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DESIGN RESEARCH STRAND

Our Designs and the Social Agendas They Carry

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Although the work of learning scientists and instructional designers has brought about countless curricula, designs, and theoretical claims, the community has been less active in communicating the explicit and implicit critical social agendas that result (or could result) from their work. It is our belief that the community of learning scientists is well positioned to build transformative models of what could be, to de-

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velop learning and teaching interventions that have impact, and to advance theory that will prove valuable to others. This potential, we argue, would be significantly heightened if we as a community embrace the critical agendas that are central to so many discussions in anthropology, philosophy, or even curriculum development more generally. Instead of simply building an artifact to help individuals accomplish a particular task, or to meet a specific standard, the focus of critical design work is to develop sociotechnical structures that facilitate individuals in critiquing and improving themselves and the societies in which they function, and then we use our understanding of participation with these structures to advance theory. As an example of critical design work, we describe the Quest Atlantis project and the methodology used in its creation.

> The philosophers have only interpreted the world, in various ways; the point is to change it. (Karl Marx, 1845/1998)

The learning sciences and instructional design community have participated in the development of countless artifacts, curricula, tools, and other technological spaces, as well as principles for designing them and more general theoretical claims based on observation of participants engaging with these designs. Although well-designed projects, software applications, or even technological spaces can support deep understandings and new practices, less common in this design work is a critical social agenda. Borrowing on the language used in anthropology,[1] a *critical* agenda is one that, if adopted, calls in to question and potentially disrupts existing practices and structures; it communicates a commitment that the work reflects a critique of the status quo, even exposing inequitable power structures, resource allotment, divisions of labor, or disempowerment (Freire, 1970/2000). In advocating the role of applied anthropological research, Fine and Weis (1998) solicit work "which empowers as it exposes, which offers critique as it reveals not only *what is not* but *what could be*" (p. 16, emphasis added). In reference to critical literacy, McLaren (1992, p. 319) stated that "the ability to read and write in no way ensures that literate persons will achieve an accurate or 'deep' political understanding of the world and their place within it." It is our belief that learning scientists and instructional designers are positioned to build transformative models of what could be, to develop curricular interventions that have impact, and to advance valuable critical theory.

This idea that curriculum carries with it a social and potentially disruptive agenda, one that transcends the disciplinary boundaries of the academic content to

[1]Many ethnographers, criticizing interpretive accounts that fall under the heading of "basic" anthropological research, instead advocate a social consequence to the work with a focus on what might be labeled "applied" or "critical" anthropological research. Although learning scientists necessarily carry out applied work, the argument here is that, similar to applied ethnographers, they might become proactive and explicit with respect to adopting socially significant agendas.

be learned, is familiar to critical theorists and educational philosophers alike (e.g., Dewey, 1938/1997; Freire, 1970/2000; Giroux, 1991; McLaren, 1988). However, beyond supporting the learning of a particular academic content, the "hidden curriculum" and accompanying agendas[2] (Apple, 1976; Jackson, 1968) are not always highlighted in published works of learning sciences and instructional design—although issues of power, equity, and how the learning and teaching assumptions driving our curricular interventions challenge the status quo may be frequently discussed. This does not mean that our developed lessons, technologies, or even theories are somehow neutral or apolitical. Indeed, commenting on the works of critical theorists, Torres (1998) suggests that

> they also help us to debunk two educational myths of liberalism that have become more suspect at the end of the century than ever before: First, the notion that education is a neutral activity, and second, that education is an apolitical activity. (pp. 7–8)

Although much of our earlier design work did not explicitly acknowledge the hidden curricula, we have recently become more intentional in examining the nonacademic outcomes of our work, in uncovering our own biases, and in some cases making our underlying agenda explicit.

In this article, we discuss two critical agendas that are central to our current research. First, we discuss the importance of critical design work, highlighting the broader opportunity for design-based researchers to explicitly acknowledge and actualize social agendas in their work. Second, we advance a specific design as well as the methodological process used in creating it. Designing curricula that change classroom practices (e.g., from teacher controlled to student controlled, from didactic lectures to inquiry-based, from individual to shared knowledge, from knowledge acquisition to engaged participation) has rich potential for advancing a critical agenda. However, we suggest that design-based researchers might take even better note of how their work supports or confronts existing practices. Reflecting the different possibilities for critical enactment, design-based researchers can instantiate a critical stance in different aspects of their design work and at different levels of its implementation, including transforming the curriculum, the student, the teacher, and the sociocultural contexts in which their designs are being realized.

At the curriculum level, it involves enlisting socially critical narratives to situate the curriculum such that it is about learning more than disciplinary content but also recognizing and even acting on potentially disruptive agendas. At the student level,

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[2]Apple (1976) discusses the "hidden curriculum" in schools as "the tacit teaching to students of norms, values, and dispositions that goes on simply by their living in and coping with the institutional expectations and routines of schools day in and day out for a number of years" (p. 211). As Doll (2003, p. 4) elaborated, "the hidden curriculum, rarely discussed in public and certainly not printed for distribution, taught conformity, fear of reprisal, obedience to others."

researchers might consider how the interventions are being taken up by students not in terms of outcomes on standardized tests items or more innovative performance-based assessments, but to inspire the adoption of new frames for understanding and, possibly, changing the world. At the teacher level, it involves recognizing that, to the extent that our curriculum stands in contrast to existing dominant teaching and learning practices, it carries with it challenges in adoption and makes necessary changes in practice and even deeply felt philosophical beliefs that can prove difficult and uncomfortable. Finally, at the school-system level, researchers might acknowledge the sociopolitical implications of their work being realized in schools and discuss the challenges whereby supporting wide-scale implementation of transformative curriculum (both in pedagogy and in content) runs the risk of compromising or undermining one's critical agenda. In short, critical design work takes place in nested spheres that should all be recognized as the object of critical design. For example, in terms of the Purple Moon project which was an entertainment product, Laurel (2001) explained her belief that software designers have an opportunity—indeed a responsibility—to serve society in a manner that goes beyond the simple production of technical innovations, to aspire to the utopian ideal of transforming and empowering individuals. Significantly, Laurel leveraged her design work to impact not only the individual girl player, but stakeholders and structures in the wider social context, including, some have argued, the gaming industry itself.

In addition to discussing critical design work in general, we are also advancing a specific methodological process, design ethnography, for those interested in understanding a particular group, context, or organization with the goal of adopting and advancing a critical agenda, as well as reifying the critique into a design intervention that may have useful application for other similar groups, organizations, or contexts. For example, in his Fifth Dimension program, Cole (1986, 1996) sought to leverage a "utopian methodology" to transform after-school centers worldwide, with the goal of supporting disadvantaged students in restructuring their identities as academics as well as aiding preservice teachers in reflecting on teaching and learning more generally. Demonstrating the methodology of design ethnography, Cole's (1986) critical design work began with an in-depth ethnographic study and involved research and design around an artifact. Still, such ethnographic work was conducted in the service of a broader agenda: as Brown and Cole (2001) wrote, "The research cycle of utopian methodology ends with social criticism: we address the conditions that make an ostensible social good impossible to maintain." Significantly, the Fifth Dimension program—particularly the metagame structure balancing educational and play activities, and the notion of a "site" or "center" of the innovation—has contributed much to our thinking.

As case in point, the Quest Atlantis project described in this article was funded by the National Science Foundation to better understand the role of online community and video games in supporting academic content learning. It would have been possible within the context of this funding to simply develop content and research

claims focused on particular science standards and conceptual understandings. However, although we were working to ensure that children would understand the scientific concept of erosion and the standards focused on complex ecosystems, for example, we became concerned with attitudinal change and determined to situate these within a larger context highlighting attitudes toward environmental awareness and social responsibility. Similarly, as the work expanded to other disciplines, and units were designed to focus on, for instance, similes and metaphors, we situated these academic activities in contexts that illuminate attitudes of personal agency and compassionate wisdom.

The important point is that we could have enlisted different narratives to situate the target content to be learned—ones that focused less on transformation and empowerment. In fact, given the current emphasis on standardized testing and achievement concerning relatively disembodied test items, it is difficult to work other agendas into the busy life of schools. However, our epistemological assumptions and experience have highlighted for us that thinking is not a coldly cognitive act, that education more generally is not apolitical, and that design work is accountable for the choices made regarding the contexts enlisted and the hidden or not-so-hidden messages conveyed. Some might argue that the work of learning sciences and instructional design should not embrace an ideological lens, as if we are scientists who should remain unbiased by social agendas. However, our conviction is that education necessarily entails issues of empowerment and transformation: any educational or curricular work—especially that based on situated assumptions of what it means to know and learn (Lave & Wenger, 1991)—must enlist rich contexts and what is too often treated as nonacademic content.

In this manuscript, we further describe our critical design initiative that overtly adopts a social agenda. This technology-rich educational innovation called Quest Atlantis (see http://questatlantis.org/) is a learning and teaching project that uses a 3D multi-user environment to immerse children ages 9–12 in educational tasks, a project that principals and teachers find conducive for teaching standards-related curriculum in the classroom. Quest Atlantis has served over 4500 users, distributed across seven countries, and has been discussed in a number of published works. As a designed space for advancing theoretical claims, this work continues in the tradition of design studies by developing a theoretically inspired design intervention, implementing it in naturalistic contexts, revising design decisions according to empirical data, and conducting the work in the service of advancing theory (Brown, 1992; Cobb, diSessa, Lehrer, & Schauble, 2003). In the next section, we provide an overview of this project as one example of critical design work. Then, in the subsequent section, we overview the design ethnography methodology that informed the development of Quest Atlantis and our understanding of critical design work. Reflecting on this work, we then discuss methodological implications for carrying out critical design work more generally. We also overview lessons learned for others who are intentionally designing with a social agenda or simply inter-

ested in reflecting on and being more proactive about the agendas underlying their work.

QUEST ATLANTIS AS CRITICAL DESIGN WORK

At its core, Quest Atlantis sits at the intersection of entertainment, education, and a set of social commitments (cf. Barab, Arici, & Jackson, 2005; Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005). We overview it here because of its being an example of a designed intervention that explicitly adopts a critical agenda. From an educational perspective, the underlying activities that constitute Quest Atlantis are founded on an inquiry-based pedagogy (American Association for the Advancement of Science, 1993; National Research Council, 1996) and an experiential learning framework (Dewey, 1938/1997; Kolb, 1984). In addition, there is a commitment to situating all content as part of rich narratives (Bruner, 2002) and all activities as part of a Web-supported, globally distributed community (Wenger, 1998). These perspectives, like the social commitments, permeate all activities and provide both theoretical and practical guidance to the development of new functionalities. Building on strategies from online role-playing games (Gee, 2004; Koster, 2000; Squire, 2006), Quest Atlantis combines elements of free play, role play, adventure, and learning, allowing members to virtually travel to three-dimensional worlds where they select developmentally appropriate curricular tasks, talk with other students and mentors, and build virtual personae.

Quest Atlantis is chiefly a virtual world housed on a central Internet server, accessible from school or home to children with online access, password permission, and the client software. As a multi-user virtual environment, Quest Atlantis immerses children in educational tasks in an adventure to save a fictional Atlantis from impending disaster. Participating as "Questers," children engage in the virtual environment and respond to associated inquiry-based challenges called Quests, and through these challenges, they help the Atlantian Council restore the lost wisdom of their civilization, one much like our own. The story line, associated structures, and governing policies constitute what is referred to in the commercial gaming sector as the metagame. Specifically, the Quest Atlantis metagame consists of several key elements:

- A shared mythological context that establishes and supports program activities.
- A set of online spaces in which children, mentors, and the Atlantian Council can interact with each other.
- A well-defined advancement system centered on pedagogically valid activities that encourage academic and social learning.
- Regalia and rewards associated with advancement and wisdom.

- An individual homepage for each child, showing their advancement and serving as a portfolio of their work.

Through this metacontext, the primary function of which is both structural (providing a cohesive framework) and motivational (providing an engaging context to stimulate participation and learning), Quests and member behaviors are targeted and instilled with meaning. However, in contrast to traditional role-playing games, one's game identity and activity depend on the child exiting the virtual environment to respond to Quests in the physical world. In this way, Quest Atlantis is not simply a "computer game" but incorporates "real-world" activities as well.

The Quest Atlantis community consists of both the virtual space and the face-to-face Quest Atlantis Centers. To take part in the program, children must be associated with a particular Center (participating elementary schools, children's museums, after-school clubs) and be registered through official channels, after which they may participate at one of the Centers or from other locations with Internet access. On entering the virtual environment, children customize their avatar and personal homepage, allowing them to develop an online persona—a powerful motivator for engaging participation in online worlds (Bers, 2001; Calvert, 2002; Gee, 2003; Turkle, 1995). Using their avatars, children travel through worlds and villages, where they can learn about the theme of each village, complete Quests, and text-chat with other children and mentors (see Figure 1). Specifically,

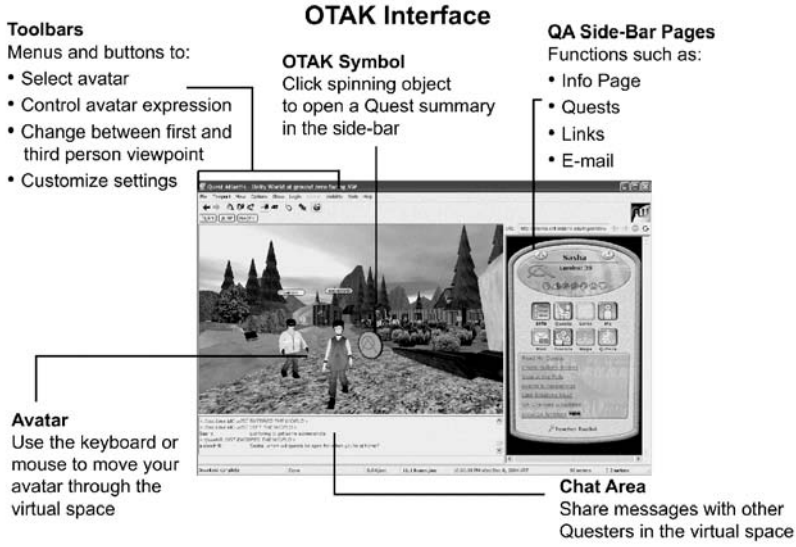

FIGURE 1 A screenshot of Quest Atlantis showing a virtual village on the left and the student homepage on the right.

the virtual space is divided into worlds, and each world is comprised of three related villages, with each presenting up to 25 Quests associated with the theme of the village. The villages each have themes (e.g., Healthy Bodies, Community Power, Global Issues, Our Waterways) designed to sponsor diverse areas of knowledge and feature something for almost everyone, yet still not strictly mirror traditional academic categories.

Even so, the Quests, which range from simulation to application problems of varying levels of complexity, represent legitimate curricular tasks designed by individuals with expertise and interest in a particular content area, and they align with established academic standards. Completing Quests requires that students participate in real-world, socially and academically meaningful activities, such as conducting environmental field studies, researching other cultures, analyzing newspaper articles, interviewing family members, and developing action plans. Further, children's work on Quests includes both content-area findings and personal reflections to foster retention, critical thinking, and metacognition. More generally, the challenge in the design of Quests and other participant structures is to bring together two traditionally disparate forces—the motivation of free play and the rigor of academics—and scaffold children's exploration while, at the same time, facilitating content learning.

A key challenge in the design process was how to integrate the social agenda in a way that was not prescriptive and that would undermine neither the entertaining nor the academic aspects of the program. Through the initial ethnographic stage of our work (described following and in Barab, Thomas, Dodge, Newell, & Squire, 2004), seven social commitments emerged to constitute the agenda foundation of this work:

- *Personal Agency* ("I have voice"): The child should articulate issues of concern to him or her and implement a fair plan to address the issues.
- *Diversity Affirmation* ("Everyone matters"): The child should value others while, at the same time, appreciating the qualities, differences, and viewpoints of others.
- *Healthy Communities* ("Live, love, grow"): The child should express feelings of connectedness and support members in building interpersonal relationships.
- *Social Responsibility* ("We can make a difference"): The child should develop a commitment to altruism, honesty, integrity, dependability, and justice.
- *Environmental Awareness* ("Think globally, act locally"): The child should comprehend and respond locally to environmental issues that are of global concern.
- *Creative Expression* ("I express myself"): The child should find multiple ways in which he or she can bring forth and foster his or her personality.

- *Compassionate Wisdom* ("Be kind"): The child should act in empathetic ways to all, using his or her understanding of complex issues to find understanding and forgiveness.

Collectively, these dimensions aim to both enhance the lives of children and to assist the formation of knowledgeable, responsible, and empathetic adults. The social commitments maintain a delicate balance, variously prosocial, liberal, pluralist, and secular; they may seem "politically correct" to the point of ambiguity or obscurity, but, at the same time, they align with strong cultural values. For example, personal agency reflects a Western European concern with individuality, whereas compassionate wisdom, suggestive of Buddhist philosophy, reflects the concerns of collectivist, Eastern cultures. Any decision to conceptualize the commitments with greater clarity must be made carefully because, as they become more instructive, they also risk becoming more radical, or more conservative, or more or less spiritual, and so forth.

Indeed, in an effort to encourage and support children in developing individual understandings of the commitments, each bears not only a formal title but also a more casual, colloquial phrasing—a "catch phrase" that pervades the Quest Atlantis paraphernalia and the classroom walls of many of the participating teachers. For example, the term "social responsibility" conveys such complex understandings as that people collectively constitute an entity with moral duties that may not pertain to the solitary individual, whereas the catch phrase "we can make a difference" suggests, more simply, situating oneself within a plurality and engaging in action to affect change. As will be shown, other design decisions likewise reflect the attempt to translate critical conceptions into curricular material that children could meaningfully employ in their lives.

Quest Atlantis was purposefully designed to foster the development of each of the social commitments within and among the children who participate, not only through Quests targeted toward individual commitments but even in the functionality of the technical infrastructure of the program. For example, in many multiuser role-playing games, a key part of game play is leveling, in which one's game character develops increasing functionality over time. The player's level represents his or her expertise and, in most games, creates new possibilities and resources for interaction in the game space, ones that were unavailable before attaining the level (Gee, 2003). Although providing a rich opportunity for reflexivity, leveling can unfortunately lead to competitive participation, usually focuses on gaining power for killing, and often connects to the activity narrative only idiosyncratically. In contrast, we wanted leveling to be not only entertaining but also educational, and we wanted it to provide a structure that connected more directly to the social commitments (Barab, 2006).

Toward this end, an additional story line was woven into the project narrative: two of the Atlantis Council members found shards of crystal that, when combined

into a flower, would illuminate. The seven petals represent the different social commitments, and colorful Web pages elaborate on the commitments so that children can evolve personal interpretation of their meaning and, at the same time, contribute to their community's understanding of the commitments (see Figure 2). At the top of student homepages are icons that illustrate his or her progress or "luminations" for each of the seven commitments (see Figure 3). Every Quest and most Quest Atlantis activities relate to these commitments, and depending on which commitments a particular student prioritizes, he or she will "luminate" (level) on different commitments and develop requisite functionalities; thereby, evolving a unique character based on her personal interests. Gee (2003) discusses how one's game character represents a phenomenological blend of the player's nongame identity in combination with his or her in-game choices, thus creating a third self. In this way, we have infused Quest Atlantis with social commitments, which are leveraged to not simply provide the content of children's experience but also to do identity work (Merten, 2005; Turkle, 1994) as they potentially bound themselves up in the identity of each child.

Elsewhere, we conducted a series of case studies revealing the complex way in which learners' participation with the commitments binds itself with personal

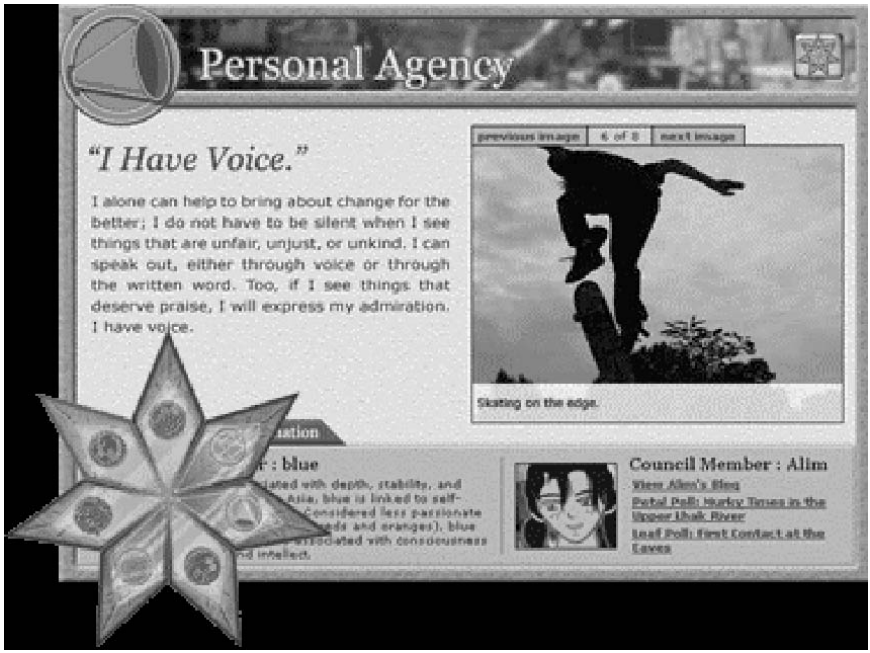

FIGURE 2 Shardflower and Social Commitment Page. This figure is a screenshot of two interrelated Quest Atlantis pages, the Shardflower page and the Social Commitment page for Personal Agency.

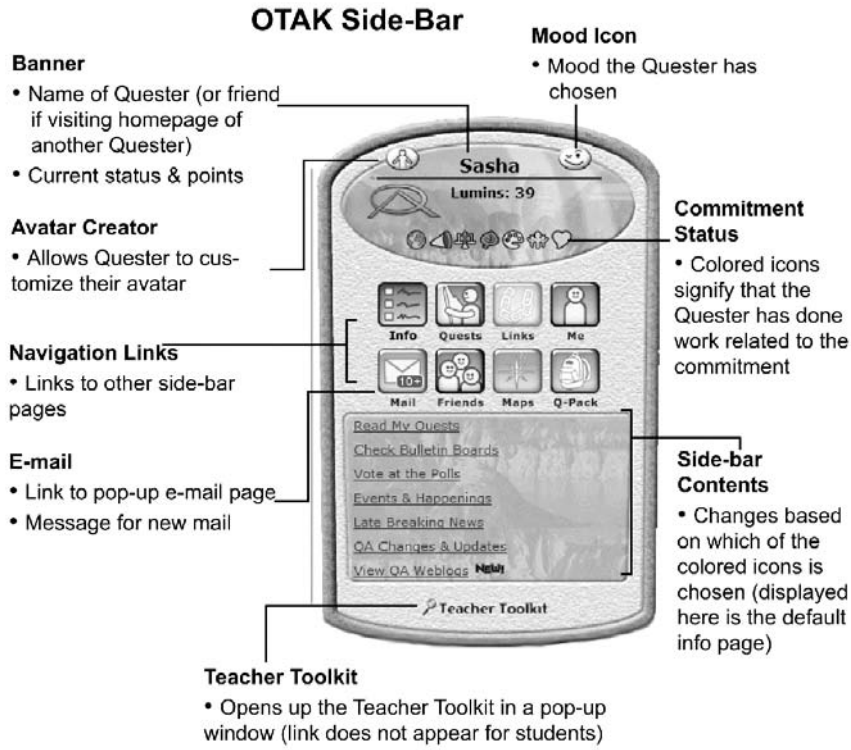

FIGURE 3 Screenshot of Student Homepage (Q-Link). Commitments are on the top portion of the Q-Link.

identities as they are expressed within and outside of the game space (Dodge et al., in press). The commitments appear in other ways as well: They are evident in the animated movies, Web logs, and emergent plotlines through which the mythical Atlantis Council members share their stories and communicate with the children (e.g., a Council Web log as shown in Figure 4). Based on our collaboration with classroom teachers, each commitment also became one of the foci for available unit plans—the latter being a necessary design addition for Quest Atlantis to be useful to teachers. By grouping collections of Quests around a common topic, we can foster particular trajectories as children complete a group of Quests or interact in a virtual world designed to support the learning of a common theme, such as data sampling, colonization, or perspective taking.

To be clear, aspects of the design, both form and content, reflect our prioritizing and explicating the critical agendas underlying the project. The Quests, although connected to academic standards, are rooted in our social commitments and are framed by the types of issues and interests that the children themselves have ex-

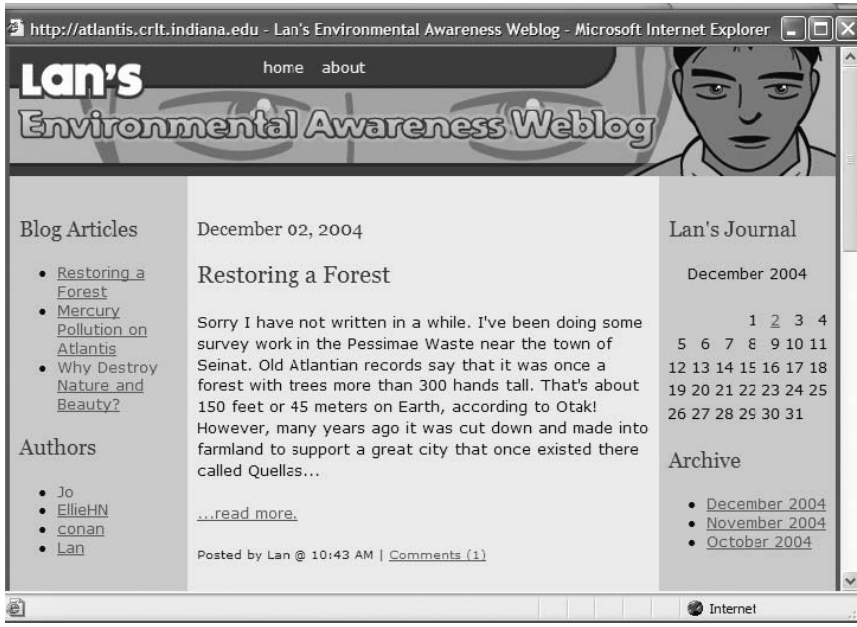

FIGURE 4 Screenshot of Council Member Lan's Environmental Awareness Web Log.

pressed. For example, as children complete Quests, they can work to understand their own lives in terms of the movies, music, toys, and magazines that they view as exciting; more important, however, they can bring in stories from their own family and culture as material for legitimate reflection, not simply work with those introduced by the textbook or software publishers who produce the majority of school materials. Valuing multiple perspectives in critical design is also demonstrated in the Quests: For example, in the "Collage Me" Quest, students can express their identity by constructing a collage of magazine images or even personal photographs and artwork. The activity moves beyond mere expression to entail what may be regarded as fledgling efforts toward identity construction, but more important to this discussion is that the children work alongside one another and together view the finished collages displayed at the local site.

Supporting the implementation of Quest Atlantis in terms of the integration and possible transformation of a particular site are the other two spheres that a critical design might impact. In terms of Quest Atlantis, a core challenge has been how we best support teachers in successfully implementing Quest Atlantis, especially given its inquiry-based activities and its commitment to rich narratives and rich participation as opposed to mere content acquisition (see Figure 5 for a screenshot of the Teacher Toolkit). Employing Sfard's (1998) distinction between the acquisition and participation metaphors of knowledge, whereas much of K–12 schools as-

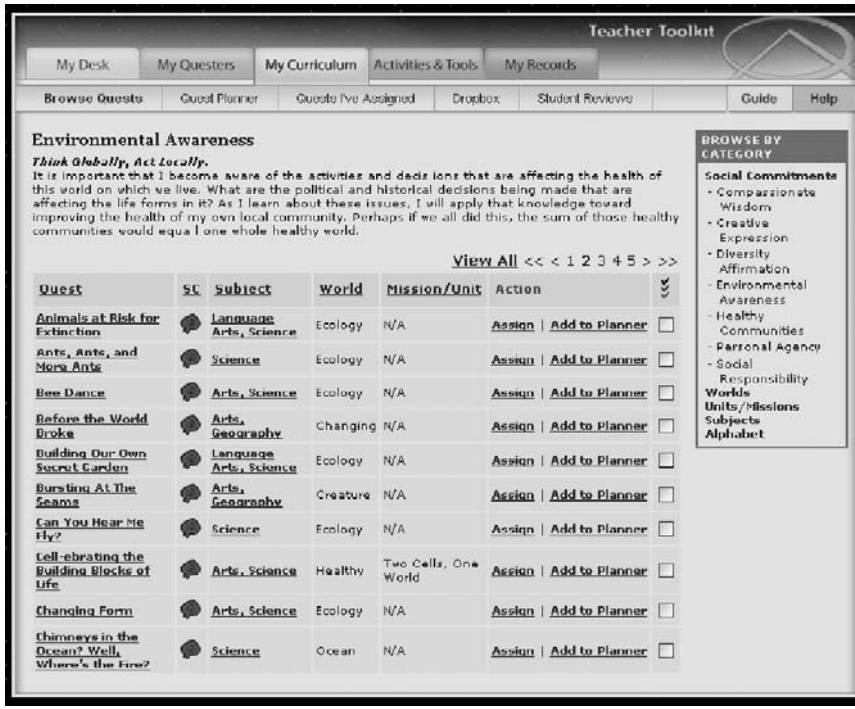

FIGURE 5 Screenshot of Teacher Toolkit for Quest Atlantis.

cribe, at least in terms of the actual classroom practices, to an acquisition model, Quest Atlantis is based on a participation metaphor. Accordingly, developing buy-in and successful implementation of Quest Atlantis and its underlying pedagogy requires us to support professional development. However, rather than focusing on introducing new pedagogy directly, we have opted for a form of embedded professional development (Barab, Jackson, & Piekarsky, 2006, p. 156). In this model, professional development occurs not as an explicit change process in which the teacher is an agent to be changed; rather, we support teachers in understanding how to more successfully leverage the components and agendas that we have attempted to design into the curriculum.

Professional development involves implementing the innovative curriculum and, simultaneously, reflecting on the underlying frameworks; teachers must ask how they might adjust their pedagogical practices to more successfully support student learning. "In our embodied professional development framework, we leverage the informal activities of teachers as they are implementing curriculum in their classrooms as points through which to stimulate change" (Barab, Jackson, et al., 2006, p. 156) The important point is to focus on supporting effective curricular

implementation, not on transforming teachers or the systems within which they are nested. Professional development in this context involves reconciling the designed structures with teacher's usual practices, as well as reflecting on how Quest Atlantis compares to other forms of teaching that they do and what teachers can do to improve the experience for their students. In this way, professional development and teacher change is a natural process, with teachers becoming change agents for their own pedagogical practices. Similarly, just as the design engages students in critical narratives, teachers must also engage these agendas if they are to support students in successfully using the curriculum. Expanding to the next level, as more teachers at a particular school or district come to engage in the curriculum and underlying pedagogy, we are stimulating the opportunity for a bottom-up change; indeed, given its expansive curricular and pedagogical scope, Quest Atlantis could be leveraged as an ideological vehicle for broader social change that goes beyond the particular curricular (Hlynka, 1996). It is in this way that, as an example of critical design work, Quest Atlantis supports change at the level of the curriculum, the student, the teacher, and, potentially, even the larger sociocultural system.

DESIGN ETHNOGRAPHY AS CRITICAL DESIGN WORK

In this section, we describe an ethnographic methodological process and elaborate on the development of the Quest Atlantis project, which we have argued, is explicit about adopting a critical agenda both in form and in content. Clearly, not all curricular designers harboring a critical agenda are interested in nesting that agenda explicitly in the content, let alone being interested in conducting a 2-year ethnography of a particular context. Although we believe that critical design work in general is an agenda that could, and perhaps should, be taken up by all designers, it is also our belief that others who wish to carry out critical design work but not conduct full-fledged design ethnography will benefit from this example. This is because inherent in this example of critical design work are tensions and difficulties that, because of their being so pronounced in design ethnography, can help illuminate challenges that are likely to arise in other critical design work that has a more subtle social agenda. We will elaborate more on these later. Here, we begin by articulating the theoretical and practical work framing the design ethnography methodology; from there, we show how it informed the design of Quest Atlantis; and following this exemplar, we return to the broader discussion of critical design work.

Relevant Literature

Ethnographic research is traditionally discussed as entailing such elements as field work conducted in natural settings for extended durations, a "thick description" reflecting the context of activity, and a concern for understanding events from the

perspective of those being researched (Geertz, 1976; Marcus & Fischer, 1986). Still, criticizing such "basic" anthropological research, many current ethnographers emphasize the social consequences of their work through what might be labeled "applied" or "critical" anthropological research, a stance intent on exposing unequal power structures within the domain of the study (Freire, 1973; Levinson, 1998). As one such methodology, critical ethnography takes a step toward bringing a transformative agenda to the more value-neutral, traditional ethnographic or anthropological approach. The critical ethnographer seeks to construct understandings with an ideological lens aimed at uncovering, exposing, and deconstructing power structures that serve to subjugate a segment of a population (Glesne, 1999). Such structures, their critique, and the commitment to their deconstruction may involve socioeconomic concerns, issues of equity and equality, and the like; in this way, critical ethnography seeks to empower the people it aims to understand. Critical ethnography, then, dispenses with some neutrality to embrace a critique or social commitment.

Other critical methodologies involving applied anthropological research fall under the headings of "action," "participatory," or "collaborative" research, which aim to empower the participants as activists within their own field of transaction (Fals-Borda & Rahman, 1991; Greenwood, William-Foote, & Ira, 1993; Levinson, 1998; Reason, 1994; Selener, 1997; Yanow, 2000). The question of how to engage groups in collaborative work is central to what Reason (1994) refers to as participatory action research, in which the ethnographer strives to facilitate social transformation. As in critical ethnography, the researcher's role in participatory action research takes on a critical stance: The researcher becomes a change agent who collaboratively develops structures to support the evolution of the communities being studied. Whereas the ethnographer seeks to understand social contexts, the participatory researcher aims to leverage this understanding and resultant critique to change them.

Still, neither critical ethnography nor participatory action research necessarily "packages" the critique in a manner that can be used by others who were not privy to the goings-on at the site where the critique was developed, thereby limiting its potential impact. This notion of packaging or reifying concepts, ideas, or strategies into artifacts or tools that others can use figures centrally in the work of instructional designers. Informed by critical ethnographers and action researchers—specifically their appreciation of the value of a participatory posture—many instructional designers currently employ a participatory approach with the belief that it will result in more useful design outcomes (Schuler & Namioka, 1993; Wasson, 2000). Participatory design encourages the reflective practitioner to evaluate the usability of the design in realistic, authentic contexts rather than artificial laboratory settings. Unlike critical ethnography and participatory action research, participatory design results in an artifact that can be used by multiple users, many or even most of whom work in contexts not a part of the initial design effort. Likewise

emphasizing the naturalistic context and designed intervention, design-based research involves the systematic variation of designed features, with each iteration serving as a sort of experiment that leads to the development and testing of theory in a naturalistic context (Brown, 1992). What design-based research does, then, is not only produce an innovation that packages conceptual understandings but also produces, tests, and advances these understandings that, withstanding contrary evidence and conjecture, can mature into novel and useful theory. That is, the focus of design-based research is not so much the resulting design as the developing theory.

Neither participatory design nor design-based research necessarily embraces an ideological lens with a focus on actualizing a social commitment—again, a central purpose of critical ethnography and some forms of participatory action research. It is our belief that by bringing together the efforts of designers, critical ethnographers, and action researchers, we can usefully integrate these powerful methodologies to implement social agendas. We refer to this synthesis, focused on the design of sociotechnical structures[3] that transform individuals and those contexts in which they function, as critical design work. Coupled with an interest in making a theoretical contribution, the goal of this work is to develop a design that can support users and the culture in their own transformation. This involves committing to extended timelines, balancing tensions, maintaining flexible adaptivity, and implementing tentative solutions to problems that elude clear answers.

Critical design work acknowledges an underlying agenda and the development of commitments, with the design of the intervention reflecting these both. One can be committed to a particular cause (e.g., cleaning a polluted river), to an idea (e.g., regarding cognition as situated), to another person (e.g., expressing vows to another), or to a way of being (e.g., eating a vegetarian diet). In the case of critical design work, one is committed to supporting meaningful change through leveraging a design, but *the underlying challenge is that one does not simply hold a commitment for oneself but endeavors to design an innovation such that others will adopt a commitment to help them find meaning in themselves and their world.* Adopting a commitment to change and empowerment has implications for one's role in the research and design process. This position as researcher-designer with a change agenda complicates the researcher's role even beyond those challenges traditionally associated with ethnographic and naturalistic research (Clifford & Marcus, 1986; Fielding & Fielding, 1986; Geertz, 1983/2002; Jackson, 1996; Silverman, 1993). As design ethnographers, we are more than participant observers: We harbor an agenda as change agents with the goal of supporting a transformational pro-

[3]We use the term *sociotechnical* to capture our conviction that spaces designed for collaboration are not simply defined by their technical structure but may be better described as sociotechnical interaction networks, the latter term highlighting the social relationships through which these technical structures take on meaning (Kling, McKim, Fortuna, & King, 2001).

cess (Grills, 1998), establishing ties to action research (Eden & Huxham, 1996; McNiff, 1995; Stringer, 1996; Wells, 1999), action ethnography (Nilsson, 2000), utopian methodology (Cole, 1996), and developmental work research (Engeström, 1987, 1993). Given this participatory and applied commitment, our research and design methods must be viewed as iterative and emergent, locally bounded yet externally accountable.

Design Ethnography in Practice

Following, we outline the design ethnography process in terms of five steps and illustrate the process by reference to the design intervention Quest Atlantis. The steps presented here represent thematic groupings that, although qualitative in nature, arose through team discussions and multiple writings, and moreover, they balance the criteria we deem necessary: The steps are useful, illuminative, comprehensive, and parsimonious. Following, we address each of these steps, although space limitations require us to discuss only highlights and, thereby, present enlightening but not exhaustive accounts of the complex transactions involved in conducting design ethnography and, more broadly, critical design. These steps, although building on each other, do not constitute a linear or prescriptive approach of design but, rather, involve overlapping and iterative processes.

Step 1: Building a rich understanding. Design ethnography begins with building a rich ethnographic understanding of the initial site of innovation and the individuals who participate at the site. Not a simplistic matter, choosing the initial site involves purposive sampling, with the final selection being based on convenience, representativeness, practicality, and local interest. Ethnography refers to the writing about people and cultures and typically includes naturalistic and extended fieldwork, a thick description that richly characterizes the context of activity, and privileging the perspective of those being researched (Geertz, 1976; Marcus & Fischer, 1986). At its core, ethnography is an act of sense-making (Emerson, Fretz, & Shaw, 1995; Rosen, 1991) in which the researcher attempts to understand multiple layers of meaning reflecting the identities of the members of the community being studied; it is not "an experimental science in search of law but an interpretive one in search of meaning" (Geertz, 1976, p. 5). Design ethnography involves developing a critical posture on this sense-making, and then wrapping that critique into a design that can support others in engaging the critique.

In terms of critical design research, ethnography provides an empirical base on which to ground formative design work. In our case, initial overconfidence led us to believe that we roughly knew the desired outcomes and that we simply needed to work with an after-school context and some classroom teachers to inform and validate the design. As it turned out, a series of events (other funded projects with deadlines, the departure of a project member, etc.) compelled us to postpone de-

sign work, so we spent more time as ethnographers in this phase than we originally intended. To our benefit, such a sustained investigation resulted in the development of rich relationships with people we came to regard not simply as "participants" but as "collaborators"; indeed, we entered into the various personal worlds of these individuals. This all resulted in a grounded appreciation of their actual needs and interests—as opposed to our a priori assumptions—and, thus, changed our initial conceptions so that, instead of simply focusing on the development of a virtual environment for learning math and science, we became committed to the development of whole persons. Moreover, as we became committed to critical design and local empowerment, we developed spaces and activities targeting the adopted social commitments, such as Unity World with its associated villages of Community Power, Global Awareness, and All about Us—titles reflecting our commitment to empower whole learners and the nested communities with which they transact.

Stage 1 of this ethnography lasted 12 months and involved around 200 site visits to an after-school site (a Boys and Girls Club) and two elementary schools (Barab, Thomas, et al., 2004). Field notes targeted the evolving technical structures (especially participants' interactions with computers) as well as the social relationships, interactions, and conversations through which these structures are informed and imbued with meaning. In addition, data collection focused on determining what actions members perform in the computer room, what those actions mean to the members, and what large-scale patterns of social activity and structure occur. The 1st year of field notes resulted in over 500 pages of data entries, with each including not only a narrative of the visit but also a researcher analysis of that visit, and in addition to field notes, we also gathered site documents and child-developed artifacts and conducted dozens of informal interviews. In short, we spent much of this 1st year simply observing and talking with children in the after-school context to earn their trust so that they would help us better understand their concerns and develop our social commitments.

In Stage 2, from months 14 to 18, our research became more focused and accordingly entailed more particular methods to build an understanding of the children that would eventually use our design (Barab, Thomas, et al., 2004, p. 260). We conducted activity analyses, in which we interviewed children individually and collectively to learn about what lab activities they engaged in and why they chose them, and we examined how those activities related to ones outside of the Boys and Girls Club. We also carried out semistructured interviews with a more formal protocol and followed these up with talking diaries (Levinson, 1996) and informal questions. Talking diaries involves asking participants to tell about the important events in their lives as if they were reading their diaries over the intervening days and weeks. In addition, we asked participants to build *personal documentaries* (Goldman-Segall, 1998), in which they photographed important events in their lives and then narrated them for us in oral or written form. We also built *researcher biographies*, a form of data collection in which the researcher travels with the par-

ticipant through their day to develop a documentary of what "a day in the life" was like for a particular participant. We continually shared our understanding with staff and Club members to determine whether our interpretations were consistent with their felt experience, and we compared our findings to related work to help build interpretations with both experience-near meanings and experience-distance significance (Geertz, 1976).

Step 2: Developing critical commitments. A second core aspect of doing design ethnography is advancing a social commitment, but a related challenge is defining the particular commitments that will be of most value to those whom the work is intended to support. Although it is possible for an outsider to select commitments that will also be relevant to other contexts, we believe that the social commitments for a particular project should be cooperatively uncovered, not simply imposed by the design team—a posture that we believe is indispensable to responsible instructional design. Our role is not to create problems or issues of concern but rather to position ourselves in a manner that will attune us to extant issues and highlight them among the community and in the context of our design work (Levinson, 1996). We also avoid a stance that might appear arrogant, naive, or disrespectful: Again, our agenda derives from those for whom we design and for whom we seek to bring about change. Central to the process of developing social commitments is to integrate voices and interests from sites beyond the initial site of innovation, which involved informal interviews, focus groups, and design workshops with current and potential stakeholders. The goal is to produce a set of social commitments that will have local meaning as well as experience-distant relevance and that can serve as a jumping-off point for subsequent design work.

In some situations, the design researcher must undertake the problematic but defensible task of exposing a situation, in what Freire (1973) calls the development of a "critical consciousness"; in these cases, critical design work involves "rocking the boat." Diver-Stamnes (1995), for example, outraged some staff members with opposing agendas at an impoverished Watts high school by working to raise the students' critical consciousness of their own complex identities—some existing simultaneously as students, family heads, peer counselors, and gang members—and helping them develop their own strategies for managing and even escaping the dead-end facing them. Although the adoption of a social commitment (and often times a political stance) provides the theoretical basis for critical ethnography (Eisenhart, 2001a, 2001b; Levinson, 1998; Nilsson, 2000), it also provides us with a focal point from which to instantiate our designs with affordances that can empower and transform a disempowered group. This coupling of action-based research with socially grounded design constitutes our conception of critical design.

Many of the children with whom we worked would not have characterized their lives as disempowered. This was evident on one occasion, for example, when for a period of time the staff at the Boys and Girls Club decided to ban Internet use, de-

spite the children's excitement for going online. When the children were informed of the ban, however, not one protested. Informal conversations with the children revealed to us that they were disappointed but did not feel as if they had a voice in changing the policy. Indeed, many of the children were accustomed to rules being imposed top-down, without explanation. If children would remain silent on issues of personal interest, how would they express discontent with issues such as prejudice or with family or community problems, we wondered. Such observations as these, coupled with our reading of the literature, led to our focus on what became our social commitments, namely supporting children's sense of personal agency, an aspect of our broader empowerment agenda. Although the initial iterations of our commitments were formed at the first site of innovation, they evolved based on discussions and research at additional sites.

A core question for the critical design researcher is what constitutes a legitimate warrant for action and how to decide on which issues should be acted. In our work, problems were identified through an examination of field notes, interviews with staff and children, our reading of the literature, and our own personal commitments—indeed, to ignore the latter would be inconsistent with our responsibility to honor and leverage team members' experiences working with children. Members of our team had different interests and, accordingly, developed and pursued individual commitments while, at the same time, they contributed to the team's overall focus. For example, one African American team member, through a conversation with a White child and in relation to a particular Quest, realized that this child—despite living with an adopted African American sister—had no understanding of the word *race*. Accordingly, the team member explored the child's understanding, studied the relevant literature, held discussions with teachers at potential sites, and embraced the social commitment of diversity affirmation while, at the same time, questioning whether her drawing attention to the concept had ironically created a distinction in the world for a child who previously did not see the world in black and white terms.

Another team member, after observing the pride and interests of students working on creative projects, focused on creative expression as an important social commitment. Responding to a series of local environmental problems and working with teachers in a neighboring school, another team member created science Quests that encouraged children to "think globally" yet "act locally," instantiating the commitments of environmental awareness and social responsibility. Still another member of our team, with an appreciation for the weak connection between the Club and the surrounding community, and with an explicit interest in fostering community, focused on the social commitment of healthy communities. Finally, dedicated to promoting compassionate individuals, another member of the research team introduced the compassionate wisdom commitment, in part based on our commitment to reach out to international sites during a period (shortly after 9/11) when anyone non-American was too often considered a potential threat. As these examples show, our commitments served to underpin and guide our work.

Step 3: Reifying commitments into design. In whole, Quest Atlantis has been designed to be both culturally potent and also safe for children, both innovative and normative. To develop a substantial community, we have had to appeal to the interests, concerns, and needs of many parties distributed across states and even continents. Students, teachers, and facilitators represent the core participants, but parents, administrators, and funding agencies constitute additional stakeholders who have considerably affected the direction and complexity of our work. The design trajectory began with an initial minimalist design geared toward iterative development in relation to emergent observed and expressed needs; significantly, this contrasts design driven by a top-down, theoretically fueled conception of what should occur. We regard this as an organic and self-evolving process but not as a self-organizing system because we remained very much at the center, directing, stimulating, and facilitating its activity.

As much as possible, we tried to incorporate into our design what we learned during the ethnography stages of our work. For example, children and especially boys liked—indeed, many were obsessed with—trading cards of all kinds: They enjoyed collecting them, talking about them, and trading them. As such, we developed Quest Atlantis trading cards with the expectation that as students completed Quests, they could trade in awarded points for the cards. Consistent with our social commitments, our trading cards featured real people who had contributed to the world in important ways (e.g., Jane Goodall, Mahatma Ghandi, Leonardo da Vinci); the cards described each person in terms of their positive contributions and highlighted the characteristics of kindness, creativity, personality, strength, and wisdom. Similarly, girls expressed liking characters, settings, and stories, so we developed a rich back story for our Atlantis legend, with a fanciful setting and admirable characters—the Atlantis Council. Further, we found that the children liked for overly dramatic plot to be tempered by wit, so we studied the banter common in popular children's television shows to inform our design decisions. Consistent with some models of participatory design (Bouillion & Gomez, 2001), we even invited children to participate in the design process, from developing mockups to proposing potential design trajectories that they would find compelling. In addition, over the last 2 years dozens of children have signed up for optional jobs in the virtual space, such as greeting other children, checking hyperlinked resources, and even serving as a design intern for extended periods of time.

Just as we wanted to make the designed intervention motivating for children, we, similarly, needed it to meet the professional needs of teachers. Accordingly, we also invited teachers into the design process to clarify what design decisions would help make the space usable for them in the context of their many demands. For instance, to meet their disparate needs, we developed Quests of varying lengths and difficulty and even developed the facility for student work to be reviewed not only by the teacher but also by the children themselves. We also connected each

Quest directly to national[4] and local academic standards and developed a database allowing teachers to sort Quests according to standards—features that have proven central in supporting and, anticipating Step IV, attracting teachers and administrators. Indeed, although the design of the foundational Quests was driven not by particular academic standards but by broader pedagogical and curricular interests, we now design curricula explicitly to align with specific academic standards so that they may integrate more usefully with extant teacher practices. In addition to academic standards, each Quest is associated with at least one of the social commitments, maintaining our critical agenda. Similarly, satisfying both teachers' needs and our agenda, many Quests stipulate that activities be conducted away from the computer, such as working with the local community, not only because student time in the computer lab is frequently limited but because our social commitments themselves entail real-world participation. All of these design elements exemplify our belief that critical design work begins with an appreciation of and relationship with participants. It is important to note, although we clearly harbor a critical agenda and at times focused explicitly on "doing good" in the world, much of our design involved couching the critical and academic agenda of our work within a playful and entertaining context.

Enlisting real-world issues in the context of schools is not a trivial design decision; in fact—and ironically, given that the program is based on game-based technology and design strategies—one student commented that, in relation to the normal school curriculum, Quest Atlantis was real. In game design, the notion of a "magic circle" refers to the imaginary boundary that separates the game world from the life-world of the individual (Salen & Zimmerman, 2004). In curriculum design, we argue that this same line exists; however, unlike games, the learner engaged in school curriculum rarely enters the magic circle because the curriculum represents mere content to be memorized rather than a situation on which to be acted. One benefit of enlisting a critical agenda within one's curricular design work is that it becomes somewhat impossible to establish a curriculum that does not introduce and embody the learner within a complex situation. In fact, in our experience, it is participation in such situations, and not disembodied content, that makes learning meaningful and transformative. Although there are certainly other ways to infuse academic content with meaning (Dewey, 1938/1997), embedding a critical agenda is a valuable one. In short, doing critical design work involves dis-

[4]This process initially involved sorting through multiple national (and some international) organizations representing each discipline. In addition, we looked at standards in a number of states, including the state in which the initial site of innovation was located. As this process became somewhat overwhelming, we opted to follow the distilled list of national standards generated by Mid-continent Research for Education and Learning (http://www.mcrel.org/) and then worked with stakeholders to locally adapt the Mid-continent Research for Education and Learning standards to those of particular states participating in Quest Atlantis.

mantling barriers that effectively isolate learning and instruction from their meaningful application in the world.

With a commitment to supporting real-world change, we developed activities to engage children in doing their own critical work. For example, as students complete Quests, they directly engage and reflect in problematic issues of their community with an eye toward changing them. By aligning these actions with the social commitments, students develop a fluency with the underlying commitments, and the status of their game character changes accordingly, serving to reify their realization of the underlying critical agendas in their own life. Also, through their engagement with the Atlantian back story (e.g., when reading Council web logs), students are introduced to role models who, by way of various project structures, share and illuminate life trajectories that embrace critical agendas. We even develop virtual world simulations, such as simulated parks in which students explore water problems that require socioscientific solutions, balancing issues of land use, job stability, economic prosperity, and even civil rights of indigenous cultures who share the land. Also, leveraging the concept of a game mission, we employ scripted game "bots" as protagonists in the virtual space to introduce problematic situations (e.g., the closing of a homeless shelter) and give students an opportunity in the play space to explore the ramifications of their decisions—even featuring transgressive elements in which students can opt to "sell out" with respect to a particular narrative to earn more game currency.

Step 4: Expanding the impact. A number of researchers have addressed the challenges of implementation, including cultural and political factors. In terms of maintaining (sustainability) and expanding (scalability) an intervention, Fishman and Krajcik (2003) discussed the need for the intervention to align with the local site culture, capabilities, and policy and management priorities. Similarly, Smith and O'Day (1991) suggested that the fundamental challenge of sustainability is systemic and involves alignment across the multiple elements of the intervention site. Confrey, Castro-Filho, and Wilhelm (2001) likewise suggested that implementation research needs to recognize the complexity of the school system and its interlocking components and that any implementation needs to operate at the broader system level. Fishman, Marx, Blumenfeld, Krajcik, and Soloway (2004, p. 49) stated, "if the challenge of alignment can be met, an innovation has a better chance of being both sustained and scaled because the alignment of the system creates a stable structure and provides needed support." Critical design work has the added challenge in that many of the driving assumptions reflected in the design structures involve critiquing and even disrupting the current state of affairs—a potential misalignment. Accordingly, ensuring sustainability represents a balancing act in which one operates within the site of implementation while, at the same time, recognizing that success involves, at some level, operating on the site. Adop-

tion of a critical agenda necessarily alienates some potential users, creating a necessary challenge to critical design work.

In other words, the identified challenges involved in making a curriculum sustainable and scalable[5] are further complicated in critical design work because of the nature of what one is trying to sustain or scale. At one level we are talking about an actual (design) intervention; the challenge is to determine how to support the continued use of the design at existing sites and at an increasingly number of new sites. At another level, critical design work carries with it an agenda that the intervention is advancing, and, therefore, the critical designer also hopes to support the scaling of the underlying assumptions and commitments. This idea that the actual design instantiation is bound up in a larger "educative" goal beyond the curricular goal of supporting student learning is not new. For example, Ball and Cohen (1996) discussed their notion of how an educative curriculum simultaneously supports both student and teacher learning, as the teacher comes to understand and value the underlying pedagogies embodied in the curricular implementation process.

To be clear, with respect to Quest Atlantis we are interested in expanding the impact in terms of (a) the curricular innovation, (b) the particular critical agenda associated with the innovation, and (c) a critical disposition more generally. In this way, sustainability does not simply involve continued use of the designed intervention but, in fact, is concerned with inspiring teachers and students (and potentially districts) to engage in the forms of critical work that the curriculum was designed to foster. For example, a teacher or student who no longer uses Quest Atlantis but becomes committed to personal agency represents for us a more successful form of sustainability than one who simply continues to use the curriculum. Building on this concept, the challenges of ensuring the successful implementation at any one site involve supporting the use of the designed intervention as well as elucidating and fostering ownership of the critical agenda that underlies the curriculum. Effective strategies for scaling reported in the literature include concrete, teacher-specific, extended training; classroom assistance from project or district staff; teacher observation of similar projects in other classrooms, schools, or districts; regular project meetings focused on practical problems; local development of materials; community involvement; teacher participation in project decisions; and principal participation in training (Berman & McLaughlin, 1978; Buechler, 1997; Elmore, 1996; Slavin & Madden, 1999). Buechler (1997, p. 6) pointed out that those wishing to advance any innovation must "nurture commitment on the part of teachers,

[5]Many researchers have sought to explain the problems of sustainability and scalability, and common obstacles reported in the literature include lack of teacher buy-in, political complexity, variable support by policy makers, political influences on implementation, educational parochialism, resource shortages, competing priorities, and variability across implementation sites (Buechler, 1997; Elmore, 1996; Fishman et al., 2004; Pogrow, 1998; Slavin & Madden, 1999; Sumner & Zellman, 1977).

preferably by involving them from the beginning in discussions of what and how to change."

Elsewhere, in addressing the embodied professional development model that accompanies our work, we have discussed the challenges of simultaneously providing teachers with rich curricular content that meets their existing classroom needs while, at the same time, affording them opportunities to innovate their teaching and reflect on their personal teaching beliefs (Barab, Jackson, & Piekarsky, 2006). "[Professional] development often involves reconciling our designed structures with teachers' own usual practices, as they reflect on how Quest Atlantis compares to other forms of curriculum and what they can do to improve and customize the experience" (p. 156). One component of this process is that the professional development focuses on supporting teachers in collaboratively reflecting on their implementation practices in situ, creating opportunities for them to deconstruct their beliefs in relation to the practices engendered through their participation with the intervention. It is here, as teachers reflect on the conversations and implementations that the role of the social commitments, the value of students becoming inspired to advance a critical agenda, and even the value of the inquiry approach become explicit and valued.

A final challenge related to scaling is that, as stated by Geertz (1983/2002, p. 4), "the shapes of knowledge are always ineluctably local." Scaling a successful implementation to additional sites can be problematic, especially if a design is inflexible or hegemonic. Furthermore, the predictability that often accompanies ubiquity often results in unintended consequences such as poor quality, oversimplification, and dehumanizing effects (Ritzer, 1998). Analogous to a biological organism, a design must adapt to ecological change, remaining flexible enough to meet the needs of local contexts and maintain its fidelity and integrity, including the commitments of its initial intervention. The goal is to develop flexibly adaptive (Schwartz et al., 1999) interventions that artfully negotiate this tension between flexibility and fidelity in scaling up. The design Quest Atlantis reflects an understanding of problematic issues as they reveal themselves in actual settings, not merely in the minds of the design team, and we have found that these issues and the value of the program have demonstrated relevance beyond the initial site of innovation. Not simply a lucky occurrence, this derives from the fact that in the world there exist common structures and emergent dynamics across different sites; indeed, it is the responsibility of the critical design researcher to connect with people and contexts beyond the initial site.

Still, scaling involves a paradoxical tension: An intervention, originating in a local context, bears the potential for transfer or generalization, which, in turn, can be accomplished successfully only through another iteration of local adaptation. Accordingly, we found it necessary that the Quest Atlantis virtual environment be adaptable and made "local" by future users. This was done through, for example, the Teacher Toolkit, which allows teachers to dynamically change the virtual envi-

ronment to benefit their own students, such as by creating local affiliations, selecting affiliation-sponsored Quests, introducing their own Quests, creating local guilds, and reviewing student work in ways consistent with their extant classroom practices. The process of supporting local adaptation, yet avoiding "lethal mutations" (Brown & Campione, 1996), for us has involved continual design iterations introducing local control and tweaking the technical design and professional development scaffolds to increase the likelihood of adaptive local translations. How to develop an intervention that allows for local customization yet still adheres to the original commitments and fosters change is a central challenge facing designers with a critical agenda. Accordingly, the problem of supporting scaling yet maintaining fidelity is a core tension that we face.

Further, not all aspects of an innovation appeal to stakeholders, due to either fundamental design decisions or subsequent revisions made to sustain the original intention as, through scaling out, a program undergoes adaptation. To illustrate the former, consider that student Quest responses, by design, are assessed according to criterion-based rather than norm-based reference. One teacher, reviewing student work, lamented that she was not given the option of assigning "a particular number of points for their [work]. The only choices I had were to 'accept' or 'revise.'" Nonetheless, we responded that the pedagogical decision, from the start, had been that the program would employ a mastery approach to learning, by which students would respond to Quests at a level of understanding reaching established criteria; they could do more than expected if they wanted to, but for personal satisfaction, not additional credit. Illustrating the latter case, an aspect of design was retracted, despite its proving to be useful to practicing teachers: Specifically, we chose to remove a rubric feature that simplified reviewing student work because, despite its popularity, the feature led to impoverished teacher feedback from a paragraph to a number. For Quest Atlantis to infuse the classroom and other center cultures, and for it to foster a distributed and variegated community, has inspired us, required us, and even prevented us from deferring to stakeholder wishes, balancing those with our own (Barab & Jackson, 2005).

Step 5: Generating theoretical claims. As a final and important component of design ethnography, and drawing from its roots in design-based research, the work does not simply result in a product but also advances theory (Barab & Squire, 2004): The raison d'être of a particular critical design is to both advance a social commitment and serve as a platform for generating knowledge. It is this final stage, as the outcomes of the work progress from empirical and hypothesized phenomena to statements of broad explanatory power, that gives the methodology its full scientific usefulness. Accordingly, a successful design can be thought of as necessary but not sufficient for conducting what we argue constitutes critical design work. With that said, it is nonetheless essential that the design has local impact and scalability for the theoretical work to have credibility. In terms of local impact,

this has meant demonstrating the value of Quest Atlantis through a number of different studies, even showing its value in terms of traditional standardized items.

For example, in one study, students learning world history in the context of Quest Atlantis advanced from almost no appreciation for how this content related to their own lives (Pre$M$ = 10.30) to a deep appreciation for its relevance, and they demonstrated the ability to take multiple perspectives in the international arena (Post$M$ =47.45) $t(19) = 10.28$, $p < .01$ (Barab, Arici, et al., 2005). Previous work has also shown transfer of understandings from the rich context of Quest Atlantis to learning gains on distal-level standardized test items ($F(1, 23) = 39.73$, $p < .001$; Barab, Sadler, Heiselt, Hickey, & Zuiker, in press; see also Barab, Zuiker, et al., in press). In a laboratory study, we compared dyads using a traditional water quality text condition (direct instruction) with a version that involved some narrative but did not take place in a 3D environment (2DD) and singles (3D) and dyads (3DD) using a 3D game-based version (Barab, Scott, et al., 2007). Results revealed that the 3D dyad (X = 5.385, SD = 1.500) and the 3D single condition performed significantly better on the standardized items than the direct instruction group (X = 3.750, SD = 1.220; $F(1, 50) = 3.900$, $p < .05$) but not the 2D condition. However, we found that the 3D dyad condition (X=4.429, SD=1.555) did significantly better on the open-ended transfer task than the 2D condition (X = 2.833, SD = 2.210) or the direct instruction condition (X = 2.250, SD = 1.712; $F(1, 50) = 3.060$, $p < .05$). Lastly, we have also conducted rich case studies, showing how Quest Atlantis participation becomes wrapped up in personal biographies of the students outside of school (Dodge et al., in press). We also have dozens of testimonials from teachers around the world who have reported how participation in the project has motivated children who were failing other classes to complete academic work, who were relatively uninvolved in prosocial activities who championed particular agendas as they completed particular Quests, or have themselves changed their pedagogical practices or classroom norms.

Although these findings demonstrate that Quest Atlantis supports learning, in themselves, they do not advance a broader theoretical perspective, but over the last 4 years, we have also leveraged Quest Atlantis to generate a number of theoretical conjectures. For example, in the late 1980s, Malone and Lepper (1987) developed a taxonomy of intrinsic motivations for learning based on four factors they observed as motivating children while playing videogames: game challenge, stimulating curiosity, a sense of control, and the fantasy of the game. Although certainly valuable—especially when used to inform the design of curricular experience or to contrast game and textbook design—this research was based primarily on single-player games. In contrast, our work involved the design of a multi-user virtual environment, and when children were interviewed about their experiences using Quest Atlantis, other factors emerged as important for engagement. Specifically, Tuzun (2004) found evidence for not only the four established factors but ten additional motivational elements as well: identity presentation, social relations, play-

ing, learning, achievement, helping, rewards, immersion, uniqueness, and creativity. These new elements were identified due to the unusual nature of Quest Atlantis as a context for learning; for example, identity presentation, social relations, and helping revealed themselves as motivators because of the innovative context that is Quest Atlantis—indicating the heavily contextualized nature to the theory of motivation that one develops.

As another example, a core focus of our work has been to engage children in "socioscientific inquiry," the process of using scientific methods to interrogate rich narratives about societal issues that have a scientific basis yet whose solution requires balancing scientific claims with political, economic, and ethical concerns. Our pre-implementation conceptualization of socioscientific inquiry included only three core components: narrative engagement, scientific inquiry, and inscription (de)construction. Using this framework, we designed a water quality curricular unit and examined an implementation designed to both support learning and further evolve the framework, thus, allowing us to situate the framework in terms of an actualized implementation instead of an idealized conceptualization. Our initial theoretical framework for describing socioscientific inquiry proved insufficient to account for student experience as it unfolded as part of a naturalistic context: Specifically, on examination, other elements were illuminated as necessary, including prior experience, external resources, social negotiation, and teacher facilitation—elements integral to characterizing the framework in practice.

Rather than regarding the difference between our initial and revised conceptions as a mutation of the model or even of the curriculum, we have worked to integrate these additional "enabling elements" into our theoretical framework. Beyond revising our conception of socioscientific inquiry, however, this work enabled us to further advance theoretical claims about the curricular potential of enlisting narrative story lines and rich contexts for situating learning, suggesting that situationally embodied curricular contexts can prove overly "situated": That is, without the necessary scaffolds, students may fail to gain an appreciation for the cross-contextual value of the underlying, invariant content, thus, creating contextually bound understandings (Barab, Sadler, et al., in press). Although not being "inert" as criticized by Whitehead (1929) and others, ironically these contextually bound understandings can result in the same lack of transfer. Therefore, a core part of the Quest Atlantis agenda has been to develop a more rigorous characterization of how to leverage rich environments for learning yet still support learners in recognizing the underlying invariant properties such that they can transfer what and how they are learning to other contexts. Another core agenda underlying the project has been to reconceptualize what is curricular, repositioning contextual elements not traditionally considered academic content as usefully constituting the minimal curricular ontology, including social agendas and elements used in videogames (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005).

More generally, from the case of Quest Atlantis, we have been building "petite generalizations" (Stake, 1995); that is, refined understandings of the patterns that we have encountered and that others in the field may likewise encounter. Indeed, it is through generalization that patterns—and their theoretical utility—emerge, and the following description of critical design work demonstrates this. Through bringing a critical ethnographic and participatory design stance to bear on our approach to design-based research, we developed the methodology discussed previously, namely that of design ethnography. Moreover, we posit that this methodology can be more generally presented in a way that preserves the critical ethnographic and participatory quality while, at the same time, easing the taxing demands entailed in traditional ethnographic research. For instance, some designers may not be able or willing to engage in a 2-year analysis before initiating the design work, but the rich understanding mentioned previously attained through developing a traditional thick description can be approximated through more selective means such as leveraging extant analyses and consulting informed stakeholders. This broader methodology, termed critical design work, thus, represents another theoretical outcome of the design-based research reported so far.

IMPLICATIONS FOR CRITICAL DESIGN WORK

A Process for Critical Design Work

The Quest Atlantis Project as an example of critical design work represents a complex outcome with a complex history. Chiefly, as framed in this manuscript, that history entailed developing rich ethnographic understandings to design a curricular innovation that could infuse the daily lives of children and teachers with new activities and meanings. In this way, our work in design ethnography instantiated our dedication, more broadly, to critical design. As learning scientists and instructional designers, we brought a critical stance to our curricular designs, but not all learning scientists harbor such an explicit critical agenda nor are committed to spending 2 years developing an appreciation for a particular context. Appreciating these different goals, in this article, we have argued that whether our designs simply reproduce or attempt to positively transform the cultures for which they are intended, they are certainly all political. Especially in the national context of increasing federal influence over pedagogical and curricular practices, questions of power and ideology come to center stage in the decisions that educational designers make. Who are the stakeholders? Who must be pleased? Who must not be displeased? If the answers influence our design of a particular feature, message, or philosophy, will the audience for our design diminish to a few allies willing to sub-

ject themselves to our research? Will the use of our design be relegated to those fleeting moments in the computer lab during "fun time" or "life skills time"?

Simple tools are often designed to flexibly serve many purposes—a simple pocketknife, for example, can slice an apple, carve a statue, or spring a lock—and, unlike curricular design, they rarely bear significant political messages. A core goal of this manuscript is to help design-based researchers and curriculum designers to more richly infuse their designs with a critical stance. Building on the prior discussion, we propose five steps that others might use, thereby, offering a set of practical recommendations for design-based researchers not committed to conducting a full design ethnography but nonetheless wanting to more critically reflect on the agendas that their designs advance. Table 1 overviews steps that designers may take to make their work more critical; although directly adapted from

TABLE 1
Five Steps of Critical Design Work

Steps	*Description & Examples*
1. Building a Rich Understanding	Developing a multilayered description of particular contexts, as well as interests and activities of those people at these contexts who will be affected by the design
	Rich understanding can be gained through reading accounts of the stakeholders and their contexts, or engaging in ethnographic methods to better understand participants and issues at the intended sites.
2. Developing Critical Commitments	Using the produced understandings to develop a social critique and associated commitments, with a focus on transforming individuals and the broader eco-social system
	Critical commitments can be developed through consulting stakeholders, studying relevant literature, examining relevant media, and analyzing data collected as part of the first step.
3. Reifying Commitments into Design	Collaborating with individuals at local and other sites to better understand their needs and how one's understanding and critical commitments can be instantiated into an intervention
	Design decisions can be guided through consulting stakeholders, analyzing related interventions, and sharing formative products.
4. Expanding the Impact	Evolving the design such that it and the underlying content and assumptions are sustainable at existing sites and are taken up at new sites
	This process is facilitated through analyzing media around new sites, consulting stakeholders, and conducting implementation studies.
5. Making Theoretical Contributions	Progressing from empirical and hypothesized phenomena to statements of broad explanatory power resulting in the creation and application of knowledge
	Constructive theory can be advanced through identifying gaps in the literature, analyzing the outcomes of related projects, and abstracting on lessons learned.

our design ethnography methodology, the steps are here repurposed for those interested in carrying out critical design work more generally.

One begins the process of critical design work by building a rich understanding of relevant contexts. Although not necessarily involving a full ethnography, this might involve incorporating the use of particular ethnographic methods such as those mentioned earlier, as well as secondary sources such as previous analyses or relevant research studies. The purpose, whatever the methods used, is to develop an informed understanding of the experience of, and relevant critical issues possibly affecting, potential adopters. The next step of developing critical commitments is iterative, shifting back and forth between understanding what has been learned through the first step and envisioning possibilities of what is practical, useful, and perhaps necessary. In other words, one's participatory stance and commitment to grounding in current practice should not overly constrain alternative visions of what could be. Once one has clarified the set of issues or commitments that will influence the design work, the next step is to reify the commitments into design. For us, this involves a participatory process in which we develop increasingly complex structures, working collaboratively with potential implementers to check and evolve the value of the design such that it continues to foster transactions resonate with the critique. Having developed an initial design, the next step involves expanding the impact for particular schools or classrooms; consistent with the argument made by Hall (2001, p. 220), "the process of adoption itself involves further design, fitting, and adaptation for circumstances of local use." Lastly, one works toward making theoretical contributions by reflecting on the extent to which the impact of the design served to realize the critical agenda.

It is our belief that when the work becomes critically informed, an innovative curricular design can structure students' experiences, individually and collectively, such that their life participation may be framed in novel and revealing ways. Teachers, too, may envision their activities and understandings with new clarity and insight and, more important, bring this to bear on their classroom practices. Furthermore, the local school and its community context may likewise be transformed in ways demonstrating the critical perspectives being adopted by its members. To be clear, we are suggesting that by using the five methodological steps to identify and advance a critical agenda, designers can transform the critical work being done through their intervention in terms of four spheres of influence:

- *Curricular:* The content should be situated in critical (even politically disruptive) narratives that are consistent with the adopted social commitments, as opposed to focusing on impoverished contexts or those that simply target domain-relevant content.

- *Student:* The student should regard the curriculum not in terms of school tasks or "performance dilemmas," but instead in terms of problematic issues to be considered in life.
- *Teacher:* The curriculum should be based on teaching and learning practices that may contrast with those practices the teacher is typically using, thereby, transforming teacher conceptions of content, learning, and teaching.
- *School System:* Stakeholders in the school and broader school system should consider the implications of the curriculum in terms of further adoption, professional development, and even assessment practices, potentially transforming what are considered best practices and useful curriculum for the school and district.

Having considered the steps of the critical design methodology and its impact on various levels of the educational system, in the next section, we discuss key challenges that we recognize in conducting critical design work.

Challenges of Critical Design Work

All designs are political. Although they are still open to local interpretations, we must acknowledge that the contexts we create for our designs, and the ones that are created because of our designs do bear political baggage (Torres, 1998). For instance, when the Cognition and Technology Group at Vanderbilt (1993) situated the learning of distance, rate, and time in a narrative involving a female boat owner and mechanic, they did so intentionally, attempting to expose and dismantle stereotypes regarding women's roles. Sometimes the messages are less intentional yet still recognized by participants. In the Inquiry Learning Forum, for example, a participant pointed out to us that in 90% of the mathematics videos, the teachers were male; only then, did we realize what message we were inadvertently conveying regarding who can do math. The important point is that the content associated with a design is never apolitical; one must, therefore, consider both the explicit and implicit statements that the content communicates (Jackson, 1968).

Indeed, the implications of adopting a critical stance transcend the domain conventionally occupied by education. Consider, for example, a customary textbook addressing effective teaching: Its breadth encompasses diverse topics including not only pedagogical content knowledge and the structure of knowledge but even individual student needs and intercultural concerns. Still, adopting a critical stance entails surpassing delineations established by content knowledge or classroom walls. Certainly, curricular content must figure centrally in any viable conception of education, but, addressed from a critical perspective, even content must be transformed: The selection, framing, and presentation of content, while, at the same time, necessarily adhering to domain understandings and aligning with academic standards, must be scrutinized. For instance, the narratives through which

students gain familiarity and fluency with domain content must themselves be recognized as decisions: No word problem, case study, or thematic unit can be divorced from the messages—too often implicit and even inadvertent—that they convey, ranging from perpetuating social stereotypes to defending political injustices. Moreover, not only curricular content but also its context—the spaces which it occupies, and the people for whom it operates—must be revised.

Transfigured content engages the student so that he or she establishes a functional relation with the domain, effectively becoming a practitioner, however novice, of the field. More than a purely cognitive affair, learning should connect with the personal in potentially transformative ways. A core challenge in any critical work, then, is to develop interventions and technological spaces that intersect and resonate with user experiences. Inherent in this issue of connecting with the personal, and representing one of the central lessons learned through this project, is the tension between designer-arranged and personally ownable structures. As Lave (1997) wrote, "the more the teacher, the curriculum, the texts, and the lessons "own" the problems or decompose steps so as to push learners away from owning problems, the harder it may be for them to develop the practice" (p. 33). That is, structures designed to facilitate learning must do so not by presenting content as sanctioned and immutable, nor even by enticing users to interact within the boundaries of a structured context, but by affording users to appropriate the structures as their own, utilize them in authentic practices, and realize them in novel contexts in which previously such structures were not recognized. The learning, then, takes the form of an act of knowing, an engagement with a context through understandings and effects that mature with experience.

Not only the student but also the teacher undergoes critical transformation: To the extent that students enlist their interests, aptitudes, and experiences in coming to appreciate curricular material, the teacher, too, can be redefined as not a purveyor of wisdom but a facilitator of understanding, a vehicle for imagination. The school itself—the institution, its mission, and the rules by which it functions—may likewise undergo critical revision, with its extended population participating in, as Douglas Bush wrote, "not a chimerical commonwealth but a practical improvement on what already exists." The array of stakeholders, including not only students and teachers but also administrators, parents, and others, all figure into the systemic change made evident, bottom-up, by curricular design. These stakeholders do not merely witness change but occasion it, in their own venue, and our role as educational researchers plays out when we bring a critical stance to bear on the curricula that we make.

Avoiding hegemonic influence. Adopting a critical posture and engaging in ethnographic practices, we naturally and perhaps necessarily harbor concern regarding the potential hegemonic influence of our work, namely, rather than being adapted with sensitivity to the characteristics of other contexts, an intervention will

coercively impose itself. Indeed, given the expansive scope and iterative refinement of its design, Quest Atlantis could, as argued previously, be leveraged as an ideological vehicle for change. Moreover, such potential would, in conventional conceptions of instructional design, reflect successful work: Heavily influenced by behaviorist and information processing perspectives of educational psychology, instructional design traditionally regards the student as a recipient of carefully prepared instructional messages that elicit desired responses including particular student understandings (Wilson & Myers, 2000). Despite advances in the learning sciences regarding, for example, what constitutes an effective pedagogical practice, learning environment, or measure of success, the aim of our present educational system still reflects the industrial age during in which it developed (Reigeluth, 1995). That system operated with classrooms of "as many as 500 students, with a space of 10 square feet allotted to each" and where students were subjected to "an efficient scheme of classroom management" (Saettler, 1990, pp. 33–34). Further, despite the recognized benefit of individualized instruction, this homogenization continues through not only "efficient classroom management," but also detailed academic standards, to which all curricula and instruction is expected to align. The programs of study of academically accomplished high school students, for example, typically favor Advanced Placement courses, which, because they necessarily target explicit domain content and require students to develop specific understandings, represent one instance of curricular hegemony and result in a near uniformity of student experience—at least if the courses are successful.

To prevent the detriment that hegemonic influence may bear, one might keep curricula provincial, that is, restrict bringing to other contexts the understandings developed through research; such local allegiance, after all, reflects the philosophy of critical ethnographers and participatory action researchers—but not of instructional designers, who, again, work toward developing an artifact that can be transferred to multiple contexts. From our vantage point as design ethnographers espousing to do critical design work, both the research and design components of our work become indispensable: Theory building, by its nature, depends on previously established knowledge, and our designs, from their inception, bear generalizability to other contexts. We argue that instructional designers should consider their work as part of a system of human activity (Engeström, 1987; Senge, 1990) and, accordingly, recognize themselves as "directly positioned in social and political contexts of educational practice" and, thus, also as "accountable for the social and political consequences of their research programs" (Barab & Squire, 2004, p. 2). Moreover, designers should regard their work in terms of its impact not on a situation directly but, rather on how users transact with the work, with each other, and with their contexts; in this way, the design functions as a tool within the broader system.

To elaborate, a design bears myriad affordances that, according to Gibson (1979), represent possible actions, but the converse, as Norman (1988) explained,

is that the user must recognize the *affordances* to actualize them. Herein lies a paradox central to our work: The human propensity to invest phenomena with meaning reflects both the individual imagination as well as the language and culture that we share. A challenge central to our work is to recognize that the dissemination of a design represents not a deterministic threat to the individual but, rather, an opportunity for individuals to idiosyncratically interpret the world. "There is structure in the world, both the physical world and the epistemological world, that places constraints on knowing," the Cognition and Technology Group at Vanderbilt (1992, p. 115) wrote, yet ironically, it is these constraining structures that make possible the act of knowing. Our work, then, is to structure participation, to design opportunities for individuals to transact and together imbue the world with meaning.

As an analog to the fields of learning science and instructional design, in the field of literary studies, we likewise find an ardent concern with the particularity of the individual. Claims of universality are not only privileged by those with power but foisted on those without it. In essence, claims for the transferability of curricula, standards, and innovations reify the power relations between parties engaged in the business of education; as Apple (1975) wrote, even apparently benign curriculum tacitly "legitimates the existing social order" (p. 114). On the other hand, according to Qin (2004), a critical stance decries the "essentialist and universalistic concept" inherent in most conceptions of identity and culture (p. 298). Instead, "knowledge of difference is necessary to the recognition of mutual interdependence; we cannot know our commonalties unless we know our differences" (p. 300). In this way, we must recognize the particularity of the students and, in addition, the reduced efficacy inherent in their position relative to us.

A life of compromises. Along with the challenges discussed previously, several interrelated tensions also emerged as problematic for our efforts yet illuminative of critical design work more generally, including (a) tensions among preexisting biases and supporting local needs, (b) tensions between empowering teachers and empowering children, and (c) tensions between local design work and more general products and theories. Further, related to the three of these is a more global tension recurrent in the prior discussion of the process of critical design work, namely, the critical design researcher's responsibility to understand the local concerns and use an appreciation of the literature to characterize the local context in a way that considers local problems but with broader significance. In terms of the first tension, among preconceptions and local needs, it is our conviction that the critical design researcher does not create the problems for another group but rather brings expertise to help uncover and illuminate extant problematic issues. Although informed and even clarified by critical design research, local problems nonetheless exist in the community a priori of the research. Previous experience, familiarity with the literature, and a grounded appreciation of the local context together contribute to the usefulness of the critique; preconceptions should be ac-

knowledged and brought into the dialogue as part of what is challenged, eventually entering into a reflexive interplay with local needs.

In this project and others (cf. Barab, MaKinster, & Scheckler, 2003 on the Inquiry Learning Forum; Barab, Barnett, & Squire, 2002 on the Community of Teachers project), we have struggled between supporting existing practice and stimulating change. For example, we have continually connected Quest Atlantis project work to academic standards and have developed rubrics to support teacher assessment while, at the same time, providing complex activities that involve deep inquiry and individualized feedback. Related to the second tension, between empowering teachers and empowering children, this adaptation to local constraints has also meant curtailing the use of more innovative elements of game design (e.g., transgressive narratives, scarcity of resources, formation of competitive alliances) so that teachers would feel that Quest Atlantis suited their classrooms. Other points similarly demonstrate the tension between empowering children and teachers. For some teachers, inquiry pedagogy and individualized activities resonate with their conception of appropriate curriculum, but others may find these strategies unsettling and undesirable. Further, supporting meaningful inquiry with 25 students, each expressing a different interpretation of the activity and framing their work accordingly, becomes a logistical challenge for the teacher. Moreover, the possibility of having students evaluate each other's work disrupts current divisions of labor and power existing in many classrooms and risks diluting the academic rigor of the lessons. Finally, the idea that play may be meaningful clashes with many teachers' ideologies: They would rather abide by the paradigm wherein activities might include both learning and playing but not "meaningful play" in which the boundaries between the two are more porous such that play is elevated from merely serving as a reward to constituting the activity itself.

With respect to the third tension, between local impact and experience-distant relevance, a final struggle involves the scalability of the work, in terms of both design and theory. As stated before, locally identified problems may not be idiosyncratic but, rather, may arise in other contexts in which the solution reified as a designed artifact may be of value. At the expense of appearing structuralist or ethnocentric, we believe that this results in part from the fact that we populate a shared world and that similar dynamics operate in multiple contexts and give rise to common issues of concern. Therefore, in the initial ethnographic stage of critical design, researchers must identify seemingly local phenomena that nonetheless may occur elsewhere, immersing themselves in a local context to develop experience-near understandings while simultaneously testing emergent hypotheses at other sites (Geertz, 1976). Again, given our grounding in design-based research, we believe that local impact is necessary but insufficient: A goal of critical design work also involves building theory.

Tensions are not necessarily overcome; rather, different forces need to be understood and balanced so that multiple agendas can be valued and, wherever possi-

ble, reified into the design and project outcomes. Still, this does not imply that the work need always occupy a middle ground: Understanding multiple perspectives is necessary when studying complex, sophisticated problems because these perspectives not only strengthen the intervention but also serve to empower both the people involved in developing it, and the people who eventually make use of it. However, critical design work does involve making commitments and necessary tradeoffs that may benefit some groups more than others: One commitment is to support impact, whereas another is to support theory. Just as using Quest Atlantis without a playing component—or even making a distinction between learning and playing—is potentially a lethal mutation (Brown & Campione, 1996), creating a space that too rigidly adheres to theory or underlying commitments would likely result in an unusable design outcome. Given our pragmatic orientation, we would view this type of work as unsuccessful and incomplete critical design.

CONCLUSION

In this manuscript, we have argued that the work of learning scientists might benefit from considering the social implications and potential of design work. The Quest Atlantis work described here, and the design ethnography process used for its creation involved the adoption and advancement of an explicit critical agenda. Although we deliberately brought this critical stance to our curricular design work, others in other venues may work with a more traditional academic focus or simply an interest in providing new visions of how people learn. Although Quest Atlantis prioritizes liberal, pluralist values and a protracted, inquiry-based pedagogical model, we have also aligned all of our Quests to national and state academic standards. Although we strive to foster a child-centered and child-owned community, we find it necessary to observe and discipline these same children. We have had to adapt our vision to the surrounding cultural contexts to create the opportunity to go beyond the mandated curricula to attempt something more, with more than a few. Simply put, we have had to make compromises to achieve broad agency.

Multiple agendas are either artfully served or these different needs must compete, and when needs do compete, they compete for the time, energy, and creativity of the designers, the teachers, and the children; they compete for precedence and prominence in our implementations. As Schutz (2000) characterizes theories, we believe that complex designs "invariably bear the 'fingerprints' of particular groups and moments" and that "those fingerprints are always multiple, overlapped, and conflicted" (p. 217). Just as we attempt to align ourselves with critical theorists, working to design and enact a transformative curriculum, those same theorists might question our allegiances. Is it possible to please all stakeholders and still truly serve them? Such questioning is necessary to achieve sustainable, scalable implementation; it is the opportunity, if not responsibility, of learning scien-

tists and instructional designers. Many believe that value-laden agendas are inappropriate to a field that ostensibly should remain objective and neutral, but we believe that they can, already are, and should be integral and explicit components of our work.

We further believe that we are in a period when individuals must focus more on the meaning and consequences of their actions and interactions, and that it is the duty of educators to help children find those experiences that are personally meaningful, communally enriching, and developmentally transformative. As a design-based research project, our work involves interacting with the designed play space, in both its material and social forms, to understand and advance specific research questions, theoretical claims, and social commitments. We are committed to evolving Quest Atlantis as one instance of critical design work in the hope that it can positively impact the lives of children and their communities. Others may not be explicitly focused on changing a particular context, but we have argued that, unless designed simply to reproduce existing practices or the status quo, design work necessarily advances an agenda and impacts the people and contexts in which it is implemented. We hope that this manuscript will inspire others to think through, and perhaps make more explicit, the social agendas that underlie or could underlie their work.

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