



# Persuasive Technologies

Now is your chance to decide what they will persuade us to do—and how they'll do it.

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**B. J. FOGG, GUEST EDITOR** Persuasion has always been part of the human experience. From ballads to bible stories, parents to personal trainers, people have always sought to influence others' attitudes and behaviors. Although many of us resist the idea of being persuaded, most of us seek skilled persuaders for ourselves and our significant others.

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Can computers persuade? Yes they can. And like the human persuaders in our lives, persuasive computing technologies can bring about constructive changes in many domains, including health, safety, and education. In the process, computers can help us improve ourselves, our communities, and our society. But persuasive computers can also be used for destructive purposes; the dark side of changing attitudes and behaviors leads toward manipulation and coercion.

In order to achieve the potential and avoid the pitfalls of persuasive computing, a small but growing group of ACM members has been exploring the theory, design, and analysis of computers as persuasive technologies—an area we call “captology” (based on an acronym derived from Computers As Persuasive Technologies; see [www.captology.org](http://www.captology.org)).

To be sure, not all technologies are persuasive; in fact, only a small subset of today's computing technologies fit this category (see Figure 1). As we see it, a persuasive computing technology is a computing system, device, or application intentionally designed to change a person's attitudes or behavior in a predetermined way. This point about intentionality may be subtle but is not trivial. Intentionality distinguishes between a technology's side effect and its planned effect. Captology focuses on the planned persuasive effects of computer technologies.

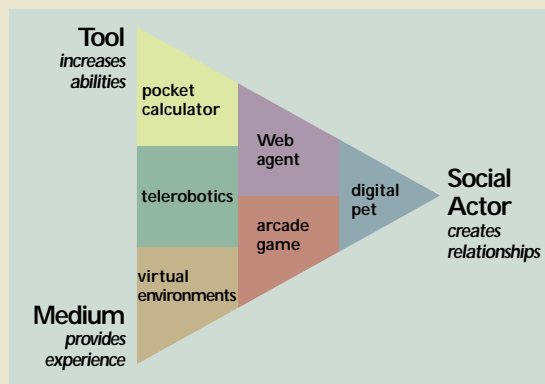
As you'll see in this special section, examples of persuasive tech-

nologies include a computerized doll designed to motivate responsible sexual behavior, a CD-ROM that persuades kids to eat fruits and vegetables, and a virtual social environment that increases safety by motivating responsible drinking. One thing to note from these and other examples is that persuasive com-

puters function in three basic ways—as tools, as media, or as social actors—each affording different pathways to persuasion (see the sidebar below).

Because the study of computers as persuasive technologies is such a new endeavor, many key questions remain unanswered, including:

### The Functional Triad of Computer Persuasion



Computers play many roles, some unseen and unnoticed. But from a user's perspective, computers function in three basic ways. As a tool, a computer application or system can provide humans with new abilities, allowing people to do things more easily. As a medium, a computer can convey either symbolic content (such as text and icons) or sensory content (such as virtual worlds and simulations). As social actors, they can invoke social responses from users [2], especially when adopting animate characteristics (such as physical features, emotions, and voices), play animate roles (such as coach, pet, or opponent), and follow social dynamics (such as greetings, apologies, and turn taking).

Together, they are the functional triad. One simple (and admittedly simplistic) way of viewing them simultaneously is to map them into two dimensions (see the Figure).

This triad is helpful for understanding persuasive technologies because it shows how computers use various techniques to influence people's attitudes and behaviors. By viewing a computer technology as a tool, one might ask, How can tools change attitudes or behaviors? Although this question has various answers, three possible ones are that computer tools persuade by increasing self-efficacy, by providing tailored information, and by leading people through a process.

Consider a computer tool designed to motivate people to prepare financially for retirement. It can lead people through the steps needed to analyze their financial situations, set financial goals, and take action to meet these goals. The process can motivate

users to create and follow a budget, save more for retirement, or donate to charity.

Computers as media suggest different pathways to persuasion, most notably by providing people simulations and virtual environments. Computers as sensory media can influence people by providing vicarious, first-hand experiences; by prompting insights into cause-effect relationships; and by allowing for cognitive and behavioral rehearsal.

Consider "HIV Roulette," a kiosk developed at San Francisco's Exploratorium, a hands-on science museum. This exhibit is a computer simulation allowing people to make hypothetical choices about sexual behavior and then see how their choices would affect their chances of contracting HIV, the virus that causes AIDS. In "HIV Roulette" and other persuasive technologies, computer simulations don't need to force ideas on users. Instead, people can explore various options in the simulation and observe the results for themselves—a powerful way to persuade.

Computers also function as persuasive social actors, possibly persuading people to change their attitudes and behaviors by providing social support, modeling attitudes or behaviors, or leveraging social rules and dynamics [1, 2]. For example, in the 5-A-Day Adventures CD-ROM, such characters as "Bobby Banana" and "Pamela Pineapple" praise users for practicing behaviors that lead to good nutrition, including checking virtual food labels or choosing various foods from a virtual salad bar. Children respond well to praise from these onscreen social actors and seek their continued positive feedback.

The functional triad is not intellectually deep nor conceptually difficult. However, the overall framework is useful and widely applicable. When used in analyzing persuasive technologies, it helps reveal how an interactive technology persuades—by increasing a person's abilities, providing users with an experience, or by leveraging the power of social relationships. In its generative role, the functional triad helps people who create interactive technologies recognize additional options for incorporating persuasive strategies into their products, where appropriate.

- What are the best applications for these technologies?
- What is their potential?
- What are their limits?
- What are the effects and side effects of using them?
- What are the ethical implications?

During the past few years, captologists in universities and industry have increased our knowledge of key issues in this area, but one thing is clear to those of us close to the domain: Not only do we, as a scientific community, need to understand more about the persuasive technologies that already exist, we need more insight into what could exist, and perhaps more important, what *should* exist. This special section is a step toward answering these questions and inviting others into the discussion.

Providing a backdrop for the subsequent articles, King et al. describe and analyze the persuasive interactive technologies that already do exist, including applications, users, form factors, and strategies. It reviews the current landscape of persuasive technologies, offering glimpses of what's coming just over the technological horizon, as well as several promising commercial applications that have already found a market.

The article by Tseng et al. focuses on issues of credibility as they apply to computing systems, defining credibility and outlining its importance in computing systems. Surprisingly, there is little public research on computers and credibility. To raise awareness and inspire additional work, this article suggests new frameworks for understanding the dynamics of computer credibility.

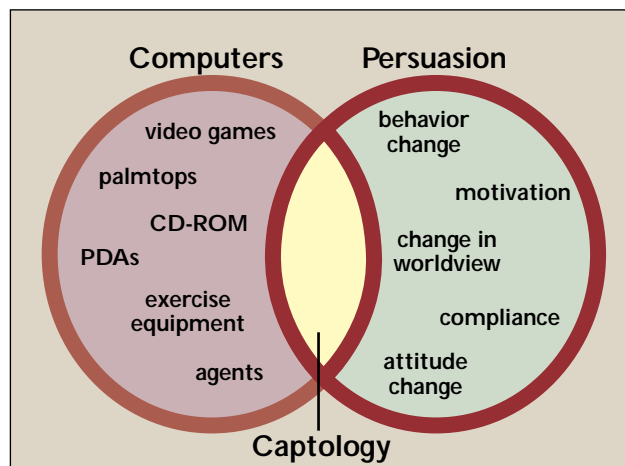
What follows is perhaps the most controversial article in the section, addressing “seductive computing.” Not only is seduction a controversial type of persuasion, but Khaslavsky et al. push the limits of scientific tradition by drawing their personal insights from industrial design and popular culture to detail the potential for computing experiences that seduce.

The section concludes with an examination of the ethics of persuasive technologies. Berdichevsky et al. first lay the foundation for discussing ethics in this domain, then boldly articulate their guiding principles for designing ethical persuasive technologies.

I don't expect readers to agree with all the ideas put forth here, but I hope these articles provoke and inspire you to raise key questions and discuss how they relate to these technologies. Whether or not we address these questions, we will soon see more examples—good and bad—of computers designed to change human attitudes and behaviors. Increasingly, we will see computers in new roles motivating health behaviors, promoting safety, promoting eco-friendly behavior, and selling products and

services. Still other persuasive technologies will emerge in areas we can't yet predict.

This forecast may sound like bad news—a world full of inescapable computer technology constantly prodding and provoking us. While such a technological



**Figure 1.** Captology is the study of computers as persuasive technologies.

environment could develop, in most of the important cases, we'll choose the technologies we want to persuade us—just as we choose a personal trainer at the gym or a tutor for our children. And even though certain types of persuasive technologies will be imposed upon us, we will learn to recognize and respond appropriately to their persuasive appeal. In extreme cases we—as an ACM community—will need to help create the public policy that influences the design and uses of computers as persuasive technologies.

But to effectively shape the future landscape of persuasive technologies, we first have to educate ourselves and others about the related potential and pitfalls. By understanding persuasive computing, designing responsible computing technologies, and discussing and acting on ethical issues in this domain, we create for ourselves the opportunity to leverage the power of persuasive computing to improve our lives, our communities, and our society. ■

## References

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2. Reeves, B., and Nass, C. *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*. Cambridge University Press, New York, 1996.

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