Making Connections:
A Model for On-Line Interaction

Susan E. Metros

ABSTRACT

The overuse of visual imagery and the redundancy of information in traditional and new communication media have desensitized our society, resulting in an emotional bankruptcy. The World Wide Web communication medium, with its highly visual interface and virtual environments, perpetuates and aggravates this situation. The "new designers" of the twenty-first century must partner with technology experts, content specialists and common users to reinvigorate imagination and rekindle emotions. To this end, we can identify and extract the six essential ingredients of engagement from the traditional performing arts, communication and design theory and recast them to support new media that are both visually stimulating and emotionally provocative.

A THOUSAND PICTURES ARE NOT ALWAYS WORTH A WORD

Our society has become desensitized and emotionally bankrupt after decades of overexposure to explicit visual imagery in every conceivable form of communication media. Cold depictions of violence, copious use of sexual innuendo, Hallmark-card visions of love and romance and clip-art renditions of everyday life have greeted us at every turn in the media blur of film, television, advertising, newspapers, magazines and now cyberspace. The noise and redundancy of these images are so pervasive and so overt that they no longer either agitate or titillate—they bore us [1]. Psychologist Kenneth J. Gergen labels this phenomenon as "postmodern consciousness,"

> a syndrome in which Americans are so bombarded with a multitude of images, personalities and relationships that they have trouble hanging on to their own personal identity and recognizing the authenticity of traditional reason and emotions [2].

This behavior is perpetuated by today's post-television generation, whose members make important decisions based on video clips and a picture-book press. Politicians wage political campaigns not on issues, but through their visual persona—the swagger of step, the color of a necktie, the sound bite [3]. Wars are televised live directly to the La-Z-boy® recliner, complete with special-effects trailers, commercial breaks, sportscaster-like banter and icons and idols [4]. Criminal trials have become 24-hour-a-day, 7-day-a-week globalized spectator events, catapulting even the most mundane witnesses into media stardom [5]. Newspapers have had to pack their pages with color photos in order to compete for market-share with the plethora of televised news shows and popular culture magazines.

Statistics reveal that television viewing [6] and movie attendance are rising while reading is on the decline [7]. This indicates that this generation prefers watching films, videos and made-for-television movies to reading books and is consequently affected more by the visual image than the written word. In the celluloid, tape and digital media, Hollywood supplies the faces, bodies and personalities, sparing viewers from having to tax their imaginations. In the case of music, MTV (Music TeleVision)—along with its many emulators—has reinvented the song as a visual extravaganza that almost eclipses the auditory experience. As a result, viewers experience popular music as a series of pulsating, color-saturated visuals coupled

Susan E. Metros (graphic designer, educator, information technology administrator), Innovative Technologies Center, University of Tennessee, 915 Volunteer Blvd., Dunford Hall, Knoxville, TN 37996, U.S.A. E-mail: <smetros@utk.edu>.

Fig. 1. This is a list of commands that players use to customize their character in FurryMUCK, an on-line, text-based MUD. Players devise and describe themselves as anthropomorphized animals, referred to as "Furries." See "Help for New FurryMUCKers," <http://www.furry.com/telzey/furry/beginner.htm>.

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Note For Newcomers
@set me=j       {This allows you to utilize various programs on the MUCK.}
@set me=!k      {This is so that you can't get "killed".  =)  }
hand #ok        {This allows objects to be handed to you.}
@set me=_scent:{whatever you smell like}
@set me=_smell_notify:%n smelled you.  {optional -- lets you know if somebody
smelled you!  =)  }
@set me=gender:{your sex, either male, female or neuter}  {also, be sure to
set the following property, too, as some programs use "gender", while others
check for "sex" -- program inconsistency.  =P  }
@set me=sex:{your sex, either male, female or neuter}
@set me=_remote_look?:yes    {allows others to use the "lookat" command to
look at descriptions of objects that you are carrying}
@set me=species:{your species}   {When others use the "whospe" command, this
setting will be reported as your "species".  Purely optional, for informative
purposes.}
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with trendy, quick-cut transitions. Once video producers add a visual facade to the lyrics of a song, they can no longer exist solely in the listener's imagination.

TANGLED IN THE WEB

Nowhere are the overuse of visual imagery and the redundancy of information more apparent and appalling than on the visually saturated sites that populate the Internet. Self-publishing and rampant commercialism have led to visual clutter on the "super highway" far in excess of all of the billboards and signage that crowd our city streets and suburban parkways. World Wide Web users roam sensory-deprived electronic landscapes, browsing and searching for information, entertainment and inte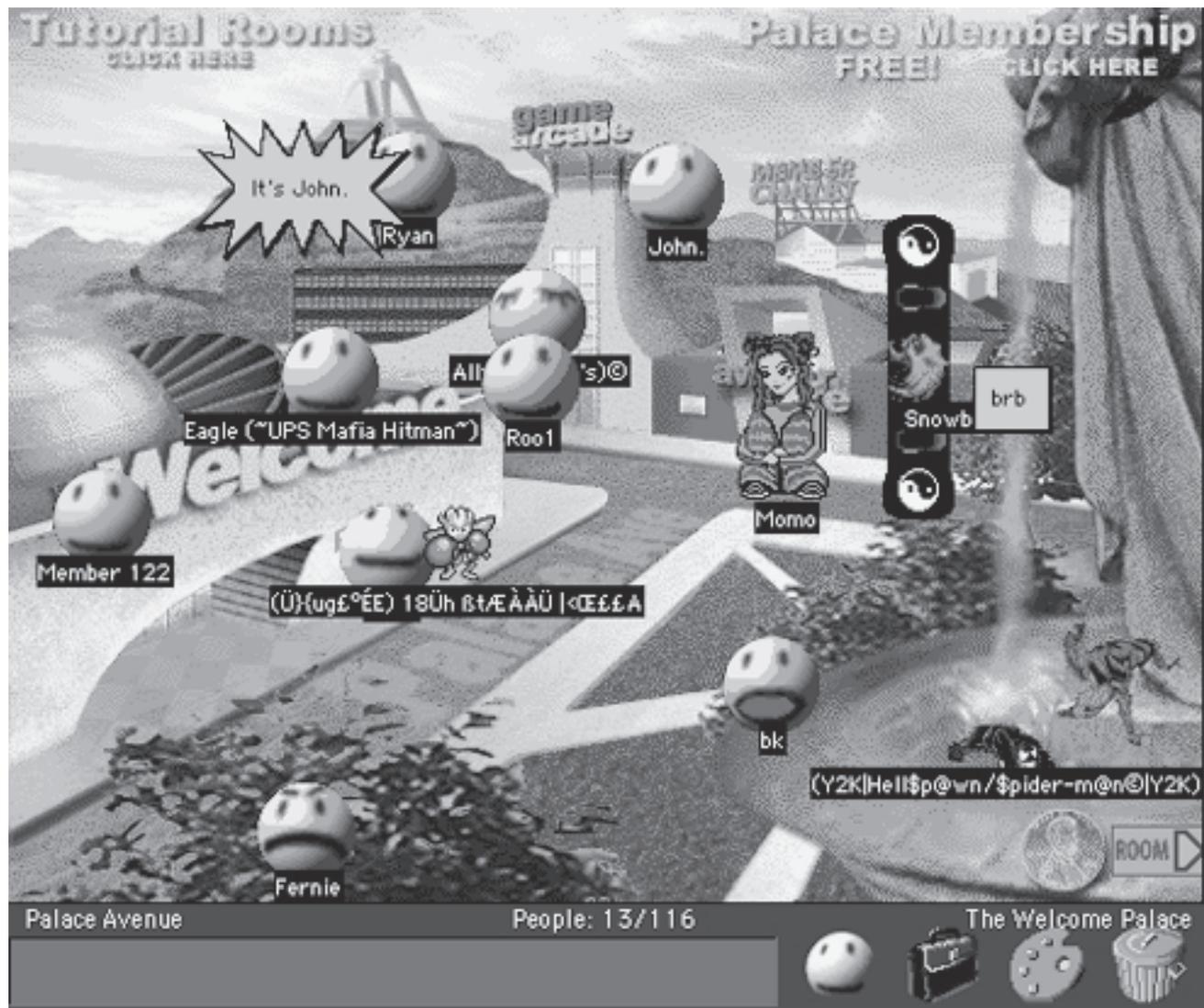raction. Despite all the hype and promise of virtual reality and multimodal interfaces inclusive of video, text, audio, speech recognition, gesture modeling, tactile sensation and gesture, the on-line experience still remains mostly passive and shallow. Mark Dery refutes Marshall McCluhan's vision of "depth-structured" global village citizens by describing the rise of "depthless" Internet citizens whose fundamental empathy—not to mention their sense of social responsibility—is seriously diminished:

> Obviously, this diminution is largely the product of social, economic, political, and sometimes psychological factors, but is aided and abetted by the electronic media that disengages us from the consequence of our every action [8].

Text-based, on-line multi-user domains (MUDs) became a popular form of entertainment when the Web first became accessible to the general public via visual browser. Players interacted with each other through keyboard commands, descriptive phrases and improvised dialogue [9]. They typed in descriptions of themselves, inanimate objects and the virtual spaces that they inhabited. In some instances they even had the ability to "set" a personal scent and, in turn, "smell" the scent of other on-line characters (Fig. 1). Other on-line players read the descriptive prose and interacted with and played in real time within another's imaginary world. They explored, constructed and refashioned their identities. Players who frequented these text-based worlds understood a universal and exclusive language based on idioms, acronyms and iconic emoticons, the symbolic shorthand

Fig. 2. A screen from the "Welcome Palace," from Electric Communities graphical on-line *The Palace* <http://www.thepalace.com/>. When a player "speaks" his or her message, it is displayed in a bubble-like text box next to their avatar representation. Users can shop, attend live events and create their own PalaceSite. (©1999 Electric Communities.)
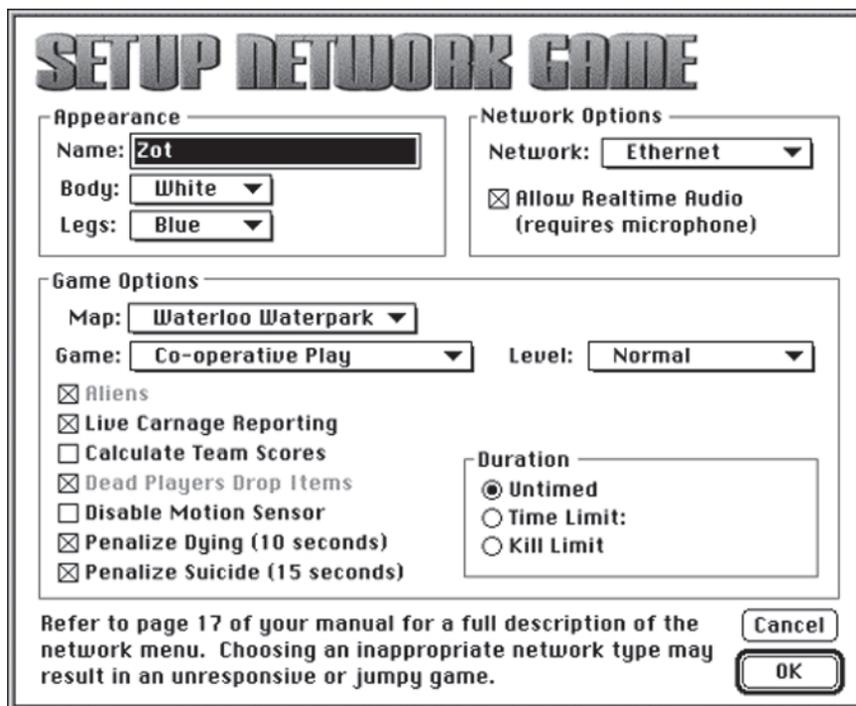
SETUP NETWORK GAME

Appearance
Name: Zot
Body: White
Legs: Blue

Network Options
Network: Ethernet
☒ Allow Realtime Audio (requires microphone)

Game Options
Map: Waterloo Waterpark
Game: Co-operative Play   Level: Normal
☒ Aliens
☒ Live Carnage Reporting
☐ Calculate Team Scores
☒ Dead Players Drop Items
☐ Disable Motion Sensor
☒ Penalize Dying (10 seconds)
☒ Penalize Suicide (15 seconds)

Duration
⦿ Untimed
○ Time Limit:
○ Kill Limit

Refer to page 17 of your manual for a full description of the network menu. Choosing an inappropriate network type may result in an unresponsive or jumpy game.

[Cancel] [OK]

Fig. 3. The preference screen for an early version of the virtual reality-type networked action game _Doom_, Id Software, 1994. See <http://idsoftware.com/7>.

viewed sideways—e.g. :(and :)—that used common punctuation symbols to not only economize keystrokes, but also to help define contexts for conversations, establishing responsiveness and attentiveness, communicating understanding, initiating play, describing actions in real life and conveying mood, feeling and emotion [10].

As network bandwidth increased and visual representation marked the competitive edge, many of these text-based games mutated into the virtual reality communities of today, and many new ventures were launched. These visually defined virtual environments require players to label their personae visually and to interact with other visible entities and objects in extravagantly rendered spaces (Fig. 2). Visual clutter accumulates as advertising spreads and Internet citizens continue to build ramshackle sites that lack aesthetic form. In 1995, the product author of AlphaWorld, one of the first fully functioning on-line communities, likened his habitat to an ant farm. He boasted, "We took it a step further. Instead of only getting to watch the ants, now you get to be one too" [11]. The evocative nature of virtual communities has not advanced even though they utilize virtual reality space, three-dimensional (3D) graphics, Internet chat, multisensory input and avatar technology. The problem with virtual communi-

ties is that everyone on-line sees the exact same thing. The current, visually saturated virtual reality is altogether less compelling than the text-based virtual reality MUDs of the past in which one simply typed in what one wanted to have happen and described in words what one envisioned. No predefined pictures forced any one user to share the same virtual images with everyone else.

Author and educator Sherry Turkle—who is considered the leading expert on constructions of self-identity within virtual communities—is wary of the visually defined virtual environments. She comments,

> In the text-based virtual realities that exist today, people are exploring, constructing, and reconstructing their identities. They are doing this in an environment infused with a postmodern ethos of the value of multiple identities and of playing out aspects of the self and with a constructionist ethos of "Build something, be someone." And they are creating communities that have become privileged contexts for thinking about social, cultural, and ethical dilemmas of living in constructed lives that we share with extensions of ourselves we have embodied in program [12].

Even MIT's very wired Nicolas Negroponte chose the conventional book as a vehicle for his discourse, _Being Digital._ He defends his choice in the book's introduction:

Interactive multimedia leaves little to the imagination. Like a Hollywood film, multimedia narrative includes such specific representations that less and less are left to the mind's eye. By contrast, the written word sparks images and evokes metaphors that get much of their meaning from the reader's imagination and experiences. When you read a novel, much of the color, sound and motion come from you [13].

WHO IS IN CHARGE?

When Apple Computer, Inc., introduced the Macintosh in 1984, third-party vendors claimed with great fanfare that their graphic software packages would replace a company's graphic designer and possibly its entire art department. The claim proved unfounded, as it quickly became apparent that the novice user required much more than a computer to create effective design. However, at present the desktop computer is no longer a stand-alone product addressing the needs of a select few. When connected to the Internet, it serves as a conduit for information and ideas that traffic through an enormous and growing global network of people and their machines. Today, communication technology is growing exponentially, and the new breed of visual web browsers is once again shifting the responsibility of design decision-making to a visually illiterate public. The ability to self-publish on the Web contributes significantly to the medium's visual ineffectiveness and information overload. In response, graphic designers are fighting a losing battle to regain control of the visual interface, claiming that they alone uphold and protect the aesthetic value of their medium. As designers carp about the demise of standards, the public is having a heyday crafting a new cyber folk art out of appropriated imagery, copied sound bites, scraps of typography and borrowed HTML (hypertext markup language) coding. Brenda Laurel summed it up in an interview with Jas Morgan in _Mondo 2000_:

> While we [designers] were out evangelizing that the computer was merely a tool, somehow, in spite of us, it blossomed into a full-fledged medium [14].

In order to move forward, graphic designers must accept the fact that they will never again be the lone purveyors and proprietors of the visual image. They also must transcend the inflexibility of print without sacrificing the evocative properties of prose. If they are to

Fig. 4. A screen shot from Cyan's CD-ROM game *Riven* depicting a three-dimensionally rendered landscape of a walkway in which the player has the ability to explore in a 360° environment. (*Riven* © 1996, 1997 Cyan, Inc. All rights reserved. *Riven* ® is a registered trademark of Cyan, Inc. Used by permission.)

succeed in this quest, the "new designers" of the twenty-first century must serve as catalysts to reinvigorate imagination and rekindle emotions. In order to do so, they must spawn a new design paradigm in which interdisciplinary teams comprised of human-computer interface designers, graphic designers, writers, application developers, technologists, programmers, subject matter-experts and other specialists share design responsibilities with the Internet savvy end user.

GETTING ENGAGED

Marshall McLuhan warned that "societies have always been shaped more by the nature of the media by which men communicate than by the content of the communication" [15].

How do we initiate a shift from a technological environment rife with visual overkill and information overload to a communication medium rich with meaning and emotion? The answer is through engagement. Engagement occurs when our attention is held long enough to induce participation in an activity. Laurel defines engagement as

> what happens when we are able to give ourselves over to a representational action, comfortably and ambiguously. We gain a plethora of new possibilities for action and a kind of emotional guarantee [16].

The vehicle for engagement is interaction. To be engaged is to be enticed into participating. While the first phase of interaction is simply connection, it is the second phase—in which the user perceives whether or not the activity has value—that defines intensity and determines the extent of engagement. Interaction can be either passive or dynamic. Users interact passively with computer programs by browsing, lurking or merely identifying with some aspect of the activity's content or form; users can go one step further and interact dynamically if they somehow are enticed into participating. The more attentive the user is, the more completely he or she is engaged. Experimental psychologist Mihaly Cikszenmihalyi coined the term "flow" to refer to the state of total engagement. In order to allow users to achieve flow, an activity should strive to absorb all of their attention, give them control, allow them to lose self-consciousness and distort time. A person has attained the flow state when she/he has no conscious awareness of time passing [17].

Human-computer interface designers and cognitive scientists wrestle with the problem of how to provide the new generation of visually savvy on-line viewers with engaging on-line experiences. In her seminal book *Computers as Theatre,* Laurel suggested ways to use the notion of theater not simply as a metaphor, but as a way to conceptualize human-computer interaction [18]. Interface designer A.J. Bilson expanded on Laurel's work and augmented the notion of theater with other live performance situations, including music, parades and demonstrations, organized religion and school. He theorized that audience reaction to and participation in live performance could serve as a model for building engaging, community-driven, on-line experiences [19].

I agree with Laurel and Bilson that we can identify and extract engagement as the essential ingredient of live performance and repurpose it to support a new media that is both visually stimulating and emotionally provocative. However, I cast the net further and wider to include the following as models for engaging on-line experiences: the performing arts of theater, music, storytelling and dance; the traditional communication media of film, television, advertising and marketing; and the design theory underlying architecture, design and art. Theater adds a live element based on established dramatic principles. Music entertains with provocative medleys sometimes coupled with lyrical narratives. Storytelling, both spoken and written, presents a narrative ripe for imaginative interpretation. Dance combines the live elements of theater, the rhythm of music and the drama of lighting with the choreography of movement. Film uses dialogue and a rich visual landscape to weave a story from multiple and simultaneous viewpoints. Television excels in tracking motion and has the flexibility to be instantly updated. Advertising and marketing imbues the science of semiotics with the

psychology of persuasion and entice- ment. Architecture provides the stability of structure and form. Design and art embrace a vocabulary of vision that de- rives from the science of perception, the psychology of Gestalt and the aesthetics of individual points of view and expres- sion. This eclectic collection of perform- ing arts, communication media and de- sign theory uses techniques to elicit viewer engagement and, ultimately, re- action/interaction.

THE SIX PROCESSES OF ENGAGEMENT

In order to define and build a new de- sign paradigm, I examined this collec- tion of performing arts, media and de- sign theories for basic conceptual similarities. I identified the processes that best promoted engagement through the act of interaction and reassembled them into six distinct, though often over- lapping, processes: suspending disbelief, making believe, creating ambiguity, stimulating senses, altering perception

and evoking passion. In a parallel re- search effort, educational technologists Sue Stoney and Ron Oliver conducted studies using a multimedia CD-ROM (compact disk-read only memory) en- titled *Principles of Financial Investment* to explore the motivation and engagement of adults. They tested their hypothesis that adult learners are motivated and engaged by educational interactive mul- timedia that generate specific learner ef- fects. The learner effects they consid- ered most important in influencing the motivation and engagement of adult learners were immersion, reflection, col- laboration, play, learner control, curios- ity, fantasy and challenge [20].

SUSPENDING DISBELIEF

The nineteenth-century poet and critic Samuel Taylor Coleridge introduced the theatrical notion of willing suspension of disbelief [21]. Laurel clarifies it as

the state of mind we must attain in or- der to enjoy a representation of action. We must temporarily suspend (or at-

tenuate) our knowledge that it is pre- tend. We do this willingly in order to experience other emotional responses as a result of viewing the action [22].

Suspension of disbelief allows us to give ourselves over fully to the experi- ence and trust that even if we entertain such dark emotions as hate and terror, we will not actually do harm or be harmed. It frees us to use our imagina- tions without fearing reprisal. Of the six processes of engagement, the willful sus- pension of disbelief is the most widely applied to new media applications. Game designers were the first to intro- duce what they termed "escapist fun," their rendition of willful suspension of disbelief, into computer environments. In many popular CD-ROM and net- worked on-line action games, players sus- pend disbelief and "hack and slay" their way through violent worlds rife with mur- der, suicide and carnage (Fig. 3).

Research indicates that realistic graphics—both static and dynamic— coupled with meaningful sound, user- controlled narrative and predictable be-

Fig. 5. The content screen from American Honda Motor Company's web site, depicting the use of the Gestalt principle of closure to en- tice the viewer to interact. See <http://www.honda1999.com/13>. (© 1998 American Honda Motor Co., Inc.)
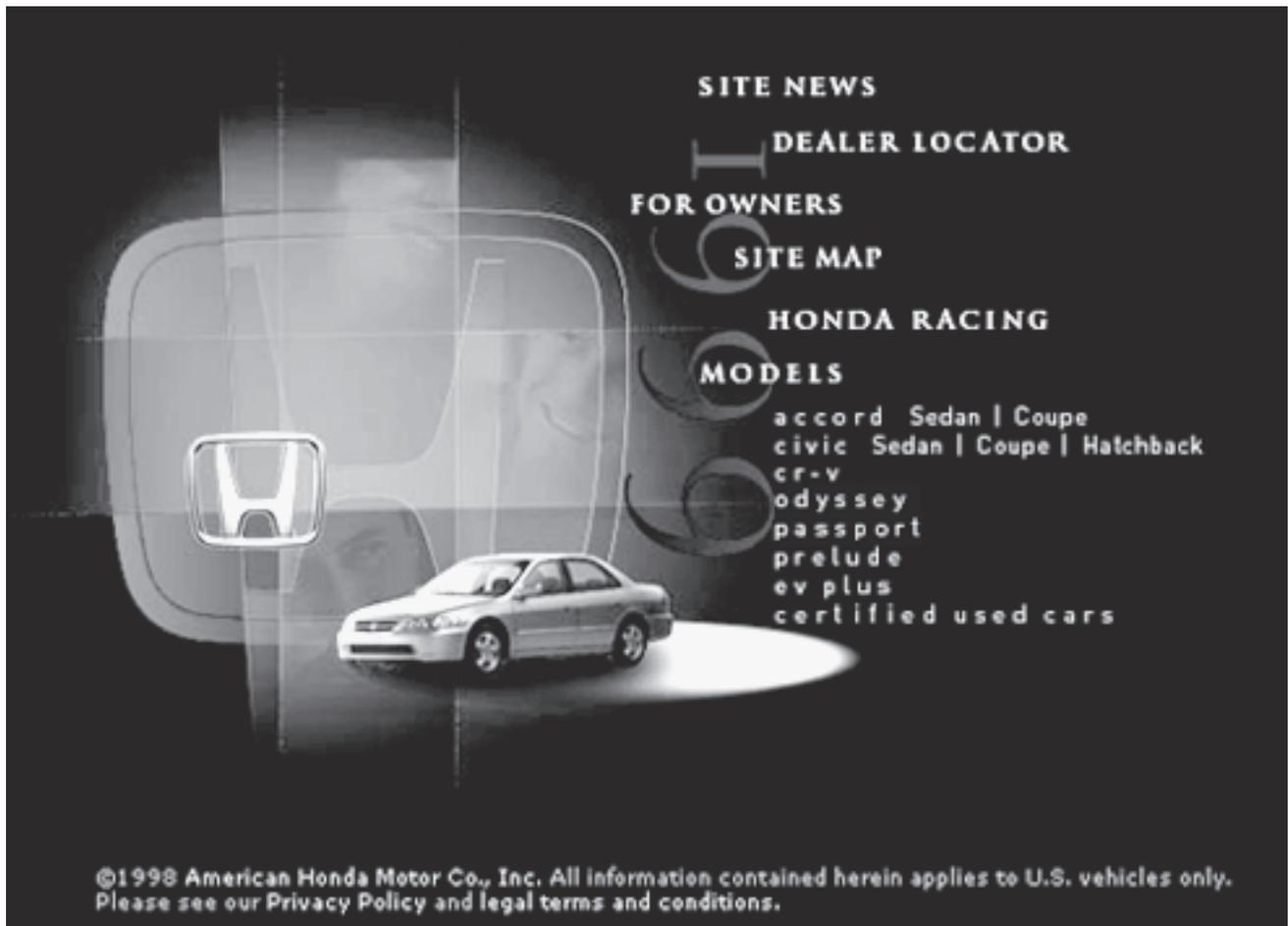
havior of represented objects contribute to the willful suspension of disbelief. Stoney and Oliver observed that providing a "graphical fix" (meaning a realistically rendered interface) for the content and context of the program aided in willful suspension of disbelief.

> Students mentioned several times that the realism of the program as well as the context, gave them a sense of being in the program which led to a feeling of complete immersion and engagement [23].

Not all games require violence to engage the user. Interactive adventure games such as Cyan's *Myst* and *Riven* and Cyberflix's *Titanic* build strong links between realistically rendered visuals, natural movement and immersive sound to contribute to environments that sustain the willful suspension of disbelief (Fig. 4). The games are remarkable for their sense of control and mood. People neither die nor are killed, yet these games induce uneasy feelings of panic and a sense of isolation in the player.

MAKING BELIEVE

Novelist Carol Shields referred to

> the curious brave efforts of children to charge their immediate world with bril-

liance, making it glow with color as they move among common objects, bringing those objects alive with incantatory music, alive with texture and outline, alive with life [24].

Outside of a select and elite artistic community, society rewards us for our rational and cognitive skills, not our capacity to make believe. Throughout our lives, our parents, teachers and employers encourage us to repress our imaginative powers because reason is easier to control. Pablo Picasso declared, "Every child is an artist. The problem is how to remain an artist after he grows up" [25]. Imagination—with its ability to extend, amplify and enrich our capacities to think, feel and act—is indeed engaging, not to mention productive. Right brain/left brain theory maintains that the most balanced individuals are those who blend imagination—inclusive of inspiration, insight and intuition—with rational analysis to react to information and to solve problems. This talent to leave logic behind in order to brainstorm freely and envision "what if" scenarios characterizes creativity.

Make-believe characters and stories were bountiful in the text-based MUDs. The popular on-line, text-based chat channels of the Internet also are packed

with users logging on with mythical and multiple identities. Grassroots newsgroups and professionally produced sex web sites alike rely on the age-old adage that 90% of sex takes place in the mind. In fact, many people who engage in virtual sex (or Netsex) admit that they are surprised by how emotionally and physically powerful it can be. Sherry Turkle interviewed a teenage boy who compared his evolving sensuality as an on-line "lover" to masturbation using a Playboy magazine. He admitted that he used fantasies to excite himself in both circumstances: "But on-line there is another person. . . . In Netsex, I have to think of fantasies she will like too" [26].

These socially structured on-line communities share make-believe as an integral component for engagement. In this context, the act of making believe provides users with permission to fantasize about indulging in an activity of direct interest that can be carried out in a safe and secure environment. Extracted in this fashion, designers of new media can apply make-believe to a broader context of applications. For example, Stoney and Oliver, understanding what was meaningful to business students, designed a realistic metaphor for the instructional landscape of their finance simulation

Fig. 6. The introduction screen of *Ubiquity* website, 1999, produced by David Bickerstaff, Ruskin School of Drawing and Fine Art, Oxford University, in collaboration with Channel at Artec, 1997. In this site, question marks serve as entry points. See <http://www.channel.org.uk/ubiquity>. (Courtesy of the Laboratory at Ruskin School. Collection of the artist.)
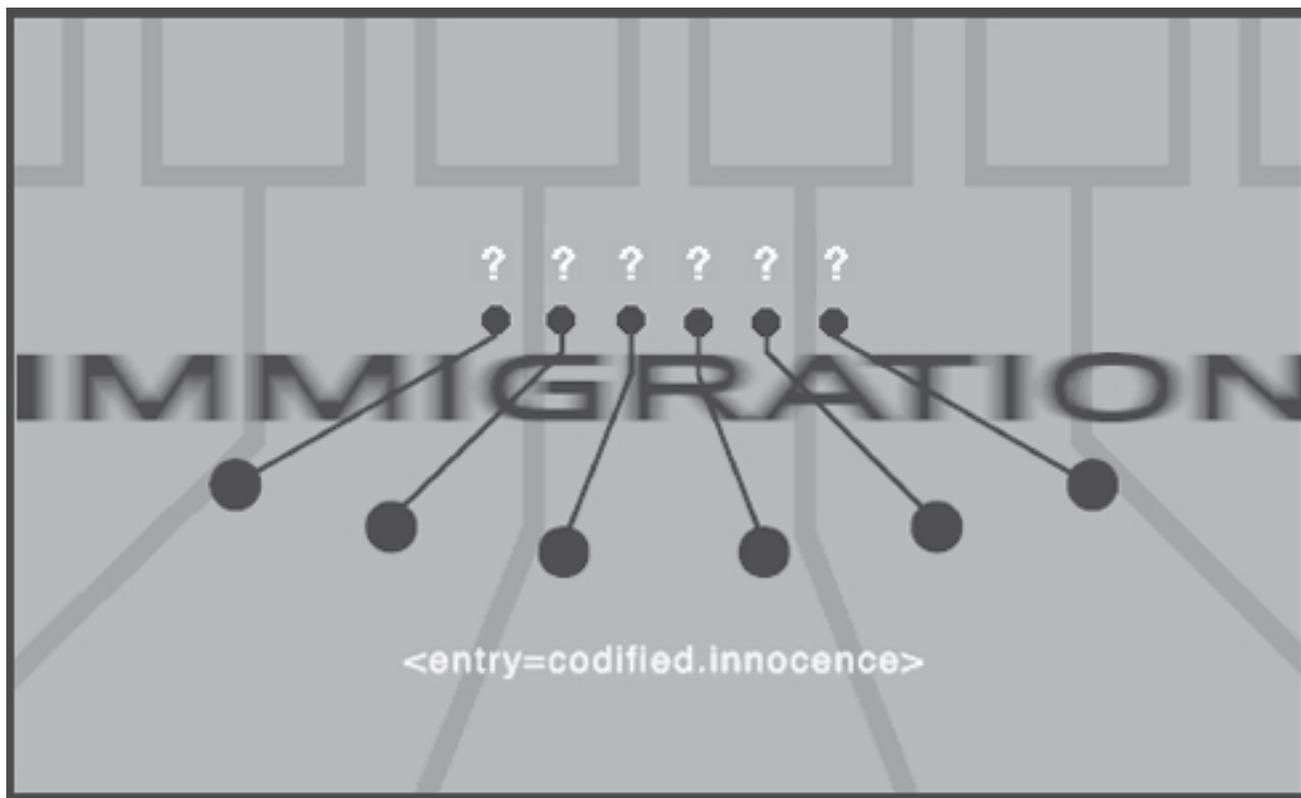
that permitted students to indulge in the fantasy of investing their own money successfully. The fantasy was supported by the metaphors representing a stock brokerage firm and the realism carried in the feedback and outcomes for the virtual trading of shares [27].

CREATING AMBIGUITY

Human beings are naturally inquisitive. Gestalt psychologists theorize that humans have a natural tendency to organize visual patterns and are therefore compelled to resolve ambiguous situations in order to stabilize a design and make sense of its meaning. Interface designers can use ambiguity to their advantage. They can entice the user to manipulate the spatial organization of the interface by incorporating the Gestalt perceptual principles of figure/ground, closure, proximity, continuation and/or similarity [28].

Another form of ambiguity has to do with content. Imagination and emotion can be stimulated by carefully crafting uncertainty into the content of a communication medium. Advertisers use this technique by arousing their audience's curiosity through clever copywriting and double entendres of meaning. Borrowing from both Gestalt psychology and advertising, the new designers can successfully employ perceptual and content-driven ambiguity to pique the user's curiosity, heighten interaction, stimulate imagination, stir emotions and, ultimately, trigger engagement.

Content-driven ambiguity is successfully practiced within many of the text-based on-line chat spaces. Users identify themselves using gender-neutral pronouns (GNPs), a convention that replaces the current set of gendered pronouns with a genderless set [29]. This degree of vagueness about identity and sexual orientation is conducive to these types of postings. In another type of example, Stoney and Oliver pique the learner's curiosity by building random elements, chance processes and open navigational structures into their educational financial simulation [30].

Perceptual ambiguity is still a new concept in interface design. One rarely finds sites whose designers have made a conscientious effort to apply Gestalt principles of design to the screen. One such example is Honda's 1998 home page in which viewers, succumbing to the Gestalt principle of closure, subliminally complete the circle stage on which a car sits in order to stabilize the design

Fig. 7. Microsoft ® Corporation's on-line assistant, "Max" from its Macintosh Office '98 product. (Screen shot reprinted by permission of Microsoft Corporation. © 1993–1998 Microsoft Corporation. All rights reserved.)

(Fig. 5). The designer of this site not only affords interaction by requiring viewers to be actively involved in the composition, but also is successful in focusing their attention.

In another example, Brenda Laurel described her joint project with videographer Rachel Strickland to build *Virtual Coyote,* a virtual world brimming with texture-mapped, natural imagery. In Laurel's words they used this imagery because "we think that ambiguity is a key to the engagement of the imagination and that polygons don't do that" [31]. Combining content and perceptual ambiguity, digital artist David Bickerstaff used question marks to serve both as design icons and as content containers for his site *Ubiquity* (Fig. 6). He describes *Ubiquity* as "an imaginary place where words make images and places exist only through the words that evoke them" [32].

STIMULATING SENSES

When modeling a communication experience, designers tend to limit user interaction to visual cues, occasionally accompanied by sound. But reality is actually multisensory and packed with an array of complex emotional cues. Everyday interaction is simultaneously visual, gestural, auditory, olfactory, verbal, tactile, intuitive, atmospheric and kinesthetic. Hand and body gestures and facial expressions form a non-verbal, universal language of emotion. Information about feelings is embedded in sound.

Voice inflection can project understanding, anger, compassion, superiority or forgiveness. AT&T's successful advertising campaign to "reach out and touch someone" was about transmission of emotion through voice. Negroponte describes voice as a channel that carries not only the signal but all the attendant features that give it traits such as understanding, deliberateness, compassion or forgiveness [33]. Media philosophers Mark Taylor and Esa Saarinen take this a step further by asking, "What does it mean to write with sound or even with smell?" [34]

Programmers work to simulate additional modalities, but the emulation of sensory projection is technologically daunting and psychologically complicated. Computer games, arcade games, high-tech entertainment venues and Disney-style theme park rides come closest to mimicking auditory, tactile, atmospheric and kinesthetic experience successfully. They rely on perceptual trickery, expanded visual fields, highly directional and realistic sound, motion emulators, stereoscopic images, etc. Virtual reality systems promise to immerse us in environments rich in sensory interaction, but to date these systems are still unwieldy and expensive. Human-computer interface designers are also programming agents with quasi-human characteristics that respond to our commands visually, gesturally and verbally. These "smart" agents strengthen engagement by eliciting empathy and influenc-
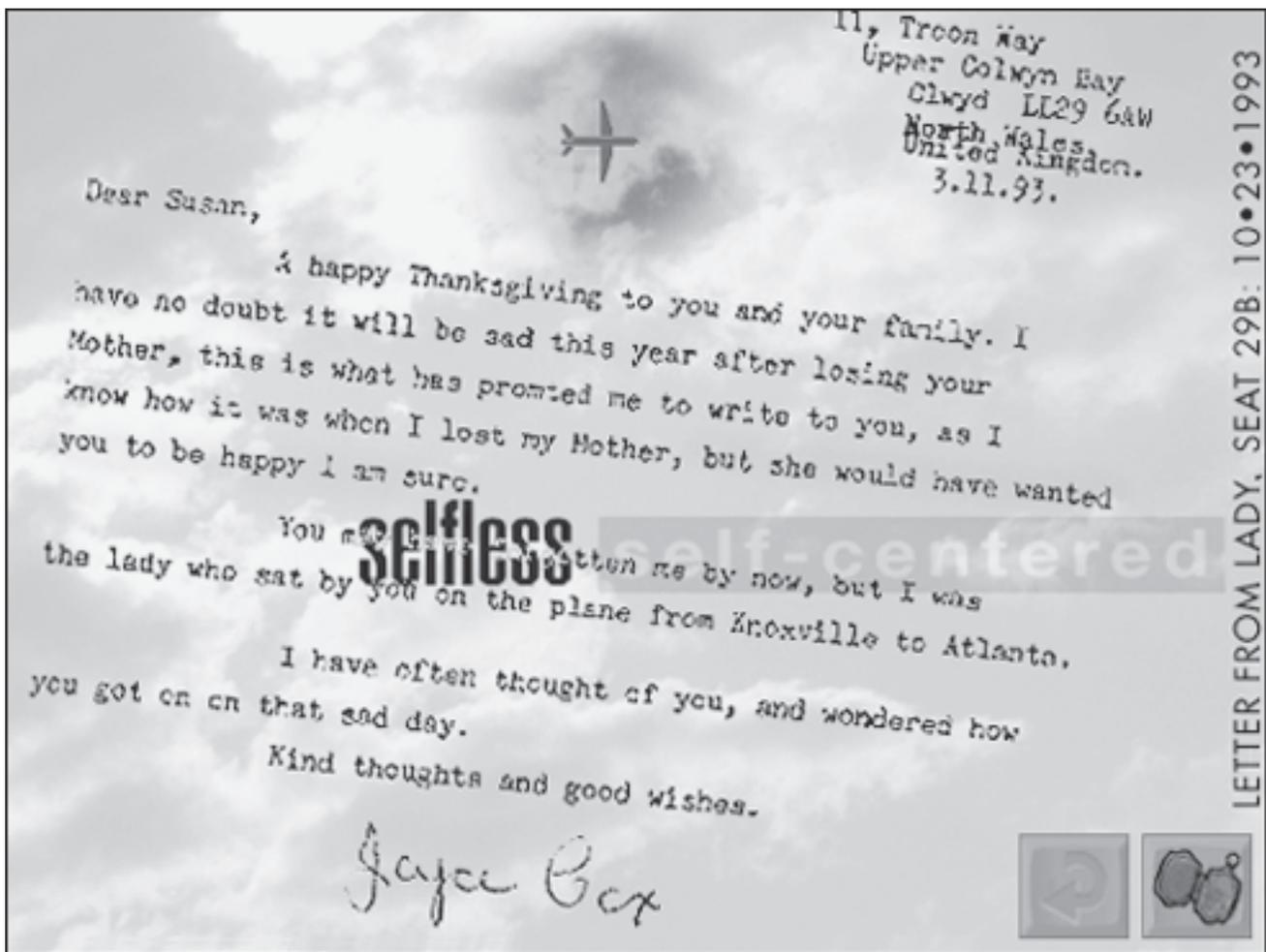
Fig. 8. Susan Metros, "Selfless," screen capture from *good daughter, bad mother, good mother, bad daughter: catharsis + continuum* **CD-ROM, 1994. (© S. Metros)**

ing the action and emotional responses of the user [35]. The Macintosh version of Microsoft Office '98 contains a gallery of "office assistants" with names such as Bosgrove, Clippit, Dot, Earl, Genius, Hoverbot, Logo, Mother Nature, Power Pup, Robot, Rocky, Scribble and Will. The default assistant is a 3D-rendered, animated Apple Macintosh Classic computer named Max. While he impatiently waits to be summoned to provide help or offer tips, he playfully shifts from foot to foot, morphs into animal forms, divides himself into spinning Rubic's Cube–like pieces, creaks, taps, crashes to the ground and bounces back up (Fig. 7).

ALTERING PERCEPTION

Images in the form of photographs and video clips are thrust before us in their raw, unadulterated and over-representational state every day. Although this is standard practice in journalism and in the disciplines of history, medicine and science (where researchers are required

to accurately illustrate material), we do not need to accept this as the norm for the more esoteric side of visual communication media. Laurel argues that the ability to create and manipulate symbolic representations of realistic objects and events is probably the central feature of human intelligence and imagination [36]. Nevertheless, many purveyors of pictures do not take the time to visually translate and artistically reinterpret imagery, due both to the self-publishing public's lack of artistic talent and aesthetic judgment and to society's incessant need to churn out massive quantities of images at a frenetic pace. Kevin Mullet and Darrell Sano posit that direct engagement does not always require that the interface be realistic. They warn against what they label "gratuitous dimensionality" and "overly literal translation," in which mimicking real-world appearances in applications and using 3D-rendered objects can escalate to such a level that the application's usefulness is undermined [37].

Traditional artists address relationships of form and content from a unique perspective. They apply the design constructs of balance, contrast, position, texture and color—the formal elements—to enhance imagery and its environment [38]. They may rely on reality for inspiration, but their art alters this perspective. Artistic selectivity can capture what is essential in a scene and reconstruct it in the most effective and economic way in order to control the way the viewers' eyes move through the picture space. E.H. Gombrich remarked, "What the painter inquires into is not the nature of the physical world, but the nature of our reaction to it" [39]. This creative and visually innovative abstraction enriches human experience and touches our deepest emotions. The quality of on-line visual representation in new media can only improve if designers craft visuals from an artistic point of view rather than from appropriating from or mimicking reality.

Spatial factors also affect perception. Designers constrain the live area of the

Fig. 9. Susan Metros, "Germany," from *[RE] collections + collections*, web site, 1998. This site is a collection of stories and photographs of William Yenofsky, WWII soldier. See <http://www.it.utk.edu/WWII>. (© S. Metros)

computer screen to the dimensions of the monitor or, at best, a predefined scrollable area. In order to extend and alter our spatial perception, interfaces should be predicated on a concept in which the monitor screen is but a window mapped onto an expanse of infinite space that is as high as it is wide and deep. Designers need to model interfaces after the spatial representations of television and film whereby the viewer is aware that the camera captures only a small portion of a boundless landscape that is rich with texture, activity and multisensory cues. Movement is the key to implying this sense of a larger space. In a discussion thread on the VISUAL-L listserv, an interface designer commented

> What "looks like TV" has seemed to boil down to around here as keeping something "moving on the screen." Interestingly, this also can be accomplished with "moving" audio. Your TV set is never silent unless you hit the mute button, whereas very few com-

puter programs have any sort of audio beyond the beep!

Another listserv participant added

> Often the very movement of light—casting of shadows and highlights across an ambiguous surface texture or image—is enough to create this dynamism [40].

EVOKING PASSION

Passion is perhaps best described as the expression of intense feelings. So viewed, it can be considered a paradigmatic form of engagement. To be passionate one must identify with the subject so profoundly that one is emotionally "moved." Oftentimes, this extreme level of emotional response manifests itself in a visceral reaction characterized in such physical terms as "weak with laughter," "cold with fear," "hot with anger" and "overflowing with tears." Passionate reaction and response

can be cathartic. Aristotle's concept of catharsis points out that it is not emotion itself but its release that is deemed pleasurable [41]. Therefore, a passionate response to communication media almost always guarantees interaction and, ultimately, engagement. Playwrights, TV producers, choreographers, lyricists and even advertisers use various methods to "tug on our emotions" and entice us to react passionately to their messages.

Quite a few artists, myself included, work in the genre of electronic personal expression and publish multimedia [42], author hypertext or self-publish over the Internet. In my own case, I used the CD-ROM medium to deliver a passionate and highly evocative message about the polarities within mother and daughter relationships. In 1994, I authored, designed, illustrated and produced an interactive multimedia art piece entitled *good daughter, bad mother, good mother, bad daughter: catharsis + con-*

tinuum (Fig. 8). This work was in direct response to the death of my mother and served as a vehicle that allowed me to work though my loss and grief. I exhibited the work kiosk-style at more than 15 galleries and festivals worldwide, and judging from the interest and feedback I received from viewers and reviewers, it succeeded in evoking passion, with some viewers moved to tears.

In 1998, I chose the Internet to launch *[RE] collections + collections,* a web site that documents the wartime experiences of my father, an 88-year-old veteran of World War II (Fig. 9). This site traces my father's journey through the war using an interface that weaves a mapping of place with the sequencing of time. A chronicle of World War II history is juxtaposed alongside my father's physical and emotional journey. His personal time line spans from 1940 with his induction into the Army and includes his anecdotes of stateside boot camp, through the Anzio beachhead invasion of 1944, to the liberation of Dachau in 1945. The web site encourages interaction by inviting viewers to respond by annotating my father's stories. To date, the majority of respondents have chosen to submit poetry in direct response to the poignant section on Dachau.

Even more intriguing is how the Internet itself has become an autonomous repository for passionate and emotional response. Artists of all types work alone and in teams to create on-line galleries, sites and virtual venues filled with digital artwork, performance pieces, live camera documentaries, hypertext storyspaces and journals [43]. Virtual reality also holds great promise for emulating intense emotional response. Laurel states

> VR is a context in which we encounter technology with passion. . . . Intelligence without passion is simply rationality. As we ponder our collective evolution, we see that passion is the prosody of intelligence [44].

A Shared Vision

In the *Wired* article "It's a Poor Workman who Blames his Tools," John Perry Barlow affirmed that the central purpose of technology is to connect:

> To make contact. To wake up, shocked by the voltage of increased interaction between the properties of humanity in my heart and those in yours. To be whole [45].

To divert the flow of society from a course of visual and information overload to a technological environment rich with meaning and emotion will be no easy task. All parties must be fluent in a new, conceptually based language in order to construct effective and fresh scenarios for interaction. This means that the designer can no longer serve as visual custodian and dominate the look and feel of the interface. Design will be much more than the surface arrangement of elements on a prescribed space. The new design might mirror our existence, but it should also go far beyond just a makeshift representation. In the twenty-first century, the synthesis of information translated into words, images, motion, sound, touch and smell will constitute successful design. Interdisciplinary design teams need to begin right now to base the new aesthetics on the intensity of engagement and the incitement of emotion. The academic institution—with its access to knowledge, freedom to experiment, computing power and wealth of bright young minds—should be the birthing place of these new partnerships. The university—with its multidisciplinary weave of art, design, architecture, communications, theater, music, dance, speech, business, computer science, engineering, information science, psychology, media studies and education—furnishes the perfect setting to invest in a new design paradigm.

Acknowledgments

References and Notes

1. Melinda McAdams defines noise as information that is neither interesting nor useful to us. It gets in the way of what we really want. The result of too much noise is that it makes us feel overloaded, numb and powerless. Redundancy is defined as too much information that is too much the same. Excessive redundancy makes people want to shut things out. Melinda McAdams, "Information Design and the New Media," *Interactions* **2**, No. 4, 37–42 (1995).

2. Kenneth J. Gergen quoted in Jim Willis, *The Age of Multimedia and Turbonews* (Westport, CT: Praeger, 1994) p. 27.

3. Historians attribute John F. Kennedy's narrow victory over Richard Nixon to their 1960 televised debates. It was generally agreed that Nixon "won" the debates on radio, yet it was Kennedy who came from behind in the polls and won the election. Even though Nixon's discussion of the issues was cogent and his grasp of events and factual detail was authoritative, all the viewers could recall of the debates was the image of a candidate who perspired under pressure, whose eyes darted during questioning, who seemed to lack confidence and poise. The major difference between the Nixon/Kennedy race and current political campaigns is that the impact of TV was not as great then as it is in our video-saturated world of today. In 1960, almost as many people listened to the debate on radio or read about it in the newspaper as saw it on TV. Fawn Brodie, *Richard Nixon: The Shaping of His Character* (New York: W.W. Norton, 1981) pp. 424–429.

4. I refer here to NBC Gulf War correspondent Arthur Kent, whose good looks and fashionable dress overshadowed the newsworthiness of his broadcasts during Iraqi missile attacks on Saudi Arabia and won him the nickname "Scud Stud."

5. This pertains not only to the infamous O.J. Simpson trial, but also to the American people's fascination with courtroom combat as glamorized by Court TV and its emulators. Court TV is a 24-hour-a-day, 7-day-a-week cable legal news network dedicated to reporting on the U.S. legal and judicial systems with what Court TV refers to as "gavel-to-gavel" coverage. See "About Court TV," *Court TV On-Line* <http://www.courttv.com/about/about.html>.

6. The average high school senior will have watched more than 15,000 hours of television by the time he or she graduates. Teens today spend more time watching television than on any other activity, including studying. See "Media Literacy: TV—What You Don't See!" on *In the Mix,* video program, Castle Works Inc., broadcast May 1997 on Public Broadcasting Service. Available by mail order from *In the Mix,* 114 E. 32nd St., Suite 903, New York, NY 10016, U.S.A.

7. According to the 1992 Population Survey and the 1992 National Endowment for the Arts' Survey of Public Participation in the Arts, the percentage of 18-to-24-year-olds who read any novels, short stories, poetry or plays fell from 60% in 1982 to 53% in 1992. Over the same period, literature reading declined 2% among the middle-aged and remained the same for adults aged 50 and older. The survey also found that 41% of young adults did not read a single book that was not required for school or work, and 60% had read fewer than four books within a 12-month period. Nicholas Zill and John Robinson, "The Generation X Difference," *American Demographics Magazine* (April 1995). Accessible at <http://www.demographics.com/publications/ad/95_ad/9504_ad/9504af01.htm>.

8. Mark Dery, "McLuhan through the Rearview Mirror," *Educom Review* **30**, No. 6 (1995) p. 27.

9. I use the term "MUD" to refer universally to all types of multiplayer on-line domains including MUDs (Multi-User Dimensions or Dungeons), MOOs (Object-Oriented MUDs), MUSEs (Multi-User Simulation Environments) and MUCKs (Multi-User Construction Kits).

10. See Lynn Cherny, "The Modal Complexity of Speech Events in a Social MUD," *Electronic Journal of Communication* **5**, No. 4 (1995). Accessible at <http://bhasha.stanford.edu/~cherny/papers.html>.

11. R. Britvich, "It's Your World," Worlds, Inc. <http://www.worlds.net/alphaworld> (web site accessed 26 January 1996; no longer accessible).

12. Sherry Turkle, "Constructions and Reconstructions of Self in Virtual Reality: Playing in the MUDs," accessible at <http://web.mit.edu/sturkle/www/constructions.html>.

13. Nicolas Negroponte, *Being Digital* (New York: Knopf, 1995) p. 8.

14. Brenda Laurel quoted in Jas Morgan, "MONDO 2000 Interview with Brenda Laurel," *Techno Culture* web site. Accessible at <http://eserver.org/cyber/laurel.txt>.

15. Marshall McLuhan, quoted in Dery [8] p. 24.

16. Brenda Laurel, *Computers as Theatre* (Reading, MA: Addison-Wesley, 1993) p. 115.

17. Kathy Kozel, "Designing with the Spiral," *Multimedia Producer* **2**, No. 1, 60–66 (1996).

18. Laurel [16] p. 20.

19. A.J. Bilson, "Get into the Groove: Designing for Participation," *Interactions* **2**, No. 2, 17–22 (1995).

20. Sue Stoney and Ron Oliver, "Designing an Interactive Multimedia Instructional Landscape Able

to Generate Motivating and Engaging Effects among Learners," in Thomas Ottmann and Ivan Tomek, eds., *Proceedings of Ed-Media/Ed-Telecom 98 World Conference on Educational Multimedia and Hypermedia and World Conference on Educational Telecommunications* (Fairfax, VA: Association for the Advancement of Computing in Education, 1998) pp. 1399–1404.

21. Samuel Taylor Coleridge, in Chapter XIV of *Biographia Literaria*, published in 1817 called drama "that willing suspension of disbelief for the moment, which constitutes poetic faith." See Samuel Taylor Coleridge, *The Rime of the Ancient Mariner: In Seven Parts,* accessible at: <http://utl2.library.utoronto.ca/disk1/www/documents/utel/rp/poems/coleridg1.html>.

22. Laurel [16] p. 113.

23. Stoney and Oliver [20] p. 1400.

24. Carol Shields, *The Republic of Love* (London: Flamingo, 1992) p. 194.

25. Pablo Picasso, quoted in Paul Heckel, *The Elements of Friendly Software Design* (New York: Warner Books, 1984) p. 117.

26. Sherry Turkle, *Life on the Screen: Identity in the Age of the Internet* (New York: Simon and Schuster, 1995) p. 21.

27. Stoney and Oliver [20] p. 1403.

28. The Gestalt perceptual principles are: (1) Figure/ground: Figure refers to the positive elements within a given field or ground. Ground is typically the background, field or negative space in which the elements or figures reside. (2) Closure: Our natural tendency to close gaps and complete unfinished forms because we perceive closed shapes as more stable. (3) Proximity: Our natural tendency to group elements according to their nearness or proximity in order to help create a unified whole. (4) Similarity: Our natural tendency to visually group elements that are similar in shape, size, texture, color, and/or direction in order to help create a unified whole. (5) Continuation: The organization of elements that leads the eye to continue along and beyond a straight line or curve. See Greg Berryman, *Notes on Graphic Design and Visual Communication,* (Los Altos, CA: William Kaufmann, Inc., 1979) pp. 8-9 and Jean Trumbo, "Web Gestalt," University of Wisconsin-Madison, September 1998, accessible at: <http://www.wisc.edu/agjourn/trumbo/gestalt.html>.

29. John Williams, "MUDs," *Gender-Neutral Pronoun FAQ,* Version 0.9.8, 23 March 1999, accessible at <http://www.lumina.net/gnp/references. html#muds>.

30. Stoney and Oliver [20] p. 1403.

31. Brenda Laurel, quoted in Morgan [14].

32. David Bickerstaff, *Ubiquity* web site, Ruskin School of Drawing and Fine Art, Oxford University, U.K., in collaboration with Channel at Artec, 1997. Accessible at <http://www.channel.org.uk/ubiquity/>.

33. Negroponte [13] p. 147.

34. Mark C. Taylor and Esa Saarinen, *Imagologies: Media Philosophy* (New York: Routledge, 1994) styles 5.

35. Gordon Kurtenbach and Eric A. Hulteen, "Gestures in Human-Computer Communication," in Brenda Laurel, ed., *The Art of Human-Computer Interface Design* (Reading, MA: Addison-Wesley, 1990) pp. 309–317.

36. Laurel [16] p. 187.

37. Kevin Mullet and Darrell Sano, "Applying Visual Design: Trade Secrets for Elegant Interfaces," *CHI'94 Tutorial Notes* (New York: ACM, 1994) unnumbered.

38. See my related paper describing a vocabulary of vision as applied to graphical interface design. Susan Metros, "Interface Lift: Elective or Compulsory," in J. Hedberg and J. Steele, eds., *Educational Technology for the Clever Country: Selected Papers from ASET '92* (Belconnen, Australia: AJET, 1992) pp. 110–150.

39. E.H. Gombrich, quoted in Heckel [25] p. 80.

40. L. Staples, "Interfaces that Look Like TV," <visual-l@vtm1.cc.vt.edu> (listserv E-mail received 31 January, 1996); S.L. Kropf, "Interfaces that Look Like TV," <visual-l@vtm1.cc.vt.edu> (listserv E-mail received 7 February 1996).

41. Aristotle, *De Poetica,* in *The Basic Works of Aristotle*, Richard McKeon, ed., Ingram Bywater, trans. (New York: Random House, 1941) pp. 1455–1487. Also cited in Laurel [16] p. 121.

42. Pedro Meyer pioneered the medium of evoking emotion via modern technology, for example, in his CD-ROM piece, *I Photograph to Remember.* Using the computer and CD-ROM technology to combine nearly 100 black-and-white photographs with spoken narrative and music, Meyer told the story of his parents' deaths due to cancer. Pedro Meyer, *I Photograph to Remember,* CD-ROM (New York: Voyager, 1994).

43. Listings and examples of hypertext resources and on-line journals can be accessed at the following web sites: "Hypertext Resources on the Web," Eastgate Systems <http://www.eastgate.com/hypertext/WebHypertext.html> and "Tracing: Alethea's Journal of Daily Thoughts and Events," <http://www.ounce.com/301a/tracing/history.html>.

44. Laurel [16] p. 214.

45. John Perry Barlow, "It's a Poor Workman who Blames his Tools," *Wired* Scenario Special **3**, No. 11 (1995) p. 142.