In Cassell, J. & Jenkins, H. (Eds.). (1998). *Barbie to Mortal Kombat: Gender and Computer Games*. (pp. 298-326). Cambridge, MA: MIT Press

Storytelling as a Nexus of Change in the Relationship between Gender and Technology: A Feminist Approach to Software Design

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> Narrative might well be considered a solution to a problem of general human concern, namely, the problem of how to translate *knowing* into *telling*, the problem of fashioning human experience into a form assimilable to structures of meaning that are generally human rather than culture-specific. (White, 1981)

> Women repeatedly used the metaphor of voice to depict their intellectual and ethical development; and for them the development of a sense of voice, mind, and self were intrinsically intertwined. (Finke, 1993)

What Girls Really Want and Who They Really Are

Recently, at a large technical computer conference where I was giving a talk on the nature of play and how to design computer games in such a way that children could appropriate technology to their own ends, a Very Famous Person stood up and made a Very Critical Remark. I had just finished describing one of the systems that my students and I have built within the framework of feminist software design—a storytelling system that encourages children first to program a computer persona to represent the wise old person of the child's own culture, and then to tell to that person the story of their lives, and the problems that they are currently facing. The VFP stood up and said, "Justine, why are you training children to entertain computers? And, besides, you are taking away the job of mothers, to listen to children." I was thrilled that this VFP knew my name, but dismayed that he understood the act of constructing one's ideal listener, and then telling the story of one's life to that listener, to be no more than entertaining a computer (let alone that he believed that the sole job of mothers—and only of mothers—was to listen to their children). The work that my students and I have done is largely about allowing children to entertain *themselves* and, in the process, to engage in the serious business of learning about themselves, constructing a social identity, and collaborating with others in the process of understanding that identity, all the while attaining technological fluency. Girls tend to like the computer games we build, but so do boys. This chapter is about the kind of software that asks children to do the entertaining, about its politics and its practice: about how we build girls'

games in such a way that the game itself participates in the construction of a child's gender and other aspects of the self, without a preconceived notion of what a girl is.

The premise underlying much of the critical analysis and industry work presented in this volume is that it is a good thing for girls to begin to use computers at a young age. This premise is well supported by reports of how much more likely boys are than girls to use a computer at home, participate in computer clubs or activities at school, or attend a computer camp; by evidence of the links between early computer use and later career choices involving technology; by the current paucity of women designing technology; and by the increasing technologization of work (see Cassell & Jenkins, this volume, for a discussion of these trends). For these reasons (or because a large segment of the market is not purchasing their products), software designers have turned to software that girls will use. And these types of software have been lumped under the title "girl games."

Much of what we read concerning this new software for girls describes how important it is to know what girls really want (each company's extensive focus-group testing shows, as Philips Media Home president Sarina Simon puts it, 'this is what girls want' (Tanaka 1996)), and how girls play ("years of research into gender differences in play patterns show that boys, in general, like competitive win-lose situations, high scores and body counts. It's almost the opposite for girls"). When we read about these efforts, we may worry about *which* girls and *which* vision of girls. But all of this research assumes that there is a gender of "girl"—as if what "girl" is is static and ontological rather than dynamic and performative. And yet much research in the social sciences has come to see gender as *constituted* rather than preexistent. That is, "the notion of gender centers on the premise that the notions of men and women/male and female are sociocultural transformations of biological categories and processes (Ochs 1992, p. 339). And, further, these sociocultural transformations are not constant across an individual's lifespan, or across the different contexts in which one acts, but rather, "[O]ne's experience of gender emerges in participation as a gendered community member with others in a variety of communities of practice (Eckert & McConnell-Ginet 1995, p. 469).

Gender, then, involves possibilities that are always in flux and that are determined by many things (race, class, age, peers, immediate context). Thus, the kinds of activities that have been described as "what girls really do" are not neutral or isolated acts but part of the construction of a complex identity. In this case, we might argue that designing "games for girls" misses the point. If we come up with one activity, or complex of activities that girls want, then we know that we must have only tapped in to one context in which girls are girls. To avoid this paradox, and to create access to computers for children who engage in a variety of gendered activities, we must expand the range of the activities that are available. In fact, we might wish to use the computer as the very site for children to make meanings, express themselves, and play out the range of identities that will constitute themselves. That is, children can use computers in order to try out identities and to explore the possibilities of expression, in such a way to make sense of their social sphere and develop an understanding of themselves.

How do we design in such a way that children can do gender and other social constructions of identity? One approach is Kinder's work (this volume), where the user chooses parameters of gender, and the parameters are explicitly split from one another (sex, gender identity, appearance). I wish to propose an alternative approach, one in which children or users of technology do not explicitly specify their gender. Rather, the technology participates in children's

construction of their own gender identity just as it does in the construction of their identity as a whole, by asking them to tell the story of who they are. This approach has two theoretical antecedents: the first, briefly described above, is the postmodern view of gender as *performative*—socially constructed and yet capable of being explored on a personal level and *played* in different ways in different contexts (Butler 1990; Sedgewick 1993). The second theoretical antecedent is feminist pedagogy, which claims that there exist alternative but equal views of reality, that the importance of experiential as well as objective knowledge must be admitted, that in all organizations—indeed in all structures—authority must be distributed among the participants, and that collaboration is essential to all work and play. Here "feminist" does not mean "for women" but "from the feminist movement," and is seen as benefiting both boys and girls.

If we rely on such an approach to design computer games for girls, what might be the best genre for our games? Many games for girls are educational (often for historical reasons having to do with how game designers see girls; see Cassell and Jenkins, this volume), many entail play situations that have traditionally been associated with girls such as those involving dolls, horoscopes, clothing, and make-up. I argue that the ideal playing field for the construction of self is storytelling and other kinds of narrative activity. That is, one very important way for children to learn about themselves, and to construct their selves, is through first-person storytelling and other kinds of participatory narratives. As Ochs and Taylor (1995) write, "[G]ender identities are constituted through actions and demeanors. . . among other routes, children come to understand family and gender roles through differential modes of acting and expressing feelings in narrative activity" (p. 98).

Many of the new computer games for girls involve narrative, including "American Girls," Purple Moon's titles, "Barbie Storyteller," and Her Interactive's "McKenzie & Co.," and "Chop Suey." The narratives are stories familiar to girls in the target age groups, with characters that girls can relate to. Why do these narratives not suffice, then, to allow the child to construct a flexible and performative gender identity? Why are they so specifically games for *girls*, rather than for girls to be who they wish? First of all, many of the games for girls have been designed to exclude or turn off boys (and hence girls who do not fit stereotypical notions of girlhood?). Second, these narratives are not about the child's own self, nor are they flexibly designed to allow a range of gendered constructions. Some, such as "American Girls," are designed simply to tell a traditional story of "girlhood" to an all-too-familiar type of ideal "girl" audience. Other software, such as Purple Moon's "Rockett's New School" or Her Interactive's "McKenzie & Co.," instead allow girls vicariously to enact the roles in the stories—to imagine that they are the heroine, or the heroine's friend, and to exercise their social intelligence to make the story proceed in a particular direction. There is also software, such as "Chop Suey," that encourages girls to act as explorers to learn more about the subplots in the story, and the setting. Some of these stories are quite strong narratively, and quite engaging. Purple Moon's stories deal with issues of the self in sensitive and reflective ways, clearly reflecting Laurel's philosophy that, "Stories are wonderful gifts. They're empowering for the teller and the hearer" (Laurel, this volume). No matter how engaging, however, the stories are about the lives of imaginary characters and not the user. And the user always plays the listener, and never the teller of the tale. A story that a child tells herself will always be the most active construction of the child's self. This does not mean that the experience of being a listener is not without value. For reading (or watching) is also an active

process, of appropriation and reflection, and self-making. Stories by others may be resources for storytelling and for constructing oneself through stories, but the teller of the tale holds the power of construction—of meaning-making—in her hands. Of course, CD-ROMs, and the concept of book on which they are based, are meant to be professional fiction, aesthetically crafted by artists and writers. However, telling a story to girls via a CD-ROM, whether or not the story is appealing to girls, or familiar, or important, still maintains the locus of control in the designer of the software, who decided what story to tell. An approach consonant with construction of social identity would give girls the role of narrator and also allow them to choose whether to be the subject of the narration—that is, to give them voice. This would let them tell whatever story they like, while the computer constructed a willing listener. In this case we only risk having the child tell a narratively unprofessional story, which might not be aesthetically appealing to the everyday listener. But it is the child's own story, told in the child's own voice. It is a way for a child to represent his or her unique perspective on the world—the first-person perspective—to the world.

In fact, such an approach mirrors the "linguistic turn" (Fraser, 1994) in social theory, including theory of gender. Here it is claimed that language is fundamental, indeed unique, in constructing social reality. That is, reality as described in language is given more weight than any objective reality. So giving the child the role of narrator and asking her to tell any story she chooses is asking her to create the world and her existence, in language.

This chapter is centered around two main points. First, I'm proposing a feminist vision of game software design as a space in which authority can be distributed to users, by allowing most of the design and construction to be carried out by the user rather than the designer—in fact, to have the game be *about* design and construction.[1] Secondly, I'm proposing that interactive storytelling games be the field on which we practice feminist game software design, because telling one's own stories and constructing one's own storytelling software can allow the finding of one's voice, a key way to distribute authority, and an important tool to give to girls (and to boys).

What Is a "Feminist Approach"?

The terms "feminism" and "feminist" have, for some, acquired a negative connotation recently, and the authors represented in this volume are as divided as the general population. (See, for example, Gesue.) At a recent talk that I gave on feminist software design, an audience member asked afterwards whether, if I was mainly interested in getting my ideas across, I could simply drop the label "feminist." I replied that I saw the label and the content as intrinsically linked. An hour later, he found me in the hall and gave me a carefully constructed sign: the suffix *-ism* inside a circle with a red bar across it. "You just don't realize how many people you have upset by using the term 'feminist,'" he said.

The modern feminist movement arose out of and alongside the civil rights and peace movements of the 1960s. The feminist movement fights for political, economic and social equality between men and women. As part of feminism's challenge to male hegemony, feminists have developed radical methodologies for studying social structures and instituting change. These methodologies,

[1] While the feminist approach proposed here has many points of intersection with user-centered, or participatory design, it differs here: participatory design brings users in during the design of a system, and then sends the system off to be built by experts. Feminist software design, on the other hand, makes the system about design, so that the design and construction cycle continues into the use of the system itself.

which may be called the "feminist approach," in recent years have been brought to bear on education, linguistics, philosophy, history, and many other disciplines. Feminist approaches share some of the following themes:

- A rejection of "the desirability or even the possibility of value-free research" (Weiler 1988). That is, it is impossible to factor out the point of view of the researcher in studying a particular problem.
- A focus on the subjective, experiential, everyday lived experiences of individuals. Thus, a feminist approach moves away from objective single-truth-oriented beliefs about the world.
- A strong emphasis on collaboration, which is seen as a key value in the construction of political movements and alliances between researchers in sometimes different fields. Collaboration in this context is often contrasted with competition, but *conflict* is not excluded (Jarratt 1991).
- An attempt to showcase a multiplicity of viewpoints and perspectives.
- An attempt to promote the distribution of authority among the members of a community. In particular, feminist research attempts to correct traditional imbalances of power between researcher and researched, teacher and students, and so on.

It is important to note that none of these themes pertains exclusively, or even particularly, to gender. Feminist approaches may be applied to any kind of hegemonic practice.

What Is Feminist Pedagogy?

Feminist pedagogy applies the tenets of feminist research to the practice of education. Feminist pedagogy is perhaps the domain in which the tenets of feminism have had the most success in changing institutions. Feminist teachers have wrought changes in the American classroom since the mid-1960s. Feminist pedagogy relies on the premise that authority should not be found primarily on the teacher's side of the desk (Lewis 1993). The feminist teacher says, "I am an expert, but I am not the only expert." Feminist pedagogy also strives to institute structures of collaboration in the classroom, despite the realities of grading individual performance. Feminist pedagogy teaches that theorizing can be based on the experience of real people with different experiences. In *Women's Ways of Knowing*, Belenky et al. (1986) argued that

> educators can help women develop their own authentic voices if they emphasize connection over separation, understanding and acceptance over assessment, and collaboration over debate; if they accord respect to and allow time for the knowledge that emerges from firsthand experience; if instead of imposing their own expectations and arbitrary requirements, they encourage students to evolve their own patterns of work based on the problems they are pursuing. These are the lessons we have learned in listening to women's voices. (p. 229).

We might summarize these principles as follows:

- Transfer authority to the student
- Value subjective and experiential knowledge
- Allow a multiplicity of viewpoints
- Give the student voice to express the truth of her life as she experiences it

- Encourage collaboration

What Is Feminist Software Design?

If we extrapolate the principles of feminist pedagogy to the design of technology, we arrive at the following tenets:

- Transfer design authority to the user
- Value subjective and experiential knowledge in the context of computer use
- Allow use by many different kinds of users in different contexts
- Give the user a tool to express her voice and the truth of her existence
- Encourage collaboration among users

Thus, as in feminist pedagogy, where the authority is distributed throughout the classroom, in feminist software design, it is not the technologist who retains authority—or design-principles—but the user, who is given a free hand in deciding the use and structure of the game (but is not abandoned alone with the technology). Rather than positing an intrinsic link between computers and math and science, feminist software design looks for intrinsic links between computers and subjective and experiential topics such as storytelling. Likewise, rather than insisting on one right answer—one path through the software, for example—feminist software design conceives of users as diverse, and their paths through technology as equally diverse (this principle is well expressed by Turkle and Papert 1990). Feminist software design concentrates on the computer as a tool of expression, or a mirror of the self (Turkle 1984). And, finally, feminist software design looks for ways to allow many users to collaborate.

The vision of feminist software design that I am proposing here has several points of contact with other current perspectives on the design of new media. In terms of politics, and in terms of the types of collaborative tools envisaged, feminist software design is similar to user-centered, or participatory design. Participatory design, like feminist research, is not a single theory or technique for accomplishing software design. Rather, it is a set of perspectives that share concern for a "more humane, creative and effective relationship between those involved in technology's design and its use" (Suchman 1993). The goal of the participatory design movement is to encourage active participation in the design process by people using computer systems, and to make this participation empowering (Greenbaum and Kyng 1991). The movement grew out of the realization that, whereas in the early days of digital technology engineers were designing technology for other engineers, today's end users may not have the same goals or practices as the designers of their technology. In practical terms, this stance translates into conceiving of users as an essential part of the design team, and therefore bringing them in early during the design phase of new technology. In practice, the tools of participatory design are frequently used to design collaborative technologies. Examples are the successful Whiteboard technology that allows two architects, artists, or other designers to see each other's designs, and CommonSpace, software for collaborative writing. The points of contact between participatory design and feminist software design are not surprising given their political commonalities—both raise questions about democracy, power, and control in the workplace (Balka 1996)— and the participation of many

feminists in the founding of participatory design (Suchman 1991).[2] However, while advocates of participatory design do bring users into the lab early in the product-development cycle, the product itself is still constructed in the absence of the users, and no commitment is expressed to making a product that allows different kinds of uses by different users at different moments.

Another approach, that does advocate users' construction of their own technology is *constructionism* (Papert 1980). Born of constructivism—Piaget's theory of cognitive development—constructionism claims that children are likely to have access to more and different kinds of new ideas when they are building things that they can reflect on and share with others in their learning community. The constructionist theory has been applied to math and science education, and more recently to learning about computation. Mitchel Resnick and his colleagues have given children computational construction kits that support children's design and construction of their own projects using on-screen software and also minicomputers embedded in small Lego constructions (Resnick et al 1996). Kafai (this volume) has extended the paradigm to the design and construction of educational video games. Constructionist technology design shares with the feminist software design principles proposed here an emphasis on personal appropriation of programming, and of technology in general (Papert 1980). Examples of software built within this framework include educational software such as Logo, which supports direct manipulation and creation of computational artifacts as well as reflection about the programming process. Starlogo is an extension of Logo that allows parallel processing and invites children to create and reflect on decentralized systems. All of these tools leverage children's understanding of the world to help them learn how to program, and use children's increasing understanding of programming to change their understanding of the world. However, the kinds of computational construction kits proposed to children have focused heavily on science, math, and computer science, and not on literature, culture, or self-knowledge. Math, science, and computer science are fields where objective truth is very much privileged, and for the most part where experiential knowledge is given little place.

What Is Storytelling and What Function Does it Serve?

I have argued that we must look to feminist pedagogy for a way to make software support experiential, first-person, collaborative activity that encourages finding one's voice. Now, I turn to the second part of the argument, that we must look to narrative for the specifics of that activity: allowing children to tell their own story. Computer environments can encourage people to share their personal stories, if we as designers of technology can set the appropriate context.

First, however, I lay out three functions of storytelling that make it a nexus of change in the relationship between gender and technology: informing others about our beliefs or experiences, exploring our role in the social world, and defining and negotiating norms that govern our behavior and our participation in communities of practice. I argue that storytelling is an important activity for the construction of self, for the construction of the world, and for the construction of the norms by which we lead our lives, and thus an activity that encourages storytelling is a potential space for the maintenance of an identity that is not a voiceless. In other words, I claim that storytelling might be the *ur*-place to raise one's voice gladly.

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[2] Thanks to Anita Borg for bringing this point to my attention.

During my first semester as faculty at MIT, an undergraduate asked about doing graduate work with me. During our conversation it came out that, after three and one-half years at MIT, she was taking her first course with a female professor. The student confided that until then, she had thought that she was unfit to be an academic herself. But seeing a woman on the other side of the desk had made her think that she could do it, too, and so she now wanted to apply to graduate school. The young woman told me this story in the context of her pleasure at finding out that I was taking graduate students, but I believe she felt the story was appropriate given the conversation we were having about research on gender and science. This kind of storytelling is powerful stuff. The act of confiding has powerful effects on the teller (Pennebaker 1990, Linde 1993); in this instance it created a bond between the teller and the listener (I admitted her as a graduate student) and, as witnessed by its inclusion in this chapter, affected the listener, too. We engage in this kind of storytelling all the time, yet as powerful as it is, and as ubiquitous, it has not had a technological home—there has existed no particular body of technology to support it, enhance it, or engage people in its practice.

I use the term "storytelling" rather than the term "stories" because we are interested here in a four-way relationship among the teller of a tale, the listener, the act of telling, and the tale itself. The literary fields have wished to denude the tale of its relationship with the teller and instead focus on its narrative aspects, and perhaps its effect on the listener. But if our interest is in voice, in giving children the chance to be heard, we must focus more on the production of tales than on their reception. But concentrating on production does not mean that we ignore the essential presence of a listener. All tales are produced for a listener—the storyteller herself or another (Polanyi 1989). Concentrating on production also doesn't mean that we ignore the important experience of consuming other people's stories: it can be incredibly validating to see in print a story similar to one's own, or to recognize aspects of oneself in a television character. In fact, as I will discuss below, it is a powerful experience for children to play both the teller and the listener of a same story. But children are quite often only given the role of listener, as a way of socializing them into the appropriate way to use their voice. Here we give them the role that is least expected. Finally, concentrating on production does not mean that we will ignore the narratives themselves—what the stories convey. Stories can be about events in the world around us, about events that we have experienced, or about the events that take place in our imaginations. In all cases, stories impose a structure on those events so that listeners (including the storyteller) can understand them and take away from them some particular perspective. Stories have these properties because of their essential duality. On the one hand, stories are made up of events that are narrated in a particular order and told from a particular point of view. On the other hand, stories are *about* events that took place in a particular order and were experienced by particular people. The order of events in the telling need not mirror the order of the events themselves, nor does the perspective on events need to mirror the original perspective of the teller. Having the order or perspective not be identical is what creates narrative effects. We build suspense ("what I have not mentioned until now is that..."), give our evaluation of what is happening ("all of this happened this way because..."), and make the story relevant to the interaction at hand ("this reminds me of what happened to us last summer"). These narrative effects, which in most everyday storytelling are included more or less unconsciously, are how tellers explore and convey knowledge and experience. We may use storytelling to inform others about our experiences or beliefs or to get enough distance from those experiences to be able to

reflect on them—what Bruner and Lucariello (1989) refer to as a "cooling off function" of narrative.

Storytelling is also a way to explore the demands of different roles in the social world. As Turner (1981, p. 163) suggests, "narrative is...experiential knowledge." The young woman who came to see me was telling a story about exploring the role of scientist and academic. Through telling stories we can express how children and parents, girls and boys, each are expected to act. This function is apparent in the tales that parents tell about their children ("[My husband] said [to my daughter] 'tell your mother she's a creep' and that's when she said, 'nuh uh, Daddy.' She said, 'You're the creep.'"), and the tales that children come to tell about themselves ("[I] didn't want other kids to play on [the slide]. I want I myself, I myself to play on it") (both examples from Miller *et al*, 1990). In storytelling we can also experiment with developing notions of roles—how we are coming to believe that children and adults act. This function is apparent in pretend play, an early version of storytelling. In fact, pretend play is a kind of coproduced storytelling, in which children share out the character roles and take turns being the narrator: "You be the teacher and I'll be the student, and I'll say I didn't do my homework and then you'll yell at me, and then...." Thus, in storytelling we experiment with, construct, and express our identities. Gender is a key aspect of that identity, and one that we can see young children exploring in their narrative play: "Planning and enacting co-constructed narrative play with same sex peers provides daily opportunities to observe, learn about, transmit and practice gender-stereotyped knowledge as well as others sorts of knowledge about the world" (Sheldon & Rohleder 1996: 629). In sum, storytelling is a means not only for projecting oneself to others, but also for constructing and interpreting aspects of the self.

Thus far I have talked about stories told by individuals, and stories told by pairs (a parent and a child, two children engaging in pretend play). Here I turn to stories that are told by groups of people, that are used to construct loci of power and structures of social organization. Eckert (1993) argues that gossip and "girl talk" serve to keep track of who is—or isn't—behaving in accordance with societal norms, and to create those norms. Thus, "girl talk can be seen as an agent of social change, as well as of social control." Eckert argues that girls in particular engage in this type of monitoring of norms because personal influence, defined as the ability to set behavioral norms and monitor other people's behavior, is women's symbolic capital (as opposed to men's capital, which is defined with respect to their accomplishments, possessions, and institutional status). Girl talk, in this instance, is a way of constructing power.

Compare this description of high school girls, however, with any one of a number of popular books on adolescent girls. Pipher (1994), for example, argues that at adolescence "girls become 'female impersonators' who fit their whole selves into small, crowded spaces." They lose interest in the subjects that they once loved, do less well in school, and in many different ways lose their authentic voices. Girl talk would appear to be a space in which girls can maintain their voices. In fact, as Gal (1991) convincingly argues, many women's genres, and women's everyday talk, manifest "subtlety, subversion and opposition to dominant definitions." Eckert and Gal both argue that language is not only an organ for silencing women, but also a weapon that has belonged particularly to women, as other kinds of power have been denied to them. And although common lore about girls being better at verbal tasks than boys from their first school days has been largely disproved (Sheldon 1993), it has been found that one enduring difference between boys and girls, and men and women, in different cultural and ethnic contexts, has been the

attention that girls pay to the contextualization of language. For example, in looking at fantasy play among three-year-old children, Sheldon (1993) finds that girls focused more than boys on negotiation around pretend play—who would play whom, what each child would say—and in some instances focused on it more than on the play itself. (See also Sachs 1987.) Johnstone (1993) reports similar findings for adult women and men producing conversational stories—women place greater emphasis on who said what. This research shows that the function of voice—who speaks and who says what—is particularly important to girls and women in fantasy play and storytelling, and that it appears to be a site for the construction of power.

Raising One's Voice

The term "voice" in narrative theory has referred to whether an author speaks through a narrator or a character, or speaks as herself—it is intrinsically linked to the notion of *character* in narrative. But popular books on adolescence, and much feminist theory, use the terms "voice," "words," "language" in a metaphoric sense

> to denote the public expression of a particular perspective on self and social life, the effort to represent one's own experience, rather than accepting the representations of more powerful others. (Gal 1991: 176)

The two meanings come together when we consider storytelling as a place where one decides who to be—where one constructs a social self—and where a perspective is maintained on one's own life—where one resists the attempts by more powerful others to silence that perspective. Stories are not only a commonly available means to create, interpret, and publicly project culturally constituted images of self in face-to-face interaction, but also places to defy others' versions of who one is.

I am referring to stories that are told, as opposed to being painted or sung, for example. Stories are, in part, such a powerful vehicle for self-construction because they are told in language. And language is particularly capable of constructing reality because the same thing can be expressed in different ways, with each alternative allying the speaker with a particular community and particular discursive practices.

In sum, storytelling is an important activity for the development of knowledge about the self, particularly in relationship to others. It is where we learn to tell what we know about social interaction and ourselves to others who matter. If narrative is experiential knowledge, as Turner says, then in stories we can learn to know our own experience as primary, we can try out versions of ourselves, we can tell our stories, we can describe our version of the world, and we can learn to trust the value of our perceptions. when the storytelling voice is our own, we retain our perceptions of who we are, in the face of opposition to those perceptions. I am arguing that the way to get voice in computer games is to turn the storytelling over to the player, rather than leading the player through a narrative that others have built. That is, the child should be allowed to be the storyteller and not the story listener, to be the actor and not the acted upon.

What Has Computer Storytelling Been?

As mentioned earlier, many computer games for girls are narrative in nature. In fact, most video games for boys and girls are described as interactive fantasy play, or narrative-based. One might

think, then, that these applications would allow children to engage in the kind of storytelling just described: experiential storytelling that constructs the self through the use of language and the mastery of voice. Why is this not the case? In classically "boy games" such as Nintendo, Fuller and Jenkins (1995) argue that "most of the criteria by which we might judge a classically constructed narrative fall by the wayside when we look at these games as storytelling systems.... The character is little more than a cursor that mediates the player's relationship to the story world...[they are] forms of narrative that privilege space over characterization or plot development." The user is invited to imagine himself the hero, conquering bad guys galore, but there is no narrator. In the case of the new girl games, as described above, many are "spatial stories" ("Chop Suey," for example; see Jenkins, this volume). The spatial story, as Fuller and Jenkins convincingly argue, is a valid narrative tradition with its own history (and roots in travelogues) and cultural functions. The cultural function of such stories, however, is not the construction of or reflection on the self but rather the experience of conquest, finding new frontiers, and so on.

Others, as discussed earlier, do indeed privilege characterization and problems concerning the construction of self in the social world (for example, Purple Moon's characters' dilemmas about what to wear to school to look cool, who to be friends with, and so on). However, in these cases, the dilemmas are firmly in the third-person. They are certainly relevant to the projected players, but not by any means in the player's own voice.

What about the new genre of interactive fiction? This refers to a short story or novel in a hypertext format, the branching nodes allowing users to read a different story each time by choosing different links. Once again, although there is room for vicarious experience and perhaps, in the better interactive fiction, for an experience approaching that of authorship, there is no place to deploy one's voice, or represent one's self (although some disagree. See the discussion of this point in Don 1990; Laurel 1993). Of course, as Jenkins and also Gailey (1993) have pointed out, children do not always work toward the goal intended by the toy designer. Children may "play crazy" with Nintendo and make characters bounce around the screen. In fact, Gailey suggests that girls may get around the strongly passive stereotypes of women in many video games by seeing themselves as stage managers of the video game narrative rather than adopting the role of key players in the story.

So storytelling with technology is tantalizingly close, and the current alternatives are exactly the places where boys are getting their exposure to computers. If technology can play a role in the storytelling, then perhaps it can play a role in the story as integral to girls' experience—if they wish it so—as theirs.

What Could Interactive Storytelling Be: Storytelling Systems Built on Feminist Principles

Mary Lyons, the founder of the women's college Mt. Holyoke, believed in the fundamental importance of lab courses in teaching science to women. The science courses at Mt. Holyoke are still based on this principle. However, Lyons' position has often been misunderstood to mean that girls are able to deal with the real world only in practical terms. One often hears this same position cited in support of designing games for girls that are based on the real world, and not geared towards the fantastical. (This position is further discussed in the introduction to this

volume.) In fact, what Mary Lyons said was that lab courses were important in teaching girls the independence of their intellect, that their perceptions of the world were valid, and their scientific intuitions valuable. Today, girls and women still can use playing grounds on which to learn to trust their perceptions of the world, their intellect, and their intuitions. And thus the utility of a tool to tell their own stories and hence to find their voices.

In the remainder of this chapter I discuss three of the storytelling tools my students and I have built on feminist software design principles. Our storytelling games are built for research purposes and don't need to meet the exigencies of the market. They do, however, meet the exigencies of the children who come to my laboratory to test them. We provide a storytelling tool that will allow them to test their theories of who they are, with respect to others and with respect to themselves. We intend to give them a lab for story design—and this is how we distribute authority.

The three storytelling tools that I am going to describe differ along the dimensions of first-person or third-person voice, the nature of collaborative activity that is encouraged, and the extent of design activities that are put in the hands of the children.

Renga

Turkle (1986) interviewed women who were struggling with their unwillingness to become hackers, proficient in programming and computer science. In "Computational Reticence: Why Women Fear the Intimate Machine," Turkle claims that their unwillingness arises from women's fear of entering into a relationship with an object: an entity without feelings that might consume their lives and not leave room for social interaction and love. One student, who to her surprise has been very successful in a computer science class, says: "I wanted to work in worlds where languages had moods and connected you with people" (p. 44).

The first storytelling system that I am going to describe has the simple goal of connecting children with one another through a collaborative storytelling activity. This Internet-based system is called "Renga" (http://mythos.media.mit.edu), and it allows for children around the world to tell a story collaboratively in real time. Renga (from the Japanese word meaning, "linked poem" or "linked image") resembles the game played in primary schools in which the class sits in a circle, one child begins a story, and each of the other children adds a sentence. Renga incorporates many of the linguistic, imaginative, and community aspects of the old-fashioned round-robin story, but allows children all over the world to share in the circle. As children type in sentences, they are immediately added to the end of the story. If more than one child submits a sentence at once, a situation potentially threatening to the cohesion of the story, one of the sentences is added where it is intended, and the others are held in a queue and added to the story later according to discourse rules that ensure that the sentence fits in syntactically and semantically. We have begun the story with a seed sentence, "Once upon a time a little girl was sitting in front of her computer," and we end the story once it is so long that children seem to be no longer reading it all before they add their sentence. When one story has been finished, we add it to a page of previous stories that children can read, and begin the story again, with the same seed sentence. The beginning sentence we chose limits very little the directions the story can go in, and also allows children to tell a first-person or third-person story. As shown in Figure 1, some children continued "and she decided to tell a story. She wanted to tell about unicorns and dragons and castles and princesses." Other children, on the other hand, took the "little girl" to

refer to themselves, and continued “when suddenly the computer sucked her in the screen. The computer took her to a magical land with funny animals. I saw amazing things! It was very strange.”

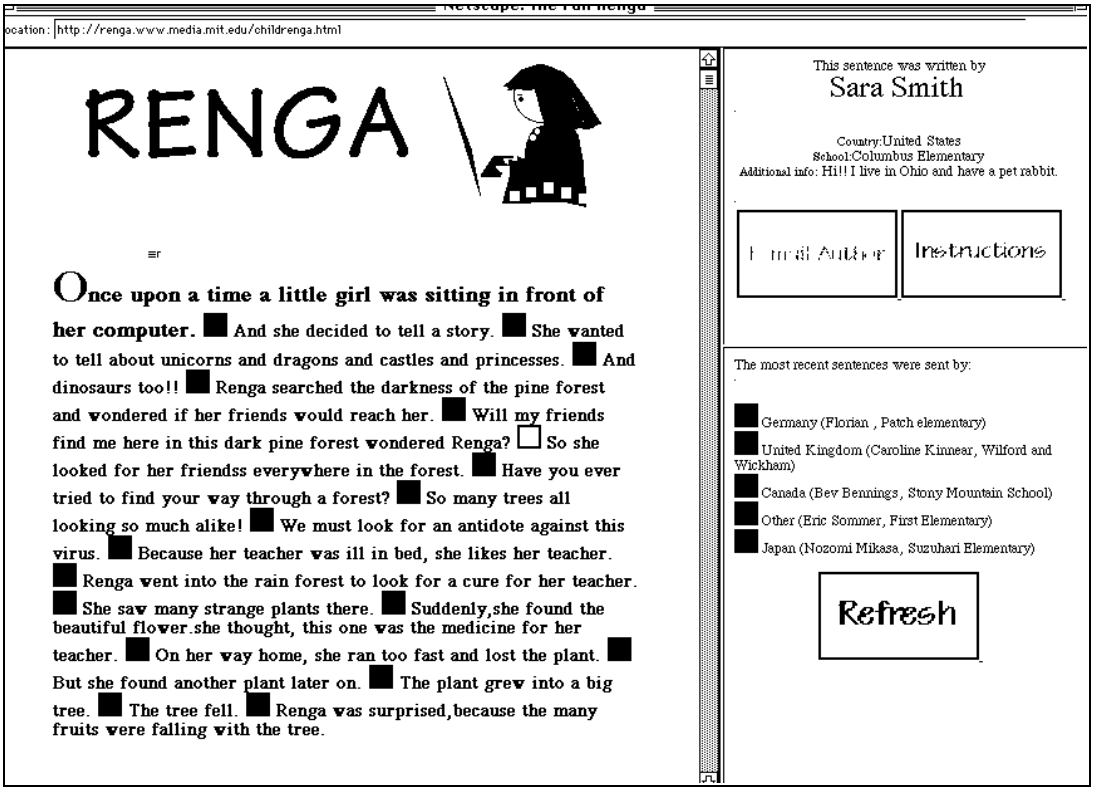

Figure 1: Renga

In our initial introduction of Renga, we invited the participation of every school in the world that had any web presence (214 schools in October 1995). Children from fourteen schools in eleven countries used Renga to collaborate on a story during one twenty-four-hour period in October 1995. While in general children found the system easy to use and enjoyable, our early experiences with Renga led us to realize how hungry for voice children really are. In our first trials with this system we found that, while children were happy to add sentences to the story, they also tended to punctuate the story with statements about themselves. Thus, in the middle of a segment about a little girl running away from a monster in the woods, one girl added, “Hi, I’m Tracy and I like ice cream. I live in Australia. Does anybody else like ice cream.” The realization that collaboration on the story did not suffice, but that children also needed to collaborate on community—on expressing who they were to one another—led us to change the format and add a separate window where information about the author of each sentence is displayed. Clicking on a sentence now reveals information about the child who wrote that sentence, including whatever description of himself or herself the child chooses to add. We also added a list of the last five children who submitted sentences, in order to give children a sense of who is in the “room” at any one time.

Rosebud

This system takes a toy that is loved by both boys and girls—the stuffed animal—(Asakawa and Rucker 1992; Dyl and Wapner 1996) and makes it the child's ally and partner, facilitating the use of technology with which the child may not be familiar and making the computer no longer just a tool but one voice in a multiparty conversation. The stuffed animal is unique in a number of ways that are important for the different kinds of narratives that children (and adults) tell. First, since it represents a sentient being, the child can attribute to the stuffed animal social goals, thus giving the child an imaginary partner to share experiences. Secondly, the stuffed animal plays an early role in the child's narrative life: the listener of children's early stories, the subject of other stories, and the hero of plays put on by groups of children. Thirdly, stuffed animals are solidly gender-neutral toys until preadolescence (at which point boys deny liking them anymore, but often refuse to throw them out). Finally, stuffed animals become keepsake objects that continue to play a role in people's memories.

In the Rosebud system (Glos 1997; Glos and Cassell 1997), the computer recognizes children's stuffed animals (via an infrared transmitter in the toy and receiver in the computer) and asks the child to tell about the stuffed animal or, in a subsequent interaction, calls the stuffed animal by name and recalls what it has heard. The child is asked to tell a story about the stuffed animal, any story at all, with prompts along the way. The computer is an encouraging listener, as well as a teacher, pushing the child to write, write more, edit, and improve. The child is in charge of the interaction, deciding which stuffed animal(s) to play with and what story to tell (see Figure 2). We have found this paradigm of the technologically-enhanced stuffed animal as ally to be a powerful way to engage children in the active use of technology.

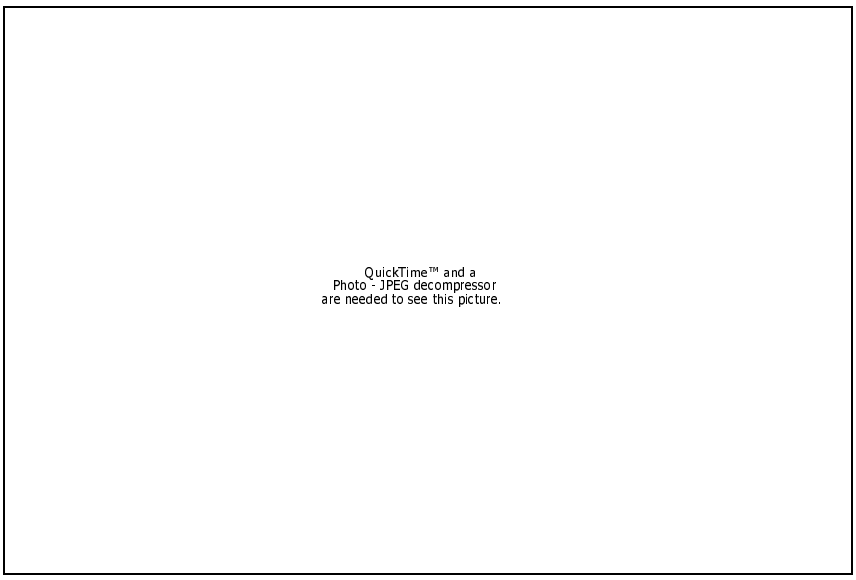

Figure 2: Child using Rosebud to tell a story about Eeyore

The collaboration among child, computer, and stuffed animal ends with the child recording the story in her own voice—the story is saved into the stuffed animal, which can then be asked to repeat the story back to her. Rosebud supports storytelling by one child and one stuffed animal, but also by multiple children each with his or her own stuffed animal, working together. In this

literal sense of "voice," and in the metaphoric sense, Rosebud encourages the establishing of voice through an open-ended storytelling framework. It values subjective and experiential knowledge, as well as participatory creativity, supporting writing of personal stories. It promotes collaborative learning, not only among several users and through peer review, but also by presenting the computer as a supportive learner partner rather than as an authoritative viewpoint, thereby avoiding a hierarchical positioning. Contrary to traditional uses of computers as mathematical machines, Rosebud does not view the child's input as right or wrong, but rather gives only limited structure and guidance. Rosebud focuses on collaboration by allowing multiple-toy use and multiple-author storybooks, so that several children can write a story together about all of their stuffed animals. Likewise, since the toy serves as a storage device, children can trade their stories by lending their stuffed animals to a friend.

Early testing of the Rosebud system focused, among other things, on whether stuffed animals that evoked highly commercialized narratives of their own, such as Pooh Bear and Eeyore, elicited less personal stories than stuffed animals with no commercial or narrative associations, such as a platypus. We found that any stuffed animal was likely to elicit a highly personal, highly emotionally charged story, such as the following story told by a nine-year-old girl playing with a Pooh Bear and an Eeyore:

> Once upon a time a very long time ago there were two friends named pooh bear and eeyore. They liked each other very much and let nothing get in there way. One day eeyore felt sad because his mother passed away. So he went to his good friend pooh bear to ask for advice. Eeyore asked pooh bear and pooh bear said to take it easy and relax. Eeyore said ok I will.

Here the emotional bond that often exists between a child and a stuffed animal appears to be more important than any preexisting identity of the stuffed animal.

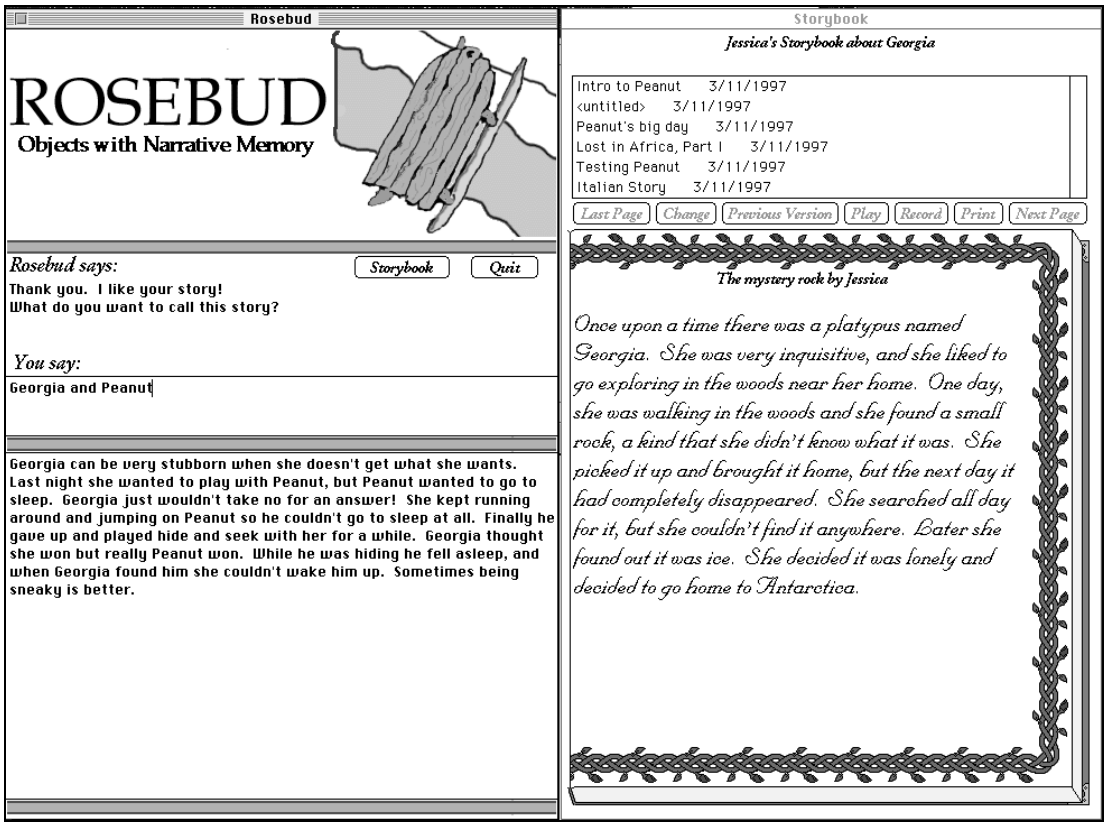

Figure 3: Rosebud screen interface

It should be noted that Rosebud is not the only existing computer application that relies on a stuffed animal or toy as interface device. Actimate's "Barney" and Mattel's "Talk with Me Barbie" both use toys as output devices for the computer, with differing amounts of personalization. Barney can talk to the child about a TV show that the child is watching; Barbie can use answers previously entered into a computer to work into her speech facts about the child such as her name, birthday, and favorite color. In both cases, however, the toy is the speaker and the child is once again firmly in the position of listener. Rosebud puts the child in the role of narrator of her own experience, allowing her an infinite range of narrative possibilities, stretching from telling a story that she has made up about her stuffed animal to telling a story about her experience with her stuffed animal to telling her own story as if it were the story of her stuffed animal (as seems to be the case in the story above).

SAGE

Like Rosebud, SAGE (Umaschi 1997; Umaschi and Cassell, under review) invites children into a three-way interaction among the child, computer, and a stuffed animal. Once again the stuffed animal serves as the child's ally, in this case with respect to a wise old person who lives in the computer and who knows traditional stories. SAGE supports the creation of and interaction with the kind of wise storytellers who always have the perfect story to tell in response to a child's problem. Children can engage with SAGE in two modes: by choosing from a library of sage storytellers and then telling a personal story to that persona, and by creating their own characters

and types of storytelling interactions. In the first mode, children interact with a wise old sage, who asks them their problems, listens, and then offers a relevant traditional tale in response. In the second, children are invited to add to the library of wise old sages by designing their own personal storyteller for themselves and other children to interact with. This dual kind of interaction required implementing a visual programming language that allows children to design and program: the actual words or scripts the storyteller says; the conversational structure or flow of the interaction; the behaviors of the stuffed animal (its body language),which behaves as the storyteller's assistant and the child's ally; and the database of stories that the storyteller draws on to comfort his or her interlocutor. The stuffed animal can be programmed to exhibit some of the types of nonverbal behaviors that humans use to indicate engagement, and that are commonly found in conversational narratives between people. For example, the rabbit nods. Unlike humans, however, the rabbit can also show interest by raising its ears. In interaction mode, children can watch the stuffed animal move as they converse with it. In design mode, children can decide on the toy's communicative behaviors as well as the different personalities and conversational styles that it might demonstrate.

Figure 4: SAGE screen and rabbit

The SAGE system allows children to learn about themselves both through the appropriation of another's story, when they are listening to a traditional tale picked out by the wise old storyteller, and through first-person storytelling, when they are telling their own story to the sage. In addition, the power of children being able to design their own storytellers is that in doing so, they design their ideal listeners. They express those parts of themselves that know how to listen to the stories that they themselves tell. When interacting with one of the sages that we had designed,

children were quick to reveal their problems. In building a sage, children designed that person to whom they wished they could turn with their problems. But it is essential to note that since the children were creating their own characters and databases of stories, they were also playing with different notions of self, and creating or imitating the narrative voices they wanted or needed to hear. Children used the SAGE system to build role models, soothing wise adults, family dogs, and other characters from their inner world. These projections allowed the children to practice presenting themselves to themselves as well as to others. One child built a storyteller called "Big Orange Fox," who, in response to the user's problems, tells stories about hard things that have happened to him. Big Orange Fox interviews the person interacting with him to find out if that person has "school problems, learning problems, teasing problems, subject problems, friendship problems, religion problems, and relative problems." Another child built a storyteller called Mother Nature (Figure 5).

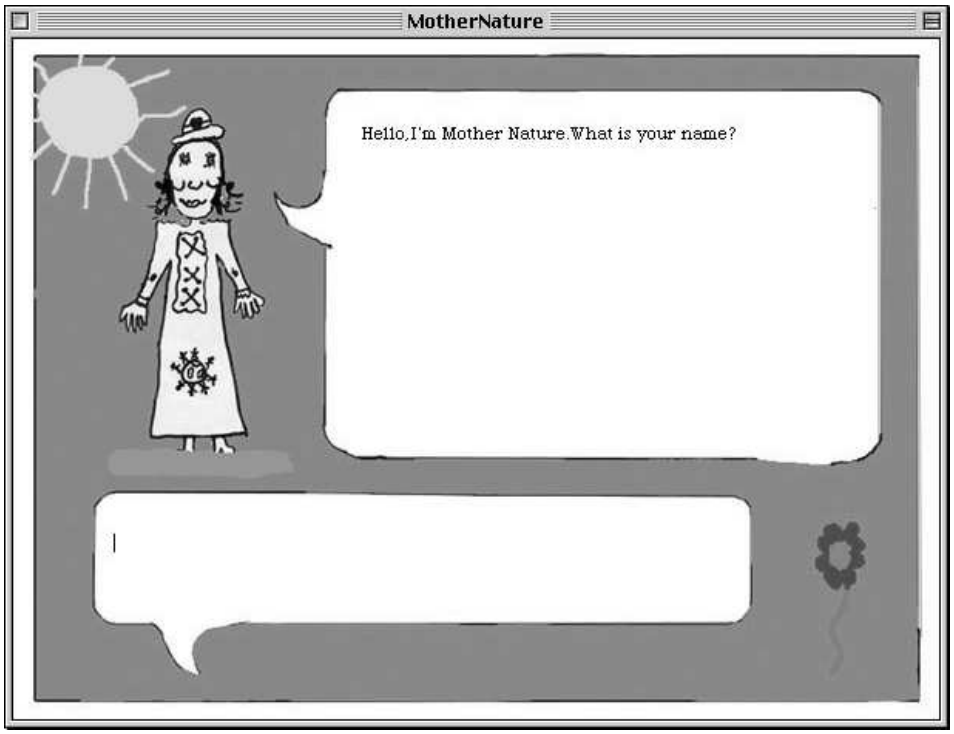

Figure 5: Mother Nature

Mother Nature calls up a myth about nature (written by the child who designed the sage) in response to the user's description of her favorite thing in nature, as shown below:

SAGE: Hello, I'm Mother Nature. What is your name?

USER: Mira

SAGE: I am very old. I am already 3183! How old are you? Please tell me in numbers.

USER: 24

SAGE: Well you're not too old honey! So, do you like to be in nature? I live in it!

USER: yes

SAGE: That is very nice! So have you ever done something good for nature?

USER: yes

SAGE: Oh, OK now I will tell you some stories. First I need you to tell me what your favorite thing in nature is because I might know a story about it!

USER: animals

SAGE: In school Julie had to list all the animals she could list not including insects or sea animals. Julie was a very creative girl and she thought it would be boring just listing them. She wanted to make up a creative story about them. So she asked her teacher if she could. Her teacher, Ms. Corty, said that was fine. As soon as Julie was home she started right on her story about animals. For each animal she wrote an adventure. Her first animal was the dog. Julie loved dogs! The story was about a little dog who could not talk nor make a sound. He thought he had the worst life but he really had the best a puppy could have! Even though he could not talk he had a special talent. He could dance better than any dog or human being. Now he knew this but no one else did. The little puppy thought dogs should not dance so he did dance in an alley where almost no one goes. But one day a super star searcher was doing his job and found the puppy. Soon the little dog was bigger than Michael Jackson! Julie finished the stories of the animals and brought it to school. She got an A+. Julie was so happy! The End!

USER: thanks!

SAGE: I hope you liked my story! I have to go and make it rain in Hong Kong! Good bye.

In using SAGE, children always tell stories in the first person. That person might be the child herself using SAGE in storytelling mode, or might be the child assuming the persona of a character to respond to other people's stories. It is revealing that once children had built a storyteller, they preferred to tell the stories of their problems to the storyteller they themselves had built.

Possible Objections

All this is well and good. But a number of counterarguments come to mind with respect to the arguments presented in this chapter.

First and foremost, one might ask if the computer is indeed the best partner with whom to discover who one is. As I was asked during the talk I gave, why are we training children to entertain computers? Why are we encouraging them to spend their time in front of a screen? Shouldn't children get out more? Shouldn't they spend more time with other children? Shouldn't parents be listening to children's stories? These questions have been asked regularly over the decades as new technologies have been introduced. It was asked of television, and the jury is still out. It was asked of radio, and there probably isn't anybody today who thinks that radio is a danger to the family and the fabric of American society. In a couple of years, the jury will probably rule that television isn't intrinsically a danger to children either. And in a couple of decades, the same ruling will come back with respect to computers. However, whereas television and radio were always output devices, I'm proposing that the computer serve as an input device, that it become a listener to children's stories, to their problems, to their deepest secrets.

Shouldn't parents be playing that role? The truth is that children have never told their deepest secrets to their parents. In the past it was stuffed animals or pillows who listened to children's secrets. Computers have the advantage of remembering the secrets, giving children the option of later sharing those stories with adults or, even later in their lives, remembering the children they once were. In one workshop we ran using the SAGE storyteller, an eleven-year-old boy built a storyteller who told only horrific tales of mutilation, fear, and anger. The boy chose to share the storyteller with his parents, who promptly sat him down to talk about what was going on in his inner life.

What about the emphasis on equity for girls? A recent article in the *Boston Globe* asked if the push for gender equity for girls was hurting boys. Will boys be left behind now that we're spending so much research time on helping girls? Such a backlash response may be a sign that we are forgetting that bringing to girls traditionally male activities—such as science, math, and design of technology—should not be our only goal in designing new kinds of computer activities. Boys have just as much of a need to be given access to traditionally female activities, such as using storytelling to talk about feelings. All children have a need to explore the nonstereotypical aspects of themselves.

Finally, do we need to call this a "feminist" enterprise? Isn't this just humanism? Or computer-supported collaborative work? Or any one of a number of other theoretical stances? To this, I have to reply that feminism's roots have stretched into neighboring fields, such as education and the design of human-computer interfaces. There is no one "feminism," just as there is no one "humanism." But the tenets of feminism have had a powerful effect on how we view relations of power, and they continue to be a useful lens through which to examine the distribution of authority and whose voices are privileged.

Conclusions

I've demonstrated that, based on feminist principles of design, new kinds of storytelling applications can be built for children that extend the range of narrative voices, and narrative activities that the computer can support. I believe that these activities allow a range of girlhoods (and boyhoods) to coexist, ultimately extending the notion of what "girl" is to a more dynamic, context-dependent, performative notion.

Women who show a positive attitude towards computers score higher on masculinity trait scales (Colley, Gale, and Harris 1994). When I interviewed undergraduates at MIT for a research position in gender and technology, several of the young women told me that they were video game enthusiasts, but then again they "hadn't been raised as girls," since they had been given computers to play with from a young age. Such an attitude maintains the gender stereotype ("real girls don't like computers"), and defines oneself as abnormal ("therefore I'm not a real girl"). Real change in girls' attitudes toward computers will be seen when this kind of thinking becomes unnecessary—the definition of "girl" will no longer have anything to do with liking computers. Real change in gender roles in general will be demonstrated by even broader movement—there will be no single narrow definition of "girl."

I'd like to design computer games that are as attractive to girls who love Nintendo as they are to girls who can't stand it. My approach is twofold: to aim for a new generation of toys and games with children as codesigners, in the sense that they can decide the story that they wish to tell and

that the games will listen; and to encourage a new generation of girls and boys who value equally what technology can do and what the narrative self has to offer.

The girls' games movement has brought a change from stories with no representation of girls whatsoever to stories about girls. But these stories often serve to show girls what they are expected to be, and to encourage them to model expected behavior. The next stage in girls' games, as in children's storytelling, is stories that girls choose to tell for themselves.

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