

Pas de deux The dance of digital design

by Kevin Brooks, PhD

Is it possible for the relationships among users and digital technologies to transcend the personal to become intimate? Kevin Brooks is convinced it will happen and describes how “storytelling” will be the heart of such a transformation. He foresees multi-functional devices that respond to tasks with knowledge of their owners’ desires, needs, and contexts. He also imagines interfaces designed to reflect a variety of interactive styles.

We are constantly looking for ways to manage the growing complexity of our computer experiences. Software developers weave increasingly more features into already bloated applications because... well, because they can, and because competition demands that they do so. Human interface designers, as members of development teams, would like to temper these ever-exploding feature sets with smarter interface tools to make life easier for computer users. Examples of this range from the simple floating tool palettes used in Adobe Photoshop to the complex intelligent interfaces and interface agents that are slowly making their way out of the academic labs and into the commercial marketplace. The dilemma is that easy software sells better than difficult software, but feature-rich software sells better than feature-poor software. See the problem?

Some of the “new” solutions to this dilemma of increasing complexity are



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actually as old as the hills. Humans have been expressing themselves and interacting with each other for millions of years. There really is nothing new under the sun—just stuff we forgot. As designers and consumers of digital experiences, we can find answers to digital interface complexity in the physical and the familiar. We can look to the methods and metaphors we as humans have always relied on. We can use the softer elements of our humanity to design the harder mechanisms of our technology. It requires, however, a careful choreography.

When I was a film student, I viewed many films that were described as fine examples of the production craft. More than once, we were shown a black-and-white “experimental” short film in which two brightly dressed ballet dancers glided through a frame that was otherwise entirely black. It was a stark and simple scene showing elegant choreography and coordination

between a male and female dancer. Directed in 1968 by Norman McLaren, *Pas de Deux* (dance of two) won many awards—not just for its amazingly beautiful camerawork but also because McLaren used the film to violate our established notions of human body movement and our rigid sense of time with its use of surreal multi- and after-image visual effects. As the dancers moved, their ghostly images multiplied, leading, as well as following, the main image of their bodies in a series of duplicate likenesses, underlining quite brilliantly the title of the piece. Though superficially the *pas de deux* was danced by those two people, the real dance was between the audience's expectation of dance itself and their changing conception of spatial and temporal representations of movement. Seeing the multiple body images made one think differently about moving in time. The film's special effects blended with the dance itself.

Technology joins the dance

There is a *pas de deux* between digital technology and design. From its earliest beginnings in the military technology of the 1940s and '50s to its rebirth with the personal computer of the 1980s to its re-birth with the commercialization of the Internet and the exponential growth of computer architecture in the 1990s, digital computing has been a dancer whose movements touch all our lives.

Eight years ago, I would snicker to myself when someone's cell phone rang while riding public transportation. "If he can afford a cell phone," I presumed, "then he can afford a car. Why is he riding a bus?" Now that cellular telephony is so inexpensive, not only is it common to see people on the phone while on the bus, but you can also see them on the phone while doing their grocery shopping. If the grocery store is out of snow peas and you're thinking spaghetti instead of stir-fry, you can always check in with your spouse via the phone just before stepping into the checkout line. Where once trips to the bank or post office were planned parts of a day's schedule, today trips to the ATM, use of an ATM card at a point of sale, and e-mail to and from friends and family are so interwoven into our daily schedules that we hardly notice them anymore. Transferring hundreds or thousands of dollars in and out of bank accounts within a single day, without ever seeing an actual dollar bill,

is no longer the province of only the very rich. By electrifying and computerizing our concept of money, we have changed the fabric of our lives—we have evolved the dance of our lives. We can still identify the steps as from a century ago (money, written and verbal communication, and so on), but the dance is new.

In the western world, business, entertainment, and even family communication, is increasingly dependent upon electronic technologies, such as personal computers, cell phones, personal digital assistants, and the Internet. We are starting to see our world as - simply a collection of nodes: callable, e-mailable, and ping-able. This technological influence is spreading, breaking through the former boundaries of justification for technology's presence—boundaries of population density and, to some extent, market value. Cell phones can now call and be called from what used to be known as remote landscapes. When Motorola's Iridium satellite system was operational for public use, it was possible to place a call with the nearest cell tower hundreds of miles and several local cultures and dialects away. Remote is no longer remote. Special interest research groups, such as LINCOS¹ and MIT's eDevelopment,² help the electronics industry redefine their traditional measure of market value to include developing nations and communities.

Let us consider the telephone—a device so common that few people are aware of the underlying technologies that make it work and the technological changes it has undergone. What we have been aware of is how the phone has changed on the outside—its changes in interface. We were aware of the change from party line to private line; we were aware of the change from rotary to touch-tone; we are aware of the option to roam cordlessly within our homes while on the phone; and we are aware that we can also roam wirelessly through the streets and highways while on the phone. In all that time and throughout all that underlying technological evolution, the only substantive

1. See the LINCOS (Little Intelligent Communities) Project at <http://www.lincos-infocomm.net/>.

2. The eDevelopment research group invents systems that empower, enrich, and interconnect developing communities. See its Web site at <http://edevdevelopment.media.mit.edu/>.

interface changes have been from the party line hand crank to the rotary dial to the touch-tone buttons. Sure, any of us now can place a call while merging into 65-mph traffic (though the more responsible of us avoid doing so), but the way we place that call basically has not changed since the introduction of touch-tone almost 40 years ago.³

But let us now think beyond the telephone to the personal computer, and then beyond the PC of today, which really struggles to provide any sense of personal-ness at all. The PC of today

is more of an impersonal device, scarcely more personal than its room-size, mega-heat-generating predecessors. It is personal only in the sense that we can own one and, to some limited extent, dictate how parts of the interface appear, but that's all! For humans to be truly able to dance with digital technology, we need to design technologies that provide experiences that bridge cultures, languages,

currencies, and ideologies. Smart means different things to different people. Tool means different things to different people. Therefore, the possible permutations for Smart Tool are mind boggling. How do we approach this issue? What universal tools, methods, or approaches do we have that span such wide landscapes?

Personal stories

Perhaps it is our notion of the word *personal* that holds us back. Instead of personal digital technology, what we need is intimate digital technology. Intimacy includes a closeness, a collaboration toward a common goal, a persistent awareness and profound knowledge of the other. More important, intimacy includes a common story. We can tell the story of our intimate friendships. We can tell the story behind our intimate objects. To be intimate goes beyond ownership—it means fit, function, acceptance, and definition. People define themselves in part by the intimacies in their lives.

Why not work toward intimate computing design—a digital experience founded on stories?

This is possible because stories and storytelling are largely about two things: culture and structure. It is impossible to have a story without at least a small amount of both culture and structure, two complex and intertwined elements. As storytellers and authors Norma Livo and Sandra Rietz put it, “Story structure is not an accidental or idle invention, but the profound product of a culture’s evolved perceptions of the way the universe works.”⁴ Stories represent a means of approaching design, whether digital or otherwise, in a way that incorporates and integrates human experience, expression, thought, and feelings. When you ask for someone’s story, you get it all, bundled together in a tight package. Inside that package are the reasons why he or she does things, and these reasons hold the keys for designing tools.

The use of stories, story collection, and story creation is nothing new to the development and design process in business. The typical business uses of stories can be categorized into two types, which for the sake of argument are admittedly simplified: design/marketing stories and engineering stories.⁵ Design/marketing stories are stories that are typically collected at the front end of the product design process; they are the type most commonly used by designers. To collect these stories, design and/or marketing teams seek out an appropriate cultural cross section of the population and either ask these people a series of questions about their lives or follow them around for some period of time, observing their behavior. The thinking is that if a set of people who fall into a desired marketing segment demonstrate a clear need for a particular device, service, or method of using a device, that need will help create a clear design direction and R&D mandate.

An engineering story is one that happens farther along in the research and development

3. See M.J. Flynn’s history of touch-tone telephones on the AT&T Web site: (<http://www.att.nl/technology/history/chronolog/64touch.html>).

4. N.J. Livo and S.A. Rietz. *Storytelling—Process and Practice* (Littleton, CO: Libraries Unlimited, Inc., 1986).

5. It should be noted that an organization’s legal department participates in a third type of storytelling. But this is the topic of a different journal article.

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process. Engineering stories typically have a technological foundation and are used to wrap illustrative context around technical ideas. When some sort of technological device or method has been created or is fairly far along in the technical thinking process, stories are created, perhaps as text, perhaps in storyboard form, perhaps as visionary videos, to demonstrate the ideas behind the new device or method. These stories are created to justify the project's further support within the company and are often shown outside the company to impress customers, potential customers, and the public at large as an example of foresight and innovative thinking.

Each of these two types of stories has its place. Each can support well-targeted design and development efforts to inspire designers

and engineers alike. But what if the devices or technologies we are telling the stories about knew their own stories? What if the technology could tell its own story? What if the technology knew some of its owners' stories?

This may sound like the ramblings of a lunatic. Why would I want my cell phone to have the ability to tell my story? Good question. Actually, this is not about cell phones. Instead, think about a device that one could carry around that offers multiple functions: mobile phone, appointments, address book, text messenger, note taker/recorder, music player/recorder, health monitor, news and weather monitor, location finder, shopping assistant, wallet, home security monitor, dictionary, language translator, emergency beacon, and so forth. Such a device could be integral to our lives. As digital electronics get smaller, as power requirements diminish, and as power sources become smaller and more technically sophisticated (using alcohol-based fuel cells, for example), more functionality will fit into smaller packages. While it is not likely that anyone would want a cell phone to "know" about his or her life, it might be handy to have a device that can arrange travel, negotiate prices for desired items, and have enough access to personal health information to be able to consider, for instance: Because of the injury last month, a bulkhead seat would be better for that flight to Denver. The recently purchased lumbar support travel pillow will fit in a coach seat.

This is an example of a simple scale-up of current technology. One might even call it an intertwining of technologies and story. Trees that grow from saplings side by side occasionally intertwine. Sometimes, as they grow, they merge into one tree. Other times, they somehow avoid merging but instead remain two distinct but intertwined entities. The device I've described above strikes me as an example of intertwining: The seams are still visible.

Story storage

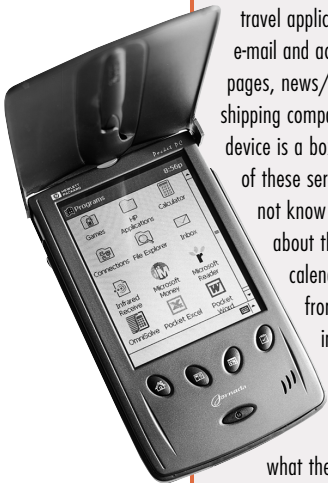
Going further: What if a device that could perform all those functions mentioned earlier could store dates, events, names, activities, and other notable details of one's life as they become available during its normal usage? And what if this device did not store these details in a database, but in a storybase, applied with the

From Box to Butler

With popular palm-top computers from manufacturers that include Casio, Compaq, Hewlett-Packard, and IBM, and particularly with the Palm operating system used by Palm and Handspring, people can now carry around small devices that act as electronic boxes. In these boxes, we can stuff address book information, notes, personal calendar information, and travel applications. With wireless networking, we can use e-mail and access large-database applications, such as yellow pages, news/weather services, package-tracking services for shipping companies, and even personal financial services. The device is a box of cool software and useful services, but few of these services are integrated. The objects in the box do not know about each other or have any intelligence about the user. For instance, on my Palm VII handheld calendar program I can enter my travel appointment from Boston to Chicago, including all the flight information. I can enter my meeting appointment with Ken, my manager, scheduled to take place one hour after I land. I can also book my flight and check on departure delays. But what the device will not do autonomously is check on departure delays knowing that if my flight is delayed, my meeting with Ken will need to be changed. In other words, it does not have a concept of Ken and his role in my life. When I ask it, my Palm can find Ken's contact information, but it will have no understanding of why I would want it.

Our lives are a series of intertwined strings connecting the people, events, and data of our experiences. We are forced to break down these strings to suit the interface needs of our devices. Instead of a box, we require a butler—a clear, intelligent, helpful voice from this tangled mass of strings. *Flight delayed 30 minutes. Important meeting with Ken in jeopardy. Ken's phone number is...* These are pieces of a life's narrative intelligently put together and expressed as a simple story.

* Photo courtesy of Alloy Total Product Design with HP (Singapore)



technical creativity of artificial intelligence?⁶ In other words, what if a device we carried around learned pieces of our lives in such a way as to make it possible to resequence the pieces into as many useful constructs as needed? Just as stories can be told and retold differently many times while maintaining their basic truth, so too can our lives be represented in many ways using the same set of details.⁷ If we can start to see the use of digital technology as telling a story of life—daily, weekly, monthly, yearly life—then we can start to design with the required sensitivities to go beyond handsets, keyboards, and other older interfaces which, though they are functional, lash us to a conservative way of thinking about interface and computing.

We know how to simply bear functional but cumbersome technology, though few of us can say we like it. We know how to simply live with inconvenient technology. But what if we could dance with technology—leading, following, gliding, creating together? Designer and professor Hiroshi Ishii of the MIT Media Lab would like to teach us how.⁸

Professor Ishii's Tangible Media Group researches and designs beautiful devices that blur the line between bits and atoms. Their goal is for the two to blend together seamlessly. One of their projects grew out of a story about Ishii's mother. Although she was not a computer user like her son, she was a fabulous cook. Her son would watch her in her kitchen, collecting bottles of spices and other ingredients to create the exact taste she had in mind. Professor Ishii's project created glass bottles that held information—in audio form. To get at the information, all one had to do was pull the stopper off the bottle. To hear the weather forecast, for instance, you could open the weather bottle and hear the sound of rain, or the sound of a clear day as represented by singing birds. In another version, which Ishii called *musicBottles*, each of the three bottles in the set held the jazz performance of a single musical instrument. Opening and closing the bottles added and subtracted instruments from the performance. Most recently, Ishii's student, Ali Mazalek, adapted the bottles to hold stories—actually, to hold “genies,” who would tell their own stories, but whose stories were affected by the presence or absence of the other genies.

Professor Ishii and his students seek the dance, the *pas de deux*, of digital technology and

natural, tangible, human-oriented design. We are learning to do this at Motorola, as well. It is a challenging dance to choreograph, requiring diverse skills and unique vision. But to get to that next step, at which we are not just lugging devices around with us, but utilizing and coordinating with our digital partners, we need this kind of vision. This is why in the User Experience group of Motorola Labs there is a cognitive scientist, a consumer psychologist, a cultural anthropologist, and myself, a storyteller. In our Cambridge, Massachusetts Advanced Design Center, there are user interface people collaborating with people in advanced product design, business development and alliances, and venture capital. The dance requires many different types of participants. Choreographing this dance requires an ergonomics not just of body, but also of mind and spirit. It requires thinking about the activities of our lives as intimate stories—not as a set of functions we routinely perform, but as a structured way in which to view the world. If we can embrace our humanity as technologists and choreograph our technology as designers, then none of us will ever need to fear the advance of technology. We need only learn the dance. ■ Reprint # 01122BRO10



musicBottles created by Professor Hiroshi Ishii of the MIT Media Group.

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6. See, for instance, Vladimir Propp's *Morphology of the Folktale* (Austin, TX: University of Texas Press, 1968), Edward Branigan's *Narrative Comprehension and Film* (New York: Routledge, 1992), and Seymour Chatman's *Story and Discourse—Narrative Structure in Fiction and Film* (Ithaca, NY: Cornell University Press, 1978). For more on artificial intelligence, see Pattie Maes' *Behavior-Based Artificial Intelligence* (Second Animat Conference on Adaptive Behavior, Hawaii, 1992), Roger Schank's *Agents in the Story Archive* (Chicago: Northwestern University, 1992), or Selmer Bringsjord's "Chess Is Too Easy," *MIT Technology Review*, 101: 23-28.

7. K. Brooks, "Metalevel Cinematic Narrative: Theory, Process, and Tools," MIT Media Laboratory, No. 218, 1999.

8. See his Web site at: <http://tangible.media.mit.edu>.