different features, elements and objects within these contexts. These challenges are spawning new ways of acquiring relevant information to inspire and inform design.

Exploring design concepts. As a profession we have many well-established modelling techniques to represent design ideas, both to ourselves and to others, and to explore what it might be like to encounter and interact with things. But when we wish to investigate ideas as they relate to people's experiences within a broader physical, temporal and socio-cultural context, we stretch the limits of traditional object-centric modelling tools like sketches, renderings and foam models. We are beginning to develop new forms of representation for design ideas that enable us to examine design ideas in more dynamic, contextually dependent and multi-sensory ways that enable us to more fully explore design expressions that support human experience.

Communicating experiential ideas. Design teams nowadays frequently involve professionals from interaction design, industrial design, engineering, architecture, human factors, business, marketing and branding, each bringing unique and important skills and perspectives. Additionally, decision-makers within a client organization usually involve representatives of multiple business functions. Both to work effectively together and to enable sponsors to grasp the value of specific design ideas we are exploring more effective ways to communicate experiential ideas, through more dynamic, context-based and multi-sensory engagement.

The next sections elaborate on each of these challenges and describe examples of specific developments in design practice that begin to address them.

DISCOVERING WHAT MATTERS

Today's designers and clients are concerned with the quality

of experiences people will have. We want to know about what people need, what they will enjoy, how specific design attributes will make them feel, what will delight them and how, through design, their experiences might be enhanced. We need to consider multiple human factors issues of 'fit' - physical, cognitive, emotional, social cultural and ecological - as well as contextual factors and dynamic aspects relating to time and space. There are many methods now applied within human-centred design to help tackle these issues: ethnographic methods from anthropology, physical and cognitive task analyses, social network analysis and testing techniques adapted from experimental psychology. These science-based methods emphasize objective observation of people's behaviours and reactions to specific design scenarios. These are recorded and analysed to reveal important aspects of people's abilities, habits and choices as they relate to design and design attributes.

But to be really useful to design for experience, objective data is not enough. We cannot leap to design ideas from analysis directly nor can we observe people's thoughts and feelings - their motivations, emotions, mental models, values, priorities, preferences and inner conflicts. Yet we need to integrate these subjective phenomena, for it is these that make up people's experience and help us as designers to respond. We need to know, for example, not just whether people are able to use a mobile phone, but what attributes will ensure that they'll enjoy carrying it around with them and want to identify with it. Our subjective ability to make empathic inferences from objective data is a key component of understanding what matters to people at this more emotional level.

Ranging from the more objective to more subjective, here are four classes of methods for understanding what really matters:

- Learning from data, whether secondary sources or our own analyses
- Looking at people in context
- Asking people to participate
- Trying things ourselves.

An example of learning from data is the application of information about toothbrush handle size, shape and colour, derived from experimental comparisons of multiple prototypes based upon people's teeth-cleaning performance and expressed preferences. This provides useful design guidance but is inevitably restricted to specific aspects of the product and usage scenario. Such an approach by itself doesn't offer insight about the qualitative nature of the experience. For example the morning/night-time hygiene or beauty ritual, as an aspect of 'packing to go on a trip,' a personal element in the shared environment of the family bathroom are all missed factors that might give rise to new ideas about better support of the experience.

Methods that involve looking at people in context - for example by shadowing specific individuals as they shop for toothbrushes, go through their teeth-cleaning and other personal hygiene processes, organize their toiletries, etc - provide insights into many qualitative procedural and contextual aspects. But such an approach is heavily reliant upon pattern recognition and inference by the designer/observer to determine what is significant.

Asking people to participate, for example by documenting their experiences in photo-diaries, or making collages to express their feelings about specific activities and products reveals another level of concerns. Tools like these are informative in themselves as well as a starting-point for personal storytelling that helps participants explore and express their own perceptions. And for designers, such visual and narrative expressions provide rich texture about other people's physical and mental

worlds, making it much easier to appreciate what matters to them than through words alone. To explore more emotional concerns, these 'projective methods' that involve asking participants to create something from their own experience have both inspirational and informational power for design. This class includes methods such as cultural probes of a user group (Gaver *et al.*, 1999), collage-making, personal narratives, photo-journal assignments and cognitive map-making around the design topic. Rather than analysed data, it is often the raw images about real people, places and things, the maps or collages themselves and the unedited personal stories that best capture important insights in ways that design and client teams can relate to. There is a personal connection to these tangible artefacts that stir empathy so that we sense viscerally what matters to the people we study. Retaining the raw evidence as images,



Figure 4: The designer here is exposed directly to a patient's perspective by playing the role of a casualty in a hospital emergency department and reordering the patient's eye view. The method provided direct and sharable insight into emotional qualities of the experience, ranging from confusion about the identity of undifferentiated white-coated people to aspects of disorientation as the trolley was wheeled through corridors under blank ceilings.

stories and video for later communications and persuasion is important too.

Trying things ourselves helps us to begin appreciating other people's experiences more directly. Of course, we can't actually have anyone else's experience. But we can devise ways to approximate it and learn from our own experiences about how situations might be improved. Here there is no claim of objectivity. The approach aims to feed designers' imagination, by providing carefully selected and relevant experiences unlike those we are exposed to in our own everyday lives. Sometimes this might mean living with a prototype we've developed - sleeping and showering with a wearable medical device, for instance. Other times it might mean using props and role-playing to simulate different personal circumstances such as a child's bedtime teeth-cleaning rituals. One design project, for example, explored how hospitals might provide better service to patients and their families. Design team members took on patient roles (see Figure 4) and went through the preparatory phases of several different medical procedures. They were wheeled around the hospital on trolleys, left to wait in various places for periods of time and interacted with medical staff just as real patients would. These recorded 'patient journeys' gave the designers an embodied understanding of patients' concerns, sometimes evoking very strong emotions that directly inspired many ideas. Some ideas were easy to implement: a rear-view mirror on the hospital trolley, for example, so that patients could make eye contact with the person wheeling them around. Others involved systemic changes to provide patients with better access to information throughout the process.

Another advantage of these less objective methods, beyond the rich information and insight they yield, is their ability to help create shared experience and common reference points within a design team. This is a powerful

asset, providing the foundation for a common point of view among professionals of various different disciplines. Exercises involving design team members and clients directly in attending carefully to their own personal experience of a relevant situation through video- or photo-documentary are especially valuable at the start of a project. They are a way to establish mutual respect for each other's perspectives and help to form an initial team point of view.

Each of these four classes of methods has advantages and limitations such that in most cases it is valuable to combine methods and look for convergent patterns rather than rely upon a single technique.

EXPLORING DESIGN CONCEPTS

Sketching, modelling and prototyping are so basic to design that they are often assumed as evidence of 'designing' itself. They are all activities in which conceptual ideas are expressed and refined. They are the means by which ideas become tangible, shareable and evaluated - whether by designers themselves, their potential users, or their clients and sponsors. Designers' traditional sketching and modelling methods - pencil and marker sketches and renderings, wood and foam models - express static form and 'object-centred' information very well so that designers and others are able to consider and react intelligently to developing concepts.

There's an important distinction to make between the use of designers' 'insider' tools, for inventing and learning, and tools for communication of an idea to be shared with others. In the first case we use sketches as a kind of shorthand for our own purposes and for 'thinking out loud.' Most other people will be unfamiliar with this shorthand and the context that gave rise to it and so need a more explicit form of representation. For example, the speed and pressure of a designer's hand gesture with a pen on paper produces a specific line quality that in the moment, and to

others present, can clearly represent a particular kind of material behaviour, resilience or tactile surface quality of, say, a beverage container. But to outsiders this subtle gesture would most likely have no significance and so would require kinds of model to communicate such behavioural qualities beyond the team.

Traditional modelling tools are limited as a means for exploring and understanding people's experiences with the things we are designing. Experience and emotional responses to the designed world are dynamic. They occur in time and space, through the flow of people's actions as they engage in activities. As designers begin to explore experiential qualities of design, we are devising ways to go beyond static representations and object-based descriptions to more dynamic and contextually relevant forms.

Many designers now employ representations such as storyboards and user scenarios as simple cartoon-like sketches or video to capture and explore dynamic and contextual dimensions too. These representation techniques are now well-embedded in design practice. Further developments are occurring as these time-based techniques are taken to an experiential level: scenarios are walked through and acted out with simple props by designers and other participants; dramatic improvisations are developed to explore how specific design elements might affect people's responses in context (Buchenau and Fulton Suri, 2000).

One key purpose of these activities is to explore possible solutions in an insider fashion, directing ourselves as designers towards more informed design of the components which will contribute to people's experiences. Much of this takes the form of a kind of 'experiential sketching' that is valuable for the team in generating and refining ideas, but not yet designed to communicate to an audience. For example, in the early exploration of ideas for a passenger aircraft interior, the design team ran a series of body-

storming explorations within a full-scale foam-core environment simulating the plane interior. Using props such as chairs, readily available in the studio, the team enacted various social situations and activities - such as sitting and reading, sleeping and talking to a travel companion, receiving and eating meals - brainstorming issues and solutions as they created and experienced different arrangements.

In addition to generating ideas, in the early stages of a project, often radically different design directions need to be compared. Again, ad hoc engagement with analogous objects can quickly guide decisions about what kind of experience is appropriate, much more effectively than explorations of sketches or hi-fidelity models. For example, in designing a three-axis control device for a remotely operated vehicle (ROV), the team explored three different potential directions. They used a palm-sized pebble, joysticks on suction pads and the surface of a skateboard to examine respectively finger, hand and full-body control; see Figure 5. Exploration with these relatively crude props was a powerful way to unveil the nuances and implications of



Figure 5: What is the appropriate sketching medium to enable immediacy in design thinking when the goal is to achieve specific experiential and affective qualities? To explore ideas about controlling a remotely operated vehicle, designers simply 'played' with this carefully chosen collection of everyday objects to feel qualitative differences in the experience of different kinds of control.



Figure 6: A print of a photo of a painting by Rene Magritte that he entitled 'La Trahison des Images'. Despite appearances, he warns us that this is not a pipe; we cannot smoke, fill, chew, smell or tap it. A two-dimensional image cannot fully communicate the breadth, depth and richness of experience with its multiple sensory, time and spatial dimensions. Each particular direction very early in the design process. It is interesting to speculate how the use of these experiential sketching tools, and breaking away from the early use of more traditional tools, may influence the ultimate outcome of a design project. Certainly such non-traditional modelling tools offer new constraints and the opportunity for immediate discovery, allowing experience-grounded idea generation and refinement right from the outset of a project.

COMMUNICATING EXPERIENTIAL IDEAS

The power of two-dimensional visual images is so strong that Rene Magritte, exploring the nature of art and reality was inspired in his 1929 photo-realistic oil painting of a pipe, shown in Figure 6, to inform us that 'this is not a pipe'. His painting's title translates as *The Treachery of Images*: we must guard against the power of images confusing us into believing that we are experiencing reality. This seems like an appropriate cautionary note for design practitioners. The primary tool we use to communicate ideas is visual imagery. What does this mean when we want our audience to understand and appreciate more about the quality of the experience it engenders, than about the

static visual qualities of an object?

As designers concerned with people's experiences, our goal in communication of design ideas is to let a client, a design colleague or a user understand its subjective experiential value. This might be with the intent of testing ideas to improve them or of persuading an audience - for example, that an idea is compelling or that a chosen design direction will be problematic. Clearly we need to introduce aspects of time, space, context and multi-sensory experience beyond that which can be accomplished by the traditional two- and three-dimensional communication tools.

Again, time-based prototyping techniques such as storyboards, working demonstrations, video-dramatizations and screen-based simulations are being used increasingly by designers to communicate experiential aspects of design. As these multimedia tools become cheaper and simpler to use, designers can tell increasingly well-produced stories about people's experiences to make the case for designing specific elements in particular ways. For example, in designing diagnostic tools for use by automotive mechanics, one design team created a half-day event that literally took their client audience on a journey. The audience was toured through a real physically staged garage, complete with cars and oilcans to set the scene. They walked past banners showing images of potential users and selected quotes that conveyed their values and aspirations. They were shown video clips from field interviews with craftsman-technicians about functional and emotional aspects of their work, reviewed an exhibit of everyday artefacts that revealed key design principles, and shown a mocked-up advertisement for the system before finally the design models of the products themselves were revealed.

Such rich contextual information - about users, usage contexts and emotional qualities that lead to design solutions - is certainly powerful. But such methods still

rely upon a mainly passive audience staying engaged and buying into the intended message. There appear to be major advantages in going a step beyond this and exploring communication tools that build upon an audience's ability to make discoveries themselves through direct experience. To quote the Chinese philosopher Lao Tse: 'What I hear I forget. What I see, I remember. What I do, I understand!'

This adage implies that there is additional value in communication methods that allow an audience to 'experience it themselves' rather than witnessing a demonstration or someone else's experience. Given that experience is, by its nature, subjective it is not surprising to discover that a good way to understand the experiential qualities of an interaction is to experience them subjectively. A classic example that demonstrates this is an early project on digital photography. The goal was to help a client envision what digital photography might be and to design both a camera and complete system (including picture storage, retrieval, manipulation, etc.) A breakthrough in communication came when the designers built an



Figure 7: To communicate selected experiential aspects of the design concept for a digital camera, this prototype sacrificed appearance, weight and scale. Instead the effect of quality and speed of response of on-screen imagery on users' experiences were directly communicated to the audience members who were able to experience these dynamic behaviours themselves.

'experience prototype' based on their proposed interaction design specifications. A small video camera was attached to a small LCD panel that was encased in a box - see Figure 7. The size of the LCD panel was determined by the desired resolution available in an off-the-shelf component, rather than by the desired physical size. The point was to maintain the key aspects of the proposed user experience, not the appearance of the device. In fact, the prototype bore little resemblance to the intended product in any of the usual attributes of a design model - its shape, form, size and weight were all incorrect and there was a thick cable running from the camera to a computer where all the processing occurred. The prototype had a live video-feed and captured still photos with audio annotations in real time. Response time was a critical component of the user experience and so the prototype was designed to make it easy to fine tune to show the client the impact on the user experience of slowing it down. Though there were many cost-driven pressures to reduce the resolution and the speed of response in the final product, the prototype - by embodying qualities of the user experience that everyone could appreciate - enabled the client company to resist such changes. This demonstrates well the communication power of providing a decision-making audience with direct hands-on subjective appreciation of experiential design ideas.

CONCLUSIONS

Clearly there are wide-ranging opportunities for designers to exercise much greater influence on the designed world. The demand is to build out from the design of objects themselves to design with a more extensive consideration of people's current and desired experiences involving products, services, environments, media and hybrid offerings. One of the design profession's major strengths is the ability to create tangible expressions of ideas and to invent and

exploit new tools; this is the key to addressing the demands of working in this expanded territory. Our success will depend upon a continued evolution of design tools and methods to overcome the limitations and inherent blind spots within traditional methods. The more that explorations and representations of insights, evidence, design ideas and final concepts can be made experiential in some way, the more all parties - team members, clients, decision makers and users - will be able to grasp how the representations relate to other people's experience. This fundamental design ability will be exploited to its full by continuing to pursue new methods of discovery, prototyping and communication that enable us to better support human experience.

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Jane Fulton Suri leads human factors design and research at IDEO, the international design consultancy based in California. With degrees in psychology and architecture, she first worked at ICE Ergonomics in Loughborough, leaving to join an industrial design company in San Francisco which merged with others to create IDEO in 1991. Since then she has pioneered their human-centred approach, evolving the use of empathic methods and experience prototyping in design of products, environments, services and media for clients in multiple industries. She continues to build and develop the practice, leading the company's now sizable international community of human factors professionals and other designers on both strategic and tactical projects. Her work has been recognized by several design awards including IDSA/Business Week and Industrie Form Europe. She is also a regular visiting lecturer at Stanford University, the Hass School of Business at U.C. Berkeley and the California College of Arts and Crafts.

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