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YOURSELF

CONGRATULATIONS  
LADIES AND GENTLEMEN  
*You* ARE ABOUT TO READ A  
CLASSIC

Not a  
**DEAD**  
classic, but a  
LIVING,  
VIVID,  
EVOLVING,  
one.

**NOW**

UPDATED from the 1991 original, written when the **PERSONAL COMPUTER** & the **INTERNET** were but

**LITTLE PUPS**

WRITTEN, RESEARCHED AND PREPARED by the talented

**BRENDA LAUREL**

“ENTREPRENEUR” “RESEARCHER” “PROFESSOR” “TECH DIVA” “ACTOR”  
“IXD VETERAN” “GAME DESIGNER” AND “VERY CURIOUS PERSON”

**NOW**

REVISED, REIMAGINED, and REINVIGORATED for today's impressionable

**YOUTH**

**COMPUTERS**  
AS  
**THEATRE**  
SECOND EDITION

**PERFORM**

WONDERS IN SOFTWARE DESIGN

**APPLAUD**

DISRESPECT FOR THE COMMONPLACE

**TRIUMPH**

AS OUR TOOLS AND KNOWLEDGE AMPLIFY US

JUST THINK...

ALL THIS BRILLIANCE IS RESTING IN YOUR OWN

**TWO TREMBLING HANDS**

**MARVEL**

AT ANCIENT GREEK WISDOM

**ENGAGE**

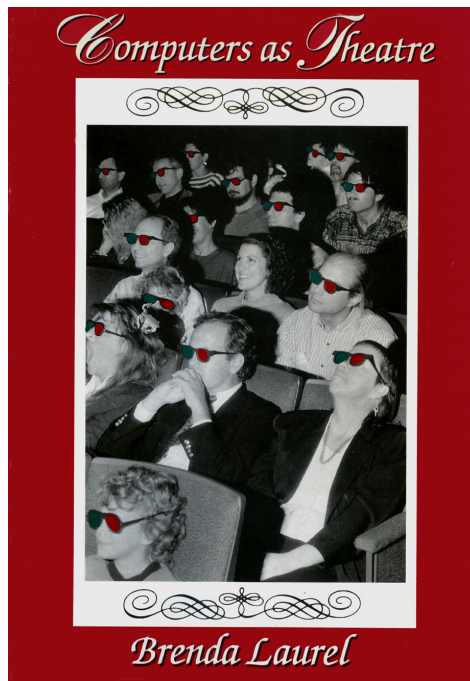
THE WORLD, GAIA, & EVERYTHING

**DREAM**

OF THE STRANGE NEW WORLDS YOU CAN ENTER

RUN FOR YOUR LIFE

LET'S BEGIN



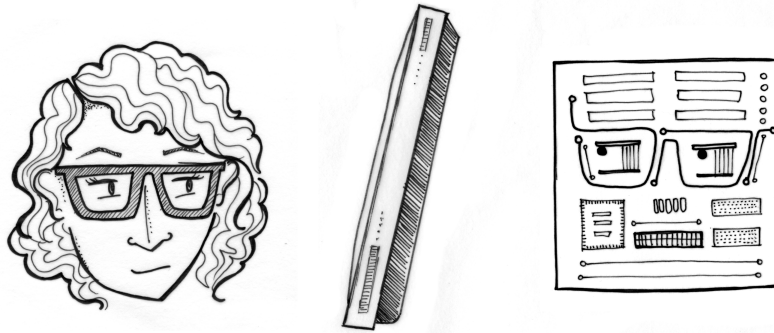
*Computers as Theatre* was first published by Addison-Wesley in 1989. 25 years later, a second edition was published by Pearson Press in paper and e-book form. The e-book version is available on Amazon. Working on the second edition gave me the opportunity to re-evaluate the original text and to add material that traverses terrains of new media and new configurations of human-computer interaction and experience design.

The cover art for the second edition was designed by the inestimable Martin Venezky and the illustrations were designed by Verna Bhargava Swelha, a star former student with a burgeoning professional career. Many more folks whose work and knowledge have contributed to the book and to my continuing growth as a theorist and practitioner are noted in the Acknowledgments section of the book.

I have secured the rights to the book from the publisher and will be offering it here for free as soon as I've re-formatted it, but for now I'm providing a taste from Chapter 1. I hope you will be intrigued.

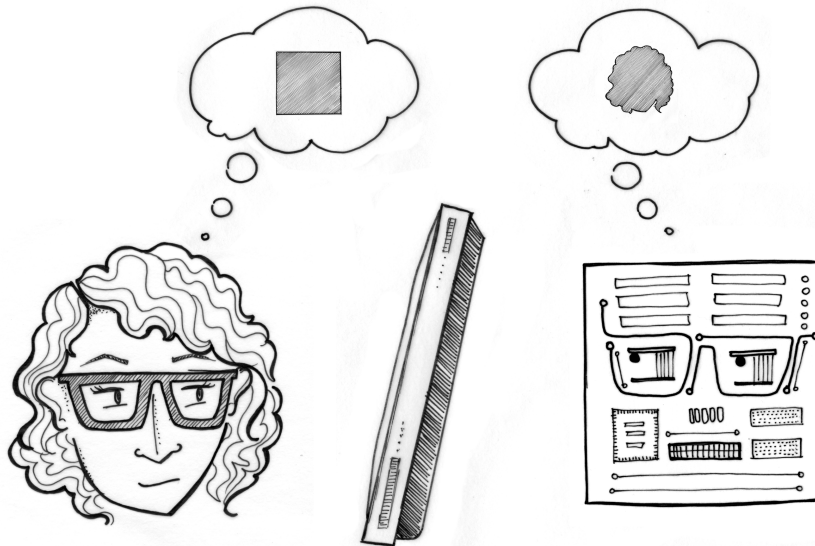
## Models of the Interface

The interface seminar group at Atari Systems Research Labs began by looking at how the concept was typically understood by people in the computer field. Figure 1.1 shows a schematic model of the interface. The shaded rectangle in the middle represents the interface, and it was seen to include what appears on the screen, hardware input/output devices, and their drivers.



**Figure 1.1.** *The pre-cognitive-science view of the interface.*

Compelling as its simplicity might make it, this model was immediately dismissed by everyone in the group. In order for an interface to work, the person has to have some idea about what the computer expects and can handle, and the computer has to incorporate some information about what the person's goals and behaviors are likely to be. These two phenomena—a person's mental model of the computer and the computer's 'understanding' of the person—are just as much a part of the interface as its physical and sensory manifestations (see Figure 1.2).



**Figure 1.2.** *The 'mental models' view. The thought bubbles and their contents are considered part of the interface.*

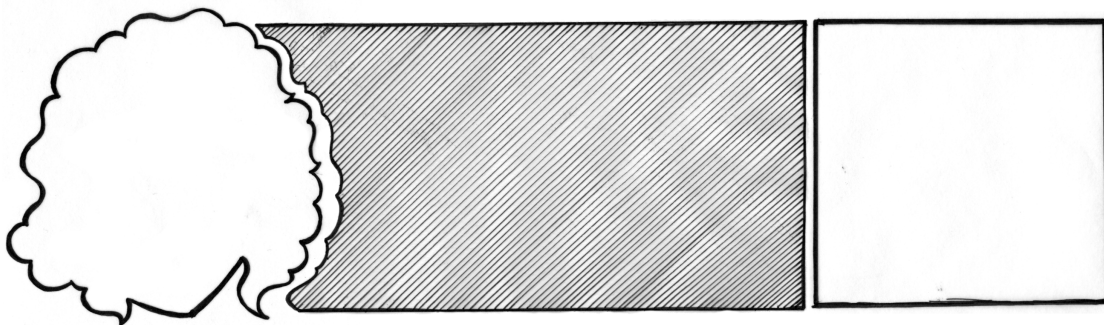
But in order to use an interface correctly, a person must also have an idea of what the computer is 'expecting' her to do. If you are going to admit that what the two parties 'think' about each other is part of what's going on, you will have to agree that what the two parties think about what the other is thinking about them must perforce be included in the model (see Figure 1.3). This elaboration has dizzying ramifications.



**Figure 1.3.** *The 'horrible recursion' version of the mental-models model of the interface. More bubbles could be added ad infinitum.*

Faced with this nightmare, the group at the Atari Lab abandoned the topic and turned their attention to more manageable concepts, such as the value of multisensory representations.

Over the years, I have frequently observed interface workers backing away from such gnarly theoretical discussions in favor of the investigation of more tractable issues of technique and technology—such subjects as direct manipulation, ‘user’ testing, on-line help functions, animation, and sound and speech, gesture, body-tracking and facial recognition. These areas contain hard problems and add greatly to the potential for interface design, but they do not necessarily advance the theoretical conversation. The working definition of the interface has settled down to a relatively simple one: how humans and computers interact—but it avoids the central issue of what this all means in terms of reality and representation.

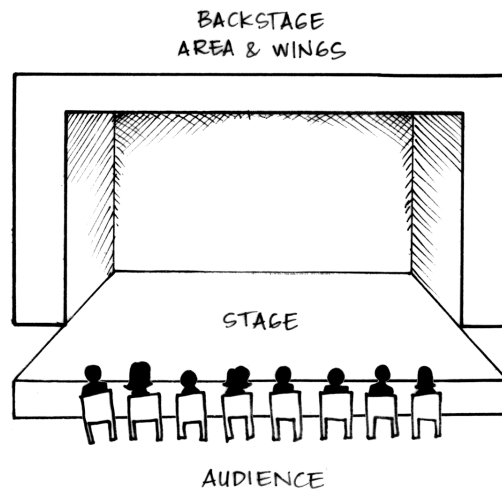


**Figure 1.4.** *A simple model of the interface, circa 1989. In this view, the interface is that which joins human and computer, conforming to the needs of each.*

It occurs to me that when we have such trouble defining a concept, it usually means that we are barking up the wrong tree.

## The World's a Stage

For purposes of comparison, let's take a look at the theatre. We have observed that the theatre bears some similarities to interface design in that both deal with the representation of action. Theatre, unlike novels or other forms of literature, incorporates the notion of performance; that is, plays are meant to be enacted.<sup>1</sup> Enactment typically occurs in a performance area called a stage. The stage is populated by one or more actors who portray characters. They perform actions in the physical context provided by the scene and light designers. The performance is typically viewed by a group of observers called an audience.



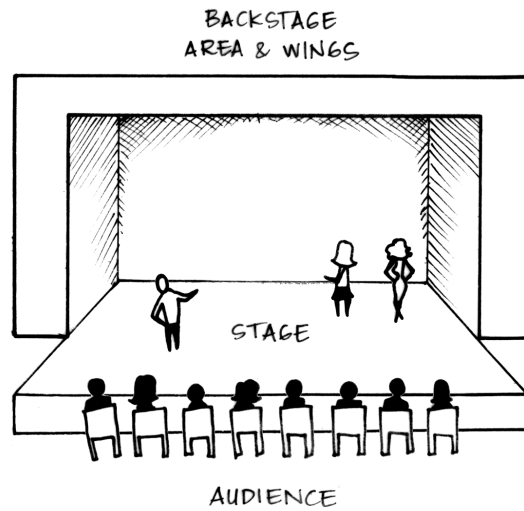
**Figure 1.5.** *A typical proscenium theatre.*

Part of the technical magic that supports the performance is embodied in the scenery and objects on the stage (windows that open and close; teacups that break); the rest happens in the backstage and wing areas (where scenery is supported, curtains are opened and closed, and sound effects are produced), the loft area above the stage, which accommodates lighting instruments and backdrops or set pieces that can be raised and lowered, and the lighting booth, which is usually above the audience at the back of the auditorium. The magic is created both by people and machines, but who, what, and where they are do not matter to the audience.

It's not just that the technical underpinnings of theatrical performance are unimportant to audience members; when a play is working, audience members are simply not aware of the technical aspects at all. For the audience member who is engaged by and involved in the play, the action on the stage is all there is. In this sense, plays are like movies: when you are engrossed in one, you forget about the projector, and you may even lose awareness of your own body. For the actor on stage, the experience is similar in that everything extraneous to the ongoing action is tuned out, with the exception of the audience's audible and visible responses, which are often used by the actors to tweak their performance in real time (this, by the way, reminds us that theatrical audiences are not strictly passive and may be said to influence the action). For actor and audience alike, the ultimate reality is what is happening in the imaginary world on the stage—the representation.

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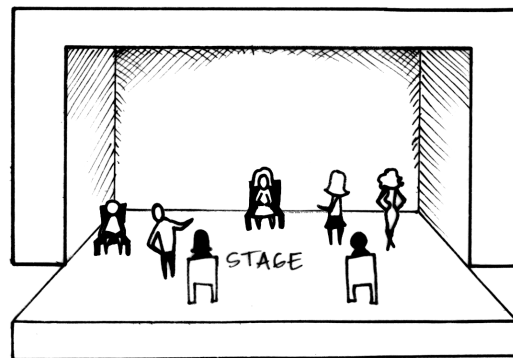
<sup>1</sup>In his book *The Elements of Friendly Software Design* (1982), Paul Heckel remarks, "When I design a product, I think of my program as giving a performance for its user."



**Figure 1.6.** *For the audience, what's happening on the stage is all there is.*

As people grapple with the notion of interaction in the world of computing, they sometimes compare computer users to theatrical audiences. 'Users', the argument goes, are like audience members who are able to have a greater influence on the unfolding action than simply the fine-tuning provided by conventional audience response. In fact, I used this analogy in my dissertation in an attempt to create a model for interactive fantasy. The user of such a system, I argued, is like an audience member who can march up onto the stage and become a character, shoving the action around by what he says and does in that role.

But let's reconsider for a minute. What would it be like if the audience marched up on the stage? They wouldn't know the script, for starters, and there would be a lot of awkward fumbling for context. Their clothes and skin would look funny under the lights. A state of panic would seize the actors as they attempted to improvise action that could incorporate the interlopers and still yield something that had any dramatic integrity. Or perhaps it would degenerate into a free-for-all, as performances of avant-garde interactive plays in the 1960's often did.



**Figure 1.7.** *Putting the audience on the stage can create confusion.*

The problem with the audience-as-active participant idea is that it adds to the clutter, both psychological and physical. The transformation needs to be subtractive rather than additive. People who are participating in the

representation aren't audience members any more. It's not that the audience joins the actors on the stage; it's that they become actors—the notion of observers goes away.

In this view, the 'stage' is a virtual world. It is populated by agents, both human and computer-generated, and other elements of the representational context (windows, teacups, desktops, or what-have-you). The technical magic that supports the representation, as in the theatre, is behind the scenes. Whether the magic is created by hardware, software, or wetware is of no consequence; its only value is in what it produces on the 'stage'. In other words, *the representation is all there is*. Think of it as existential WYSIWYG<sup>2</sup>.



**Figure 1.8.** *An alternate view of human-computer interaction, in which the representation is all there is. The shape of the 'stage' is oval, like the beam of a spotlight, to suggest that all that matters is that which is 'illuminated'.*

## Theatre: More than an Interface Metaphor

The idea of enabling humans to take action in representational worlds is missing in most attempts to use theatre simply as an interface metaphor. A central goal of this book is to suggest ways in which we can use a notion of theatre, not simply as a metaphor, but as a way to conceptualize human-computer interaction itself.

Focusing on human agency allows us to simplify another perpetually problematic concept, the notion of interactivity. People in the computer game business have been arguing about it for decades. In 1988, the first conference aimed at bringing together people from all sectors of the interactive entertainment business took place in New York<sup>3</sup>. People came from such diverse industries as personal computers, videogames, broadcast and cable television, optical media, museums, and amusement parks. Over the course of the two days, a debate about the meaning of the word "interactive" raged through every session, disrupting carefully planned panels and presentations. People seemed to regard "interactivity" as the unique cultural discovery of the electronic age, and they demanded a coherent definition. Several speakers tried to oblige, but no one succeeded in presenting a definition that achieved general acceptance. Many participants departed angry and dissatisfied. Such conversations persist today, at ACM SIGCHI, South by Southwest Interactive, the Game Developers' Conference and many others. It has also become the topic of dozens— if not hundreds—of books. The conversation has become much more diversified and nuanced, but the nature of interactivity continues to generate new theories and controversies (see, for example, Dubberly et al. 2009).

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<sup>2</sup>WYSIWYG stands for the rubric, "what you see is what you get", coined by Warren Teitelman at Xerox PARC. It has been held up as a paradigm for direct-manipulation interfaces, but some theorists have contested its value (see, for instance, Ted Nelson's article, "The Right Way to Think about Software Design" in *The Art of Human-Computer Interface Design*).

<sup>3</sup>INtertainment was an annual conference sponsored by Alexander Associates.

In the past, I posited that interactivity exists on a continuum that could be characterized by three variables: frequency (how often one could interact), range (how many choices were available), and significance (how much the choices really affected matters) (Laurel 1986a and b). In his book *Expressive Processing* (2009) Noah Wardrip-Fruin gives us a good test for significance: “what changes to the state of the system and influence on future operations can be produced by this interaction”? A not-so-interactive computer game judged by these standards would only let you do something once in a while, only give you a few things to choose from, and the things you could choose wouldn't make much difference to the whole action (or produce significant changes to the state of the underlying system). A very interactive computer game (or desktop or flight simulator) would let you do something that really mattered at any time, and it could be anything you could think of.

But these variables provide only part of the picture. There is another, more rudimentary measure of interactivity: you either feel yourself to be participating in the ongoing action of the representation or you don't. Successful orchestration of the variables of frequency, range and significance can help to create this feeling, but it can also arise from other sources—for instance, sensory immersion and the tight coupling of kinesthetic input and visual response. If a representation of the surface of the moon lets you walk around and look at things, then it probably feels pretty damned interactive, whether your virtual excursion has any consequences or not. It's enabling a person to act within a representation that's important. Optimizing frequency, range and significance in human choice-making will remain inadequate as long as we conceive of the human as sitting on the other side of some barrier, poking at the representation with a joystick or a mouse or a virtual hand. You can demonstrate Zeno's paradox<sup>4</sup> on the 'user' side of the barrier until you're blue in the face, but it's only when you traverse it that things get 'real.'

Wardrip-Fruin (2009) suggests an alternative to sensory immersion as a way to intensify the experience of interactivity. He argues for “systems that more clearly communicate their structures to audiences.” In what he calls “the *SimCity* effect”, the experience of interaction is enhanced, paradoxically, when players incrementally build “a model of the system's internal processes based on experimentation”. This model brings players' initial expectations into line with the capabilities of the game, dissolving an important barrier to successful (pleasurable) interaction.

The experience of interactivity is a 'thresholdy' phenomenon, and it is also highly context-dependent. The search for a definition of interactivity diverts our attention from the real issue: how can humans participate as agents within representational contexts? Actors know a lot about that, and so do children playing make-believe. Buried within us in our deepest playful instincts, and surrounding us in the cultural conventions of theatre, film and narrative, are the most profound and intimate sources of knowledge about interactive representations. A central task is to bring those resources to the fore and to use them in the design of interactive systems.

So now we have at least two reasons to consider theatre as a promising foundation for thinking about and designing human-computer experiences. First, there is significant overlap in the fundamental objective of the two domains—that is, representing action with multiple agents. Second, theatre suggests the basis for a model of human-computer activity that is familiar, comprehensible, and evocative. The rest of this book will explore some of the theoretical and practical aspects of theatre that can be directly applied to the task of designing human-computer experiences. But there are a few more stones to be turned in arranging the groundwork for this discussion.

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<sup>4</sup>Zeno's paradox (called the theory of limits in mathematics) says that you can never get from here to there because you can only get halfway, then halfway of halfway, etc. Mathematics offers a solution; so does common sense. But the paradox is compelling enough to have interested logicians and mathematicians for centuries.