

Innovation in the Design of Socially-Enabled Products

Silvan Linn

Carleton University School of Industrial Design

1125 Colonel By Dr. Ottawa, ON K1S 5B6

slinn@connect.carleton.ca

ABSTRACT

Discusses the emerging phenomenon of socially-enabled products and their role in enhancing human social interactions, from an industrial design perspective. Human society and human technology are inseparable, and technologically advanced socially-enabled products are a logical step. The concept of a socially-enabled object can be divided into two aspects: society as enhancer of technology (a technological object or interface is enhanced with human social cues); and technology as enhancer of society (technological objects provide or mediate social events). The case of a product that falls into both categories is also considered. For objects or products to become deeply integrated into human society, the creators must take into account sociological, physiological, cultural and technological factors. Industrial designers are ideally suited to this task, being experienced in both user-centric design and the integration of psychology and technology. Industrial designers working today should consider the possibilities of socially-enabled products.

Author Keywords

Social technology, socially-enabled product, smart device, industrial design, innovation, design opportunities, mediated social interaction

INTRODUCTION / BACKGROUND

Humans are inherently social creatures. Indeed, human social behaviour is far more complex than that seen in any other species. We are also inextricably linked to our technology, unable to survive without it for as long as recorded history can show. It has been said that these two features of humanity are what defines us as a species. It is impossible to completely separate human technology from human society.

Practically everything we make has some social component to it. A product can have an explicitly social purpose (for

instance, a cell phone); it can have multiple purposes (clothes provide covering, but are also probably the most important passive social vehicle); or it can merely serve as a status symbol (a sports car). It is inevitable that the areas of technology and society will become tied even more closely together in the future than they are today. The concept of 'social technology' is old, but always on the cutting edge of research.

With the availability of exponentially increasing computing power and ubiquitous data networks, and the increased speed and decentralization of society, the industrial designer has the opportunity to create a whole new class of products. 'Innovation' is the creation or introduction of something new; these smart, socially intelligible and intelligent products can bring together psychology, sociology, art and technology in a way as never before.

CURRENT RESEARCH

The current state of the art in technological-social integration focuses primarily on using highly advanced technology to build 'smart' devices that are capable of understanding the various subtleties of human social cues. However, they are often lacking in context, or represent only a proof-of-concept implementation. Other projects focus on using simpler technology to fill a more worked-out social area; for instance, representing complex data in a more immediately understandable format, or digitizing and transmitting an ephemeral social event such as a kiss.

There is a myriad of papers written on the subject of social computing, but the area of social products is smaller. Nevertheless, a fair amount of prior research is available. Society is just now approaching the point that smart products have the required power, size and data access for truly socially-enabled products to become a reality.

This type of research bodes well for the future. As products become more and more socially active, they will become more natural to use and open up new modes of social interaction, benefiting consumers, businesses, and society as a whole.

THE SOCIALLY-ENABLED OBJECT IN HUMAN SOCIETY

Due to the inherently chaotic nature of human society, future innovations in socially-enabled technology are impossible to predict; it is like trying to predict what the clothing fashions will be ten years in the future. However,

there are certain areas that can be expected to play an important role. These will be discussed below.

Depending on the interpretation, there are two opposite aspects of the term "socially-enabled product" that may be considered.

Aspect 1 — Society Enhances Technology

Society can be used as an enhancer of technology. That is, objects can be developed that utilize humans' pre-existing shared social cues, allowing interaction with the objects in a social manner. Examples of said social cues include speech recognition and synthesis, including intonation; touch, specifically socially detailed haptic cues; and facial expressivity and body language.

Products that draw on these shared social cues have the potential to be extremely user-friendly and intuitive. For instance, products could convey great amounts of data in a compact way by using subtle, nuanced touch input/output. So far, haptic interfaces have been limited to gross actions (a mobile phone's vibration is comparable to an auditory system making a simple beep), while the fine resolution of the human sensory system has been used exclusively in an intimate social context. Leveraging this added detail could make products simultaneously more intimate and intuitive, allowing the user to connect more fully with the item.

Haans and Ijsselsteijn [9] describe some of the possibilities of advanced haptic (touch) interfaces. They note that "many forms of physical contact have acquired a culturally shared symbolic meaning", and that modern electrotactile sensors can produce stimuli as diverse as temperature, wetness, tingling or itching. [9] The resulting enrichment of the haptic channel allows it to carry detailed data across language or cultural barriers.

Another, more whimsical, example of a socially-cued product is Kelly Dobson's Blendie. [4] Blendie is a 1950's blender (see figure 1) with a novel voice-control system. In order to control the blender's power level, the user must imitate the sound of the motor running at the requested speed. The user will make a low-pitched whirring for low speed, and move up to a high-pitched scream for the maximum power. In the artist's words, "The experience for the participant is to speak the language of the machine..." [4] Furthermore, when the blender is not in use, it randomly activates its motor at varying speed levels, in a simulation of 'talking'.

The exact implementation of this interface, while highly entertaining, is probably not viable for a consumer product. The observation most relevant to industrial designers is the sheer transparency of the Blendie interface. There is no training required for its use, and the interface does not presuppose any cultural standards or require competency in any specific language. All the user must do is listen to the blender and attempt to imitate its sounds. Toddlers, and

even some infants, are quite capable of this task. By tapping into species-wide social knowledge and abilities, the user-object interaction can be made vastly more intuitive.



Figure 1. Kelly Dobson's Blendie. From [4]

One of the more significant current "goals" in socially-enhanced technology research is to create an anthropomorphic robot that can interact with humans on a natural level. It remains to be seen whether this is a viable approach — it may be that people respond better to a single-purpose intelligent device than what amounts to a robot servant. In the meantime, research such as that demonstrated in the aforementioned projects can be implemented to significantly improve products and user interactions.

Aspect 2 — Technology Enhances Society

Technology can be used as an enhancer of society. That is, objects can be developed to mediate, facilitate, or generate social interactions and events. Historically, there has been more research conducted in this aspect of social technology; however, this research is generally more product- and technology-centered than user-centered.

One of the most extensively researched areas involves the enhancement of existing social interactions. Examples are common; one might be the Hug Shirt (see figure 2), which uses tactile information channels (pressure and temperature) to allow users to transmit a virtual hug over a cell phone connection. [10]



Figure 2. Hug Shirt. From [10]

The transmitting user's actions are digitized and transmitted over the cellular connection, and a recreation is initiated in the receiving user's shirt. A full duplex system could allow both users to experience the hug mutually.

Liu and Donath, in *urbanhermes: Social Signaling with Electronic Fashion* [12], present their technological take on the classic social product: clothing. The *urbanhermes* project is described as a "communicative social accessory". [12] Messenger bags are modified with embedded displays and short-range RF networking abilities (see figure 3), allowing two events: The bag's appearance can be updated at will (allowing for effectively infinite customizability, by displaying any digital image) and, more importantly, two bags can communicate information about their respective images (the image's source, for instance) to each other. User scenarios describe events such as bags signaling their users when another user with similar fashion sense is in the area. The bags can also intentionally modify the image based on nearby data or the user's actions; this feature has deep implications for the mediation of social interactions.



Figure 3. urbanhermes bag. From [12]

Dual-Aspect Products

There also exist possibilities for products that incorporate both aspects of the social technology concept. For instance, Kaliouby, Teeters and Picard [11] describe a device that uses research on human emotion and social cues to assist people with Autism Spectrum Disorder in social communication. The device would use biometric sensors to interpret a range of human emotions (which those people with ASD may be unable to display in a socially acceptable manner), then behave as a social surrogate. The device is able to both read and display subtle social data (aspect 1), but it is used to enhance social interactions (aspect 2).

Another example of a dual-aspect product is the *Conductive Chat* system developed by DiMicco, Lakshmiopathy and Fiore [3]. This system uses a galvanic skin response (GSR)

sensor to emphasize or understate text in an instant-messaging program based on the user's physiological response to systems. If the user's emotional state is raised (anger, passion, stress), the text becomes larger and shifts to an increasingly reddish hue (see figure 4). Conversely, if the user's emotional state is steady and neutral, the text they send will be small and monochromatic. This prototype uses an unconscious biometric (GSR) to apply emphasis to text in a natural way; rather than the user adjusting their settings to correspond with the intended tone, the system applies emphasis automatically. The system is enhanced by a social cue (the user's emotional state), and simultaneously enhances a social interaction (instant messaging).

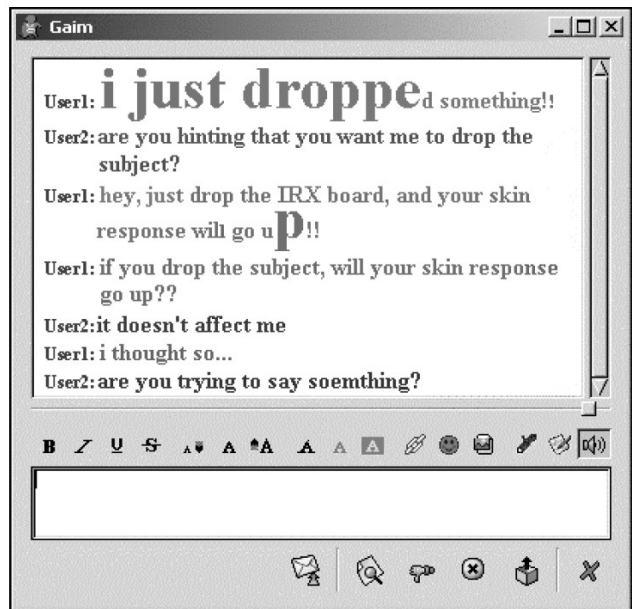


Figure 4. Conductive Chat window. Large text would normally be reddish, smaller text brown to black. From [3]

Other research that falls into this area discusses a new way of presenting existing data, using a social context or metaphor as the medium. Many examples can be found in publications by the MIT Media Lab's Sociable Media Group. [16]

THE ROLE OF THE DESIGNER

Human society is on the verge of a socio-technological explosion. While our technologies have always been at least partially social in nature, the examples cited earlier in this paper represent only the leading edge of possibilities; current developments will allow technology to intertwine with society in an almost symbiotic manner. This is perhaps the most culturally powerful form a product can take. The vast impact that a socially-enabled product can have can be seen today in, for instance, the near-universal use of mobile phones and MP3 players. Social etiquette changes as people listen to their friend with one ear and their iPod with the other; expectations of others change as everyone gains the ability to be contacted at any time and place.

Socially-enabled products are more than just electronic devices. From the designer's perspective, all of the usual requirements (aesthetics, manufacturability, etc) still apply, but the central feature of the socially-enabled object is the user's experience. Since the product can have such a vast impact on the society it is released into, it is crucial that the experience be carefully fine-tuned to be as positive as possible; this requires keeping in mind all relevant psychological, sociological, cultural and technological conditions. A smart, socially-enabled product with a poor implementation would cause more problems than its worth.

Industrial designers are uniquely suited to the creation of a socially-enabled product. The designer (or team of experts; there is no reason that the design process must be carried out by a single individual) has experience bringing together disparate disciplines in a way that is well-integrated and beautiful; he is an expert at combining the social and technological. Furthermore, the industrial design profession already focuses heavily on people and their experiences with products. Expanding from product design to 'social experience design' is a natural step.

Most of the existing socially-enabled products are 'push'-modeled prototypes, focusing on the functionality of advanced technologies rather than on how the technologies could be best used to help users' needs. The importance of this research cannot not be overstated; it is crucial to have a good understanding of the technology before proceeding with implementation in a consumer product. Nevertheless, the industrial designer can take this basic research and think of innovative new uses for the technology. The industrial designer (or team) will generally also have experience bringing products to market; our social nature is an ingrained part of being human, so the appeal of socially-enabled devices can be expected to be enormous.

CONCLUSION

It is impossible to separate humans from either their technology or their social nature. Technology has always had social aspects, but modern developments (in the use of society to enhance technology, or vice versa) are laying the groundwork for a revolution in the connections between the two areas. The industrial design profession is well-equipped to take this research and apply it in the design process.

All these factors point to a simple, far-reaching opportunity for the industrial design profession: to usher in the creation of an entirely new class of innovative, world-changing, socially-enabled products. Industrial designers would do well to keep a close watch on this area in the near future.

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