Education V. Entertainment:
A Cultural History of Children's Software
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A few decades ago, the idea of consumer software designed for the education, entertainment, and empowerment of children was barely a glimmer in the eye of a few innovative educators and technologists. In the eighties and nineties, the US saw the emergence of a new category of consumer software designed specifically for elementary aged children, which blended different philosophies of education with genres and technologies drawn from interactive gaming and entertainment. Educators and technology designers experimented in creating a set of new media genres and a commercial sector that have variously been called children's software, learning games, or edutainment. Commercial children's software, designed to be both fun and enriching, lies at the boundary zone between the resilient structures of education and entertainment that structure contemporary childhoods in the US. The history of how children's software emerged as an experimental media category, and its subsequent uptake by various social and political actors—including kids, parents, educators, and various commercial enterprises—is a microcosm for the social and cultural contestations surrounding new technology, children, and education. It describes efforts to incorporate gaming idioms into learning software, and the different understandings of play and learning that have motivated these efforts. It is also a story about the promise of technical and design innovation to transform the conditions of learning and play, as well as a cautionary tale about the difficulties of reforming existing social and cultural structures even with the best of intentions and innovative new technologies.

This essay draws on ethnographic material from my dissertation work (Ito 1998; Ito 2003) to consider the cultural politics and recent history of children's software, and to reflect on how this past can inform our current efforts to mobilize games for learning. My focus is on describing the systemic and historical contexts in which children's software have been embedded in order to understand sites of conservatism and change. After first outlining my conceptual framework for analyzing the social and cultural contexts of new technologies, I describe three genres in children's software: education, entertainment, and authoring. The body of the paper describes how these three genres play out within a production and advertising context, in the design of particular software titles, and at sites of play in afterschool computer centers where I conducted my fieldwork. I conclude with an analysis of the dynamics that lead to genre hardening in learning games, and consider where there may be opportunities for social and cultural change.

Technology, Structure, and Genre

In examining new technology, it is a challenge to avoid the pitfalls of both hype and mistrust, or as Valentine and Holloway (2001) have described it, the problem of polarization between the "boosters" and the "debunkers." New technologies tend to be

accompanied by a set of heightened expectations, followed by a precipitous fall from grace after failing to deliver on an unrealistic billing. This was certainly the case with edutainment, which boosters hoped would transform learning for a generation of kids. While the boosters and debunkers may seem to be operating under completely different frames of reference, what they share is the tendency to fetishize technology as a force with its own internal logic standing outside of history, society and culture. The problem with all of these stances is that they fail to recognize that technologies are in fact embodiments, stabilizations, and concretizations of existing social structure and cultural meanings. The promises and the pitfalls of certain technological forms are realized only through active and ongoing struggle over their creation, uptake, and revision. New technologies go through what sociologists of technology have called a period of "interpretive flexibility" where it is still not clear which social actors will have a role in stabilizing the meaning and form of the new technology. As time goes on and different social groups work to stabilize and contest the technology, we move into a period of closure and stabilization. Trevor Pinch and Wiebe Bijker (1987) have described this process in the case of the bicycle in the late nineteenth century, which exhibited a wide range of design variation until it stabilized into the low-wheeled form with air tires, which we still see today. I consider this recognition of the socially embedded nature of technology one of the core theoretical axioms of contemporary technology studies, and is foundational to the theoretical approach taken in this essay. In this I draw from social studies of the technology that see technology as growing out of existing social contexts as much as it is productive of new ones (eg., Edwards 1995; eg., Hine 2000; Lessig 1999; Miller and Slater 2000).

It may seem self-evident that the representational content of media embodies a certain point of view and set of interests, but what is often less visible is how media is embedded in structures of everyday practice, particular technological forms, and institutional relations. We often see issues such as representations of gender or violence in games taking the fore in social controversies surrounding games, but in this essay I argue that the broader institutional and business contexts of software production, distribution, and consumption are also important sites of contestation. In order to build an agenda for how games could contribute to systemic change in learning and education, it is necessary but not sufficient to analyze representational content and play mechanics. In addition, we need to understand the conditions under which the game has been produced, advertised, and distributed, as well as how it gets taken up and regulated in different contexts of play. In their textbook of cultural studies, Paul du Gay and his colleagues describe a "circuit of culture" that includes processes such as production and design, advertising, uptake, and regulation. In order to understand the meaning of a new technological artifact, they suggest that all nodes in this circuit, as well as the interaction between the nodes needs to be subject to analysis (Gay, et al. 1997). In other words, the design of a game has a structuring but not determining effect on how the game will be marketed or played, just as existing practices of gaming or education have a structuring but not determining effect on what kinds of games will get created. In the case of commercial media, although the representational content such as characters and narrative are constantly in flux, the industry relations, distribution infrastructure, patterns of player/viewer engagement, and genres of representation tend to be conservative and deeply engrained within existing social and cultural structures.

In this essay I use the concepts of *media genres* and *participation genres* to read across the circuit of culture and to describe how culture gets embodied and "hardened" into certain conventionalized styles of representation, practice, and institutional structure that become difficult to dislodge. I draw from John Seely Brown and Paul Duguid's (1996) notion of genre as something that cross-cuts form and content in media artifacts. For example, in a book, genres involve things like typography, layout, paper weight, and binding, "the peripheral clues that crucially shape understanding and use." Participation genres similarly involve the explicit content or focus of an activity, as well as the subtle stylistic cues such as stance, gaze, and attitude that help us recognize a specific action as part of a category of practices. In this sense, participation genres does work similar to concepts such as habitus (Bourdieu 1972) or structuration (Giddens 1986), linking specific activity to broader social and cultural structure. More closely allied with humanistic analysis, a notion of genre, however, foregrounds the interpretive dimensions of human orderliness. How we identify with, orient to, and engage with media and the imagination requires acts of reading and interpretation . We recognize certain patterns of representation (media genres), and in turn engage with them in routinized ways (participation genres). My argument is that we need to recognize the social and cultural patterns that keep repeating themselves in order to understand how things could be changed. I turn now to a discussion of the history of the industry and media genres before examining genres of participation drawn from my ethnographic observations of children's play.

Media and Industry Genres

The category of learning games for children is a potentially broad one, and one could imagine multiple origin stories and histories. Here I focus on a particular trajectory with origins in the late seventies and early eighties, where educators and technology makers built a new industry niche of software products for elementary aged children. This period saw the founding of a category of software that came to be called "edutainment," or more broadly, "children's software." These titles were put forth as an alternative to the drill and curriculum based computer-aided instruction systems such as PLATO and Wicat that dominated the educational technology field from the sixties to the eighties. The new children's software titles instead drew from video game approaches being developed for arcades and game consoles, applying this thinking to educational technology. *Number Munchers, Oregon Trail, Reader Rabbit, KidPix,* and *Where in the World is Carmen San Diego* are examples of the first major wave of software designed with learning goals in mind, and targeted toward the consumer market of elementary aged children. In this, children's software drew from a longer history of educational reform efforts that looked to play as a site of learning. Although games were not the only way in which playful idioms were incorporated into these software titles, the centrality of gaming is in many ways what was distinctive about this particular historical moment in the evolution of the philosophies of "learning through play." In contrast to the prior history of educative playthings and media—typified by wooden blocks, puzzles, children's literature, and Sesame Street—educational software put gaming at the center of the enterprise. By focusing on software and games explicitly designed to mediate between educational and entertainment idioms, I do not mean to privilege the learning claims made by these titles.

Clearly, there are many titles in the mainstream entertainment gaming market that embody important learning principles (Gee 2003; Ito 2006). Rather, the importance of children's software is that it is part of the ongoing social agenda to bridge the cultural divide between education and entertainment. This history has three strands that correspond to different genres of children's software: academic, entertainment, and construction.

I use the term children's software to refer to a category of commercial software that is targeted towards elementary aged children, and embodies these general cultural commitments to learning and developmental goals. Educational or learning games could be considered a subset of this category, which also includes construction and simulation tools that don't have a strong gaming component. The three strands of curricular, entertainment, and construction software are loosely tied to behaviorist, play-centered, and constructivist educational philosophies. This category of software emerged from my ethnographic record; choice of what constitutes the general category of "children's software" or "learning games" is remarkably consistent. The same types of games are identified as educational and prosocial types of software in publications aimed at teachers, educationally-minded parents, as well as afterschool program staff. In the description to follow, I sharpen the difference between the three media genres of academic, entertainment and construction in order to identify competing cultural codes and educational philosophies embodied in children's software. In the practices of play, and in the design of specific titles, however, these genres are often intermingled. A curricular title may embed elements from entertainment media or construction tools, just as an entertainment-oriented title may work to convey some curricular content. I will explore more of the messiness of these categories in my descriptions from the ethnographic record, but in this section I lay out the differences between the three genres and their relation to particular strands in software development.

Education

The first strand was founded by educators who sought to embed traditional academic content within a gaming idiom. Anne McCormick[i], the founder of The Learning Company (TLC), described in an interview the excitement of the early years in the creation of the learning software industry. Developers shared a sense that they were creating possibilities for learning that freed it from the institutional constraints of schooling: "We created a new category by working with an Atari game designer and educators … I didn't want to call it educational because to me that meant schooling, dusty, institutional. That's why I called it The Learning Company not The Education Company." Through the eighties and nineties, titles created by companies like TLC captured the public imagination and became successful commercial ventures. At the same time that McCormick was producing software titles such as *Gertrude's Puzzles, Rocky's Boots*, and *Reader Rabbit*, other educational researchers at the University of Minnesota were beginning to commercialize products such as *Oregon Trail* and *Number Munchers*. The Minnesota Educational Computing Corporation (MECC) was originally funded by the State of Minnesota in 1973, and became a public corporation in 1985, riding the successes of these software titles. Jan Davidson, a former teacher, started her company Davidson & Associates in 1983, developing titles such as *Math Blaster* which, in its

various incarnations, has been the best selling piece of math software through the years. While growing out of school-based uses of computers, these new products were designed for the consumer market. They departed from strictly curricular and instructional goals of the early generation of school-based software, incorporating visual and narrative elements from popular culture. For example, *Math Blaster* took a standard drill-and-practice type instructional mechanism, but embedded it within a shooter game idiom.
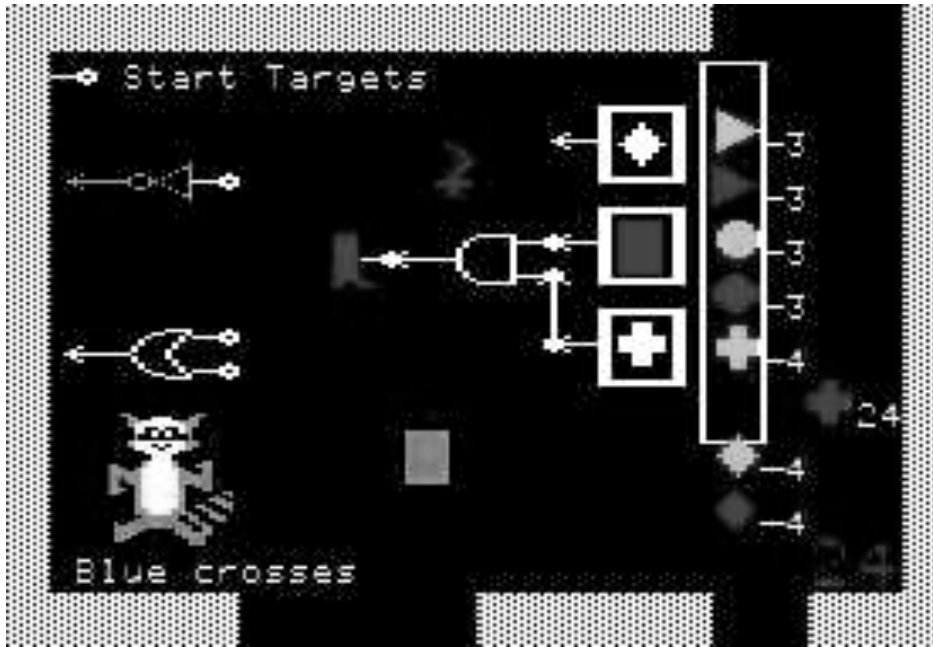
FIGURE 1
SCREEN SHOT FROM *ROCKY'S BOOTS*
Screen shot reproduced with permission from The Learning Company

The nineties saw the proliferation of PCs, the consolidation of software industries, and the emergence of a mass market in family-oriented software. Instead of being sold at specialty computer and hobby shops, by the nineties, most of the volume of children's software was being sold at superstores such as Cosco, Walmart, CompUSA, Toys R Us and Office Depot. Career CEOs had pushed aside company founders, and by the end of the nineties, the children's software industry had largely consolidated under two conglomerates, one headed by Mattel, and the other by media industry giant, Cendant. Eventually Mattel went on to sell its edutainment assets after incurring tremendous losses. Along the way to the mainstreaming of the industry, development shifted away from an experimental research mode that characterized the earlier ethos of companies like TLC, MECC, and Davidson and Associates, towards a commercial model focused on the bottom line. Most development budgets in this genre are currently spent upgrading graphics and sound and refining established formulas rather than on developing new models for interaction or game design. Products with innovative new designs or with more open-ended, complex, and multi-referential goals are difficult to produce and disseminate in this current ecology. Easily-represented marketing "hooks" like a licensed

character, established brand, or the claim to transmit curricular knowledge are more central to a product's success than innovation.

This strand of software development increasingly came to focus on curricular content rather than innovative game play, and defined what I call the academic genre. The most typical design relies on academic mini-games embedded in a role-playing scenario. Along the way to completing some kind of mission, the player encounters various problems or puzzles related to academic subject matter. This may be math problems, science questions, or reading games, but in general the content of the problems is unrelated to the role-playing fantasy narrative. Although not based in a narrow drill-and-practice approach, the educational philosophy might be broadly associated with a behaviorist approach, where children are given external rewards (action games, eye candy, points, etc.) for completion of academic tasks. Generally these games also keep close track of scores that are often tabulated in a passport or report card like format. These games are generally produced to correspond to specific subjects in for particular grades (such as 4th grade math, 2nd grade reading), and the packaging features checklists of particular curricular topics. This genre standardized around this form of game design primarily to streamline development around a successful formula. Companies committed to an underlying game engine that different forms of academic content and mini-games could be plugged into, lowering the costs of development. Further, this formula meant that the relation between the more entertainment-oriented scenario and the academic mini-games was incidental, so there didn't need to be a lot of intensive design or curricular work to make the meta-activity integrate with the drills. This is one example of a hybridization of educational and entertainment genres, but done in a way that kept them as essentially separate domains of activity.

Academic games are generally marketed directly to parents as tools for achievement. Thus the market is limited to children under the age of 10, where parents generally retain control of media purchasing. Grade-based educational software appeals to middle-class parents' desires for wholesome, creative, and interactive play for their children, that also gives them a leg up on subjects that will be covered in school. Unlike more entertainment-oriented games, which are marketed directly to children on television and in gaming magazines, educational software runs ads in magazines such as *Family PC*. One ad for Knowledge Adventure's *JumpStart* software series (figure 2), which ran in the December 2000 edition of *Family PC*, sets up an unambiguous relation between the products and academic achievement. A blond school-aged girl dressed neatly in white knee-high socks, Mary Janes, and a red skirt, still wearing her backpack, stands with her back to you (your child here), clutching a school worksheet. The sanitized space of the large kitchen and the girl's appearance code the home as White, suburban, conservative, and middle-class. The girl faces a refrigerator already overflowing with assignments red-inked with gushing teacher notes: stars, "Good Work!" and "Excellent!" The backpack, the school assignments, and the voice of assessment are represented in a central role in the intimate sphere of the home. A drawing of mom, posted in the visually prominent area at the top left, hails the parent in charge of children-related purchases. She is a smiling blond mother with curly hair and rosy cheeks.

The software provides a jump start for stalled children in the academic rat race, mobilizing the metaphor of "education as a race" which dominates the culture of competition of elite schooling in the US (Varenne, et al. 1998: 106-115). The ad

campaign's tagline—"She's a JumpStart Kid, all right"—is subtly crafted to imply a status distinction with other kids, the perpetually stalled failures that don't use this software. In marketing, the pitch to the parents is not in the gaming and fun, but in addressing academic achievement goals. This shift in emphasis is an example of the genre hardening, and the erasure of the hybrid cultural forms that were more evident in the early years of interpretive flexibility in children's software. Corporations market software as a vehicle for academic success to parents, who in turn market academics as an entertainment activity to their kids. The ads for the *Math Blaster* series feature children in moments of ecstatic play, swimming or playing superheroes, with thought balloons describing the mathematical significance of their play (figure 3). A tiny cape crusader speculates, "If I fly 90 miles an hour and the earth is 24,902 miles around, can I still get back home for breakfast?" "Must be the Math Blaster[®]" suggests that ad copy below. "Software that gets your kids into math. And math into them." This is the currently dominant logic of games following the academic genre: "The most effective forms of learning are fun. So let's package tasks that function to measure and sort children into something that is pleasurable. That way, the kids will have fun, they will also get ahead in life, and parents can feel they have fulfilled the impossible imperatives of contemporary middle-class parenting that says they must support competitive successes while also keeping their children happy and entertained." As Rieber, Luke & Smith (1998) argue in their review of learning game design philosophies, this is an approach that looks at "fun" as an extrinsic motivator of learning, rather working to support learning that is intrinsically motivated. The focus on entertainment as a motivator tends to "designate the role of games as a form of educational 'sugar-coating'—making the hard work of mathematics or language arts easier to 'swallow'" (5). These are the discourses that currently dominate the production and marketing of academically oriented commercial games.

FIGURE 2
ADVERTISEMENT FOR *JUMP START 1ST GRADE*
Reprinted with permission from Knowledge Adventure, Inc.
JumpStart is a trademark or registered trademark of Knowledge Adventure, Inc.
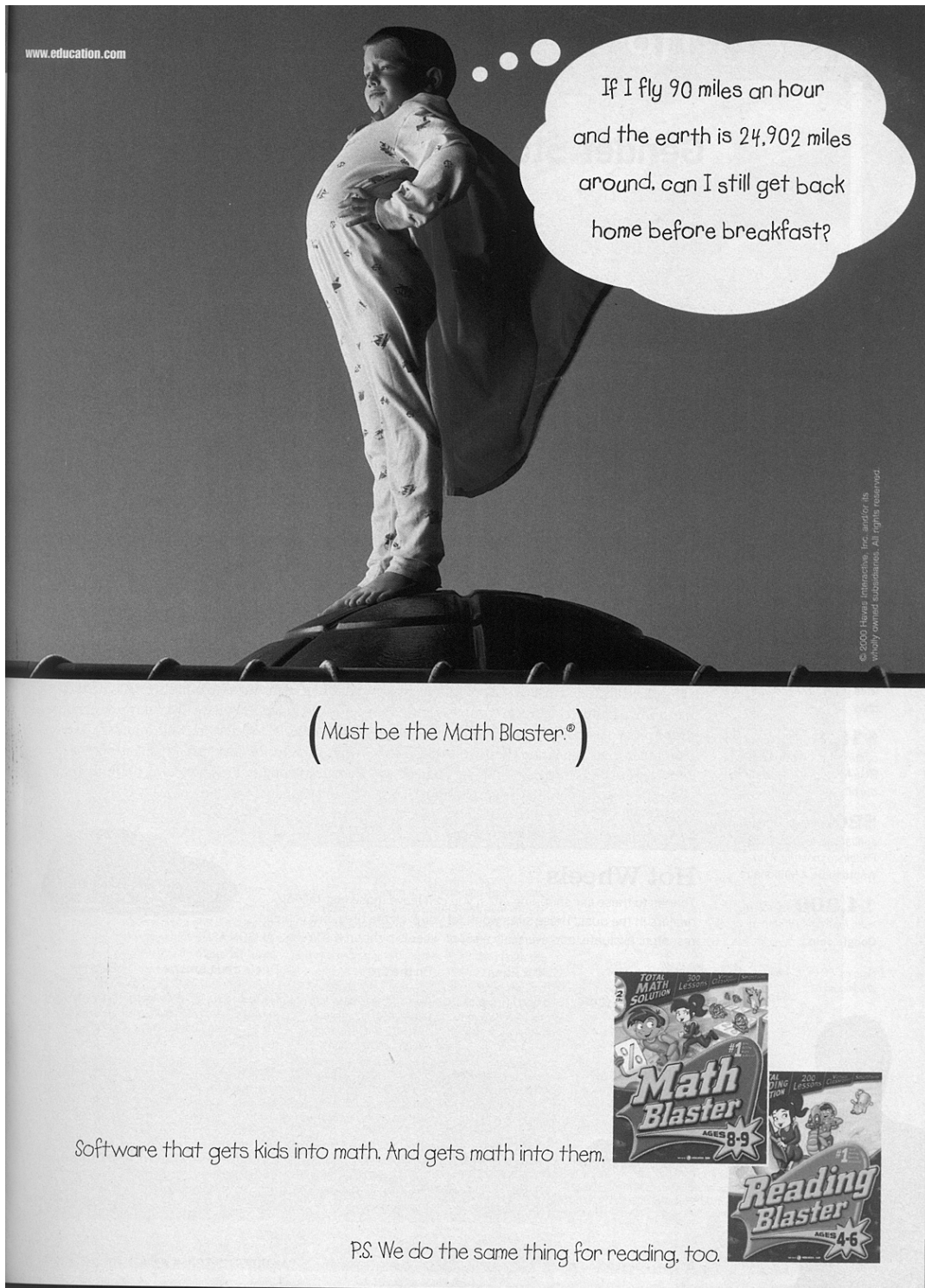
FIGURE 3
ADVERTISEMENT FOR *MATH BLASTER*
Reprinted with permission from Knowledge Adventure, Inc.
Math Blaster is a trademark or registered trademark of Knowledge Adventure, Inc.

Entertainment

The second strand of children's software development originated from the commercial software industry and the growing availability of multimedia personal computing, seeking to create products that were family friendly, pro-social and appropriate for young children but not necessarily academic in focus. While Ann McCormick was developing her first TLC titles for the Apple II in the eighties, Gary and Douglas Carlson were building a new business in selling computer games out of their apartment in Eugene, Oregon. In 1982 the Carlson brothers purchased the rights to *Bank Street Writer* and then went on to publish *Where in the World is Carmen San Diego*, *Just Grandma and Me,* and *Myst*. In contrast to the educational goals of McCormick and Davidson, Carlson stresses childhood pleasure and wonder rather than academic content. "None of had degrees in education. We didn't want to go out and make all these pedagogical claims….Basically, our idea was to do products that we ourselves found interesting. … That's just kind of whatever seemed fun." In 1989 the Apple Multimedia Lab produced *The Visual Almanac* on laserdisc. A few years later Voyager went on to publish titles such as *Countdown* and *Planetary Taxi* that took the content of the *Visual Almanac* and created the first full-color multimedia educational software titles with sophisticated sound, graphics, and animation. Companies such as Humongous Entertainment with their *Pajama Sam* series went on to create role playing games for young children, and by the mid nineties all the major children's toy and media companies had jumped on the multimedia bandwagon making multimedia titles around popular licensed characters such as Barbie, Mickey, and Yoda.

Entertainment-oriented children's software is a comparatively broad genre. Although one can easily recognize the academic genre in series such as JumpStart or Math Blaster, entertainment titles could include software such as authoring tools, interactive storybooks, or simulations, and the box design and marketing pitches are less uniform. Most typically, titles that are specifically in the children's software category of entertainment feature open-ended and exploratory online environment for players to explore. They may feature game-like idioms, but are often more open-ended and toy-like, and tend toward sandbox-style games rather than linear, goal-oriented ones. The classic entertainment genre for young children is "click and explore," where clicking on certain hot areas of a scene will trigger funny animations and sounds. Unlike academic genre games, however, these titles generally have a more unified fantasy scenario and do not embed academic mini games within the virtual world. The early *Living Books* series set the standard for this kind of interaction modality. There is more likely to be some kind of building and construction or authoring component in entertainment titles, though it is not uniformly the case. Titles such as *Barbie Fashion Designer* or Tonka and Lego games are examples of entertainment titles with strong authoring components built into them. The ads for the more entertainment-oriented titles portray children as ecstatic and pleasure-seeking rather than reflective and brainy, and childhood as imaginative, pure and joyous. The ethos is parent-friendly but child-centered, a formula-established by children's entertainment companies ever since the Mickey Mouse Club aired on television.

Humongous Entertainment puts the child's pleasure close-up and front and center. "This is the review we value most" declares the ad copy above a large photograph of a beaming child (figure 4). The ad mobilizes discourses from the established genre of film reviews by describing how "critics rave" over the software title. The endorsement from

PC Magazine is particularly telling. "Nobody understands kids like Humongous Entertainment." The company is positioned as a channel to your children and their pleasures, the authentic voice of childhood. The box for *Pajama Sam,* one of Humongous' most popular titles (figure 5), features the adorably caped hero, Sam, and describes the software as "an interactive animated adventure." The back of the box does list educational content, but in a small box that is not visually prominent. Although the title relies on a role-playing game format, the title is not labeled in that way. The list of "critical thinking, problem-solving skills, memory skills, mental mapping and spatial relations skills" does not make any curricular claims, and stresses the "creative and flexible" nature of the software and "the power of a child's imagination." "Feature-film quality animation" and "original music" are central selling points for the title. It can compete with television and videos for your child's attention, and it still has some educational value.

Entertainment titles use the same visual styles as education titles such as *Reader Rabbit* and *Jump Start*. They occupy the same shelves at retailers and are oriented to a similar demographic of middle and upper middle class families, but keyed somewhat towards the more progressive and permissive parent. What distinguishes the entertainment genre is the more open-ended. Educational titles, particularly those that make curricular claims, are generally linear and make much of achieving certain levels and scores. Unlike the *Jump Start* titles, where progress to new areas is contingent on solving problems in a linear trajectory, with *Pajama Sam,* the player can explore the world freely in order to collect the items associated with the quest. There are no embedded academic tasks or external markers of progress in *Pajama Sam, Myst,* or *Living Books*. With this entertainment genre, what gets packaged and marketed is not achievement, but fun, exploration, and imagination. These titles are also distinguished from entertainment titles such as first-person shooters, sports games, war games, and role-playing games marketed primarily towards teens and adults. In contrast to the darker hues and sometimes frightening characters adorning the boxes of these titles, entertainment software for younger children is clearly coded as a separate market with brighter colors and smiling, wide-eyed characters like *Pajama Sam.* The packaging and marketing of these titles gives clues as to the underlying cultural logics animating the software.

FIGURE 4
ADVERTISEMENT FOR *PUTT-PUTT*
Putt-Putt® Joins the Circus™ and Pajama Sam® artwork courtesy of Infogrames
Interactive, Inc. © 2002 Humongous Entertainment, a division of Infogrames, Inc. All
Rights Reserved. Used with Permission.

FIGURE 5
BOX ART FOR *PAJAMA SAM 2*
Putt-Putt® Joins the Circus™ and Pajama Sam® artwork courtesy of Infogrames
Interactive, Inc. © 2002 Humongous Entertainment, a division of Infogrames, Inc. All
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Construction

In parallel with these developments in entertainment software for children, another strand of software development was evolving that focused on construction and authoring. Seymour Papert, probably the best-known spokesperson for the use of computers in education, evangelized this construction sensibility, calling for the use of computer programming as an educational tool. Papert's efforts to promote programming in schools predate the period of children's software development I am focusing on here. However, the entry of the LOGO programming language and other child-oriented authoring tools into the consumer market happened during the same period that saw the rise of entertainment genre titles. Although part of a shared intellectual community as McCormick and others involved in children's software, Papert's position is distinctive in promoting programming as a key educational and developmental goal. Published in 1980, Papert's book *Mindstorms* describes the LOGO programming language for children, arguing against the drill-and-practice orientation of computer-based instruction dominant at the time. "In most contemporary educational situations when children come into contact with computers the computer is used to put children through their paces, to provide feedback, and dispense information. The computer programming the child. In the LOGO environment the relationship is reversed: The child, even at preschool ages, is in control: The child programs the computer" (Papert 1980, 19). This constructivist approach focuses less on conveying academic or cultural content, and more on providing tools for construction and tinkering. Many titles in this category, such as *KidPix,* or Papert's own *Microworlds* are closer to authoring tools than games, but simulation games such as *SimCity, SimTower, DinoPark Tycoon,Droidworks,* or *The Incredible Machine* also fall within this category. All of these titles provide kids with a toolkit to create computer-based programs or simulations.

The most successful titles in this genre are kid-oriented graphics programs such as *KidPix* and *Print Artist* and simulation games, most notably *SimCity.* Unlike the other genres of children's software, authoring and construction titles do not always posit a sharp break between the markets of adults and children. This can create problems in defining distribution and marketing channels. Although the Sim line of games have included major commercial successes, it has been more difficult to develop a sustainable market niche focused on authoring and construction games specifically for children. Licenses such as Barbie and Lego have had successes building on their existing brand and practices of open ended and constructive play. *Barbie Fashion Designer* and *Lego Island* were both ground-breaking and successful titles that were based on design, construction, and open-ended play. Other entertainment companies, such as Lucas Learning had a tougher time with titles oriented towards older kids but with an educational bent. Jon Blossom, who worked on *Droidworks* explained: "It's hard to convince parents that our games are educational and it's also generally hard to sell to a pre-teen, particularly someone who is ten or eleven, trying to be independent." The Lucas Learning products, almost all of which fell in the construction genre and were oriented to pre-teens, received a great deal of critical acclaim, but were not commercially successful, trapped in the shelf-space wars between the bright boxes of children's software and the dark boxes of mainstream games.

Authoring and construction titles generally package their appeal as technical empowerment, the ability to translate authorial agency into a media form. They draw less on explicit educational ideologies or images of play, and more on images of mastery and control that reference creative or hacker-like subjectivities. "Create your own Star Wars world with fantastic 3D creatures," suggests the box of *The Gungan Frontier.* "Create anything imaginable in real-time 3D!" proclaims an ad for Disney's Magic Artist 3D, featuring a virtual Mickey stretching the surface of a shiny, 3D, textured Mickey logo. Like *SimCity 2000,* titles in this genre are often not age-specific, and cross over between adult and kids markets. "The power to change history is in your hands" announces the ad copy for the game *Call to Power,* packaged in an adult entertainment genre but advertised in *Family PC*. Similarly ads for *SimCity 3000* that ran in *PC Gamer,* stress that radically different game outcomes can result from the player's actions (figure 6). "Mr. Roger's or Mr. Hussein?" queries the ad copy over contrasting images of a peaceful town or a blown-out office building. "It's a beautiful day in the neighborhood when you've got the power to rule over *SimCity 3000*." These titles all package their appeal on personal identification, customization, and authoring, rather than claims that they will transmit specific bits of knowledge or spectacular pleasures.

Titles in this genre often fall outside of the bounds of what is considered "educational software" or "learning games," though the titles designed for children are still within the category of "children's software." Titles such as *Kid Pix,* or *Magic Artist 3D* are considered more tools than software with an explicit learning agenda. Simulation games like *SimCity* or *Rollercoaster Tycoon* have been celebrated by educators, but the learning outcomes and fit with curricular goals is often not clearly defined. These titles also do not fit squarely within the categories of interactive entertainment and gaming. Titles with simulation elements are generally labeled as games, but often have little explicit game play. In fact, in my interview with Will Wright, he objected to the label of *SimCity* as a game, and preferred to call it a toy. As Papert has been arguing for many years, the educational value of these games lies less in their ability to convey academic content, than in a certain stance towards technology, authoring, and creativity, a set of activities that is neither obviously "entertainment" or "educational."
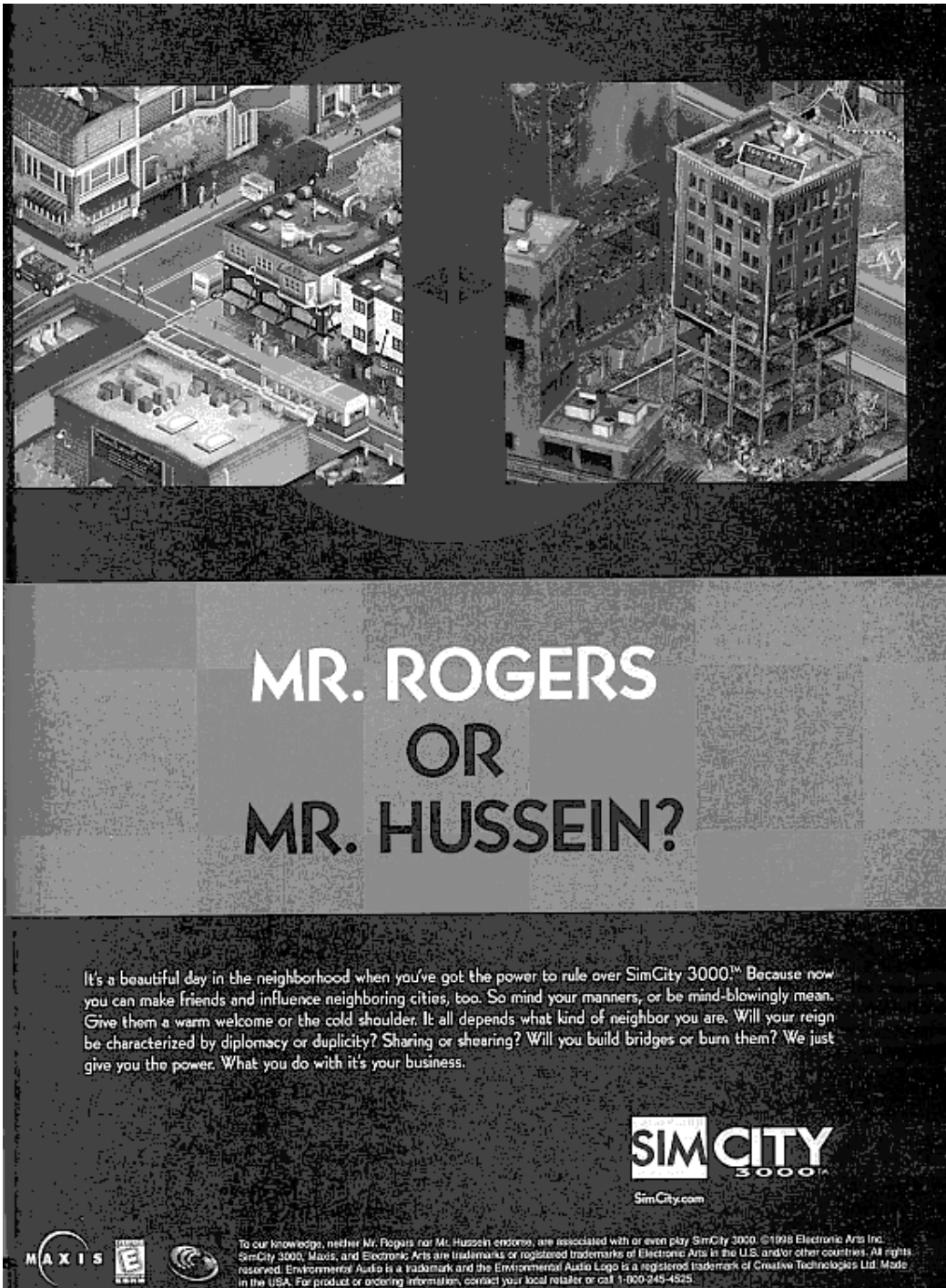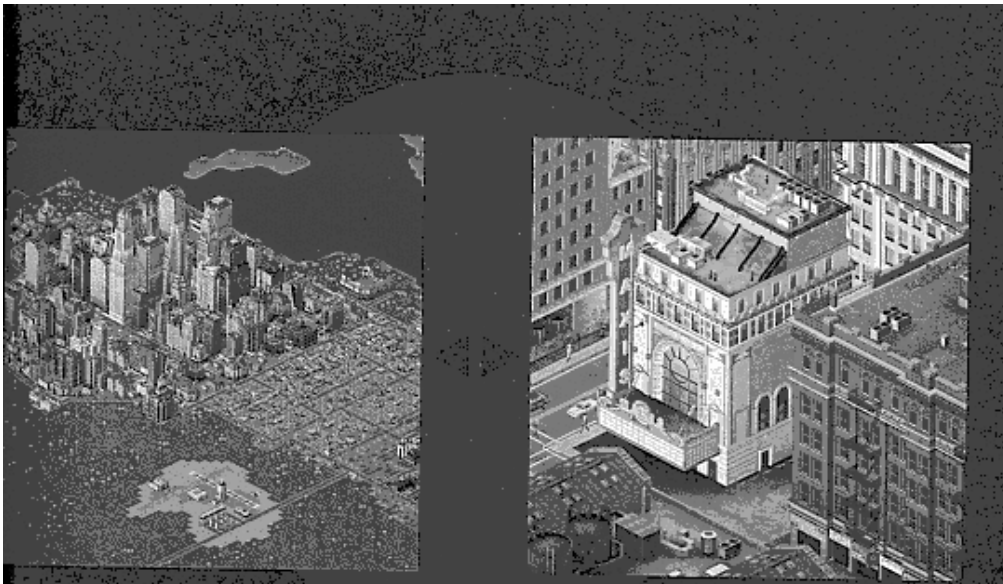
FIGURE 6
ADVERTISEMENTS FOR *SIMCITY 3000*

FIGURE 5, CONTINUED
ADVERTISEMENTS FOR *SIMCITY 3000*

Genres of Participation

The different media genres and markets discussed have a complicated relationship to different modes of play. While the advertising of the products may suggest a clear mapping between software design and particular genres of learning and participation, in practice, the relation is highly contingent on situations of play (Stevens, Satwicz, and McCarthy, 2007). Just as the children's software industry has been characterized by a struggle to define a space that is not absorbed into the dominant institutional structures of schooling and commercial entertainment, in contexts of play we see competing discourses and genres of participation jockeying for position in the micropolitics of kids' everyday lives. While parents and educators may be operating in an academic frame, kids may find ways of mobilizing more peer-oriented entertainment idioms. Kids and adults fluidly mobilize different genres or participation of educational achievement, fun entertainment, and creative construction, enlisting the genre structures that are embodied in the design in these performances of play. In this section, I turn to these complicated contexts of play, focused on fieldwork I conducted at afterschool computer clubs. The 5thD afterschool clubs are educational environments designed to mediate between home and school, education and entertainment. They rely on an activity system where elementary-aged children and undergraduates from a local university come together to play with educational software. The clubs are located at community institutions such as Boys' and Girls' Clubs, schools, or libraries and vary considerably depending on the local context and institution. What is common across the settings is a commitment to a collaborative and child-centered approach to learning, the non-hierarchical mixing of participants of different ages, and the use of personal computers running software designed for children.

My research was conducted as part of a three-year, collaborative ethnographic evaluation effort in the late nineties. Although the 5thD clubs are in many ways an idiosyncratic environment to observe play with computer games, they had the advantage of making visible the negotiations between kids and adults in defining the terms of play. They are also an example of a learning environment that was designed with a set of learning agendas roughly in line with much of the original impetus of children's software. The focus, with the 5thD, shifts in an important way, however, from the design of a specific artifact to the design of an overall learning environment that includes the software as an integral component. Here I describe a few examples of play from our video record that exemplify some of the negotiations between kids and adults, make visible genres of participation with learning games, and give hints to the broader social and cultural structures that inform play. The three categories of practice I cover—achievement displays, spectacle, and building my own world—correspond roughly to the my three software genres of academic, entertainment, and construction.

Achievement Displays

When engaging with software with clear markers of educational achievement, players often orient towards these recognitions of success at the expense of more constructivist or experimental modes of play. children's software in the academic genre most often invite this achievement orientation. The following example is taken from a day when "Roger"

completes the whole game sequence of *The Island of Dr. Brain* during one club period. Although not as sophisticated as current educational games, this game embodies the basic structure of educational children's software, engaging a player in academic mini games in the course of fantasy role-playing. Although this game includes click and explore scenes, kids are quick to recognize the academic genre and tend to orient to the linear achievement stance of the game rather than pursuing exploratory play. Roger has played bits and pieces of the game previously with other kids, but this is the first day in which he gets sustained time with the game, and, with adult help, moves through puzzle after puzzle. In this first example, Roger has just begun to work on a puzzle which involves identifying the chemical code for elements in a set of objects, a tin cup, a zinc bar, etc. When the puzzle pops up, he reads the instructions, and then tries clicking around to determine the nature of the task.

> *A = Roger*
> *Ad = Adult*
> *SC = Site Coordinator*

1	R: What am I supposed to do? I don't get this.
2	SC: OK did you analyze it? It says: "These chemical elements ..."
3	R: (Pulls down another screen of directions and reads, moving pointer over lines.)
4	SC: Oh, you're doing trace elements OK, here.
5	R: Ahhhh! I see. (Starts to read the description of the element to find. The object under question is a zinc bar.)
6	Ad: Oh, do you get the hints?
7	SC: "Blank" -oxide (referring to the description, which gives a hint that the answer is a "____ oxide").
8	R: Carbon. Blank? Blank?
9	Ad: See the blank here? (Points to screen.) They're saying fill in the blank.
10	R: Yeah, I know.
11	SC: It's like the sun block people put on their face … You know, people put it on their nose ...
12	R: Yeah what is it?
13	SC: What is it called?
14	R: SPF.
15	SC: No. There's a thing that completely blocks it out.
16	R: What? Blank?
17	SC: Zinc-oxide, maybe?
18	R: Ziiiinc...
19	SC: Have you ever heard of that?
20	R: (Nods.)
21	SC: It's the really white stuff. So you have to find that.
22	R: What's the "Z"? (Points to "Z" in table of elements.)
23	SC: Go up one. That's the zinc. See it up on top?
24	R: (Selects Z for zinc, and gets the first element identified correctly.) Allright.

25   SC: OK. Now you're doing the next one. It's two percent. It says: "These chemicals are present only in minute amounts. The analyzer cannot trace them." So, that's the hint you got before, which is the trace element, which means there wasn't enough of them to pick up.

26   R: (Selects "Trace Element" and successfully completes analysis of the first object.) Allllright. Zinc Bar ... (Places zinc bar to the side, and puts tin cup in the analyzer.) This is tin. I know it already. Tin ...

In this sequence of activity, Roger orients quickly to the suggested task structure: read the directions, determine what the problem is, get the correct answer to the problem, and display knowledge. When Roger falters in determining the procedure, he enlists the help of the adults: "What am I supposed to do? I don't get this" (line 1). Roger and the site coordinator orient to the instructions, and then, the initial recognition occurs, "Ahhh. I see" (line 5), as he is able to decode the instructions and recognize the call for action. Both Roger and the site coordinator then shift their orientation toward the content domain and solving the problem: What kind of oxide is it? (lines 7-10). The site coordinator, then, tries to get Roger to fill in the answer, by providing some hints, though she eventually must give him the answer: zinc (lines 11-17). Roger responds with another act of recognition: "Ziiinc," in an extended, low tone, and nodding to the site coordinator's confirmation that he understands the answer (lines 18, 20). For the remainder of the clip, she guides him in locating zinc on the list of elements, and he inputs the answer: "Allright" (line 24). This mode of interaction with the puzzles, where Roger decodes the instructions, executes them in solving the puzzle, completes the puzzle, and moves quickly on to the next, is typical of his engagement throughout most of the game. As he works through a puzzle, each successfully completed step is punctuated by an "Allright," or "Ahhh!" of recognition. In this way, he repeatedly enacts the subjectivity of one whose knowledge and competence is being tested and assessed, orienting to a participation genre of academic performance. The point here is not exploratory play or authoring that we see in the entertainment or authoring genres of participation, but rather the orientation towards progress and achievement that characterizes an academic participation genre.

The next example is from one of the first instances of Roger's exposure to *Island of Dr. Brain.* Roger is working with another kid, Herbert, and they are just beginning "the rat-driven elevator" problem. The task is a complex one. They are asked to determine how many spokes on two different gears are required to balance a counterweight with the weight of the elevator. They spend quite some time keying in different answers and trying to figure out the nature of the problem, enlisting the site coordinator's help. They try various solutions, but the elevator continues to either fly into the ceiling or the floor, toppling the crash-test dummy inside. Eventually, they begin to enjoy simply watching the dummy crash time after time, moving for a moment away from an achievement orientation to pleasure in this spectacle, engaging in a more entertainment-oriented participation genre. After almost ten minutes, in which they continue their trial and error tactics, they finally happen on the correct answer. This excerpt is of this concluding sequence:

R= Roger
H= Herbert
SC = Site Coordinator

1   R: OK, fifty-six. Fifty-one and seventeen. You have seventeen and forty-eight. Forty-eight. OK let's try it.

2   H: Yeah.

3   R: I love doing this.

4   H: Yeah this is it. Yep. Nope. Nope.
(Elevator crashes.)

5   R: Ahhh!! I love that.

6   H: It must, it must be fifty-one. Oh, man.

7   R: This is so hard.

8   H: Eighteen teeth. Watch this, watch this. Watch this.

9   R: You think this is right? No, he got tired. (Elevator crashes.) Ahh!!!
(Laughs.) I love this!!

10   H: Eight, twenty-one. Nooo!!!!
(Elevator crashes.)

11   R: I love doing this.

12   H: Thirteen. Yeah. (Elevator is lowered successfully.) Oh my gosh. We got it. We got it!!! Yeah, [site coordinator name]. We got it.

13   SC: Allright!

14   R: And we did it by guessing too!

15   H: I know, huh!

16   R: We're so good. Yeah, we can ride it.

17   H: Yeah.

This clip records a gleeful moment, with Herbert calling out to the site coordinator about their accomplishment, and the two boys mutually congratulating themselves (lines 12-16). They are particularly happy at having "tricked the system" by getting the right answer by guessing. Far from detracting from their sense of mastery, this accomplishment serves as a display of achievement. "We're so good. Yeah, we can ride it." In a subsequent day, Roger revisits the same problem, and mobilizes the guessing tactic that he developed with Herbert, abandoning any attempts to decode the nature of the problem. Although the adult helper he is working with tries to get him to solve the problem by dividing the elevator weight by the counterweight, he insists on guessing instead, "I have no idea. I'm just guessing. It works!" These excerpts from the video record provide some hints as to how the genre of academic software plays out in the everyday play of kids. The focus on external assessment and the linear sequencing of the game encourages an orientation to accomplishing the technical conditions of success rather than deeper exploration of the problem domain. Even in the case of the 5thD, where adults try to push kids towards exploratory and imaginative play, the kids quickly recognize the genre expectations of educational achievement.

Spectacle

In contrast to a game like *Dr. Brain*, titles that have more open ended and exploratory structures often elicit different genres of participation. Storybook games rely heavily on the uniquely spectacular features of interactive multimedia to draw children into engagement, and kids will often exhibit a more entertainment-oriented genre of participation as they play with these titles. During my period of observation at the 5thD, the club purchased *The Magic School Bus Explores the Human Body* which included multimedia sound and graphics that were state-of-the-art for children's software at the time. Players randomly drive around the human body and click on objects to see what visual and auditory effect will result. Kids find these small animations highly amusing, particularly if they are accompanied by a gross noise or visual. One undergraduate describes how two girls working together wanted to click on every animated object in the classroom. One of the girls says she likes the game because of "the music and the weird sounds it makes and how you can go into the human body." In the tapes where kids are together at the game, observers will be constantly leaning in and pointing at things to click on. The kids rarely tire of this mode of clicking on animated objects, and will revisit areas to show particularly cool interactions to other kids and their undergraduate helpers. The animations that form the transitions between the different parts of the body often draw appreciative "EEEW"s from both undergraduate and kid viewers, as they watch the tiny bus drop into a puddle of stomach goo, or fly down a sticky esophagus. Kids identify these spectacles as "fun" elements of kid culture: "This is the fun part. This is fun. Watch," insists one kid as he initiates the opening animation.

   One area of *MSBHB*, involving a simple painting program, is particularly notable as an embodiment of the logic of the interactive special effect. Clicking on the drawing pad of one of the characters calls forth a screen with a canvas, and various tools, shaped like body parts, along the side. After selecting a body part, the player can squirt, splat, or stamp blobs and shapes onto the canvas, accompanied by appropriately gross bodily noises appropriate to the body part. Often to the dismay of the accompanying undergraduate, kids will spend excruciatingly long minutes repeatedly squirting juices from the stomach, or emitting a cacophony of farting noises from the tongue tool. One undergraduate notes, after playing with a group of girls: "Each different shape or design made it's own unique sound. I think the kids get a much better kick out of the sound than anything else. And they would laugh and laugh when they found the sound they liked best." Here is an example of another instance of play, which was captured in our video record.

   R = Ralph
  UG = Undergraduate

1	R: Look, I could pick any one of these. This one. (Selects an organ.)
2	UG: What's that stuff right there?
3	R: (Squirts juice out of an organ.) I don't know. Squeezing all the juice out of him.
4	UG: Lovely. Now what happens if you grab that one?

5   R: Big one, the big one. Blood, brain. (Continues to select organs and
        make blobs and squishing and squeaking noises.)
6   UG: Oh, you can do it on here? Oh, it does a print of what the brain looks
        like.
7   R: Oh man.
8   UG: You can do the mouth, you haven't done that one.
9   R: Spitting, it's spitting.
10   UG: I know there's more down this way too. Skin, oh that just changes the
        color of it.
11   R: Yup. Do you want to see the nose?
12   UG: Nose. I don't know.
13   R: Gross.
14   UG: Oh, gross.
15   R: Boogers, eww.

        Continues through each organ in a similar manner.

16   UG: Your tongue. Oh wow.
17   R: (Creates long drawn out farting noises.) Ewww!!! (Pushes repeatedly
        on a squeaking, blapping organ.) OHHHHH!!
18   UG: Wow.
19   UG: What else is there that you could do?
20   R: Nothing.
21   UG: Is that the last one?
22   R: Yeah.
23   UG: Are you sure?
24   R: Yeah.
25   UG: How do you know that?
26   R: (Goes back to the farting noise, and hits it repeatedly.) It's my favorite.
        The tongue. Watch.
27   UG: Are there any more?
28   R: Oh yeah. The finger. (Clicks repeatedly, making more gross noises.)
29   UG: Eww.
30   R: Ewww. Look.
31   UG: Are there any more after the finger? Let's see. Muscles. Whoa.
32   R: I want to go to the finger again.
33   UG: Why don't we go back and explore the body.
34   R: Okay. I know why. I know why. Cause you didn't like the sounds.
35   UG: No, the sounds were great.
36   R: I don't want to play anymore.

        This extended sequence of play with interactive special effects is gleefully
engaged with by Ralph and tolerated by the undergraduate, but she eventually suggests
that they return to the main areas of the game (line 33). Ralph than suggests that she is
discouraging him from playing with gross sounds (line 34), and then decides that he
wants to stop playing (line 36). The undergraduate has actually been remarkably patient

through a very extended sequence of play with each drawing tool, suggesting on various occasions that he try one or another tool. Yet the boy still insists that he knows why she suggests that he move on, "Cause you didn't like the sounds." In this case, the boy is more active than the undergraduate in constructing the opposition between the adult stance and kid stance with respect to the orientation to gross special effects.

All gaming titles in some way cater to a hankering for spectacle, which is a cornerstone of participation genres associated with entertainment media. Children are quick to recognize these forms of engagement as "fun" and part of their peer status economy rather than the achievement economy of adults and education. In other sequences we have captured on tape, we have seen kids exploit cheat codes in *SimCity 2000* to build large structures for the purposes of creating spectacular explosions, much to the delight of kid onlookers and the chagrin of adult educators. These are not the dominant modes of engagement in play with children's software, but they are small, ongoing breaks in the narrative trajectories of multimedia titles. They are also sites of micropolitical resistance to the progress-oriented goals and adult values that seek to limit violent and grotesque spectacles in an educational setting like the 5thD. With titles that have multiple and open-ended goals, players are more able to define the genre of participation, sometimes even in cases when adults are trying to call them back to the educational goals of the game.

Building My Own World

Competitive and spectacular pleasures are present in simulation games like *SimCity* or *Dinopark Tycoon*, but differ from the pleasures involved in creating and authoring a unique virtual world. A game like *SimCity 2000* allows players to create their own spectacles, settings, characters and interactive possibilities, constructing user subjectivity as a world-builder rather than world-explorer. Game play and mastery involves uncovering the technical functionality of the building tools, and then executing a personalized vision of a city while managing the balance between different factors such as cash flow, population density, and aesthetics. The results of these construction endeavors are often highly invested with personal reference, style and meaning, a sense of personal creative *accomplishment* that differs from a sense of *achievement* in meeting external goals. Kids will continuously debate what features and buildings are cool, and where they should be placed, and showing off their creations to one another. "My friend had one of those big shark-looking things up on a big hill that he had made!" "Look! Want to see my huge mountain? I made this huge mountain by hand and I covered it in water by hand. I did this all by hand." This sense of self-expression is characteristic of the participation genre of construction.

One way that *SimCity 2000* accomplishes a sense of identification is by suturing players into identification as the mayor of the city. Advisors from various city offices advise "you" on the state of transportation, education, and other city services. After achieving a certain population level, you are awarded a "mayor's house" that can be placed at will. Kids will often spend a great deal of time placing the house in a nice location—on top of a hill, overlooking a lake, distanced from the bustle of the city—and might add a private subway or park for the mayor's residence. The player with ownership of the city will without exception refer to the house as "my house," and the appearance of

the house will generally initiate a sequence of imaginative projection, where interlocutors will talk about what it would be like to live in a particular location. "Girl you want to see it?" asks one of our teenage players to a new friend at the club. "Watch. That's my house girl." "Oh!" Proclaims the friend, impressed. "I want to build. I'll make mine."

One instance of a boy (Jimmy) and an undergraduate (Holly) discussing the mayor's house is representative of these interactional moments.

J= Jimmy
Holly = undergraduate
brackets signify overlapping talk

1   J: I can make my house, the mayor's house (Clicks on rewards icon.) Where do I want to make my house?

2   H: (Laughs.) You want it overlooking everything? (Laughs.) Aaa... Do you want to have it overlooking the lake or something?

3   J: (Dismisses year end dialog box.)

4   H: Yeah, you can have like those be the really nice houses or something. Like up in the hills?

5   J: Up here? (Moves cursor to flat area on ridge.)

6   H: Uuuu maybe over here (pointing) because this you'd be just overlooking over the power plant. That wouldn't be very nice. Maybe over by the lake or something?

7   J: How about, right here? (Positions cursor over flat ground by the lake.)

8   H: Sure, yeah, like right on the lake?

9   J: (Builds house on lake opposite city.) Yeah, I need power, *obviously* because it's my house.

10   H: (Laughs.)

11   J: (Builds power lines to mayor's house.)

12   H: You need water I would think.

13   J: Hate water! (Selects water pipe tool.)

14   H: (Reads from status bar.) Water shortage or something. Why would there be a water shortage? Something like a drought or something? You can't really.. mmm...

15   J: (Builds pipes to mayor's house.) There! (Water keeps running out.) Better give me water! (The water doesn't flow to house.) I don't care though! (Dismisses budget window.) It's so hard...

16   H: What is?

17   J: Using this... (Selects hospital tool.) Hospital? Should I put in a hospital?

18   H: Another one?

19   J: Do I already have one?

20   H: Uh-huh. You have one by the college. You have another on... do you have a free clinic or something for the people [who can't afford it? --]

21   J: [How 'bout auuummm!] A prison.

22   H: You have a police station already, right?

23   J: Where should I have it, right here?

24   H: That's over by the hospital. You probably want it... how about over by the sewage, like the industrial area. So it's not, cause you don't, I mean, like, no one would want to live in that area.

25   J: (Tries to place prison on terraced ground.) I can't put it on the, like, it has to be on flat ground. How about right here? (Positions cursor by lake.)

26   H: Don't put it right by your house! You don't want to live by the prison do you!? (Laughs.)

27   J: (Laughs.) Right here? (Positions on opposite side of lake.)

29   H: Sure. That's right by the police station. You might as well.

30   J: More convenient.

In this segment of activity, Jimmy begins by taking up the identification between him and the mayor: "I can make my house. My mayor's house," and then invites Holly into the decision of where to place it: "Where do I want to make my house?" (line 1). Holly's talk then draws in a series of connections from her knowledge about the world: what constitutes desirable real estate, a good view, and signifiers of power and wealth (lines 2, 4, 6). Jimmy takes up her first suggestion, to put it overlooking a lake, by trying to place it on a ridge overlooking an industrial area. She then offers an alternate suggestion, to place the house by the uninhabited region by the lake. Jimmy, with her agreement, places "his" house by the lake opposite the city (figure 7). They go on to lay down water to the mayor's house (despite the fact that is it difficult to do and Jimmy "hates" it), and then they consider the placement of a prison. Holly advises against placing it next to the mayor's house (lines 23-25). The placement of the mayor's house is inconsequential in terms of game outcomes, but functions as an effective hook for locating a subject position for the player within the game's mis en scene. While the tone of the talk is decidedly playful and peppered with laughter—it's just a game after all—Jimmy, Holly, and *SimCity 2000* have succeeded in organizing themselves around a series of identifications that link Jimmy, the Mayor, "nice" parts of town, and a good view. In this case, the game, Jimmy, and Holly collaboratively perform the participation genre of construction.

FIGURE 7
SCREEN SHOT OF JIMMY'S MAYOR'S HOUSE IN *SIMCITY 2000*
Screen shot reproduced with permission from Electronic Arts, Inc.

On another day, two girls, Allie and Jean, are playing the game with an undergraduate. The undergraduate fieldnote describes how they engage in a series of imaginative projections where they build a mansion for themselves, and then a homes for others in their lives.

> There is a young man named Seth who Allie doesn't like, and she built
> him a house on the far corner of the city, and proceeded to surround his
> home with dense forest, far from civilization, roads, and water. Because
> neither girl likes Jean's four-year-old sister, Allie built her house in a
> deserted valley without water or electricity, to die in isolation. I said that it
> was mean, so Allie placed a teeny, tiny lake far away from the sister's
> home.

These are just a few examples of how kids use games to contstruct their unique viewpoints in a virtual world. This genre of participation tends to be tied to subjectivities of technical mastery and often a hacker-like ethos, as well as these more creative and personal projections of identities. It is a source of pleasure in harnessing the technical

power of the computer, as well as forming a personal identification and sense of ownership of a unique creation. During the time that I was conducting my research, *SimCity 2000* was the state of the art in terms of software that enabled players to author within simulated worlds. Since then, this genre of software and participation has become much more central to the worlds of interactive entertainment, and is being incorporated into a wider range of educational efforts. Now user generated content and customization are buzzwords within the mainstream gaming industry, though a decade ago practices of game modding were still on the hacker fringe. In multiplayer online games, particularly worlds like Second Life (see Ondrejeka, this volume), user generated content, modding, and customization are at the very center of game engagement. These trends have meant that even games without any clear educational value, can become a focus for constructive play and hacking in the genre of authoring. *SimCity*, centered on player generated goals, authoring components, and a wide array of cheats for easy hackability, foreshadowed the developments in gaming and learning that we see today.

Conclusions

The production, distribution, and play with children's software involve ongoing tension and intertwining of different genres, social agendas, and educational philosophies. These dynamics include the negotiation between adults and kids performing the genres of academics, entertainment, and construction; the ideals of learning, fun, and creativity; and the politics of enrichment, indulgence, and empowerment. These three genres are tied to different social investments. Academic genres became a vehicle for producing class and educational distinction. Entertainment produces age cohort identity by creating a space of childhood pleasures defined in opposition to adult disciplines. The participation genre of construction supports a subjectivity of creative self-actualization tied to technical mastery. These genres of media and participation all have much deeper historical roots than this apparently recent turn to learning games and children's software. They draw from longstanding discourses in education and middle-class parenting that attempt to transform play into a site of learning, either through behaviorist, play-oriented or constructivist models of learning. Educational genres butt up against the entrenched idioms and institutions of commercial entertainment that have taken an increasingly stronger hold on childhood peers cultures in the post-TV era. The adult-oriented goals of progress and constructive play are increasingly defined in opposition to children's cultures of repetitive action, fun, and phantasmagoria.

Underlying my description has been a structural opposition between the cultural categories of education and entertainment. Contemporary childhoods in the US are largely organized by the institutions of school and home, and each institutional setting has certain social imperatives and associated media products of educational and entertainment media. Well-established media industries and infrastructures insist on these distinctions, segment markets and advertising based on the opposition between play and learning, and build on established genre recognitions of kids and parents. While marketing education software to parents or entertainment to children falls into established genres, it is much more difficult to market and distribute genre-breaking titles. Although many of the early children's software titles such as *Oregon Trail, Carmen San Diego,* or *SimCity* were not as genre-constrained in this way, genres hardened over time as the

industry and market for children's software matured. As the development context shifted from a small, experimental research effort to a mainstream commercial enterprise, the founding impetus of educational and cultural reform shifted to one of catering to existing institutional and market demands. Children's software titles were increasingly polarized between those oriented towards academic goals, and those that were meant to be fun and exciting and to compete with television for children's attentions.

The tendency for genres to harden over time indicates how media content is inseparable from the economic and structural conditions in which it is produced and circulates. Social change needs to be pursued at all levels of the circuit of production, distribution and consumption (Gay, et al. 1997), a daunting task for anyone aiming to transform the relations between technology, social stratification, and learning. When new technologies go mainstream they fall victim to their own success, shifting from experimental technologies controlled by innovative pioneers to conduits for existing social structures and norms. Early developers of children's software hoped to put accessible technical tools in the hands of the disenfranchised, alleviating the oppressiveness of narrow notions of education. Instead, children's software became another site for addressing achievement anxiety in parents, and for instilling the habitus of upwardly-mobile achievement for children who seem to have been born into success. Reform efforts that rely on educational media must produce innovative content as well as innovate in distribution mechanisms and contexts of reception to have systemic impact on issues such as educational equity. The problem of "using games to make learning fun" cannot be addressed simply as a research or software design problem. Although as researchers we may recognize the learning potential of games, this recognition alone does not change the structural conditions that insist on the bifurcation between entertainment and education and correlate only academic content with educational success.

Although I have stressed the conservative tendencies of genres, the circuit of culture I have described also suggests multiple points of negotiation, juncture, and disjuncture. The ongoing contestations between genres of participation and representation suggest ways of reshaping and appropriating the categories of education and entertainment that have been handed down to us. Titles in the construction genre create productive confusion in what we recognize as educational or entertainment. Just as the 5thD complicate our notions of what an educational institution is, games such as *SimCity* have challenged educators to consider alternative ways of recognizing learning. Educational institutions continue to have a determining effect on how childhood success and achievement is measured even outside the classroom; the history of children's software demonstrates the ways in which genres of education migrate and morph beyond the institutional boundary of school. Contexts of play and informal learning, while seemingly marginal to the high-stakes contestations over educational sorting and achievement, are sites that demonstrate the alignments and disjunctures between the cultural and social structures of children's lives. It is when these sites of reception can join hands with innovative software creators and distributors across the circuit of culture, that we can begin to imagine alternative genres of media and participation that are both compelling and sustainable.

Local contexts of play are highly malleable and open to contestation. Kids are political actors mobilizing cultural, technical, and social resources in pursuing status negotiations and claiming agency, momentarily resisting the progress goals of adults,

smuggling in forbidden idioms of action entertainment and spectacle, and using adults to support public knowledge and status displays. As technology and cultural trends increasingly support a malleable palette of styles and genres, these opportunities for creative mobilization are expanding for a media and technology savvy generation. In the micropolitics of everyday play, the balance of power between children, adults, and software is constantly shifting. A game like *SimCity 2000* can transform from a site of gleeful destruction and boyish status display to a contemplative site of conversation between an adult and a child about the relation between wealth and crime. One well-timed intervention can tip the scale toward a different genre, a different mode of engagement, a different power dynamic. The subtleties of software design are also highly significant in these micropolitics. Seemingly trivial design decisions such as score keeping mechanisms or a particular cheat code can inflect play in substantive ways.

  If I were to place my bet on a genre of gaming that has the potential to transform the systemic conditions of childhood learning, I would pick the construction genre. These forms of more geeky and hacker oriented play and software are moving from periphery to center; they hold out the promise of more participatory form of learning and media engagement (Ondrejeka, McGonigal, this volume: Ito 2006, Jenkins 2006). With the spread of the Internet and low-cost digital authoring tools, kids have a broader social and technological palette through with to engage in self-authoring and digital media production. With the growing popularity of online journaling, social network services, game modding, and remix cultures, we are in the midst of a much broader cultural shift that positions digital authoring and publication more centrally in the peer cultures of young people. These new practices challenge our research frameworks as well as the broader institutional structures of capitalism, entertainment, education, and the family. As the overall media ecology that children are immersed in shifts, construction oriented learning games can more effectively function as a scaffold for activist genres of media engagement and learning that do not rely on an opposition between education and entertainment, learning and play.

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