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Learning through Place-Making: Virtual Environments and Furture Literacies

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Learning through Place-Making: Virtual Environments and Future Literacies

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Abstract

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This study examines a project through which elementary school and high school students collaborated with university Architecture/New Media students in building models of virtual, immersive libraries. It presents the project in the context of multiple and cross-disciplinary fields currently investigating the use of virtual and immersive environments for learning. Focusing on two groups, a fifth/sixth grade "Structures/Architecture" class, and three twelfth grade English classes, this study examines the multiple ways youth represented their design ideas, the non-school activities that influenced their contributions and the changes in literacies that their participation heralds. Consideration of the affordances as well as the barriers to implementation of virtual and immersive environments in school settings, contributes to the beginnings of a framework on which researchers, educators and designers might develop an enhanced understanding of learning and literacy in the digital age.

Dedication

I would like to dedicate this work to Frank C. Berry.

Acknowledgements

When one stops to reflect on her arrival in a new place, she is astounded to consider the number of people who helped her along the way. While it is impossible to thank everyone by name, I do want to acknowledge my debt of gratitude. I count myself especially blessed to have known the love and support of friends and family, especially my husband, Rory, and our daughter, Sarah McNamara. My students, past, present and future, have been a rich source of inspiration. I am grateful too, for Claire Kramsch, Kimiko Ryokai, Greta Vollmer, and Yehuda Kalay who, in very different ways nurtured my interests with insightful commentary and probing questions. Finally, I would like to express my appreciation for Jabari Mahiri, a most patient, wise, and thoughtful guide.

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Chapter 1

Introduction

Young people are becoming fluent in new forms of communication that are as different from the texts of twenty-five years ago as books are different from cave drawings. In recent years, researchers have begun to examine student engagement with technology both in academic settings (Warschauer, 2006: Mahiri, 2006; Foreman et al., 2008, Jarmon et al., 2009, Lim et al., 2006, Nelson, 2007) and in non-school settings (Resnick, 1998; Papert, 1980; Ryokai, 2003; Bers, 2006; Mackey, 2007, Ito et al. 2010). Their work invites us to turn a sharper lens on the processes through which fluent student users of technology support academic learning with digital activities. We are called to examine how they use and evaluate internet resources, how they cultivate and maintain relationships with peers in support of academic achievement and how their identities, as they are shaped in online activities, resonate with their identities in school settings.

This study examines a project through which elementary school and high school students collaborated with university Architecture/New Media students in building models of virtual, immersive libraries. It presents the project in the context of multiple and cross-disciplinary fields currently investigating the use of virtual and immersive environments for learning. Focusing on two groups, a fifth/sixth grade "Structures/Architecture" class, and three twelfth grade English classes, this study examines the multiple ways youth represented their design ideas, the non-school activities that influenced their contributions and the changes in literacies that their participation heralds. Consideration of the affordances as well as the barriers to implementation of virtual and immersive environments in school settings, contributes to the beginnings of a framework on which researchers, educators and designers might develop an enhanced understanding of learning and literacy in the digital age.

As educators, we have been slow in responding to dramatic changes in media and technology. We implement technology through devices that replicate functions with which we are already familiar—the whiteboard, the projector and desktop computers that allow us to control the physical environment of the classroom. On the horizon, however, are wide-scale attempts to imagine how worlds that are very unlike conventional classrooms might be created to support learning. Studies of participation in video games and virtual worlds are illuminating features of engagement that deepen understanding of features of design that influence learning in both actual and virtual environments (Gee, 2007; Shaffer, 2006). Researchers, designers and educators are beginning to build and test these forms of technology for their ability to facilitate academic outcomes (Dede, 2009; Warren et, al., 2008). Reading these studies in light of my own experiences as a high school English teacher/researcher, inspired me to facilitate a collaboration between elementary school and high school students and university students in an Architecture/New Media course, in the design of virtual, immersive libraries.

Rather than limit the examination of literacy to the traditional artifacts consumed or produced, it is possible, in virtual environments, to design activities that allow educators to observe how literacy is enacted, and how it becomes essential to fostering

the emergent identities of critical and creative thinkers. While access continues to be a key issue, especially as quality Internet connections depend upon newer and more powerful computers, an equal concern must be on fluency (Resnick, 2001,1998; Warschauer, 2006). Students must become adept at navigating and mastering multiple forms of communication.

Arguing for a Bourdieusian approach to the study of literacy education, Albright and Luke (2007) observe,

> The developmental sequences and systems of exchange that are hallmarks of the old literacy are being disrupted by convergence and crossover with the new literacies, even as schools and systems offer bare bones policy and curricular attempts to incorporate new modes of representation and forms of life (p. 4).

If we hope to shape the future of education, we must shift our attention to these "disruptions." We must pay attention to innovations in the field of virtual learning as well as the practices of the students we teach. Just as our understanding of learning changed in response to the industrial age, so it will change in response to the digital age. In January, 2009, the *New York Times* reported that last year, more than a million k-12 students enrolled in at least one online course and that "more than 70 percent of the nearly 15,000 school districts in the U.S. currently offer at least one online course"(Hu, p.NJ1). What schooling means in this century has already undergone significant changes.

Students, teachers and parents all have a stake in considering how virtual environments can support learning. By failing to engage in the conversation we risk turning over our school systems to designers and corporations who will reconfigure them as they see fit. We must begin by paying attention to that student at the back of the classroom, hiding his cell phone under his desk. Is he texting, watching a movie, playing a game, checking his email, checking the score of a soccer match played on the other side of the world, checking his grade in the economics class he is taking online? How will we command his attention with a textbook when he has so many resources at his fingertips? How can we compel him to engage in the world building, both actual and virtual that will necessary to his survival?

Defining the Terms: "Virtual Environment"

Virtual environments (VEs) are places, accessible via the internet, where people can discover, exchange or share information, opinions and ideas. A virtual environment might include: a webpage of a political party or bookstore, a blog of a university course, a video game or an online forum on the best places to eat in Miami. The newest and most advanced virtual environments are immersive, accessible not only in text, but through the representation of a participant's self in the form of an avatar. Immersive environments include both virtual worlds such as *Second Life* (SL) where people meet for a multitude of serious and playful activities, and games such as *World of Warcraft* (WoW) where people experience the world through a purposeful narrative.

All virtual environments can be represented on a continuum of participatory activity (see Figure 1.1). Web pages and blogs are environments where one might read a posted editorial, view an article or slideshow, or write and send a response to another

participant's question (asynchronous). In a chat room, one might conduct a live (synchronous) conversation through text. An immersive environment offers opportunities for these activities, but also includes the opportunity of performing physical activities via his/her avatar. In an immersive world or game one's avatar might look and behave as one does, in ordinary life, as one strolls through a museum, gathers with others to attend a lecture, or dances at a concert. Some immersive environments offer the opportunity to represent oneself as a medieval warrior, an intergalactic goddess or a giant squid. Some allow one to lead a renegade army, conquer a nation, build a church, a night club or an artist's studio. In a VE one might experience supernatural powers—flying, teleporting, morphing. The experience of virtual environments has already begun to transform the lives of individuals and shape the development of communities outside of places such as schools and universities where they have traditionally formed communities.

Considering how an educator might use a virtual environment for learning involves a conceptual shift in thinking. It involves shifting from the metaphor of the computer screen as the desktop to the computer screen as a portal. Through participation in virtual environments, we are discovering both new ways of interacting and new ways of being. As all virtual environments share some of the same tools and features, examination of research on less interactive forms of virtual environments creates an opportunity to examine how these affordances operate in more interactive spaces and to consider their future uses in immersive environments.

(Figure 1.1) Virtual Environments

(low)	Degree of Interactivity	(high)
asynchronous writing dialogue reading/viewing writing text attaching files	synchronous writing dialogue reading/viewing writing text attaching files	a/synchronous writing dialogue reading/viewing voicing attaching files embodying, building, creating machinima (film) role-playing
Web pages Digitized books, Articles, films Artifacts Blogs, Hypertext	Chat rooms Instant Messaging	Simulations Virtual Worlds Video Games Augmented Reality

In current research on virtual environments the definition of learning is wide and includes demonstrations of the ability: to remember information (Messier et al., 2006; Kapingst et al., 2009; Foreman et al., 2008), to perform a particular skill (Aggarwal et. al., 2006; Chou and Liu, 2005) to collaborate with others, near and far (Oliver and Carr, 2009: Edirisingha et al., 2009; Jarmon et al., 2009; Hur and Brush, 2009), to enact observable behaviours that reflect engagement in learning (Rappa, Yip & Baey, 2008; Lim et al., 2006) to engage in "higher order thinking" (Dondlinger, Warren & Barab, 2008) and to create new media (Gaimster, 2008; Kuksa, 2008).

The kinds of learning demonstrated in an equally wide range of measures including multiple choice exams, a record of repeated behaviors, or the expression of positive feelings, tests that ask the participant to reflect or apply what she has learned, texts and artifacts he has created. Learning in immersive setting positions a student differently than as a student with a textbook in a face-to-face encounter with a teacher. What are the critical issues? How are they being addressed? What are the insights and the limitations of the research? How might the study of current research direct future endeavors? Researchers are making many claims about the potential of virtual environments and the aim of my literature review will be to discover critical issues that educators must address if learning is to be served.

Defining the terms: "Fluency"

Given the many ways that users of new technologies can interact in a virtual environment, a critical concern deals with the degree to which they can use multiple tools meaningfully. Resnick et. al. (2003) have forwarded the notion of "technological fluency" through his work at the MIT Media Lab (http://www.media.mit.edu). They draw a definition of the term from several sources, among them the National Research Council (1999), International Technology Education Association (2000) and the National Academy of Engineering (2002). They write, "The NRC report defines "fluency" with information technologies as "the ability to reformulate knowledge, express oneself creatively and appropriately, and to produce and generate information (rather than simply comprehend it)"(p. 2003). Fluency, according to the report, "goes beyond traditional notions of computer literacy…[It] requires a deep, more essential understanding and mastery of information technology for information processing, communication, and problem solving than does computer literacy as traditionally defined" (p. 2003). Resnick and colleagues have used this definition to identify a gap in the use of technology that is as significant as the digital divide. Though many more people now have access to technology, the divide is quickly growing between those who know how to use technological tools for meaning-making activities that support learning and those with the limited skills such as computer processing or conducting internet searches. The researchers write:

> Technological fluency means much more than the ability to use technological tools; that would be equivalent to understanding a few common phrases in a language. To become truly fluent in a language (like English or French), you must be able to articulate a complex idea or tell an engaging story. That is, you

> must be able to "make things" with language. Analogously, our concept of technological fluency involves not only knowing how to use technological tools, but also how to construct things of significance with those tools" (p. 1998).

Warshauer, like Resnick, has critiqued the focus on the digital divide because it "provides a poor roadmap for using technology to promote social development since it overemphasizes the importance of the physical presence of computers and connectivity to the exclusion of other factors that allow people to use ICT [information and communication technologies] for meaningful ends" (p. 2002). Warschauer proposes: "a better model of access is provided by the concept of literacy"(p. 9). Referencing the research of Scribner and Cole among the Vai people of Liberia, Warschauer reminds us,

> Their work showed that there is no single construct of literacy that divides people into two cognitive camps. Rather there are gradations and types of literacies, with a range of benefits closely related to the specific functions of literacy practices. Literacy, in a general sense, cannot be said to cause cognitive or social development; rather literacy and social development are intertwined and co-constituted, as are technologies and society in general (p.12).

An analysis of learning in virtual environments requires making distinctions about the ways students use technology. It is a dangerous mistake for educators to believe that all students use the many forms of new media with equal ease—that because a student knows how to send text messages with a cell phone, he knows how to create a digital film, or how to effectively search a database.

Warschauer arrives at six principal conclusions about literacy that also serve well as a model of information and communication technology (ICT) access:

1. There is not just one, but many types of literacy;
2. The meaning and value of literacy varies in particular social contexts;
3. Literacy capabilities exists in gradations, rather than a bipolar opposition of literate versus illiterate;
4. Literacy alone brings no automatic benefit outside of its particular functions;
5. Literacy is a social practice, involving access to physical artifacts, content, skills, and social support; and,
6. Acquisition of literacy is a matter not only of education, but also of power.

Warschauer's conclusions suggest a framework that converges both literacy and technological fluency. Immersive environments are places where students have access to many tools that offer new methods of engaging literacy and of making new things. A virtual environment can include opportunities for the production and demonstration of conventional literacies, but also offers opportunities to role-play, chat, collaborate and create new media artifacts, activities that might be costly or impossible without technology. The social context of the learning environment can be designed to honor the meaning and value of a wide range of literacy practices.

Defining the Terms: "Immersive"

As they are social worlds, virtual worlds can be created to offer the affordances of actual worlds, a "place" for a range of communicative styles and practices. As Kalay (2006) explains,

> Cyberspace—an alternative 'space' in which more and more activities 'take place' (learning, shopping, entertaining, transacting business, etc.)—can promote a new kind of 'architecture,' in its most cherished sense of place-making, though dressed in a different physical cloth—a virtual architecture unburdened by the laws of nature yet nonetheless capable of sustaining social, cultural, and economic activities"(p. 3).

Immersive environments are places where it is possible to design both symbolic and actual benefits for particular activities. The world can be constructed in order to dramatize the relationship between particular activities and their consequences. Immersive virtual environments offer places for a range of social practices that can support literacy, practices that may be difficult or impossible to enact in actual environments. A participant who completes a series of activities may enjoy greater access to resources, higher status or symbolic rewards. Virtual environments are places where issues of power can not only be enacted safely, but also critiqued. Their ability to engage must not be taken lightly. When a virtual environment becomes an abyss in which a participant loses interest in interacting in face-to-face encounters it can be a dangerous place. In studying the potential of VEs, we have an obligation to take seriously criticisms of them. In designing, implementing and assessing virtual environments educators must examine the ways that they can simulate in order to stimulate engagement in actual life.

As students use multiple forms of technology to communicate, negotiate, create, collaborate and problem solve, they position and are positioned in virtual environments as colleagues, friends, experts, teammates, leaders, gamers, writers, musicians, artists, poets and imaginary characters. Through both their willingness to play and to learn with technology, students can guide us in channeling the energy of the current media revolution in how we create, share and make meaning.

Summary of Chapters

Chapter 2, Methodology, frames this dissertation as action research and explains how preliminary studies in the high school English classes that I taught, as well as graduate level coursework, led to the current study. An ongoing challenge for me, as an English teacher of twenty-six years, has been to discover methods of engaging students in literature. I began teaching in a time when the electric typewriter was the most innovative tool that supported student literacy practices. The dramatic explosion in digital media and technology continues to offer new means of both accessing and demonstrating knowledge in today's classroom. Chapter 2 explains how I facilitated collaboration between students in a university Architecture/New Media class and elementary school and high school students in Northern California. The chapter provides my research questions as well as the methods I used for collecting and analyzing data.

In Chapter 3, I acknowledge that consideration of the academic uses of technology must take into account theories that encourage skepticism and invite us to examine possible dangers of engagement in virtual worlds. It would be easy to dismiss the anxiety of many adults as merely a generational problem, to think that once current elementary school students reach maturity, their use of technology will be smoothly integrated into all aspects of life. But there are deeper sources of anxiety than that of being unfamiliar with the affordances and constraints of technology. Theorists and philosophers including Hillis (1999), Dreyfus (2001), Poster (2001, 1995), and Baudrillard (2001) have thought deeply about the relationships between virtual and actual experiences and their concerns are addressed in Part 1 of the literature review.

Part 2 of the literature review provides a context for the virtual library project in a multiple and cross-disciplinary study of current experiments and innovations in virtual and immersive learning. As new forms of technology are tested and implemented in classrooms across the country, it is imperative that we take stock of student and teacher readiness to use new media, assess experimental programs and participate in the design of new technologies as they evolve. With regard to the use of immersive virtual environments, research is beginning to gain considerable ground. In this part of the literature review, I examine both small and large-scale studies in which researchers are looking closely at the effectiveness of this latest technology for learning.

Chapter 4 provides the results of the twelfth grade project. High school seniors in three English classes participated by contributing to the design process for creating a virtual library as it unfolded via my presentation of digital artifacts documenting their architecture team's progress. Five students volunteered to act as key collaborators by attending the university Architecture/New Media course three times during the semester in order to participate in the seminar and to meet with their architecture team. This chapter reports design ideas, critiques and responses to the project made by students from all three classes. Additionally, it focuses on the contributions made by the five students who worked closely with the architecture team. Interviews of these students reveal how their design contributions were influenced by experience of social networking sites.

Chapter 5 provides the results of the fifth/sixth grade project. Students in Mrs. Olestra's Architecture/Structures class participated in the design of their virtual library by viewing my presentations of digital artifacts documenting the design process and, in response, drawing, writing and discussing their design ideas. Once the architecture team had completed a draft of a model, they visited the $5^{th}/6^{th}$ grade class and met with students for assistance in developing it. This chapter reports on the design ideas, critiques and responses to the project made by students in the Architecture/Structures class. Through the report of three teacher interviews, the chapter offers insights into pedagogical dispositions that made the project possible. Finally, the chapter focuses on students' use of a website and a multi-user virtual environment (MUVE) that influenced students' contribution to the project.

In Chapter 6, I discuss the results of my study in order to analyze students' and teachers' readiness to integrate the newest forms of technology into academic settings. While the findings of this study do not offer generalizations, they do offer insights that guide me, as a teacher/researcher, committed to an ongoing cycle that includes identifying problems, gathering and assessing data, planning and taking action, and evaluating results (Tomal, 2003). In this chapter I discuss how the findings of the project

invite me to take greater initiative in exploring the use of digital technology with my own students. Additionally, I discuss how the results offer implications from which all stakeholders might draw in formulating a framework for understanding how immersive environments could serve current and future literacies.

Chapter 2: Methodology

Frame: Action Research

This research is best understood as action research, described by Mills (2000) as "systematic inquiry conducted by teacher researchers, principals, school counselors or other stakeholders in the teaching/learning environment, to gather information about the ways that their particular schools operate, how they teach, and how well students learn" (p. 6). Though Mills makes a distinction between "critical" and "practical" theoretical approaches, this research draws from both. The most responsible research asks questions about the production of knowledge and offers suggestions for meeting challenges through steps that can be taken in actual classrooms. Though the ethical concerns of the teacher as a researcher are a subject of concern (Locke & Riley, 2009), encouraging teachers to investigate the learning that happens in their classrooms in order to assess, develop, and question pedagogical practices is essential to successful teaching. The sharpening of a critical lens towards practice should not be the exclusive work of researchers and policy makers outside the classroom, but a disposition cultivated in all teachers. Criticizing and problem-solving are not incompatible activities, but are inextricably bound.

Educational research suffers from the disparity of experience between researchers who, though versed in theory, have had either little or unsuccessful experiences in the classroom, and teachers who may have taken a required semester of Piaget or Vygotsky in order to earn a degree, but who have been given no opportunity to make sense of theory once they begin teaching. As a consequence, researchers and teachers rarely speak the same language. Sadly, the greatest harm is often perpetuated by administrators whose job it is to translate theory from the ivory tower to the workers in the field. Often competent in neither teaching nor theorizing, they select sound bites from theory, which, through the reductive lens of their training in organizational management, they deliver in power points mandating teachers to devise "outcomes" or to shift from "teacher-centered" to "student-centered methods," or, as is happening more frequently, they simply hand teachers a script (Kozol, 2005). Action research attempts to address this crisis. As Kemmis (2007) points out,

> Empirical-analytical and interpretive research preserves a 'gap' between theory and practice. They institutionalize the separation of theory and practice in the separate roles of the researcher-theorist and the practitioner. Critical social scientific research requires the development of self-reflective communities of practitioner-theorists committed to critically examining their own practices and improving them in the interests of rationality and social justice (p. 179).

While the aim of my actions has always been practical in that I have wanted to improve the conditions of particular students in particular places—my classroom and the schools in which I taught, I have also hoped that my experience would speak to issues of learning in the wider world of academia.

Because most action research seems to have been conducted under the mantle of Frierean liberation, it may seem strange that this work describes the experiences of middle and upper middle class students in a charter and a private school whose

populations are predominantly white. Relative to most other groups, the educational system seems to work well for these students. Without investigating either the affordances or constraints of middle class students, researchers, teachers and parents make assumptions about the education of these students. I believe that it is important to study middle class students both for the purposes of demystifying their experiences and of considering the consequences of the widening chasm between educational opportunities of students from different social classes in this country. Indeed, I would argue that with the dismantling of the dinosaur bones of traditional public education through charters, magnets, small schools, schools-within-schools, online and virtual schools, there may never have existed a better time for all stakeholders to answer Eisner's (1984) call to define and support "the kinds of schools we need."

As well as being action-oriented, this research is also descriptive (Sagor, 2005) in that it illuminates the participation of $5^{th}/6^{th}$ grade students and 12^{th} grade students in the design of virtual, immersive libraries. The research presented here investigates sources of readiness as well as resistance in students, teachers and schools as they encounter the newest technologies. It offers a detailed picture of students engaged in an unusual collaboration, one that required flexibility, improvisation and creativity, in short, qualities in high demand in the digital age (Sawyer, 2006).

History: Digital Conversations

Drawing on Lewin's (1947) groundbreaking work in developing an action research model, Tomal (2003) outlines six steps that include: problem statement, data collection, analysis and feedback, action planning, taking action and evaluation (p. 11). The model aptly frames my practice in that the virtual libraries project was, in many ways, a "responsive action" (Schmuck, 2007) in a cycle of research that began with my struggle, an ongoing one for high school English teachers, to construct opportunities for students to make literature relevant. Addressing the problem has required that I pay close attention to how students make meaning in their everyday lives.

As educators, we generally assume that the incessant texting, messaging, and emailing that students perform, distracts from learning. But what if this fast paced style of communication could be used to foster conversations that support learning? I decided to experiment by assigning online conversations in response to an independent reading project on contemporary novels. For years, I had assigned the writing of reader-response journals to my Advanced Placement, English Literature and Composition students. Probst (1994), an advocate of this method, wrote that the aim of this practice was "to cultivate in students a love of reading," and "to develop readers and writers rather than literary scholars" (p. 42). The process of journaling allowed students the opportunity to stop and record their thoughts as they read. It was also a way for me to follow students' progress through their novels. In their journals, twelfth graders would systematically jot down questions, observations, insights and predictions. They would copy powerful passages from the text and analyze them, referring to the literary techniques we were discussing in class. If, for example, we covered point of view in class, I might tell them to find a passage in their novels where point of view shifted, or where point of view allowed them access to perceptions that were critical to the development of the plot.

Over time, I observed that some of the journals were written with insight, others had a kind of "canned" quality to them; the predictions were safe, the interpretations bland. As more resources became available online, I suspected that students used supplementary sources in order to fake their way through the reader-response process. Were they really reading the assigned books? Or just downloading, cutting and pasting from study guides? Though students exchanged journals in class with peers who had read the same novel, the conversations generated by these exchanges lacked the liveliness one experiences when reading a book with someone equally engaged. A student whose journal was weak, and who was obviously struggling as a reader, might learn something from a classmate whose journal responses were insightful, but when she went back to the book after class, would she have been given the support she needed to engage more confidently with the text? Could her interest be sustained?

In 2005, I facilitated the formation of groups within an AP English class of 31 students (20 girls and 11 boys) and required that every member of each group propose a contemporary novel that the group would read together. I allowed time during a couple of class sessions for students to read book reviews of novels that interested them and to persuade their partners to select their choices. Within two weeks, I approved each group's proposal as well as the reading schedules to which members had committed. Each group was required to meet four times in an online setting to discuss their novels and to submit transcripts of their conversations to me.

Over the course of the project, I read and responded to e-mailed journal responses and transcripts of instant messaged conversation and I conducted an informal survey of their online practices. All groups chose either to e-mail journal responses to one another, or to meet online to discuss their reading using an "instant messenger" or chat room program after reading a designated number of pages. Each group was required to submit transcripts of group exchanges. I read the transcripts and asked questions or made comments that I hoped would provoke further analysis. A few class periods were devoted to discussing the process of reading the selected novels in groups and of using the computer as a mediational tool for discussing the novels.

Seven of the 10 groups chose instant messaging (IM) as their chief mode of response. Three groups chose to e-mail journal responses to one another. The transcripts that students produced in IM programs were generally longer than those who exchanged e-mailed journal responses. In a few cases students who instant messaged were able to code their responses by the minute of each exchange and I was surprised to find that several groups met online for as long as an hour at a time. With those who IM-ed, the exchanges were lively and intelligent, occasionally antagonistic, sometimes punctuated with "lol," laughing out loud. The e-mailed journal responses (e-journals) were more deliberative. Students often responded to each other's points specifically which gave the exchanges the feel of short letters passed between readers. In the e-journal process, the first sender's response to the novel, prompted his interlocutors to comment on the issues he generated; it was not often that the interlocutors would generate their own topics. The e-journal process seemed to promote a more leader-centered experience. By contrast, in the IM sessions, direction of the conversation was frequently negotiated. The screen became a place where student could "chat" (through written text) in a manner that more resembled a form of conversation.

The data that I collected of 12th graders online discussions provided me with a very different type of positioning vis-à-vis the students. A hybrid of conversation and writing, the online chat positions the teacher as an invisible audience. During class time, teachers are rarely afforded the opportunity to observe a small group of students intently discussing a novel for up to an hour. The demands of the setting simply do not allow it; during group activities, a teacher must move about the room to assure that students stay on track. Reading, analyzing and responding to the transcripts created a new opportunity to witness my students interacting in a cyber setting, a parallel classroom in an imagined place.

I began to notice differences not only between the IM and the e-mailed exchanges, but also between the classroom and the chat room. Not only were the practices different in cyberspace, there were shifts in the ways students presented themselves. Notably, some students who rarely spoke in class were lively interlocutors in the virtual realm. I started to think about the chat room as a virtual place and wondered what it would be like if it were "furnished." What if students, via avatars, could meet in a place where they could commonly share the texts, where they could post or display responses, and role-play characters? What if it were a place where they could access historical, critical, artistic resources that would enhance their experiences of literature?

The Influence of Coursework

Graduate school introduced me to ethnographic the methods of Heath (1983) who investigated students' "communities and classrooms" and Valenzuela (1999) who examined student identity and the "politics of caring" enacted by teachers and administrators that shaped students schooling. I began to investigate the literacy practices of students in outside-school settings. Engestrom's (2000, 2005) expanded activity theory demands that researchers take a contextual view of activity, to consider the effects of outside-school activities on the classroom practices and to investigate the attitudes, dispositions and beliefs, as well the rules and structures and systems that made the project possible. His theory invited me to think of students who were *not working* on school assignments on the computer as "knotworking" (2000) a process that "refers to rapidly pulsating, distributed and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and activity systems"(p. 530). Students introduced me to their participation in social networking sites and in games. I interviewed students in order to understand the extent to which they used digital media in support of larger personal and academic goals. Did they use the computer to communicate with their friends while doing homework? Did many of their courses require that they read, write or research online? What skills had they been taught in academic classes? What technological skills had they developed that they used to forward their academic goals? Two students allowed me to observe their computer stations at home. In discussing their use of computers, they provided insights regarding how the computer assisted their construction of identity and how it structured relationships with others.

Doctoral studies led me to the virtual world building projects of a professor of two departments—Architecture and New Media, who was in the process of completing the design of an interactive virtual environment that aimed to teach participants about the

history and culture of residents in an urban, American post-war setting through a series of quests. A grant allowed me the opportunity to develop curricular materials that aligned with the California State Standards for U.S. History. I introduced the project to several of my students; I wanted to discover whether their interest levels would be high enough to merit a larger scale collaboration between university students building virtual worlds and school age children who engaged daily in literacy practices via technology. Two students who traveled with me to the university had many interesting insights into the project, and their level of enthusiasm persuaded me that I should seeks means of extending the dialogue between the builders and potential users of virtual worlds.

The Digital Libraries Project

In the spring of 2009, the same professor and I applied for and received a grant that allowed architecture students from his virtual world building class an opportunity to form partnerships with elementary and high school classes in designing immersive libraries. I found and facilitated collaboration between the university students who worked in three teams. I approached my school's principal and was given permission to conduct the project with students from my own 12th grade classes. Additionally, I facilitated collaboration with a combined 5th/6th grade class in a charter school, in the same city as my own school, sixty miles from campus, and a 9th grade class in an urban, private, parochial high school, forty minutes by public transportation from campus. For the purposes of this dissertation, I will focus on the 5th/6th grade class and the 12th grade class. As I was directly responsible for teaching the project in each of these two classes, I had greater opportunity to observe students and to gather data from these groups.

In each of the classes with which we worked, I gave an introductory presentation framing the goals of the project. I designed activities through which the school age students could present their ideas to the college students. I facilitated a face-to-face meeting between the college and school age students in each of the groups and I made final presentations of the finished models to each class. As the project unfolded, it quickly became clear that the suggestions and ideas that students generated were drawn from their experience of other classes and of activities that they engaged in at home. The project provided me with opportunities to interview the school age students about these experiences of virtual environments. Additionally, over the course of the semester, I became interested in how the teachers of the 5th and 6th graders viewed the role of technology, especially in its relation to literacy. Interviewing three of the school's four core subjects teachers provided me with data that triangulated my own experiences as a teacher attempting to bridge virtual and actual environments.

Research Questions

An investigation of the following questions allowed me to understand the role that technology plays in the literacy practices of the young people who participated in this project and to suggest a framework for issues that must be addressed in order that teachers successfully integrate new forms of technology into their teaching:

1. What are viable ways for elementary, middle and high school students to participate in and contribute to the design of virtual environments?
2. What kinds of prior experiences do students draw upon to contribute to the design of virtual environments?
3. How do students, teachers and librarians reveal changes in literacy learning through the use of virtual, immersive environments?
4. What are the challenges of integrating virtual, immersive environments with pedagogy?

Only by addressing these questions can educators begin to imagine a future for students involving technology in stimulating and responsible ways. Through an active analysis and evaluation of student engagement with new media, can we begin to consider its value for both learning and identity. As Hsi (2007) points out, "The advantage of engaging children as data collectors and curators of their own artifacts, knowledge and insight it is that data can be more easily collected in everyday settings, can carry the intentionality, authenticity and perspective of the digital kids, themselves"(p. 1520).

Participants

Students in this study are largely from middle and upper middle class backgrounds. The majority of students were white. The schools they attended were in the same city, just beyond the periphery of the Bay Area. Many are on a trajectory that will lead to college. Thumbnail profiles of the schools appear below:

Saint Paul's High School: Saint Paul's High School (SPHS) markets itself as primarily a Catholic, diocesan school, rather than a college preparatory. Upon graduation however, the majority of students qualify for admission into four-year colleges and universities. While the school is a single-sex high school for young men with a population of approximately 400 students, the English department integrates its upper division classes with St. Theresa's High School, a single-sex school for young women whose campus adjoins SPHS's. The sixty-five, twelfth graders who participated in this study were enrolled in two sections of Advanced Placement English Literature and Composition and one section of academic English. In addition to participating in the activities I conducted with these classes, five students volunteered to attend the Virtual World Building seminar three times during the semester, and to meet with their assigned architecture team.

Advanced Charter School: Advanced Charter (AC), a public school serving fifth and sixth graders, represents itself as offering a curricular program modeled on the Gifted and Talented Education model. The school, with a population of approximately 130 students, shares some facilities with an adjoining public junior high school. The twenty-five $5^{th}/6^{th}$ grade participants in the project were enrolled in an in-house elective entitled, "Architecture/Structures."

Position

As action researchers view educational practice as *praxis* (Kemmis, 2007), a critical component of methodology involves reflection on one's position in relation to the other participants. As Schmuck (2007), discussing action research, points out, "It consists of both self-reflective inquiry, which is internal and subjective, and inquiry-oriented practice, which is external and data based" (p. 29). The process of gathering data allowed me to observe and interact with students in a variety of settings from a range of subject positions:

Teacher/Student: In both the 5th/6th grade classroom and my 12th grade classrooms, my position as teacher allowed me to design, implement and assess activities aimed at both sparking student interest in the project and observing levels of student participation and engagement. The position is not unproblematic from a research standpoint, as it denotes a power relationship that influences students' responses. Several factors mitigated the obvious imbalance, however, implicit in my role as teacher. All of the students understood that, with regard to this project, I was also a student at UC Berkeley. In many situations, I was dependent upon much younger students—the elementary and high school students, as well as my fellow graduate students who were years younger than I, to act as my teachers and guides.

Facilitator: One of the challenges of the role of facilitator was to engage each group of student participants with the architectural teams with whom they were collaborating, and to engage the teams with the students. Given that the physical distance between collaborators was significant, I needed to represent their ideas to one another. In the elementary school and high school classrooms, it was necessary to keep the students apprised of the work that the student architects were accomplishing in order to maintain their interest in the project. At the university, it was necessary to represent the ideas of the younger students to the architectural teams so that their designs would respond to the younger students' interests and expectations. As a facilitator of the project, I was also given the opportunity to hand over the reins of teaching to the university students which allowed me the chance to observe them as they interacted with elementary school students in their own classroom. In the case of the 12th graders who visited the university classes three times during the semester, I had occasions to observe my students as they discussed design features of their library.

Mother: As a mother, I have been provided with opportunities to observe my pre-teenage daughter and her friends interact in online settings. They have graciously offered to "show me around" when they play with friends, classmates, and participants from around the world. My adventures with them provided me with insights regarding the appeal of games and worlds. They have also raised concerns regarding the value of young people's experiences, as well as concerns for their safety as they interact with others whose identities cannot always be verified.

Avatar: As "Maryanneberry Pye," an avatar I created in Second Life, I have been able to experience a virtual world, interact with participants and explore possibilities for

education. The American Library Association's island, for example, provides useful resources in exploring digital library projects. Additionally, conversations with virtual world inhabitants have provided me with vital sources of inspiration and direction in guiding my research.

Goodwin (1994) makes the point that "the ability to see a meaningful event is not a transparent, psychological process but instead a socially situated activity accomplished through the deployment of a range of historically constituted discursive practices" (p. 606). He draws from the fields of anthropology and from criminal justice in order to demonstrate how the processes of coding, highlighting, producing and articulating material representations both "build and contest professional vision"(p. 606). Further, he describes how an event "emerges through the interplay between a domain of scrutiny and a set of discursive practices" to become an "object of knowledge"(p. 606). The opportunity to work, play and observe in multiple digital and actual environments allowed me to question my identity, to participate in a range of digital and actual communities, and to engage in multiple literacy practices where full participation depended upon levels of fluency and understanding I have not yet achieved. The multiple subject positions I negotiated while conducting this research, invited me to consider the ways that the role of teacher must change in the digital age. The aim of this work is as much about questioning the "object(s)of knowledge" on which discourses in current pedagogical practices rest, as it is in creating a new object. If this research succeeds in creating something new, my vision is that it resemble a tool, something like a Swiss Army knife, one that would not simply sever some of the tethers of traditional literary education in order to discover what floats, but one that might be useful for survival on the subsequent journey.

Sources of Data and Collection Procedures

The data will be presented in two chapters, one devoted to the 12th grade students and one devoted to the 5th/6th grade students. The project has afforded many opportunities to collect a rich data set including:

For 12th graders:

- Observations at school site
- Observations at university site
- Transcripts of online discussions
- Audio-taped interviews of students
- E-mail correspondence
- Artifacts: machinima
- Analytic memos

At the start of the project, data collection with the 12th graders began with my making a presentation to the students in my English classes about learning in virtual, immersive environments. In addition to the virtual Smithsonian project, I was able to show my students several *Youtube* videos about a variety of experiences in Second Life. I both discussed and elicited written feedback from my students about their responses to and

experiences of such environments. While I invited all of my students to submit design suggestions to the architecture team, I also created an opportunity for interested students to work more closely with a team by traveling to the university three times during the course of the semester. Five students volunteered to participate. They understood that they would earn no additional credit for their participation in the project.

On their first meeting they toured, with the entire architecture class, three of the university's libraries. After the tour, they met with the team that had chosen to design the 12th grade library. On subsequent meetings, the 12th graders observed critique sessions with the architecture class and then met with their own team. Between meetings, I met with students and discussed the project with them. In our English classes, I presented assignments and initial models created by the team as the design process progressed. Upon completion of the 12th grade model, "Mybrary," the five volunteer students viewed the machinimas in our English classes and discussed the models with their classmates.

After the completion of the course, during summer and fall of 2009, I conducted interviews with each of the five students who worked with an architecture team. In several cases, after analyzing transcripts of the interviews, I followed-up with e-mailed correspondence in order to clarify or pursue understanding of a point made in the interviews. It was clear from the design of the virtual libraries, that several members of the group, as well as members from the English classes, were influenced by their use of social networking sites, notably Facebook. One student volunteered to set up a Facebook account for me and this provided me an opportunity to consider how and why participation on this site influenced students' ideas about design. Through out the research process, I kept analytic memos to document my emerging conceptions of experience and to formulate questions and problems that demanded further investigation.

For 5th/6th graders:

- Observations at school site
- Observations of interaction on the web on websites and in games
- Audio-taped interviews of students and teachers
- Students' written responses to prompts
- Artifacts: book projects, drawings of virtual libraries, machinima
- Analytic memos

With the 5th/6th graders, I devised and presented lesson plans that created opportunities for them to contribute to the design of the digital library. Students understood that they were under no obligation to participate in the classes I presented. They were free to attend study hall on the days that I worked with the class. They understood that their work would not be graded or reported to their teacher though she acted as an aide during the lessons I presented. I visited the class five times during the spring semester, 2009, and followed-up with two visits in the spring of 2010. With each visit, I wrote field notes documenting my observations and I collected students' written or artistically rendered responses to activities I assigned in class. Between meetings with the 5th/6th graders, I made reports and delivered data to the architecture teams. To facilitate the process of collaboration, during my classroom visits, I reported back to the 5th/6th graders on the progress of the teams. Typically, after reporting, I would show slides of the architects'

assignments and drafts. I would then guide students in providing feedback on the designs. Once the architects decided on the concept of the "Vending Machine Library," they visited the 5th/6th graders, explained their design and invited the young students to contribute to the development of the plan. Upon completion of the library models, I presented machinimas (films made inside virtual, immersive environments) to the students and led a discussion in which they critiqued the final projects. I asked them to briefly respond, in writing, to my presentation.

The analytic memos I kept for this group were helpful in formulating a plan for investigating the context of the experience. Comments that students made in class and in their written responses, prompted me to widen the scope of my investigation in two ways. First, I wanted to try to account for the high level of receptivity that the 5th/6th grade students expressed for the project by discovering more about the academic climate of the school in which the project was situated. This concern led me to interviewing three of the school's four core teachers, and to make observations regarding the fourth teacher during the spring and fall semesters of 2009. Second, I wanted to learn more about the non-school activities from which students drew ideas for the design of the virtual libraries. It was clear that students were both active readers and active participants in websites and online games. Several students suggested that I investigate a website devoted to a popular series of books. Two students allowed me to observe them as they played an online game. These non-school activities offered me the chance to contextualize students' participation in the virtual libraries project with related non-school activities.

Data Analysis

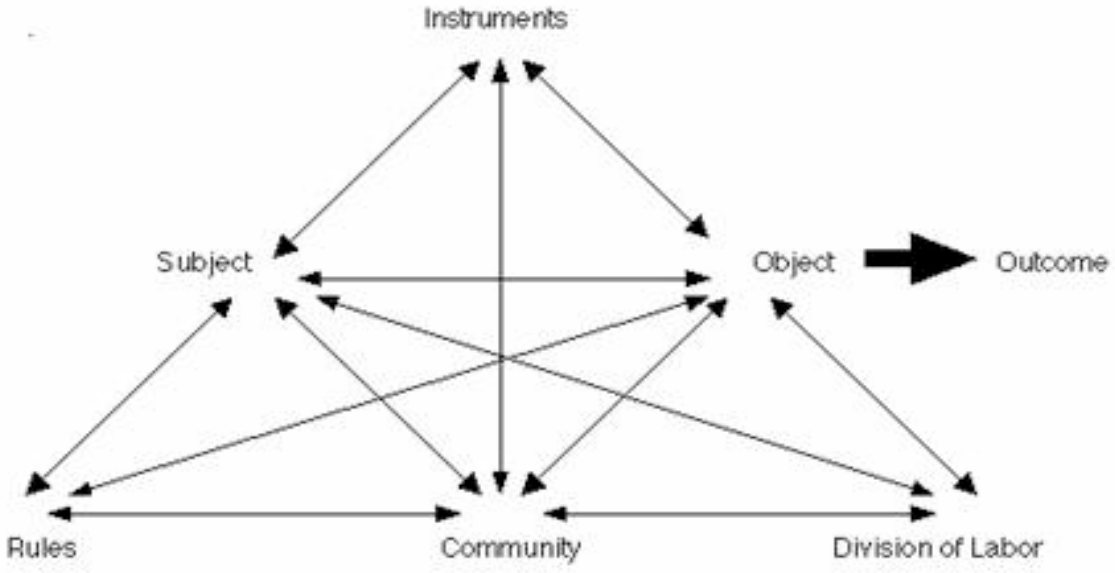
Opportunities to facilitate, observe and discuss the design of virtual libraries provided me with many entry points into the nature of students' experience of virtual and immersive environments (including the novels) in which they were engaged. I employed an inductive approach to this study, guided by discoveries that unfold in the data. I employed open coding in the first stage of data analysis (Johnson & Christensen, 2000; Stauss and Corbin, 1990), examining the transcripts of interviews and observations for repeated ideas about students' multiple uses of technology, affective expressions related to use, and identification of conflicts concerning the use of technology in school and outside school settings. From these concepts, I used axial coding to determine themes of "Experience of Technology," "Literacy and Technology," and "Barriers/Concerns." Additionally, with the teachers, I examined the theme of "Pedagogical Support" that identified teachers' understandings of themselves as facilitating student use of technology.

In the second stage of analysis, the tools of discourse analysis (DA) and of conversation analysis (CA) proved useful in examining the transcripts of interviews, interactions in online settings, and recorded conversations in order to study the meaning of the project as it evolved in and between participants. In Gee's (1996) sociocultural approach to the study of discourse, he outlines analytic methods that illuminate the relationship between discourse and identity. His work was especially useful in considering the ways that outside school literacies, sometimes in harmony, sometimes discordant with school literacies, contributed to students' understandings of themselves.

The emphasis in CA is on interaction—what people *do* in conversation, not just what they *say* (Schegloff, 2007). Through the activity of participating in designing the virtual libraries, students were positioning themselves in particular roles, aligning themselves with particular communities—actual and virtual communities, and creating social structures of possibility not commonly realized in traditional school settings. On the micro-level, formal analysis of the sequence of exchanges between interlocutors uncovered how participants guided one another through the acts of questioning, proposing, affirming, interpreting and applying their understandings as they contributed to the design process.

In the third stage of analysis, I conducted a macro-level examination of the context of the virtual libraries project. As Moerman (1988) points out, "All meaning is in relation to a context. Explicating the meanings requires stating the context. Every context is multi-layered: conversation-sequential, linguistic, embedded in the present scene, encrusted with past meanings, and more"(p. 7). Examination of the multi-layered nature of the context, using Engestrom's (1987) model of expanded activity theory (Figure 2.1), allowed me to view the abilities, preferences, and histories of individual subjects in relation to conceptions of community, rules that facilitated or constrained activity, the division of labor that shaped possibilities for participation, and instruments students used to express ideas about design in the production of the virtual library models.

Figure 2.1. Engestrom's (1987) Expanded Activity Model



On this level it was necessary to analyze the context that supported creativity as a collective, social endeavor. Through analysis of interview transcripts, and observations and written responses I examined how the discourses of learning and teaching in the schools in which these classes were imbedded made the project viable for students. I explored how prior experience provided instruments from which the students drew and

how imagined subject positions such as, “client,” or “avatar” contributed to experiences of changing literacy practices. Finally, I examined how rules and instruments both facilitated and constrained the integration of virtual immersive worlds in current pedagogical practices.

Chapter 3

Literature Review

Part 1: Practical and Theoretical Concerns

Researchers have investigated some of the issues that educators face in integrating new media with classroom learning (His, 2007). On the practical level, Rice (2007) defines and organizes the barriers to exploration of virtual environments. Though he focuses specifically on video games, his critique extends to other environments, as well. According to Rice the barriers fall into six categories that include:

> …negative perceptions toward video games as educational components; the difficulty of providing state of the art graphics in educational video games; a lack of adequate computing hardware in the classrooms to run advanced video games; a school day divided by short class periods which hinders long term engagement in complex games; a lack of real world affordances; and a lack of alignment to state standards (p. 249).

Rice thoughtfully addresses each of these barriers and suggests possible solutions, but he fails to fully probe educators' "negative perceptions." He focuses on the educator's impression that most games have little in the way of content that can be linked to academic study and that games are generally associated with violence.

Chubb, Moe & Cuban (2009) looks more broadly at why technology has not found greater use in the classroom and he concurs with Rice. Cuban claims that "Few earnest champions of classroom technology understand the multiple and complicated roles teachers perform, address the realities of classrooms within age-graded schools, respect teacher expertise, or consider the practical questions teachers ask about any technological innovation that a school board and superintendent decide to adopt, buy and deploy" (p. 46). While teachers, young and old are using computers at home, there are a number of reasons why they their use is limited in the classroom. He describes the "intractable workplace conditions"(www.edtechnot.com) that demand that the average teacher meet many students for several different subjects, in short blocks of time. He describes the "external demands" that hold teachers accountable for subject matter, classroom management, and student preparation for mandated, high-stakes tests. Should an innovative teacher attempt to employ technological tools while juggling these responsibilities, she will likely have to cope with "software glitches and computers that crash" relying on students to help her solve problems as few schools can afford on-site technical support.

There are remedies to some to the problems that both Rice and Cuban describe. The look and feel of computer graphics is improving greatly (White et. al., 2009). And with regard to the teaching profession, at least on the high school level, many schools have implemented block schedules that allow for 80 or 90-minute sessions with students (Zepeda & Mayers, 2006). As netbooks and hand-held computers become more reliable and less expensive, it seems reasonable to assume that in many schools, students will be

able to log-on using their own devices. The shift with regard to distribution, maintenance and upkeep of technology will, no doubt, have a profound influence on the ease of use in classrooms. Designers are addressing the need to use standards based curriculum as a factor in design (Ketelhut et. al., 2010). Teachers and pre-service teachers who have had opportunities to test immersive virtual environments have expressed enthusiasm about the software, but they have also voiced concern that the game features of virtual worlds might detract from the learning (Omale et al., 2009). Still, there are a number of issues that are not addressed by either Rice or Cuban and these have to do with deeper psychological and philosophical issues.

The Virtual Destroys the Actual: Philosophical and Social Barriers

The writings of Baudrillard (2001), one of the most outspoken critics of contemporary society, explore the dangers of a mediated reality. In his view, not only do we lose personal agency—a situation that might be temporary and reversible, but we also threaten to destroy society; with simulation, all life is changed. According to Baudrillard, meaninglessness is a consequence of a post modernist world in which societies have reorganized around simulation. Media swallows up reality and offers, in its place spectacles that seduce viewers into a kind of drugged stupor. In *Impossible Exchange* (2001), Baudrillard writes,

> As for the sign, it is passing into the pure speculation and simulation of the virtual world, the world of the total screen, where the same uncertainty hovers over the real and 'virtual reality' once they go their separate ways. The real no longer has any force as sign, and signs no longer have any force of meaning" (p. 135).

As Kellner (2007) explains, Baudrillard asserts that in the media-saturated, consumer society, people are so caught up in the play of images, spectacles, and simulacra, that their ties to an external reality are severed. The very concepts of the social, political, or even "reality" no longer seem to have any meaning.

The fear of meaninglessness persists today in writers and thinkers who live in a world far more digitally mediated than Baudrillard's was even a decade ago. Fear is echoed in Pulitzer Prize winning journalist, Hedges (2009), who in *Empire of Illusion: The End of Literacy and the Triumph of Spectacle*, offers the idea that,

> The flight into illusion sweeps away the core values of the open society. It corrodes the ability to think for one's self, to draw independent conclusions, to express dissent when judgment and common sense tells you something is wrong, to be self-critical, to challenge authority, to grasp historical facts, to advocate for change, and to acknowledge that there are other views, different ways, and structures that are morally and socially acceptable. A populace deprived of the ability to separate lies from truth, has become hostage to the fictional semblance of reality put forth by pseudo-events, is no longer capable of sustaining a free society (p. 52).

And yet, we must admit, illusion has always guided human interaction in such forms as mythology, religion, political ideology. How much of human life is spent testing our illusions, trying to make them real? The fact that humans are far less rational than would seem healthy is a reality that continues to demand attention. But is it really the abundance and easy access to illusion that is the cause of so much ignorance?

Had Hedges lived in an earlier time it might be easy to guess where he would have positioned himself in response to the wave of illusion that was crashing over the American populace in the form of the novel by the early 1800's. Commenting on the period leading up to this new wave of media, Baym (2006) relates,

> No doubt American life in the colonial, revolutionary, and early national periods was inhospitable to fiction. Religious conviction, pragmatic values, and the hardships of settlement life certainly cooperated to make fiction seem a dispensable if not shameful luxury (p. 780).

By the early 1800's, the popularity of the novel was cause for concern. Baym chronicles magazines and journals articles in which editors asserted the need for reviewers to exercise surveillance and provide direction to the newly literate masses who had taken up the habit of reading fiction. Fiction was seen as dangerous because, as Baym describes, "In gratifying the self, novels foster self-love and a tendency toward self-assertion that make the mind ungovernable and thus jeopardize the agencies of social and psychological control" (p. 788).

In Hedges view, the masses are no longer literate, and it is "the divide between a literate, marginalized minority and those who have been consumed by an illiterate mass culture"(p. 190) that is cause for grave concern. It is not possible to tell why Hedges believes that a highly literate culture would be without depravity. Has he considered the ways that educated people have been simply more successful in either hiding, or in making their own vices seem refined? The real issue must surely be more complicated than fostering literacy in traditional forms; it must involve the promotion of critical literacy skills. People who, by Hedges standards, practice the most limited forms of literacy, demonstrate the ability to distinguish "shit from Shinola." In the end, Hedges' attack seems less on culture, or media, or literacy, but on people of a class who do not seem as willing as they should to accept their station in life and to trust the educated elite to make decisions for them.

What does the practice of "thinking for one's self" mean in the digital age? Surely, it must begin with making distinctions between the actual and the inflated dangers of new media. There are, of course, dangers in a world divorced from the possibility of authentic experience. But should we assume that all digitally mediated interactions are less valuable than those experienced face-to-face? Certainly people who use digital media, just as past generations have used print media in the form of pamphlets, books and print journalism to manipulate public sentiment, inflame fear and encourage ignorance, threaten us all. Young people are extremely vulnerable to the influence of media (Quart, 2003). Designers of virtual environments can exercise influence over young minds. They can exercise potentially more power than the writers of textbook because, as studies are revealing, simulation can draw a student's engagement more successfully than textbooks do. Will teachers be given tools to critique, as well as create, immersive, virtual

environments? Will teachers have power to choose how and when the virtual will stand in for, support, illuminate or challenge the actual? How are students' and teachers' positions re-inscribed in these new worlds?

The Values of Face-to-Face and Distributed Interaction

Dreyfus (2002) takes a studied approach to the dangers of a mediated world. Though his book, *On the Internet* was first published in 2001, the concerns he articulates are still very much at the forefront of the resistance to new forms of technology in education. For Dreyfus, a Heideggerian philosopher, interaction via the internet threatens to diminish our humanity, He makes a thoughtful and considered argument. He lists fours dangers:

- Loss of the ability to recognize relevance.
- Inability to acquire skills.
- Loss of a sense of the reality of people and things.
- Life without meaning.

With regard to learning, Dreyfus concedes that interaction in a virtual environment might afford a student the opportunity to learn basic skills. He argues, however, that deeper learning is dependent upon face-to-face interaction. Citing the work of scientists who are developing robots, Dreyfus reports, "Their studies suggest that a holistic sense of embodied interaction may well be crucial to everyday human encounters, and that this intercorporeality, as Merleau-Ponty calls it, cannot be captured by adding together 3D images, stereo sound, remote robot control, and so forth" (p. 58). We could certainly agree, if what we planned to do was replace every human encounter with internet interaction, but we must grant that some activities are more expedient, engaging and focused when conducted digitally rather than face-to-face. Reflecting on the types of activity that might be conducted more successfully in a virtual than an actual environment could be useful way for educators to begin to consider how technology could support rather than limit their ideas for expanding learning.

Researchers are discovering that the social nature of creativity, for example, can be enhanced by virtual environments. Fischer (2004) argues for online interaction as an asset in the field of design. He emphasizes the need for "computer mediated collaboration among humans to reduce the gaps created by spatial, temporal and conceptual distances" (p. 7). He describes this environment as a "fish scale" model where specialized knowledge is "distributed in overlapping areas, much as the scales of a fish overlap" (p. 8). In an environment linked by virtual places, participants can work on particular features of a project and more readily envision their contributions to the larger work. Reading Fischer's description, it is easy to understand how success is determined by a balance of interdependence and autonomy, qualities that are not often considered in the design of classroom interactions.

Dreyfus writes, "in the domain of education at least, each technological advance that makes teaching more economical and more flexible, by making the teacher and student less immediately present to each other, makes teaching less effective" (p. 62). Maybe this idea should be amended to acknowledge that a certain type of teaching depends on face-to-face interactions, but that learning takes place in a variety of

interactions and that to overvalue the teacher's experience, might be to ignore some critical issues regarding optimal experiences for learners. As Mahiri's (1998) research on teaching struggling writers in a computer lab shows, engaging with students while they work at their screens, for example, can allow teachers to draw from students' digital literacies in order to enhance their academic literacies. A thoughtful guide can forego immediate control of student attention in order to encourage independent excursions (via the computer screen) from which he will return with new possibilities. In the lab, a student who imagines the key terms in his essay as icons opening up onto larger, or more clear perspectives, can investigate these possibilities and devise new strategies as a writer. In the presence of his teacher and the screen, he enjoys a greater opportunity to understand the writing process than does a student who is simply handed an essay covered with red ink and told to revise it at home.

Lost in the Trash Heap

At the core of discovering new teaching methods is our understanding of how we are positioned and how we position ourselves as we engage with others through the use of virtual environments. One of the fears concerning digitally mediated communication centers on issues of attribution. When we cannot as easily assign ideas to a particular person or source, we naturally question its worth. In the name of creating more democratic forums, we seem to be dismissing all hierarchies of authority. What does it mean to engage with people whom we may never meet in a face-to-face environment? How can we trust anything we read? Dreyfus discusses the difficulty of finding useful information on the web. He writes, "One thing is sure, as the Web grows, Net users who leave their bodies behind and become dependent on syntactic Web crawlers and search engines, will have to be resigned to picking through heaps of junk in the hope of finding the information they desire" (p. 26). He cites Kierkegaard who in "The Present Age" criticized the "passionlessness of the press and the reflectiveness of the age, that give birth to that abstraction's phantom, the public, which is the real leveler" (p. 78). Dreyfus writes,

> Keirkegaard would surely have seen in the Internet, with its Websites full of anonymous information from all over the world and its interest groups that anyone in the world can join without qualification and where one can discuss any topic endlessly without consequences, the hi-tech synthesis of the worst feature of the newspaper and the coffeehouse…In news groups, anyone, anywhere, any time, can have an opinion on anything. All are only too eager to respond to the equally deracinated opinions of anonymous amateurs who post their views from nowhere. Such commentators do not take a stand on the issues they speak about. Indeed the very ubiquity of the Net tends to make any such local stands seem irrelevant (p. 79).

Dreyfus speaks to an ongoing concern of teachers. We have not effectively taught students how to navigate the internet, how to tell useful information from trash, how to draw effectively from the many resources available (Quarton, 2003). When asked to perform research, many students google their topics, unaware of databases available to

them through their public libraries, research available to them through community commons, or university library websites. While we might not agree with Dreyfus in referring to sources available on the internet as a "trash heap," we can certainly admit that students often wander through mountains of information without maps.

While the internet seems to have taken our orderly society, where one could identify both people and resources, and turned it into a trash heap, the reality of an overabundance of resources might be the best argument for the development of virtual, immersive environments. Whereas websites largely organize resources, and sometimes offer the possibility of "chatting" with another user/producer of resources, virtual worlds, to a much greater degree, organize both resources and activity. They offer participants the chance to make meaning of resources through experience and through interaction with both resources and people. With regard to student interaction on the web, Paulfy and Gasser (2008) point out, "Our challenge is to help them make sense of these new contexts and new meanings and to think synthetically and critically, rather than to lose their way" (p. 253).

Worse Than Lost: Prisoners of the Screen

While Dreyfus articulates the concern that the internet dislocates us and subjects us to worthless material, Manovich (2001) depicts the coming age as one in which we are in more dire straits, one in which we become prisoners of the screen. In *The Language of New Media*, artist and professor of Visual Arts at UCSD, Manovich writes,

> The interaction with a fresco or a mosaic, which itself can't be moved, does not assume the immobility on the part of the spectator while the mobile Renaissance painting does presume such immobility. It is as though the imprisonment of the spectator is the price for the new mobility of the image.

In essence, we pay with our bodies for the engagement of our minds. But Manovich's choice of the word "spectator" is a curious one that limits the role of one who interacts in virtual environments. The term is more commonly associated with sporting events than with artistic or educative endeavors and surely denies any agency to one who engages in online activity.

Rather than viewing virtual environments as places for potentially liberating experiences, Manovich views our relations with computers as ultimately fatal. He writes:

> And what about the immobilization of the body in Virtual Reality, which connects it to the screen tradition? Dramatic as it is, this immobilization probably represents the last act in the long history of the body's imprisonment. All around us are the increasing mobility and miniaturization of communication devices—mobile telephones and electronic organizers; pagers and laptops; phones and watches which offer Web surfing; Gameboy and similar hand held game units. Eventually VR apparatus may be reduced to a chip implanted in a retina and connected by wireless transmission to the Net. From that moment on, we will carry our prisons with us—not in order to blissfully confuse representations and

> perceptions (as in cinema), but to always "be in touch," always connected, always "plugged-in." The retina and the screen will merge (p. 113).

In both Dreyfus and Manovich, those who interact in virtual environments do so at the risk of demeaning their personhood. What is produced on the screen degrades us in its magnitude and volume. It overwhelms or hypnotizes us with promises it cannot deliver and still we subject ourselves to it.

Other theorists envision our imprisonment on a larger scale. Hillis (1999) reads virtual environments as "new spheres of social control" (p. 201) and shares the sense of the way media robs us of agency. He writes,

> Joining the idea of a receding frame to a positioning of the machine and the user in close spatial proximity increases the potential for the user's active perception to collapse into the active conceptions contained within the technology. Part of an emerging "informational imperialism," immersive technology suggests that the conceptions it proposes are at one with the user's perception, thereby suggesting that the subject's independence is a fiction (p. 16).

Reading this description, I cannot help considering that if we replaced the words "machine, "technology" and "immersive technology" with the word book, which we seem to have forgotten is also an example of technology, Hillis would be making the argument on the dangers of reading. Is it really information that is making us prisoners? Have all of the old imperialistic forces, the ones so easy to identify, given way to this endlessly multiplying virus of an organism—information? Or are we imprisoning ourselves by our own unwillingness to devise appropriate methods of making sense of it?

Technology and Power

In school settings, virtual environments both displace teachers and complicate their accountability for students. In some senses, when students visit a virtual world or plays a game, the experience multiplies the responsibility of teachers; now they are responsible for the physical bodies sitting at their desks, but also the representations of those bodies in cyberspace. Direction, order, discipline all take on new meanings in virtual worlds.

Historically, school has been constructed as an institution that addresses the intellect through subjugation of the body. As Foucault (1980) observes:

> In the seventeenth and eighteenth centuries a form of power comes into being that begins to exercise itself through social production and social service. It becomes a matter of obtaining productive service from individuals in their concrete lives. And in consequence, a real and effective 'incorporation' of power was necessary in the sense that power had to be able to gain access to the bodies of individuals, to their acts, attitudes and modes of everyday behaviour. Hence the significance of methods likes school discipline, which succeeds in making children's bodies the object of highly complex systems of manipulation and conditioning" (125).

Foucault reminds us that, as all technologies involve power, they will be used in ways to liberate and to constrain bodies. Access to virtual environments destabilizes teachers' control of students' actual and virtual bodies as well as the products that teachers demand of them.

These concerns draw us naturally to question the ideas about the mind/body connection. In *Philosophy in the Flesh*, Lakoff (1999) describes the break, in the 1970's from "first generation" cognitive science which he characterizes as "disembodied" and what resulted in "second generation" or "embodied" cognitive science. "Meaning," says Lakoff, "has to do with the ways in which we function meaningfully in the world and make sense of it via bodily and imaginative structures" (p. 78). Linguistic anthropology and the sociocultural approach to sociology in the form of ethnography have emphasized the "situated" nature of literacies; the bodies of our students are much more than casements for the intellect. Through the process of illuminating the situated nature of learning, Gee (1996) believes, "The goal for the future is an integrated view of mind, body and society"(p. 65). Philosophers and scholars have aimed to dispute Cartesian duality, the mind/body split, and worked to acknowledge the embodied nature of experience. To imagine ourselves as figures on a screen seems to contradict the latest truths we have realized about ourselves. Just at the moment when we have re-discovered the unity of our bodies and minds, immersive, virtual experience comes along and seems to fracture us. Is there any way that experience of immersive environments might complicate notions of identity without turning away from the integration of mind and body? Might it provide the opportunity of knowing more completely our minds so that we become more conscious of the needs of our bodies?

When we consider the ways that schools have constrained bodies, is it any wonder young people are so fascinated with virtual environments? As one of my own high school students put it, "The only reason to have a body in school is to carry your brain from room to room." Perhaps engagement in virtual environments is so compelling because schools have failed dramatically in resolving the needs of young bodies. It is ironic then, to consider that adult concern focuses on the representation and control of bodies in cyberspace. For Dreyfus, interaction via the internet threatened to diminish our humanity. In *On the Internet* he writes, "…if our body goes, so does relevance, skill, reality, and meaning. If that is the trade-off, the prospect of living our lives in and through the Web may not be so attractive after all" (p. 7).

It is interesting to consider that Dreyfus' definition of the problem of interacting sans our bodies, should be considered the solution to the problem of distance learning. Edirisingha et al (2009) studied the experiences of four students and two tutors interacting in a virtual learning environment created by the University of Leicester within the School of Archaeology and Ancient History. The researchers' findings demonstrate "how a 3D MUVE (*Second Life*) can facilitate social presence and foster socialization among distance users for collaborative learning activities" (p. 459).

Students who engage in traditional distance learning feel isolated from peers. They generally engage with written texts and work in isolation to produce written texts through which they are assessed. Online discussion groups have helped to assuage this feeling and to support learners' development of new concepts. After meeting in SL for a series of four activities, the students in this study began real world network building with each other. They met in the virtual environment 10 or 15 minutes before their class

sessions began, and continued to chat after the session ended (p. 467). "As some students explained, their experience in SL felt like being in a class, being next to their peers and tutors: these are indications of 'immediacy' in teaching and learning contexts" (p. 468). Though there are limitations to communication in SL. (In this experiment, participants communicated through written text.) Conversations can be stilted as interlocutors struggle to type fast enough to keep up in conversations. They lacked the oral and visual cues that contribute to face-to-face interactions. Participants reported that they perceived the other students to be "polite" (p. 475) but that interaction did not generate a real sense of the identities of the other participants.

Of course, as the researchers acknowledge, this pilot study, involving only six participants was not of a scale that could support firm conclusions. But it does help to open up the conversation about Dreyfus's concerns. Many thousands of students do not engage in the kind of learning that involve tightly knit communities where students linger after class or enjoy late night conversations deepening their thinking. In the current economy, even students at prestigious universities must contribute to the cost of their educations with work-study jobs or part time work in the community. The opportunity to log-in to a virtual world open twenty-four hours a day could provide some students with the chance to develop less conventional bonds, but ones that might be critical to their success in completing a degree.

New Questions about Identity

Understanding the place and value of immersive virtual environments will depend upon how we conceptualize the relationship between virtual and actual bodies. According to Manovich (2001), the imprisonment of the spectator necessarily involves the splitting of the self in two:

> …in the representational tradition the spectator has a double identity. She simultaneously exists in the physical space and in the space of representation. This split of the subject is the tradeoff for new mobility of an image as well as for the newly available possibility to represent any arbitrary space, rather than having to simulate the physical space where an image is located (p. 112).

Gee on the other hand, describes a tripartite self, consisting of the "virtual," "real," and "projective" identities. He describes the virtual as "one's identity as a virtual character…"(p. 49), the real-world identity as "namely my own identity as "James Paul Gee," a nonvirtual person playing a computer game,"(p. 49-50) and the projective identity as, "playing on two senses of the word "project," meaning both to project one's values and desires onto the virtual character" and of

> …seeing the virtual character as one's own project in the making, a creature I imbue with a certain trajectory through time defined by my aspirations for what I want that character to be and become (within the limitations of her capacities, of course, and within the resources the game designer has given me) (p. 50).

These definitions are problematic on a number of levels. First it posits the "real" as different from the "virtual," when the experience of a virtual environment is a "real" experience. The term "projected" is problematic because the common uses of the word are associated first, with the definition of project that suggest a plan, proposal, scheme or task in which humans engage as well and second, the Freudian concept of "projection" which "involves seeing in another traits, feelings and representations that belong to the self"(Chatham, 2008, p. 229). Not only do these ideas express a contradiction—the avatar is both a material thing and another being, they seem to divorce the person operating the avatar from the act of animating him.

While I would agree that identity is tripled when the spectator participates in virtual world, I believe that the relationships between our actual and virtual selves might be better conceptualized in the following way: A student's "actual" self exists in a "first" life—at his desk listening to his peers discuss last night's basketball game as he sits down to the computer. A second self, one I would call a "mediational" self, who sits in front of the screen, poised over the keyboard, operating between the actual and virtual worlds. While interacting in the virtual environment, he attends to the virtual world where people are responding to his "representational" or third self, his avatar. This third self exists in the virtual space his avatar travels, no longer moving documents on a desktop, but wandering, for example, among others through a virtual museum exhibit. The second self mediates the interaction between his first and third selves. People he meets in the virtual world are aware of both his representational self (avatar) and they assume an identity for his mediational self (working the computer) but they may have little or no knowledge of his actual self.

As more people engage in the activity of animating an avatar, the discoursal interplay between the multiple selves will be a rich site for study. As strange as it may seem to some, it is not as alien an experience as it may seem. Examine Birkerts (2010) description of reading a novel:

> Where am I when I am reading a novel? I am "in" the novel, of course, to the degree that it involves me. I may be absorbed, but I am never without some awareness of the world around me—where I am sitting, what else might be going on in the house. Sometimes I think—and this might be true of writing as well—that it is misleading to think of myself as hovering between two places: the conjured and the empirically real. That it is closer to the truth to say that I occupy a third state, one which somehow amalgamates two awarenesses, not unlike that short-lived liminal place I inhabit when I am not yet fully awake, when I am sentient but still riding on the momentum of my sleep. I experience both, at times, as a privileged kind of profundity, an enhancement (p. 38).

Birkerts' description, strangely similar to the experience of animating an avatar, appears in "Reading in the Digital Age," an essay in which he argues that "…the novel is the vital antidote to the mentality that the Internet promotes" (p. 37). Clearly if educators and theorists hope to distinguish the virtues of traditional literacies from those of digital environments, they will need to do further research that might involve physically experiencing virtual and immersive worlds, rather than dismiss them out of hand. Had he done so, Birkerts' may have discovered the similarities between reading and animating.

Why assume that the experience of literacy via new media is entirely superficial? Works of fiction and nonfiction are available on e-books, ipods and dvds. As with Hedges, the real issue with Birkerts seems other than what he purports. It troubles him that students surf the web while he addresses class. He wonders whether his students will make their brains incapable of reading texts that require sustained attention. He argues,

> Concentration is no longer a given; it has to be strategized, fought for. But when it is achieved it can yield experiences that are more rewarding for being singular and hard-won. To achieve deep focus nowadays is also to have struck a blow against the dissipation of self; it is to have strengthened one's essential position (p. 44).

The fact that he cannot capture the attention of his students, seems not to be an issue. His argument, like the others, has a moral tone. His students are rotting their brains. Their very selfhood is at stake. We seem to have come full-circle. Extolling the virtues of novel reading will likely do as little as last century's warnings did in changing the habits of the newly literate devotees of fiction. A more worthwhile challenge will be to discover the best methods of using all available tools to leverage more engaged, critical thinking.

Future Worlds

Virtual immersive environments will certainly overwhelm and threaten to destroy the reality of classroom learning if educators fail to understand their affordances and are prevented from participating their design (Cuban, 2010). Educators bear a critical responsibility for guiding students in methods of navigating the internet and of making meaningful choices regarding online activity. In a virtual environment it is possible to: address individual differences among learners (by creating a place for horizontal learning activities), construct opportunities for new and greater types of collaboration, organize resources so that students can take better advantage of them, and develop customized features so that teachers and students can truly own their places.

Educators will need to participate in conversations about how the virtual will support, stimulate, compliment the actual. Class management software has been helpful to teachers in organizing resources and assignments—but virtual environments might provide a place where students could perform the activities that demonstrate their understanding of texts and concepts that they have studied. Every technology is created by humans and thus, every technology is concerned with power. Humans will continue to bend this power in all kinds of surprising ways. Telephones originally imagined as a technology supporting commerce turned out to afford intimacy at a distance (Hutchby, 2001). Once telephones became more accessible, their use grew and changed. Considering the applications available on telephones, it hardly seems reasonable to call them telephones any longer. The same is true with immersive, virtual environments; as they become easier to access and use, a multiplicity of uses will be generated. The research project presented in this dissertation takes us a step closer to imagining virtual immersive environments as worlds where we might bring new dimensions to learning.

Part 2: A Cross-disciplinary Review

A cross-disciplinary review of the use of VEs in academic settings provides a context that allows me, as a teacher/researcher, to make meaning of the virtual libraries project. I wanted to be able to offer my students examples of the ways virtual and immersive environments are becoming places for learning and to participate in imagining the worlds to which we might someday have access. Investigating the field allowed me to consider the issues of community, the role of teachers and possibilities for identity as well as to reflect on the ways that literacy is critical in the development of each.

I have not limited my survey of the research to strictly one field for two reasons. First, the use of immersive environments has a longer history in both medical (Notarianni et al., 2009) and military education (Hillis, 1999) where simulations have played a critical role in training a wide range of skills. Progress in these fields has already influenced wider education and it is useful to examine the ways that particular features of medical and military models can guide the development of virtual learning in elementary and secondary school settings.

Second, a cross-disciplinary approach highlights the wide range of designs used to teach a wide range of subjects. Research exploring problems confronted in distance education finds parallel concerns in traditional classrooms. Features that one field has discovered to scaffold particular kinds of learning might be used to address similar issues in another field. Also, by examining the attribute or skill that an environment supports, it becomes possible to explore the value of that attribute or skill in the study of another field. Ultimately, the most successful immersive environments will be those that draw from diverse fields.

As an example, the following handful of studies, concerned with use of virtual and immersive environments in order to strengthen students' capacity for memory, demonstrates how critical a cross-disciplinary approach is in highlighting the issues essential to the construction of successful environments.

Experience and Memory in VEs: The Critical Role of Literacy

In the field of medicine, a study of memory and learning involving patients who had suffered brain trauma (Matheis et al., 2007) indicates that virtual reality can be helpful to medical personnel and to patients as both a teaching and an assessment tool. Researchers determined that VR "could be a useful medium for producing neuropsychological measures with greater ecological validity" than pen and paper tests and that patients who were attempting to strengthen memory may have been helped by the by presenting "target stimuli both verbally and visually which may have improved initial encoding of information" and through the use of "spatial cues" which VR provides. If multimodal learning strengthens memory, one would expect to see similar results across fields. Other research, however, reveals that not all learning in virtual environments supports memory. In teaching abstract genomic concepts to healthy adults (Kapingst et al, 2009), researchers discovered that a "change in recall was greater for didactic learning than for active." In teaching historical chronology, Foreman et al, (2008) observe that, though young people were engaged by the use of VEs, "the use of

traditional methods in history teaching such as the use of paper images can be as effective, and sometimes more effective than technological media" (p. 170).

In related research, Pazzaglia, Toso & Cacciamani (2008) studied the "cognitive mechanisms implied in multimedia processing and memory" (p. 123) particularly working memory (WM). The researchers examined "the specific involvement of verbal and visuospatial WM in a learning activity with hypermedia"(p. 113) in order to understand how learning in a multimedia setting might improve geographic knowledge. Working with a group of 92 middle school students who used a computerized geography program, the researchers discovered that both the verbal and visuospatial components of working memory "play a role in hypermedium processing, but with specific and distinct functions"(p. 121). The researchers report, "Our study suggests that, despite the presence of pictures, the importance of the verbal component is still paramount, and as a consequence, scarce verbal abilities could be a limit in multimedia processing" (p. 122). They also discovered that learners spontaneously construct a spatial representation of the multimedia structure and in the construction of this mental representation, they rely on visuospatial WM resources. So while, memory is involved in constructing spatial representations that are linked to particular kinds of information, literacy plays a critical role in learning.

The relationship then, between navigating a virtual world and learning from the experience, might depend upon the ways reading and writing are central to the design of the world. One might build an elaborate or compelling virtual environment, but how a participant engages with the communicative systems of that world might be as, or more, critical than how she experiences the architectural design of that world—at least in terms of strengthening memory. The design of the world might, in fact, detract from the learning a student is expected to demonstrate. Emotions attendant upon the experience also play a role in supporting or inhibiting learning.

Further research indicates that the effectiveness of virtual environments for learning cannot be found simply in the multi-modal nature of experience of places; some research suggests that it is the act of decision-making that makes the learning meaningful. In comparing decision-making with control, Bakdash et al. (2008) differentiated the two by explaining, "decision making requires a representation of the environment's global, spatial layout whereas control can be achieved using local information"(1). In the study of historical chronology by Foreman et al. (2008) the experience of one group of students was described as a "fly through" of historical events that were depicted as "places" in a virtual world. Results indicated that the experience was not successful in teaching the students to remember the sequence of events. The research of Bakdash and colleagues seems instructive on this failure. They point out, "Making decisions is interactive, it has consequences, and, therefore it creates a relationship between the body and the environment. Whereas, performing instructed actions is reactive, does not require a representation, and there are no consequences, which means no link between the body and the environment"(2008, p. 2120). If the students had no opportunity to make decisions in the places through which they flew, then it is not surprising that they had difficulty remembering the sequence of events.

Further complicating the issue, researchers Berry et al. (2008) studying the role of emotional images in learning history report findings that "support the idea that emotionally provocative images can enhance memory retention of related historically-

based content" (p. 444). How the images "speak" to the participants might be as important as the text in activities they perform. Studies that aim to test memory need examine not only how the events, or artifacts are depicted in a virtual world but how the participant experiences them intellectually and emotionally. Whether a student flies through or makes decisions while engaged in/with the events and artifacts, as well as how he feels about the experience, might better determine the power of VE in contributing to memory.

As this example of a collection of studies clearly indicates, there are many factors to take into consideration when designing, implementing, and evaluating activities aimed at promoting learning in immersive environments. Studies across fields highlight shared considerations. The target population of users will vary, the uses will vary, the tools will vary and so will the definitions of learning. The reason why an immersive environment might succeed or fail in contributing to learning might have as much to do with the nature and possibilities for communication, as with the architectural design of the place. A review of the literature in a range of fields focuses on different designs and purposes; taken together they suggest a framework from which further designers and educators can draw in both constructing and evaluating virtual environments for learning.

While my approach is cross-disciplinary, I have organized the review around three socio-cultural components of learning in virtual environments: 1.) communities that are defined, addressed and formed, 2.) roles of teachers, students and mentors and, 3.) identities, both virtual and actual, that interact in the process of engagement. Understanding of how the latest technology has re-defined these socio-cultural elements of learning is critical to advancing our aims as educators. A close examination of literature highlighting each of these components raises critical questions that we must address in order to the possibilities of learning in virtual environments.

Communities of Practice

Though the word "community" is used frequently in the literature describing virtual environments, not every virtual environment becomes the site of a community. One might read a website or a blog and never interact with the "community" of other readers. Because visits to a site can be easily recorded, the sponsors of a site like to describe the number of people who visit that site as "members" of an online community. In some senses, "lurkers" might be considered members—just non-participating ones. In an immersive environment one might don an avatar and stroll the streets in a game such as *Grand Theft Au*to or a world such as *Second Life* but never speak to another inhabitant. The act of visiting a virtual environment does not make one a member of a community, just as the act of shopping in Paris does not make one French. But visitors sometimes do become members and communities do exist in virtual worlds. Some virtual environments like *Second Life* are so extensive that a participant could never meet all of its members. In these worlds as in games, there are rules, protocols, and repertoires that are different from the way participants interact in actual worlds. The differences between actual and virtual communities are part of their appeal; through one's avatar, one might enact a persona very different from the ones she assumes in actual life.

As educators it behooves us to look closely both at the features of virtual environments that are making learning more compelling through the development of virtual and actual communities.

Researchers draw on Wenger's (1998) definition of "communities of practice" in describing the design of virtual environments (Oliver and Carr, 2009; Ardichvili, 2008; Hur & Brush, 2009; Squire, 2006; Goodfellow, 2005, Gaimster, 2008). Crafting a social theory of learning, Wenger (1998) explores four interconnected components: meaning, practice, community and identity. The theory informs daily actions, policies, technical, organizational and education systems. Central to learning in a social setting is the concept of "legitimate peripheral participation," a concept Wenger developed with Jean Lave (Lave & Wenger, 1991), as a way of broadening the "traditional connotations of the concept of apprenticeship—from a master/student or mentor/mentee relationship to one of changing participation and identity transformation in a community of practice" (p. 11). The concept of legitimate peripheral participation holds particular interest for researchers of virtual environments in that newcomers become members through a process of negotiating meaning through the activities and tools available in the environment.

A key aspect of education within communities of practice concerns what Wenger (1998) describes as "the opening of identities"(p. 263). Wenger believes that educational design must not focus primarily on the transmission of reified knowledge, but encompass a variety of forms of participation. Wenger insists that instructions should create rich contexts in which students actively learn though processes of negotiation of meaning. These contexts should draw on the possibilities of interactions "among generations in ways that interlock their stakes in histories of practice" (p. 276). Experienced members of communities become educators when they mutually engage with newcomers in negotiating meanings (p. 277).

The issue of community is central to Oliver and Carr's (2009) study of five couples and how they learned while playing *World of Warcraft* (WoW). In this highly developed virtual environment where roles and activities are carefully articulated, learning is necessarily tied to not only the shared activities of all players, but to specific interactions and negotiations within particular sub-communities formed within the world and to the relationships of players in the actual world as they support one another's progress. Oliver and Carr draw on Wenger's model in order to understand the ways that learning occurs through social relations enacted in a virtual world. Through observation of ludic, social, and material activities, researchers discovered how participants experienced trajectories that enhanced or limited their participation as members of the game's communities.

The researchers relate their findings to research on distance learning. Oliver and Carr noted that one of the key problems facing distance education is the difficulty students have feeling connected to other members of their host institution. While the research concerns students in online courses, educators would do well to consider how these issues relate to students in traditional settings. The high drop-out rates among high school learners (Killough, 2009) might suggest that youth who attend actual schools might also feel a lack of connection to their peers. Regarding the WoW game participants, the researchers observed, "the material and social tensions that they faced hindered their ability to progress with the content of the programe" (p. 455). The struggle to successfully cope with tensions that hinder progress is not limited to distance learners;

many students feel isolated from their school's communities. Learning demands both concentrated individual effort and support of family, peers and teachers. Many students in traditional classrooms come to school burdened by material and social tensions that hinder their progress with "the program" of the curriculum. If, in addition to managing these tensions, students fail to experience identification with peers who are successfully engaged in their school communities, it might be that much easier for them to opt out of traditional learning.

The researchers discovered that feelings of success, on the other hand, were generated by identification with their peers. Researchers Edirisingha et al. (2009) reported similar success in studying a module of Archeology taught in *Second Life*. They discovered that "SL and the learning activities provided a context for this small cohort of distance learners to establish their social presence and to socialize with their peers and tutors" and that this interaction led to "real-life network building" (p. 476). If virtual worlds create opportunities for students to bond with their classmates, research might be directed toward designing virtual worlds that enhanced friendship and support in schools were students felt disconnected.

Sadly, the sense of isolation is true for teachers as well as for students. Hur and Brush (2009) studied online communities of teachers who participated in self-generated groups and discovered that the opportunity to share emotion in a space unconnected with their school communities was a reason teachers participated. Ironically teacher discovered greater camaraderie in a virtual environment than in their actual school communities.

Not only do the material and social tensions create challenges to success in academic settings, schooling itself has become further and further removed from students' actual lives. While at one time, learning was more deeply connected to living, in many ways the time and energy it takes to learn something today seems directly at odds with the demands of daily life. Before "Taylorism" (Eisner, 2002) and the industrial age of education, a child learned to weave, or quilt or knit a blanket because he needed the blanket to survive the winter. In the process he would learn, not only a valuable skill, he would learn about design, color, history and math. He might have developed a relationship with his teacher and with the others with whom he worked. There might be time for storytelling and reflection. Let's not romanticize. He might also have experienced tedium and resentment. The learning, nonetheless, would have been based in an activity that was necessary to his life.

Awareness of the disconnect between learning and life has led many teachers to design and implement hands-on, real life, collaborative creation such as quilt making (Logan, 1999) as a method through which to meet a host of curricular standards. But these experiments require many hours of extra effort that need to be repeated with every instantiation and have waned in popularity. Today there are undoubtedly many more teachers instructing their students in the use of powerpoint than needlepoint, but can we say that schooling is more meaningful? We can blame multiple-choice testing, but the truth is that we do not need to make our own blankets anymore. Though the learning was authentic, the activity was symbolic. This is not to discredit the power of a group of students collaborating in order to make of a beautiful object. The activity often fosters a strong sense of community and frequently extends both the participation and the learning from the classroom into the wider circle of school and family. But it does not address the

enduring challenge for educators, which is to leverage the power of technologies (both old and new) to support learning related to students' actual lives.

Why are communities formed in virtual environments more viable than those formed in actual communities? Ironically, virtual environments, especially games, address participants' need to experience immediacy with regard to learning and living. Virtual worlds structured as games require players. People have a need to feel included. In a virtual game world, anyone can play. The world is ordered. Even in a game devoted to war, there is order. A social order is inscribed in pre-defined rules, activities, goals, and relationships. Participants who observe the rules become players. Communities form not simply by participants playing the game, but by those who exercise opportunities of critiquing the affordances and constraints of the game.

If a participant does not like the way the game is structured, she might try to thwart or change it. She might implement new ways of playing or of communicating her critique through the use of tools provided in the game, or by constructing other sites where discussion of the game can occur. One could say that a community forms because there are rules and because participants care enough about their social standing in the worlds that they attempt to excel by mastering or by bending, even breaking the rules. A crucial aspect of the design of virtual environments involves not only arousing feelings between the members of the community, but allowing those members to participate in the way the world runs. But if we do not want community life to begin and end in virtual space, we must think deeply about how the virtual environment can stimulate interaction in an actual world as well.

Stimulating Involvement in Actual Worlds?

Researchers Jarmon et al. (2009) studied a project-based interdisciplinary communications class and discovered results similar to those in the study of distance students. Jarmon's students attended a traditional program at the University of Texas. The project, also conducted in Second Life, created an opportunity for a team of five students to collaborate in building two virtual models of low-income, sustainable urban homes. The virtual models, designed by actual architects were part of a real world project to build a "non-profit housing project in Austin, Texas" (p. 6):

> The project process required students to apply interdisciplinary communications concepts from the class curriculum, devise appropriate communication strategies, and practice their strategies in authentic communication contexts to complete their project tasks" (p. 5).

Students met these goals through communication with educators, members of the initiative group, architects and architecture students. The researchers provided evidence of student engagement that extended beyond the confines of the course. "After their class together, on their own initiative, the student team maintained a close working relationship and wrote an extensive 54-page grant proposal for funding to create a non-profit with an SL focus" (p. 6). While the class itself did not create a community, it became a vehicle for a team of students to contribute to an initiative that influenced an actual community.

What this research suggests is that one of the possibilities for the greatest learning exists in leveraging the opportunities to tie the project to the actual world. That is to use virtual environments as places to linking students to actual communities. To real people with real issues. If a virtual environment can be a place where, through the use of an avatar, a distance learner can feel that he/she is less isolated, the virtual environment serves both as a place to deliver content and as a strategy for meeting the actual needs of a student. If a virtual environment can be a place where students use communicative and building tools to interact with live communities facing challenges, the added dimension makes the learning authentic. Designers of virtual learning environments will fail if their only concern is to make learning as engaging and fun as video games. Students face many challenges that compete for their attention with schooling. If they feel both connected to members of their school communities and engaged in authentic activity they are more likely to experience success. Immersive environments should be designed to address real needs both of their participants and to foster opportunities for engagement with wider communities.

Goodfellow (2005) argues that researchers need to study not only the interactions, but the social practices of actual communities shaping these virtual communities. He makes the point that in the actual world, community has been physical and interactional settings while, "In the virtual context, however, 'community' is a construction placed on activity that is achieved entirely through the technologies of remote communication"(p. 114). He contends, "a conflation of community with communication, inherited from the literature on building virtual communities has led to a focus on online learning activity as personal interaction rather than social process" (p. 124).

In more developed, immersive, environments, it is necessary to widen the lens from activity to practice and invite investigation of the social aspects of learning where meaning evolves. Wenger claims,

> …it is only as negotiated by the community that conditions, resources and demands shape the practice. The enterprise is never fully determined by an outside mandate, by a prescription, or by any individual participant" and "the power—benevolent or malevolent—that institutions, prescriptions, or individuals have over the practice of a community is always mediated by the community's production of its practice (p. 80).

Both the design and use of a virtual environment determines the opportunities for the development of community.

Goodfellow examines four types of virtual learning communities: 1.) decentralized 2.) online classes 3.) professional development and 4.) civic learning in order to "see how technical and social contexts interact to shape the kinds of community that emerge and the characteristic learning that results"(p. 118). In decentralized communities, largely devoted to issues of information technology (IT), "participants are engaged in the solution of real-life issues drawn from their occupational contexts, and the fact that their learning 'agenda' and their internal systems of social control are developed by the participants themselves" (p. 119). Because participants are made up of members of diverse groups and exhibit little interest in shared enterprise except for the exchange of knowledge, they diverge from the kind of "communities of practice" originally described

by Lave (1998). For many of these decentralized groups the "system of control is not owned by community itself," (p. 119) but rather with a sponsoring agency. So while they appear to model the democratic ideal of an online community, the authority that exerts control over them is disguised (p. 120).

Online classes, more obviously linked to sponsoring institutions "are designed to exclude as much as to embrace"(p. 121). Furthermore, with many technical services outsourced, the influence of "the marketing practices of their corporate sponsors" pervades academic institutions. In professional development communities, the goals of the institution influence the nature and type of interaction possible in virtual environments. With regard to the constraints of these types of learning environments, Goodfellow speculates, " It may be that the virtual interaction alone does not provide for participation rich enough to support the 'tuning of the joint enterprise' (Wenger, 1998, p. 95) which is essential to the idea of learning in practice"(p. 122). In his final area of emphasis, civic learning communities, Goodfellow examines efforts to connect communities on the other side of the "digital divide" and thereby reduce inequality. He observes, "electronic networking created high expectations of opportunities for self and community development. However, virtual community is not necessarily created in the form of an extension or deepening of ties amongst disparate groups sharing the same physical environment" (p. 124). Face-to-face interaction seems necessary to the development of an online community.

Goodfellow insists that development of learning environments in virtual space demands that educators "be informed by a 'shaping' perspective which foregrounds the bi-directionality of the relation between the technical design of an environment and the social practice it has been developed to support" (p. 125).

It would seem hardly necessary to tell educators that they needed to explore the relationship between the social practices and the learning environments designed to support them. The ethnographic work of researchers such as Heath (1983), Zentella (1997), Nieto (2000) and Valenzuela (1999) in the fields of linguistics, sociology and anthropology have contributed to a deep understanding of the ways that traditional schools have supported, ignored or undermined the social practices of their constituents. In response, equally compelling research documents effort by educators both to honor the social practices of students and to bridge these practices with the discourses of power.

If the development of immersive environments offers a critical opportunity, especially to youth, of inhabiting imaginative and innovative places, it also offers a critical challenge to educators to thoughtfully investigate the relationships between both the social practices of the school, home and virtual communities students inhabit. Virtual immersive environments for learning should be designed to support the genuine needs of students and link them to communities engaged in actual endeavors.

Just as webpages are easily customized, virtual environments will become places that can be shaped to the users' needs. Having a voice in shaping communities allows students to stake a claim in their successes. Goodfellow argues for a dialogue between people building communities and researchers in the field of education who value the "situated" nature of learning:

> In order to further investigate the shaping of virtual educational communities through an examination of practice, we need to be able to represent activities and

> events in both physical and virtual contexts in comparable form. One way to approach this might be by viewing the practices in question as textually mediated and exploring how the common and fundamental activities of reading and writing are used in both offline and online contexts to create and sustain engagement at the level of community. This means exploring the role of literacies in the creation of meaning and value, the exchange of goods, the conferring of status, the inclusion and exclusion of participants, in both the print and digital productions of the community (p. 125).

This emphasis on the role of literacies seems to be lacking in much of the research on immersive environments. Researchers study what the virtual world allows them to do—navigating, building, creating, problem solving, collaborating—but fails to attend to the communicative features that support these activities.

Current research on the online literacy practice of today's "digital youth" should provide useful information to designers and educators alike in emphasizing the meaning and significance of patterns of behavior and dispositions that are critical to the formation of communities of youth. In a white paper summarizing the highlights of the recently published book, *Hanging Out, Messing Around and Geeking Out: Kids Living and Learning with New Media* (Ito et al., 2008) highlights several features of online communicative practice and its meaning to young people. A key point the researchers make is that network publics provide context for youth to develop social norms in negotiation with peers. Students are already using media tools as ways of extending and creating communities. Designers need to pay attention to these practices as they craft immersive environments. Youth should be called upon to participate in the construction of worlds they will inhabit.

Ultimately, Ito and colleagues ask important questions about the future of education:

> Rather than thinking of public education as a burden that schools must shoulder on their own, what would it mean to think of public education as a responsibility of a more distributed network of people and institutions? And rather than assuming that education is primarily about preparing for jobs and careers, what would it mean to think of education as a process of guiding kids' participation in public life more generally, a public life that includes social, recreational, and civic engagement? And finally, what would it mean to enlist help in this endeavor from an engaged and diverse set of publics that are broader than what we traditionally think of as educational and civic institutions? In addition to publics that are dominated by adult interests, these publics should include those that are relevant and accessible to kids now, where they can find role models, recognition, friends, and collaborators who are co-participants in the journey of growing up in a digital age (p. 39).

These questions and considerations are echoed in the work of other researchers and theorists. Ardichvili (2008) proposes "a framework for motivational factors, enablers and barriers of knowledge sharing" (p. 543). He highlights the value of trust in creating environments that promote the participation of all members. (also see Gaimster, 2008, p.

189) He echoes an idea presented in Goodfellow (2005) when he writes: "practitioners and scholars need to understand individual elements of systems, tensions and dualities in systems, and the role of these tensions in systems' evolution and functioning"(p. 551). He argues that experts "should treat both designers/supporters of the community and users as co-creators" of the evolving experience of virtual communities and furthermore, "removing barriers for individuals' participation, supporting and enriching the development of each individual's uniqueness within the context of the community and linking that uniqueness with the community purpose" (p. 549).

Virtual environments are already affording participants the opportunity to create, shape and maintain communities of people who share the same classroom or the same planet. How we come to think of school communities will depend on how we leverage the affordances of virtual environments to support and extend collaboration to potential partners in learning. As designers and educators we have important decisions to make, but we must begin with the realization that young people have already begun the groundwork. Respect for their contributions, honor of their practices and understanding of their needs will be key in the developing the trust necessary for building magnificent and durable structures.

Role of the Teacher

The shape of any community formed in an environment focused on learning will necessarily be influenced by the role a teacher assumes. Virtual environments pose challenges that teachers have never before encountered. Learning in virtual environments complicates the teacher's role. Does he facilitate and stand back, engage as a peer, or assume a leadership or guidance role in the virtual, as well as the actual world? How much computer expertise will teachers need in order to teach 21st century students? Many teachers have moved some classroom activity into blended environments through the use of blogs, electronic bulletin boards, websites and internet research. Immersive environments will demand a greater shift in performing the role of teacher and, consequently, what it means to be a teacher. Recent research (Sardone & Devlin-Scherer, 2008) indicates that guided exploration of immersive learning environments provides pre-service teachers with greater levels of self-confidence in the use of innovative technologies. Developing familiarity and comfort are, of course, only the steps in determining how a teacher might use an immersive environment for learning.

Studies are emerging that shed light on the relationship between immersive interactions and the teaching of traditional literacies. Reviewing the practices of students aged 17-18 using role-play to learn how to construct a written argument, researcher Rappa et al. (2009) critiqued the opportunities that were provided to students through a Second Life scenario. The students discussed, debated and negotiated positions on social issues in order to scaffold the writing process. The project allowed educators and researchers the opportunity to better understand the dynamics of the teacher/student/ICT relationship as it unfolds in a virtual environment and to suggest how better attention to the interactions between the three components might improve learning.

Rappa and colleagues observed how role-play allowed the students a unique opportunity to explore the perspective of an assigned persona. The curriculum and the environments encouraged students to "extend their experience from one semiotic domain

to another related domain" as they discussed, negotiated, and expressed their views first in online chat and then, in writing. Analyzing the features that supported collaboration and guidance, the researchers suggested that better use of pairing students with one another and greater support from the teacher who could enact "the role of a mediator to whom the parties could turn when they reached a deadlock" (p. 66) would have better supported learning. As in any case of immersion, when acting in an immersive environment, the teacher needs to consider the degree to which she will offer direction, support and guidance. Clearly teachers will not abandon, bur re-design the roles they will play in unfolding scenarios.

Gaimster (2008) in her study of the use of virtual worlds in learning art and design, discusses the ways immersion prompts changes in the student/teacher dynamic and offers possibilities for new communities that extend beyond the classroom. She observes that the anonymity a participant can experience through the use of an avatar can be freeing, but problematic. The teacher might encounter a student in a form very different from the one he meets in the classroom. Knowing students and developing trusting relationships with them takes on new meaning in immersive environments where students might choose to try on not only different appearances, but different personas. While virtual environments offer opportunities for new forms of engagement, they also require that a teacher address different contingencies than she might encounter in a traditional classroom.

Kuksa (2008) who examines the use of virtual reality in theater education and design, also considers both the affordances and constraints of immersive environments. She describes the "double-sided impact" of the latest technology. Immersion in virtual realities can enhance established ways of learning through the development of new communities and also change the nature of scholarship and performance in that students become more active than passive learners—but that they also foster "social exclusion" in students who lack expertise or who suffer low motivation. Just as a teacher must consider how to make her course welcoming and inclusive in the physical world, she must consider and address the barriers that would prevent full engagement in a virtual world.

Kuksa also comments on the difficulty of creating/assessing work in worlds where there are so many resources it is easier than ever to "copy and paste." She writes, "Nowadays, the role of the teacher is no longer that of an instructor but that of an interpreter of course resources, with a greater emphasis on the students and their active engagement with learning materials" (p. 74). While plagiarism-detection devices such as Turnitin.com are available to check student essays, many educators still rely on personal impression and intuition in determining whether a student's work is authentic. As literacies expand to include multi-media digital artifacts, it will be more and more difficult to distinguished between original and copied work. Ultimately, Kuksa argues for a "blended learning approach" that integrates technological and face-to-face methods.

A critical issue these research studies highlight is that the relationships between students and students, between teachers and students and between all participants and the technology need to be considered on a case by case basis—just as they do in actual classroom employing more traditional forms of technology. A teacher must decide whether an activity is best performed individually, in partners or in groups. She must decide where and when to direct, intervene, or step back. Participation in a virtual

environment doubles this decision making process. Presence in a virtual environment does not ensure learning. A student's avatar might appear to viewing a slide show in a virtual world while he is texting his friend and listening to his ipod in an actual classroom. A classroom teacher, conversing with a group of students via her avatar in a virtual environment, must simultaneously attend to the physical presences of her students.

The challenges of facilitating a class of students investigating a virtual world was carefully described in research conducted by Lim et al. (2006) of a group of young students learning science, in the MUVE, Quest Atlantis. The teacher leading the class closely monitored the students' progress and frequently intervened in order that the students maintain a productive measure of engagement (p. 225). The teacher's intervention included introductions and demonstrations, clarification of objectives and vocabulary as well as other "orienting activities that supported student autonomy" (p. 228). Far from becoming invisible, the teacher was critical to students' engagement.

Whether teachers are attending to young students or adults, the role of the teacher continues to be vital to learning. Reiber and Noah's (2008) study of adults using a game-like computer simulation to study the relationship between acceleration and velocity supports Lim and colleagues' observations about the changing role of the teacher in virtual environments. Conclusions about the technological tools used in their study include the insight: "Rather than replacing the teacher, this software elevates the role of informed teachers and emphasizes the importance of their contribution and influence" (p. 90).

Not only will technology offer new tools for teaching and assessment, but new means of interacting and consequently new identities for teachers. The changes include:

A.) New Ways of Representing Presence: Immersive environments allow a teacher to represent herself in the virtual world as an avatar. This affordance creates new opportunities and questions regarding how a teacher might split her attention between the actual and virtual worlds. McKerlich and Anderson (2007) investigating learning in Second Life, observed a simulcast of a speaker who shared power point slides and audio while "a colleague logged-in as her avatar. This brought new meaning to teacher presence—she was in two places at once; a multimedia presentation of her real self as well as an avatar presentation of her second life avatar" (p. 43).

B.) New Responsibilities for Facilitating Communication: While teachers using traditional media need to master the use of books, films, projectors, and various forms of equipment that supported learning, teachers using immersive environments will need to master the tools available in these new worlds, and to teach appropriate methods of employing these tools (McKerlich and Anderson, 2007, p. 48). As Edirisingha and colleagues (2009), also studying learning in SL, point out, moderators must "establish ground rules and protocols for smooth communication" (p. 472). The classroom has been a site where languages and literacies are negotiated (Albright & Luke, 2007). Many students have mastered a wide range of communicative competencies in online settings that include video games and multiple forms of social media. But the skills developed in these settings will not be the only ones needed for students to achieve success in virtual

learning environments. The forms of discourses that influence "chatting" or "twittering" are less unproductive in crafting a powerpoint. Teachers must play a critical role in using and assessing new media and other communicative tools that scaffold learning in immersive environments in order to act as guides for students.

C.) New Methods of Interaction: In traditional settings, teachers have juggled the demands of the class, as a group, with the needs of individuals, by providing students with individual feedback, support, written critiques of their work, and opportunities for one-on-one interaction during office hours. New media has increased both the possibilities and style of interaction through email, text and chat tools. Immersive environments offer a new feature. As Lu (2008) observes in a virtual Art Café, teachers have the opportunity to "whisper" to students using a tool for private dialogue. Gaimster (2008) also notes, "The communication tools in virtual worlds enables a private exchange with a public forum, and this could be a valuable addition to the critique scenario" (p. 190). How teachers use these new features will influence the dynamics and nature of learning in immersive settings.

D.) New Methods of Assessment / Evaluation: While group and partnered work is common in traditional classrooms, teachers have always struggled to attend to the interactions of the students collaborating on an assignment. A teacher, moving from group to group can only observe brief moments of interaction. Generally evaluation has been limited to the final products rather than to the process of engagement. Because it is possible to record online conversations in transcript form, teachers using virtual environments have the opportunity to more carefully monitor students' collaborative process. By paying attention to the student interaction teachers can better foster learning. Researchers McLoughlin and Mynard (2009) coded transcripts of pre-service student teachers studying pedagogical grammar and language learning and discovered that online discussion forums could be used as tools through which students developed higher order thinking skills. They recognized the critical role that teachers play in designing prompts and questions that facilitated the students' development and in the unique affordances of transcripts of online discussion to 'listen-in' on student conversation. Squire (2006) invites teachers to think of these new opportunities to observe "learning as performance" and to consider the many kinds of collaborative experiences students might have in immersive environments.

E.) Distributed Instruction: Virtual environments, like classrooms are rule-bound places with varying degrees of flexibility. In a classroom, learning is supported by the instruction a teacher provides, the books, artifacts and resources he uses, the affordances or restrictions of the room, the directives of the administration, school board or state, in short, the whole sociocultural and historic context in which the learning happens. Virtual environments are designed places. A unique feature of immersive environments is the ability to embed instruction as guidance through pop-up windows, non-playing characters (NPCs) and objects. These agents provide hints, clues, suggestions, questions or bits of relevant information

to learners (Nelson, 2007). If, especially when working with younger students, the responsibility for providing explicit instruction is shared between the teacher and agents of the immersive environments, the role of the teacher will necessarily shift. Lim and colleagues (2006) highlight the teacher's responsibility for providing orienting activities through which teachers introduce, define and model objectives of the immersive experiences so as to support student engagement.

F.) Enhanced Opportunities for Collaboration: While many teachers have mastered the art of integrating group and partnered work with large group activity in the classroom, teachers working with virtual environments will be able to take advantage of a "third place" where it is possible for both classmates and members of communities to meet. When the virtual environment is experienced as a webpage or online forum, the instructor needs to facilitate the blending of face-to-face encounters with those that happen via the web (Motteram, 2006). For over a decade designers, educators and researchers have experimented with the use of virtual and immersive environments. Roussos et al. (1997) studied the NICE project, in which school children successfully collaborated with remotely-located children in developing "simplified ecological models of various ecosystems"(p. 917). Studies regarding language learning have examined programs that facilitate collaboration between native speakers and remote learners. Von Der Emde and colleagues (2001) studied a seven-week exchange program between students in Germany and America that also yielded positive results.
Riel, interested in the use of technology to support the development of learning communities across distances (2000), writes, "Computer and communication technologies multiply the access to both human and informational resources. These tools, though very powerful, do not replace the role of the teacher; rather they extend classrooms by providing more resources—both informational and human—for teachers and students" (p. 523).

Guidance in Two Immersive Environments: *River City* and *Anytown*

Not all the research on learning in immersive environments it aimed at re-defining the role of teachers; some seems focused on replacing them.

Nelson (2007) looked specifically at the use of reflective guidance in the form of pop-up messages tailored to the student's participation in the program *River City*, a virtual learning environment designed to teach middle school science using the model of a city during 1878-1879. Students work in teams "to discover why residents of the virtual town are getting ill" (p. 85). Reflective guidance, a digital component of the environment, aimed "to support a student's hypothesis generation and testing processes without necessarily offering direct answers of making judgments about particular student actions" (p. 87). In other words, the designers attempted to replace the teacher with a program that responded to individual student's needs.

In order to test the influence of this kind of guidance on participants in the *River City* program, designers created a system that "utilized data collected on each student's activities to offer real-time, reflective prompts about the students' own learning in the

world, with the content of the messages based on the in-world events and basic event histories of each student" (p. 89). Designers and researcher collaborated in devising 3 levels of guidance; some students would receive no guidance, some moderate and other extensive.

While the few students who used the system experienced "a significant positive relationship between increased viewing of guidance and test scores"(p. 94), researchers were surprised to discover that students largely ignored the messages: "a quarter of the students with access to the guidance system never looked as a single message. Further a large proportion of students with access to the system viewed only a fraction of the available messages" (p. 94). Examining gender, researchers discovered that "although increased viewing of guidance messages among boys was associated with higher score gains, at each level of guidance viewing their average score gains were still lower than that of girls at the same level" (p. 94). Researchers reflected on the design of the guidance and speculated that more closely integrating the system into the environment could be useful and make the system more enticing to students. By embedding the guidance information into objects or by creating an in-world agent who would provide pedagogical assistance, students might freely avail themselves of information that would help them to learn more from playing the game.

The fact that the study makes no reference to actual teachers, or to any form of human guidance provided outside of the program, naturally leads one to speculate about what can and cannot be taught in a virtual environment. While designers might easily embed tacit and collaborative forms of guidance in a designed world, can they so easily replace teachers with a system of reflective guidance? Those students who availed themselves of guidance were more successful on "science content tests" (p. 95). But are there levels of thinking that teachers can prompt, in the moment, face-to-face with students who have been working at their screens?

In a similar study, this one focusing on writing, researchers also use an immersive environment examine how students respond differently to teachers than to games. Investigating problem-based learning in an environment designed to enhance student writing, Warren, Dondlinger & Barab (2008) compared the gains in writing skill of students using an immersive environment named *Anytown* with those in a naturalistic classroom context. The design of *Anytown* was "intended to create a small town feeling in which the locations, people and other objects would be mostly familiar to the majority of participating students"(p. 118). As students role-played as news reporters and completed six required writing tasks, they encountered opportunities for optional writing assignments. These assignments were embedded in the virtual world and their completion allowed students to "earn rewards and open additional content" (p. 134). The teacher played the role of newspaper editor, offering critiques of student writing after each task. Opportunities to practice writing were embedded in free-choice assignments.

While students in the virtual environment opted 26 times to engage in these free-choice practices, students in the classroom did not take advantage of a single opportunity for extra writing. Scores on the post-test differed significantly: "students in the *Anytown* digital environment demonstrated improvements on writing measures in just seven treatment periods as opposed to the lack of similar gains in the comparison classroom over the same period, indicating a higher level of efficiency of the digital PBL curriculum when compared with a more traditional form"(p. 134).

With regard to the amount of time teachers spent "answering directional or procedural questions" (p. 129), researchers noted that the classroom teacher "spent more time answering such questions within each hour of instruction" (p. 129). The researchers concluded:

> A benefit to developing the written activities in the 3D space and simulating instructional roles through pedagogical agents is that the teacher is not responsible for developing complex content, embedding multiple hard scaffolds in their classroom, or generating ill-structure problems for students to solve, thus allowing the teacher's role to evolve into that of the guide, coach or facilitator (p. 134).

Gee (2007) suggests that teachers can learn from video games how to structure their classes to draw from students the same kind of motivation they experience playing games. Interestingly, while the teacher selected for the treatment condition lacked experience with technology, the classroom teacher was expert in the use of the program used with the treatment class and hence very familiar with the problem-based learning underlying activities in the *Anytown* environment. If anyone had been prepared to draw from the game format, it was she. Gee might be correct about the need for teachers to develop new dispositions toward learning, but as far as, scaffolding assignments, delivering instruction, and motivating students to complete more practice exercises, in this case, the game has the teacher beat, hands down.

What about the leap from the immersive environment to life? How will that be facilitated? Researchers of *Anytown* speculate that students who have had experience of a virtual environment will more easily assume the roles in real life. They believe that "moving from the protection of the simulation to problem solving with real-world consequences such as writing articles for the school newspaper will occur much more seamlessly"(p. 135). But life is far from a designed experience. And school newspapers are going the way of all print journalism, which is to say that they are disappearing. Very few of the children who participate in *Anytown* will likely become journalists, though hopefully many more will possess the writing skills to enjoy a wide range of career options that depend on excellent writing skills. What aspects of traditional writing will be essential to success in the digital age? Beyond honing one's skills as a writer, what other, perhaps complimentary skills will be necessary for communication? Here is exactly where we need to re-imagine the role of the teacher because it is through teachers that children gain direction that extends far beyond the games.

We did not all become real estate tycoons by playing monopoly, but in the process of the game we might have learned about negotiation or strategy. Or we may have learned that we were not as interested in profit as we were in friendship. The significance of game-like environments for learning must lead to the development of proclivities beyond the skills necessary to achieve the goals of the game. A teacher, who facilitates, monitors, critiques and invites reflection of her students' experiences supports the process of using the game to stimulate meaning that extends beyond it. The virtual environment cannot be the end of learning. It is a teacher's role to see that it is the beginning.

Because researchers so poorly understand the art and craft of teaching, they simplify how the role of teacher might change as technology advances. Some may

imagine that teachers will become unnecessary when computers can entice young people to perform and even master the skills teachers have labored to instill in students. This kind of thinking, often unstated, echoes of the "teacher proof" scripted curriculum developed to standardize learning that Kozol (2005) refers to as "Skinnerian curriculum" (p. 74). Sadly, in order to make a case for technology, researchers fall into the easy trap of depicting educators as the cause of education's ills. They like to cast teachers as "authority figures" (Ito et al., 2008) when, in fact, the authority does not diminish; it permeates the design of a virtual environment. How the role of teacher can evolve in the age of new media is of critical importance for it will contribute to the kind of identities students have opportunities to assume.

Issues of Identity: Virtual and Actual Participants

How are the possibilities for enacting a student identity changing as technology advances? How do virtual environments position students in ways that constrain or encourage their development into particular kinds of people? Many immersive environments for learning are being designed around games. The danger is of limiting the role of students to problem-solvers, and heroes when there are so many other compelling roles from which they can learn. It has already been noted that the game-like quality of some virtual environments can distract from learning and that designed guidance is ignored. Equally interesting is Squire's (2006) observation, "It is common knowledge that players never complete the majority of missions" (p. 21) while playing *Grand Theft Auto*, "instead using the game as a driving—or chase-scene simulator of sorts" (p. 21). Why then do designers rush to create learning environments modeled on the quests featured in video games?

The most cogent criticism of our current model of education is that it positions students as passive receptacles of knowledge, rather than as doers who construct knowledge. But in the rush to make all students "doers" there are a number of issues to consider. I would suggest that we choose carefully the roles into which we thrust students because the roles they play will contribute to the identities they develop. Gee (2007) and Shaffer (2006) believe that immersive environments foster dispositions that can be helpful in introducing a student to the kind of thinking upon which adults in their professional roles as scientists or city planners rely. In assuming the identity of a scientist in a video game, a student might learn to ask the kinds of questions scientists ask, indeed, she might learn to think like a scientist. We certainly do not want students to role-play only criminals. But do we need for them to play only heroes? The scenarios we build and the subject positions inscribed in their narratives will contribute to the ways students can enact identities in virtual and actual settings.

It is useful to examine the field of medicine, focusing on a few studies that highlight innovations in virtual programs for learning. In medicine, is has not been necessary to invent far-flung adventures to effect medical training; scenarios addressing the issues of life and death decisions are already at the core of the profession. Virtual environments have been extremely useful in providing a wide range of experiences including: low risk opportunities to learn the particular skills of laproscopic surgery (Aggarwal et. al., 2006; Grantcharov, T.P. et al., 2003; Seymour, N.E. et al., 2002) assessment and comparison of visuomoter learning in patients with Parkinson's disease

and in healthy, elderly subject (Messier et al. (2007), detection and diagnosis of subsurface tumors (Dinsmore et al., 1997) and the opportunity to experience what happens inside the mind of a person with schizophrenia (Mantovani et al., 2003). They have been equally helpful in forwarding the development of communication skills so critical to the field. Educators might learn most from these studies.

In the field of medicine, simulations have been critical in meeting educational goals of improving the relationship between providers and patients. As Notarianni et al. (2009) note, "human psysiologic simulators have been used in health care education since the early 1960s" (p. 264). Recent research documents the use of virtual patients in the training of medical students. At NYU's school of medicine, researchers Triola et al. (2006) conducted a randomized trial of teaching clinical skills using virtual and live standardized patients. The study was conducted using data gleaned from a workshop whose goal was to "prepare primary care health providers at all levels in the key clinical skills of screening, diagnosing and treating individuals experiencing psychosocial sequalae of disasters" (p. 424). Comparing the experiences of health care providers who had interacted with both live and virtual patients simulating stress, the researchers discovered that "with respect to subjective experience of the workshop, SP encounters using VPs had equivalent impact on learners when compare with those exposed to live patients" (p. 428). The researchers discussed significant advantages to using virtual patients:

> As computer-based VP can be used at any time, they can be integrated into curricula in a much more flexible manner. Many learners can use a single VP case simultaneously. Virtual patients offer true standardization across interactions creating a more consistent but less flexible experience for learners. The VP has the advantage of being easily modified to demonstrate a variety of clinical or interview scenarios…(p. 424).

Using pre-post tests, the researchers also examined the attitudes of health care providers who had responded to the VP suffering various forms of stress:

> Those participants who used the VP had a much higher rating of feeling prepared to care for and treat these disorders. This may reflect the true intent of simulations, that participants can progress from the least intimidating virtual environments where mistakes have no consequence, to very realistic live simulated patients where the stakes are higher, and finally to real clinical situations. Learners who experience all three modalities may have better insight into the progression of and improvement in their clinical skills as they practice and reinforce them (p. 426-427).

This study points out a number of issues worth noting. Researchers are not looking to replace existing models of education with virtual, but examining how virtual models can support their curriculum. They are paying attention to specific features of the virtual intervention and acknowledging its limitations. They are recognizing that the virtual simulation supports feelings of confidence in the learners—which is not the same thing as saying that those who experience the virtual are ready to move onto actual patients, but

that the virtual can be a necessary first step in a low-risk environment. Stevens et al. (2006) point out, "Effective communication is a core clinical skill that can be taught, learned and practiced. The sole reliance on experiential learning of communication skills is inadequate, and it may reinforce and perpetuate bad clinical habits"(p. 6). Training in a virtual environment links very clearly to practices in an actual environment the provider will face. The fact that a variety of scenarios can be played out in a safe setting, highlights the need for flexibility of response in the practitioner; one method or style will not work in every situation, with every patient. The simulation can be used as a provider's springboard toward deeper reflection on the kind of skills and abilities he must possess in order to provide an effective response to patients in need.

Simulate to Stimulate: Virtual Community and Virtual Commons

Extending the use of the virtual patient from one-on-one training to settings where there might be greater impact, the following two studies describe different methods of leveraging the kind of learning the virtual patient affords.

Mirror Lake: While it would at first seem that the use of virtual patients might be effective in standardizing care, researchers at Ohio State University College of Nursing (Curran, Elfink and Mays, 2009) demonstrate how the construction of a virtual community might address the goal of *individualizing* care. Placing a high value on knowing the patient, the researchers designed an environment to:

> teach many key principles of sound nursing such as the influence of patient risk factors on health, the importance of knowing the patient in the care delivery process, the value of relationship-based care within and across health care settings, the significance of knowing the patient in context, clinical manifestations of disease process, social implications of disease, and the influence of environmental factors on health (p. 31).

hile the researchers acknowledge that proficiency in skills is essential to nursing, they argue that the quality of relationships is also of critical importance. They designed a virtual community, *Mirror Lake*, to resemble the county in which the university is located because it is the site where most students will experience the clinical component of their training. Contextualizing individual cases within the virtual community allows students to investigate multiple features of the environment that contribute to the health of individual patients.

Because the college does not have the resources to construct an immersive environment, they created a one-dimensional display of the town that included family genograms for each household (p. 34). It is easy to imagine how *Mirror Lake* might function as an immersive environment. Adding this dimension would allow nursing students not only access to more information, but also the opportunity to experience a variety of health care scenarios. Imagining *Mirror Lake* as an interactive, immersive environment, it is easy to see how students in different academic settings might understand the historical, political, economic, social and cultural dynamics of the world it represents. Role play in an immersive virtual environment could be an activity that

fosters the kind of reflective thinking that encourages the development of intellect, reason and compassion.

Educational Commons: Researchers Ellaway et al. (2008) describe "how a data specification for virtual patients has been developed and how this specification has enabled the creation of a multi-institutional collaborative educational commons" (p. 170). As the researchers define it, "A virtual patient commons is one where a particular community creates, adapts, shares, reuses and otherwise makes use of a bank of virtual patient cases held by and on behalf of that community"(p. 172). They examine three examples of commons currently operating in different parts of the world: one initiated in Sweden that now has partners in the Americas, Europe, Asia and Africa, one set up in the US and made available to three medical colleges, and the third a pan-European project. While the researchers echo a concern expressed by Goodfellow (2005) regarding the need for mutually accepted rules and standards, they see the opportunity of addressing inequities with regard to resources by providing greater accessibility to diverse users.

As in the previous study, this research highlights the link between the virtual environments and the needs of actual communities. Through the commons model, a university shares its resources with health care students and professionals from a range of institutions. The virtual environment, rather than becoming a closed world designed for training, becomes a potential meeting place for a variety of participants addressing authentic issues.

The chart below (Figure 3.1) depicts the change in how a simulated patient has been and might be represented over time.

(Figure 3.1)

Trajectory of the Virtual Patient

Patient as "case study" in a textbook.
Patient profile available through an electronic database.
Virtual patient accessible in an immersive one-on-one simulation.
Virtual patients in an immersive environment accessible to a group of university students.
Virtual community in an immersive environment accessible to multiple universities.

The field of medicine, by nature, prepares students for activity in the actual world. The growing use of virtual patients in simulations that through advanced technology gain in complexity and realism will shape what it means to be a health care professional. Already virtual patients are authentic enough to stimulate emotions in medical students. As Stevens and colleagues (2006) report, "Emotions such as embarrassment, fear, irritation, anxiety and self-awareness can be elicited in real people by virtual characters" (p. 809). By creating immersive models of actual places, participants will be able to experience representations of contexts that are often impossible to access in actual life.

Large-scale models, allow us to gain perspectives not available at street level. They allow us to understand systems and networks that influence practices, behaviors and beliefs. Medical training in virtual and immersive environments will allow a prospective

professional the opportunity not only to engage intensively in a one-on-one interaction, but to contextualize the engagement with information about the patient's family and larger communities. The greatest benefit of immersive environments for learning is that they afford both micro and macro levels of information. They provide parallel systems for organizing and sharing knowledge. A medical student who uses a virtual environment has access to resources that link him not only to his teacher and classmates, but also to larger, even global communities of students who might study the same condition, issue or patient. Just as the operating "theater" is a place of medical practice, study and performance, an immersive environment has the potential to become a stage on which professionals and aspiring professionals might enact the most critical roles of their careers.

Student Identity

The success of immersive environments for learning depends upon the richness of the activities students perform. The greatest criticism of contemporary schooling is that students are constructed as passive receptacles of knowledge. While this criticism is not entirely true, it is true that the assembly-line structure of education works against opportunities for active learning. Student identity will change only to the degree to which we change the conditions for learning in schools. Squire (2006) draws on Shaffer who touts the affordance of role-playing opportunities in immersive environments because, he believes, they allow students to construct epistemic frames, frames for problem-solving in one setting that students can learn to apply to new situations they encounter (p. 26). "Schools," Squire writes, "ask students to learn all at the same rate, in the same way, and at the same time…Schools ask students to inhabit a limited and very particular set of identities as recipients of ideas and agendas prescribed for them; in contrast, games require players to be active participants in co-constructing their worlds and identities with designers" (p. 27).

The successful use of virtual patients in the field of medicine invites us to consider how interactions with other kinds of virtual characters might support the development of student identities that have not been fostered in traditional classrooms. Can we imagine opportunities in elementary and secondary educational settings, like those in medicine, that offer opportunities for learning not only skills, but dispositions? What are some difficult and risky situations that, simulated, would allow students to know themselves better? Could an exchange between a student and a virtual partner who had knowledge of history, science or literature help a student realize the strengths and limitations of his own thinking or his skill in asking questions, formulating an argument or responding with empathy? Ryokai et al (2003) research studying the development in narrative abilities of children interacting with Sam, a virtual playmate, indicate that as a storytelling partner dramatically increased the frequency with which children used quoted speech and temporal and spatial expressions" (p. 201). Though the duration of the study could not allow the researchers to "conclude that the children actually learned these behaviours from Sam" (p. 202) they speculate that that Sam may have provided a model and an opportunity for children to perform and practice these skills.

Squire points out, in his examination of games, that immersive worlds are ideological and are experienced by *interpretive communities* of participants who engage interactively in those worlds (p. 22). He argues, "educators (especially curriculum designers) ought to pay closer attention to videogames because they offer *designed experiences*, in which participants learn through the grammar of *doing* and *being*" (p. 19). Traditional primary and secondary schooling has provided curriculum to which students have responded in a fairly narrow range of repertoires that include remembering, synthesizing and applying. Some fields more than others, the arts for example, have provided opportunities for students to examine how a play or a piece of music, makes them feel—although, sadly, students are often told, by their teachers, the emotions they are meant to experience. The work of deciding what students might *be* and *do* and how the experience might make them feel, has not traditionally been a part of curriculum design. While advocates of progressive education going back to Dewey (1990) have argued for curriculum that acknowledged the holistic nature of young people, most in the field of curriculum development have acted as though emotions either do not exist, or if they do, they should be suppressed. The field of education, as compared with the medical field, seems ill prepared to address the affective responses a virtual experience might generate.

Any development in design of virtual environments will necessarily depend upon how educators position students. Rigby and Przbylski (2009) offer a provocative suggestion; they forward the concept of the "learner hero" as "a conceptual framework for self-determined activity that can inform ongoing research and development of learning technology" (p. 217). They write:

> Even during the earliest experiences in a virtual world, when the activities available are limited to learning the basic parameters of the game and how to function in it, there is the suggestion that much bigger and greater opportunities are available if the player chooses to pursue them. In other words, by building a context of the player as a heroic actor, virtual worlds establish a highly facilitative environment for intrinsic need satisfaction. After all, heroes blaze new trails (autonomy), heroes master the challenges before them (competence), and heroes act in relationship with and for the betterment of the community (relatedness) (p. 217).

Collaborators at MIT and Harvard seem to have embraced this possibility for student identity in their design of the immersive environment, *River City*. Students who play the game form teams in order to investigate a mysterious illness that threatens the inhabitants of the town. Rigby and Przbylski argue further for their framework:

> By creating learning environments where learners pursue individual and communal goals within the self-determined context of heroic action, both internalization of learning and the intrinsic framing of activity would be facilitated. Furthermore, because virtual worlds allow the learning environments to combine shared spaces with instanced content in which every learner can take center stage without competing for limited resources, both personal autonomy and

collaborative objectives can be achieved. In turn, this ensures that our learner hero always feels valued and relevant in the pursuit of meaningful goals (p. 222).

While certainly the opportunity to be recognized as an achiever will motivate some children to engage in an immersive environment, do we really want students to participate in world where they can be only problem solvers and heroes? I've been a high school English teacher for 26 years and consequently have spent many hours thinking about how to make difficult content compelling to young people. While I have experimented with games and competition, I believe that the most powerful learning experiences have been scaffolded, not by competition, but by role-play and the opportunity to learn from diverse points of view.

Much of the research on virtual learning environments seems to focus on positive attitudes towards learning and "self-efficacy" (Ketelhul, 2007; Chou & Liu, 2005, Pan et al., 2006) and is reminiscent of the 1980's focus on "self-esteem." While recognizing the need to support students' development with encouragement and praise, we much question the necessity of positioning every child as a problem-solver. With regard to *River City*, rather than position students in teams as investigators, might there be other roles from which students could learn science? Might the characters who suffer the illness be regarded as possessing expert knowledge, knowledge critical to unlocking the mysteries of the illness? More variety in the roles available to participants would foster more reflective thinking as well as lend a degree of authenticity to the scenarios. Instead of dividing up the world between problem-solvers and problem-sufferers, heroes and villains, a diversity of roles that might enhance both in-world and in-classroom communities.

Summary

A review of cross-disciplinary research demonstrates how virtual environments challenge understanding of communities, the role of teachers and the identity of students in the 21st century. The following components must be central to the success of digital technology in providing both tools and places for learning: 1.) Activity performed in a virtual environment must be designed with goals for the actual world. 2.) Role-play must be diverse not limited to problem-solvers and heroes. 3.) Researchers and designers must attend to affective responses prompted by interaction in virtual worlds; competition must not be the primary emotion generated by immersion. 4.) Students must have opportunities to extend, contribute or amend the virtual environment. One-size-fits-all models may be useful in delivering content, but learning involves much more than content. If we are only using virtual worlds to teach material that can be assessed through narrow measures, we are missing the real benefits of immersion. Ethnographic research has contributed deep understanding of learning as a situated activity. It is imperative that the worlds we design be carefully situated in the worlds in which we live.

When we examine the multitude of ways that researchers, designers and educators are exploring learning in virtual environments, we cannot help but be struck by the inventiveness with which professionals address critical issues in many fields. Our sense of ingenuity knows no bounds. No longer constrained by the physical planet, we are inventing new worlds with new purposes. This gives us reason for both concern and

hope. Given our historical trajectory it should not be surprising that the metaphors for exploring these new worlds should involve terms like *adventure*, *quest* and *mission*. Given what humans are, it should not be surprising that some of these worlds involve conquest, warfare and destruction. We have real reason to fear that if the metaphors that have guided human history play out, every aspect of cyberspace will become, like the physical world we inhabit, highly territorial and contested.

But we live in an age of opportunities the world has never known. If the rate at which technology has advanced is any indication of the future, in a few years from now, the research described here will be thought of as fledgling in its attempts to address critical issues of the age. We are bound to see the development of more fully articulated worlds outfitted with resources that astound in their capacity to foster new communities, change the role of teachers and the enlarge possibilities of identity. In a virtual world, the borders of the roles "student" and "teacher" become permeable. As we invent such worlds, can we make them better than the ones in which we live? Can we invent what we are not yet, but what we strive to become—a more global, open and compassionate society? In the mirror of the virtual, we will see what we are and what we lack. Embracing the chance to collaborate in the creation of new worlds, we might *real*-ize our greatest opportunity for learning.

Chapter 4

Twelfth Grade Findings

Introduction

A number of factors contributed to making the virtual libraries project viable in my English classes at St. Paul's High School. Over the course of the year, I had made use of a variety of technological tools to support learning. In a research unit, I had introduced my students to the use of databases and online resources available to our students through our school library, the county library and a local university. I regularly used the projector connected to my computer to access such sites as *TED* talks available on *YouTube* as well as National Public Radio's series *This I Believe* and *Story Corps*. As part of a unit on autobiographical writing, I played podcasts of former students' recordings of personal essays. When teaching poetry, I required students to create digital artifacts in order to re-present a poem by a British Romantic, an assignment that generated *iMovies*, slideshows set to music, and *Powerpoint* presentations. In response to another assignment in which groups of students independently read novels, they participated in a series of online discussions using instant-messaging or email programs. In class we discussed the mutability of texts, an issue easily raised in comparing film versions to books we had read and discussed. In as many ways as I could, I demonstrated to students that the same tools they used recreationally could be used to forward academic goals. While I believed that they were prepared to participate in considering the possibilities of immersive worlds for literacy learning, the idea proved more difficult than I anticipated.

The 12th graders who participated in the project have come of age in a period of enormous change with regard to the development of virtual environments. As children, they were cautioned by teachers and parents of the dangers of interaction with strangers in online settings. During their time in elementary and high school they have witnessed the installation of whiteboards and projectors, but they have met few teachers whose use of technology greatly enhances the courses they teach. While they have more digital tools at their disposal than any prior generation, the organization and demonstration of the use of these tools in school has been spotty, haphazard. While one might assume that middle and upper middle class white students entering college have the greatest access to and familiarity with technology, the students in this study demonstrate that there are many gaps with regard to use, and that even in a privileged school, students have limited options for engaging in virtual environments that support learning. The contributions made by students highlight both the experiences that influence their ideas and the challenges that integration of technology for learning poses.

In this chapter, I present representative contributions made by members of all three of my 12th grade classes, and I focus on the responses of five students who served as key collaborators in the project.

The School Community

I teach in a parochial high school on the periphery of the Bay Area. The classes that I meet are comprised of predominately white students from the middle and upper middle class. The majority of my eighty-one students are 12th graders taking my Advanced Placement Literature and Composition class and they are college bound. The years that many of them have spent in a faith-based elementary and high school have impressed them with the notion that they must strive for virtue. In their required community service work, they talk about their desires to be "good role models" to children who come from less privileged environments. Most of my students show up everyday in clean clothes, well fed with smiles that bring the poet Joseph Brodsky to mind when he described "a place where dentists thrive" (as cited in Milosz, 1996, p. 115). Students rarely miss school and if they do, it is for league sports events, family vacations or tours of colleges. With regard to their internet activity, many use it to communicate with one another, to shop, to watch *YouTube* videos, to google-search. Everyone knows how to produce a typed, MLA formatted document. Some know how to use software to make *Powerpoint* presentations, movies or music. More and more students are using social networking sites such as *Facebook* to communicate with one another and to broadcast their opinions, preferences and activities. They sport the gadgets.

There are challenges to teaching any group of students, but if forced to generalize about the challenges of teaching these students, I would say that many seem to suffer from a certain intellectual sleepiness—it seems to me that, as a teacher, I need to awaken curiosity that lies dormant in them. With students who have been given as many advantages as they have, it is easy to be critical of what can seem to be a lack of motivation, but what is, more likely, fear. It is easy to forget that they have been protected from the realities that many people with fewer financial resources face. Much of what they know of life they have learned from participation in highly structured activities and from viewing media. Wealth allows parents certain freedoms to craft their children's experiences. Their worlds have been designed to include particular activities and encounters: leadership camps and spiritual retreats, summer courses at colleges and trips abroad. Their lives are shaped with particular destinations in mind—college, or the family business. There is little room for many of these children to diverge from the course. The real challenge, perhaps the challenge with all teenagers, is to crack the veneer of cool, and invite them to do the risky work of expressing their interests, fears and questions in order that they might take greater hold of their lives.

Many parents of these students exert firm grips on their shoulders. Some, maybe too firm. Other parents have allowed the raising of their children to be performed almost exclusively by people they have hired—day care providers, nannies, camp counselors, and coaches. Some students wriggle a little under the pressure of adult direction, but if they rebel, it is in mostly predictable ways with body piercings or tattoos, in their choice of music or their style of dress. Though rumors around town suggest that some of the wealthier students have access to "better drugs" than public school students, many of those who use manage to be functional abusers. When caught, their parents are more likely to defend them than to readily agree to counseling. The vast majority of students,

however, do not get into trouble; they work at being responsible, team players and high achievers. In many ways they lead the kind of lives many parents dream of for their children. And when, through sports or student government, art, music or service-learning, they discover their ability to affect change, to move people, to speak back to authority, or to question, it is truly a delight to witness their growth.

It can seem to a student who has lived a sheltered existence that all of life is a matter of making the right decisions. That his future is in his own hands. Of course there are those among them whose parents have struggled to provide them with a private school education, and less privileged students are sometimes quietly resentful of their peers to whom so much has been given. While contemporary research has made strides in giving texture to descriptions of both elite and impoverished students, middle class students have not been depicted as the complicated individuals they are. While, as a group, they share certain commonalities in resources and opportunities, they are as varied in their aspirations, dispositions and abilities as their peers in other socio-economic groups. It is not easy for them to cross boundaries into worlds different from their own, but many of them long for experiences that will enlarge their worlds.

Teaching literature, would seem to be an easy thing to do in this environment, but there is subtle resistance to reading and writing about literature as these activities seem to the students to have little to do with the business of making one's way in the world. Literature introduces them to characters who are not very likable. Predicaments are not always resolved. Interpretation is hard work; it makes them uncomfortable. Many would rather go online and search for an interpretation than to hazard one on their own. They have found ways of gaming the system. In this environment, the teaching of literature is, and must be, counter-cultural for it introduces students to worlds that are not constructed to model their own. Reading forces them to consider how the social construct stacks up against individuals. These literary worlds are complex and chaotic, messy and mean. Encouraged to craft, describe and defend their interpretations of what they read, students, at first, flounder. But, over time, a teacher who creates an environment where it is acceptable to struggle with interpretations, to make mistakes, and to question, finds that these students can find ways into worlds very different from their own. When engaged, they use their skills to reach new levels of critical thinking, to chart territories they have never explored.

The Actual Library / Computer Lab

Few students read for pleasure. The school's actual library, housed in two rooms of a classroom wing, is a place where one discovers purposeful activity, but very little browsing. Built in 1964, the physical building has been updated very little since then. It is often crowded before school, at break, lunch and for a while at the end of the day. A small vestibule room has a circulation desk, a wall lined with periodicals, and two walls lined with tables on which sit eight desktop computers. Two adjoining conference style tables provide a place for students to sit and study, complete homework assignments or to play chess or checkers. The larger of the two rooms seats up to seventy-five students. Atop a waist high row of bookcases, sits another six computers. The library houses seven thousand books and through the computers, students access several databases that the school has purchased. An adjoining computer lab offers thirty-three additional

computers, but because classes are scheduled in the lab all but one period a day, most teachers have no opportunity to use the computer lab as a resource with an entire class. As there are not enough computers for every student in the library, a teacher who wants to use the fourteen available ones with her students must visit the library on an 80-minute block period, divide the class into groups, and provide an alternative activity for students waiting for a turn at a computer. While some students occasionally bring laptops to school, there use is not widespread. A wireless network exists on campus, but only administrators have access. At the time the project was conducted, there was no committee established to address the issues of learning and technology on campus, though during the year that I have been writing, one was formed.

Initial Reponses to Virtual Worlds

When I first introduced the virtual library project to the 12th graders, they expressed a range of levels of interest and knowledge regarding virtual worlds. Many were familiar with games, though few admitted to playing. A couple of students, girls and boys, enjoyed the *Sims* when they were younger, and a few of the boys said that they were familiar with *World of Warcraft* and *Grand Theft Auto*, but no one readily came forth with information about their experience of video games. A ripple of smiles traveled across some of the boys' faces, but they were not about to make any public confessions or try to defend their interests. No one had visited *Second Life*. Many seemed skeptical about the value of virtual worlds as places for learning. I introduced the library project by presenting classes with a couple of *Youtube* videos that explained opportunities for learning in *Second Life* as well as Prof. Yehuda Kalay's machinima of the Virtual Smithsonian (see *Youtube.com*: "Virtual Smithsonian_Studio 101"). After viewing my presentation, students jotted down their initial impressions:

"I think that second life could be very interesting for students if they wanted to learn, but a high school student could easily get distracted to something non-educational."

"I was really amazed that you could go into a Picasso painting, but I don't have any interest in the 2nd world because it could probably be addicting."

"*Second Life* and virtual worlds are becoming a horrible excuse to become an antisocial and introverted person. It's not real life!!! I think it's terrible!!! It's really dangerous."

"It's crazy that people can be somebody else on second life, you could be anything you want. What a perfect name, because it's really like living a second life."

"In my opinion I don't think that second life is very useful. I personally think that it is a waste of time. If you want to play a video game, actually play a game. Role-playing is also not my thing."

"I think that [it] is pretty cool, but I'm afraid that people will get addicted to it and won't do anything but sit at the computer all day and socialize."

"*Second Life* seems like a really interesting and safe way to re-live your greatest experience or try something you would never actually do in real life. Its educational purpose would be amazing because of the possibilities. I've never played a video game in my life, but it would be interesting to try it."

"*Second Life* seems totally unreal to me. I have to admit that it's pretty creative, but I'm not sure if it would be totally beneficial. I think it promotes more time in front of a computer rather than going out and experiencing the real thing."

For those students with limited experience of video games, the idea of an immersive world was very strange. As our discussions unfolded, students continued to ask questions about the nature of experience in an immersive environment. They wanted to know the physical functions one's avatar could perform. 'Can you kill someone?' 'Can you get married?' 'Can you pee?' They wanted to know about money. Confronted with the unfamiliar, they echoed warnings that they had heard from their parents and admonitions from news media that highlighted the dangers of addiction. Maybe they experienced the simple fear of the unknown. But it might be something deeper. Perhaps fears of virtual worlds stem from fears that a student will never be given the chance to lead the life he imagines, that he will forever be consigned to a world, like school, constructed by others with rules and regulations that often seem unfair and arbitrary. Twelfth graders talk about the "real world," a world they imagine they will experience after they leave school. To them, it seems easy to distinguish between the real and the virtual.

Key Collaborators

In order to generate viable ways of participating in and contributing to the project, I elected to share the responsibility of engaging my three classes by asking for volunteers who elected to participate as key collaborators. Generally more tech-savvy than many of their classmates, these students mediated their roles as students and clients. During classroom discussions, they were able to report on the progress of the project and to share their ideas regarding design strategy. The larger group of students responded positively to the fact that their classmates were participating in the project and their interactions with the key collaborators facilitated classroom discussion and written responses. Over the semester, the collaborators met with the architecture students, took a tour of three of Berkeley's libraries, sat in on the world-building seminar and conferred with the team that constructed the 12th grade library. My interviews with these students allowed them to reflect on their experience of the project and to surface issues that educators must confront as they consider ways of integrating technology and learning. In conversations they revealed the changes in literacy practices that have most influenced them and in which they feel most invested. The following profiles offer insights into the ways these students contributed to the project:

Cody

I like to let students choose their own seats and only ask them to move if their social activity becomes a distraction. During English class, Cody elected to sit in the third seat of the center aisle, leaving the first two seats empty. Over many years of teaching I have noticed that people who choose this spot are willing to engage, ready to be recognized. Often they are students who remember where last class's discussion ended. They have done the homework you assigned and have it completed in a folder on their desks. You can quietly ask them for an opinion while the rest of the class is chatting. They are your barometers. Not always the loudest, or the first to speak, they nonetheless are ready with a response or a question that will move the class along. They remember where you left off last Friday. Cody, an excellent student, was all this and more.

He politely assumed the role of "computer geek" and would take any opportunity to look at the trouble I might have at the computer. The story of his interest in computers is perhaps common to students with his abilities. He remembered playing on the family's first computer when he was about four years old. His grandfather, a retired electrical engineer, nurtured his curiosity about how computers worked. After building simple things, a light that he could illuminate, he realized, "to be able to do anything complex, I would have to go into programming." His grandfather bought him a Lego robotics kit and Cody described making a robot that could roll around, but he did not compete in any robotic competitions. "I didn't know anyone who was interested but me." In middle school he got books and took a young person's programming class at the local junior college. He became so immersed that he would stay up late at night and his mother would complain, "You've been on the computer too long." He says that she did not realize that he was "actually learning."

In junior high, what Cody remembers was that the school librarian and parents warned of the dangers of computer use, rather than foster a curiosity or teach students how to use them effectively. During freshman year in high school, Cody finally got to take a computer class, but there, the students only learned keyboarding, and excel spreadsheets. There were no opportunities to link the work of the class to any actual assignments that might demand the use of technology or the chance to produce creative work. A few of the elective courses offered opportunities to learn with technology, but as Cody points out, the school is far from up to date. "The video arts class is still using film," he says with some chagrin. "There are seniors who don't know how to make a video on the computer."

In high school, the gap between Cody's abilities and those of his peers widened and he frequently took on a leadership role in using technology to support learning. In one class the teacher required that the students collaborate in writing a paper. She did not suggest any online programs that might help them accomplish this task. While other groups of students simply assigned the writing of parts of the paper to individual members, Cody suggested to his group that they use "*Googledoc*," a site that supports collaborative writing and editing. He says,

> I'm not the normal student user of technology, I'm kind of over the top…there are all these websites and interesting applications and things you can do that kind of

> like, streamline things, and make things more efficient and easier and share things more, but um, the biggest issue for me is that I never, I'm always, the one that's kind of pushing it and everyone else, is kind of, um…I have to each them about it, or they, they haven't heard of it before, or don't want to use it…

Cody's expertise went largely untapped except by a close circle of equally motivated friends during this high school years. While all teachers are encouraged to pursue "professional development" by enrolling in courses, workshops and seminars, it was clear that teachers might have gained valuable knowledge by spending an afternoon with Cody.

Sam

Sam was the valedictorian of his class though when given the opportunity to speak at graduation, he cheerfully relinquished his right. In our AP class he chose the seat behind Cody. A joyful student, he possessed a mischievous grin that would widen as a class discussion became more lively or heated. Never afraid of expressing an opinion that would counter his classmates, Sam was extremely bright with a dash of Dennis the Menace. Like Cody, he became interested in technology as a young child. He said,

> I've always liked technology and taking things apart and then *attempting* to put them back together. That led to the computer world because computers are complex machinery. Our family got our first computer and I started playing games on it. As we got better computers, I started learning how to use command prompt and other simple forms of coding and then Cody got me more involved in the programming stuff and from a gradual progression from just turning on that first computer and seeing the world inside it to exploring and finding new nooks and crannies, it just opened a whole new world. Also, all sorts of sci-fi books, like *Snow Crash* (Stephenson, 1995) or *Neuromancer* by William Gibson (1984), those are a kind of cyber punk, opened a whole new world, showed a different side. It was something new and different from what my current life was like.

Sam plans to study aeronautical engineering at a major university after which he hopes to work for NASA. School was not a place that fed or supported his interest in technology. He explained his experience by saying,

> Computers have been available, but using them in the programming ways has not been an option at school because of all the blocks and stuff on the internet…The computers are basically locked in a small little box, you can't even use a tenth of the functions of it. School kind of limits that because once you open up a small part then it opens up everything, so people aren't ready for it yet.

I asked him to clarify when he said "people," did he mean teachers or students? He said, that he meant that students were not always doing "the best things" on computers. He added, "…it's one of those things where it's new, and people are trying to find what to control and not to control. It's just a battle."

I asked him where his interest in technology intersected with classroom learning. He said, "I guess with school work it never really did intersect. It just took time away from homework. I guess the real way it kind of evolved was through the games and it was completely set aside from school. It was a sense of freedom with computers." With regard to technology, Sam had learned more from Cody than from any classroom teacher.

Amelia

Amelia, a thoughtful and conscientious student, tended to sit at the back of the classroom near the door. She liked to be close to a couple of girlfriends with whom she might quietly exchange a few words as the class shifted gears from one activity to another. A receptive student, she was always prepared for class, though she was not among the most participative. During a lively discussion, it was easy for me to imagine that she was on the verge of contributing an insight. Her closest friends were girls who were engaged and vocal.

Regarding her history with interactive media, she said that she had enjoyed playing the *Sims* by herself, but had never played a multi-player video game or participated in an immersive virtual environment. One of her first comments was, "I'm not a Cody or a Sam."

In transcripts of online conversations that Amelia and her friends conducted about the novel *Unless* by Carol Shields (2002), I observed a side of Amelia that I had not seen in class. While interviewing her, I commented on the dynamic that emerged between her and her partners. Amelia reported that while they enjoyed analyzing the book, they sometimes found instant messaging a frustrating vehicle for discussion. "We didn't like when we were doing our book project how fast it was. It gets you speeding up what your thinking, what you're saying [whereas] with the email, where there was a little bit of a delay, and you can take time to write what you're saying."

On the positive side, however, there were things that Amelia enjoyed about online conversations. She said,

> What was nice about the chat room and also the virtual world is that—You'd be talking to people in discussions, but in reality you're by yourself, you know, at your computer. I'd be getting all worked up over something and I'd step back, and I'm by myself in a room. 'What am I doing?' But like with the class discussions, I can see it being helpful, because I'm not, you know, the first person to raise my hand in class, as you know. But if I were in a virtual world, I could see myself typing something because I'd be by myself at home.

When pressed to reflect further about the differences between discussing texts in class or online she said, "In class I kind of self control myself more, I guess. It's not that I don't feel comfortable, talking or saying my opinion around people, it's just when there are other people there I like listening to what they have to say more. So, I can see myself being at home and being much more willing to say what I'm feeling. No one really sees me."

In a chat room, a non-immersive virtual environment, Amelia seemed to experience a disinhibition effect (Barak et al., 2008) that freed her to more express herself

differently than she normally would in class. Researchers Livingston and Brake (2010) in their study of youth engagement on social networking sites observe, "At the heart of the explosion in online communication is the desire to construct a valued representation of oneself which affirms and is affirmed by one's peers" (76). The researchers suggest that there three consequences of engagement that include the ability to sustain a "wide circle of friends (or 'friends of friends')" the opportunity "to overcome embarrassments of face-to-face communication" and the chance to participate in "more flexible, complex and ambiguous networks" than have been traditionally afforded to them (77). It was clear from Amelia's comments that the online conversations offered her a unique opportunity to engage in the study of literature with friends. She felt protected from surveillance as she expressed more emotive responses in the online discussion than she would have in class. The temporarily constructed network offered an alternative to classroom discussion where even the most active participants need to compete with twenty to thirty peers for the floor.

Zandi

Zandi, a friend of Amelia's who had also participated in the online chat while reading Carol Shield's novel, remembered how heated the discussion of the book became. She said, "We are all the best of friends, but we're not afraid to say anything to each other." She also said that she felt more free to express herself in an online setting. "When we did the chatting, I could definitely open up more, as opposed to sitting face-to-face because sometimes you can feel more reserved because you're afraid, oh, you don't want to, you know, offend their bias and if you're typing it, they can't see you, they can't do anything about it." I commented on the lively quality of the conversation and Zandi smiled and said, "We definitely argued about the book."

Zandi's passionate nature made her a pleasure to teach. I could count on her to express an insight or challenge a point that another student had made. She responded with her heart as well as her head when she discussed literature. I met with her during the winter break, after she had completed the first semester of college where she was pursing a major in politics at a private, urban university. She said that she loved her courses and planned to major in Politics. She seemed to have already formed close relationships with her peers and for Christmas, her parents had paid for a trip to visit a roommate in a distant state.

Like Cody, Zandi possessed the social skills that allowed her to interact with a wide circle of friends, classmates, former teachers and professors. She was comfortable, for example, visiting a new professor during her office hours a couple of times a week. Taught to use technological tools by her mother, Zandi appreciated its practical uses. She kept in touch with her close high school friends, now attending college across the globe, through *Facebook*. She said, "It's fun and it's how we keep in touch with our friends. We have—Sam, Cody, everybody, all of us, we have a huge thread with 18 people of our closest friends, and that's how we keep in touch with everybody. We just give up dates, or comment on something. It's like 10,000 pages long, I kid you not, I'm not joking, it's pretty epic. It's used for fun, but for communication between us."

On the webpages of *Facebook*, Zandi and her friends had erected a site where they could construct social identities in collaboration with their friends. As boyd (2007) points

out,

> …online access provides a whole new social realm for youth. Earlier mediated communication devices – landline, pager, mobile – allowed friends to connect with friends even when located in adult-regulated physical spaces. What is unique about the Internet is that it allows teens to participate in unregulated publics while located in adult-regulated physical spaces such as homes and schools (p. 136).

As Zandi and her peers transitioned to university life, the communities they had developed during high school continued to sustain them by being easily accessible in a virtual environment. While they face the challenges of new demands, new friends, classmates, professors, sometimes in cities, states or countries where they have never lived, they were able to maintain and sustain a presence in a world where they were already well known. Alvermann (2008) writes about the significance of technology in the lives of tech-savvy youth like Zandi: "they young people's penchant for creating online content that was easily distributed and used by others with similar interests was facilitated in part by their ability to remix multimodal texts, use new tools to show and tell, and rewrite their social identities,"(p. 13) abilities largely unrecognized in classroom settings.

Though enthusiastic about new media, Zandi was not completely won over by it. We talked about how media is geared and marketed for different age groups and she raised the issue of *Baby Einstein*, a video program that purports to boost an infant's cognitive development. She said, "It seems like a great idea, but in hindsight, why can't you interact with your three year old instead of sitting them in front of a TV and having them watch this?" She also expressed concern for her younger brother whom she said spent too many hours in front of a computer screen, playing games. While she very much enjoyed social networking, and used technology to discover and express knowledge, Zandi insisted that virtual experiences should not replace authentic ones.

Marcus

Marcus wasn't close with the other students who traveled to Berkeley, though he was welcomed by them and they drove to the campus together. Marcus was enrolled in different AP section than the others, one that usually met in the afternoon. He rarely spoke in class and it was clear that he didn't particularly enjoy being called on. When I asked him about how he was nominated for the course and why he chose to take it he said, "I'm not really sure how I got put into English 12 AP…I think it had something to do with my schedule. I *had* to be in it or I had to drop another class to get out of it, so I was like, 'Okay, I'll stay in it.' So, it worked out." I got to know Marcus by helping him with his college admissions essays. I learned that he practiced Spanish while washing dishes at a restaurant owned by a family member. He was a baseball fan. I helped him write an admissions essay on the theme of being a fan. He accepted criticism with grace and his revisions demonstrated his ability to be flexible, to try different ways of expressing himself. Marcus was accepted at several major universities. He chose a state

university whose emphasis on technology propelled it into the ranks of highly regarded schools. Lucas planned to pursue Architecture as a major.

I asked him about the source of his interest in architecture and in the virtual libraries project and he told me that he'd learned from his uncle, a structural engineer, and that he became interested in,

> buildings and how they are constructed, and the impact on the community, stuff like that. And virtual environments. I think people who are really into technology, just coming up with ideas and making them work on the screen is pretty interesting. Anyone can just access them. In a virtual world, anyone can just go on it. It's fun to do.

Marcus was not an avid reader. He had little experience either as a gamer or as a builder, but when we started talking about the process of constructing an essay, he could see parallels between his interest in architecture and writing. I asked him about his abilities as a writer and he said,

> I don't know where it came from… It's funny because English is the only class I got an "A" in this quarter. I wouldn't have expected that honestly. This quarter, I started, outlining more, ideas for papers first, and I just started typing and then one thing would lead to the next, and then I would leave it for a couple of days, I would kinda look at it, just to see, and maybe hand it off to someone and have them look at it and then, I don't know, if I thought it was a good paper, if I had my ideas down that I wanted to, I would just leave it at that, I wouldn't add anymore, unnecessary things.

When I questioned him further he commented on drawing from course readings and using them in his own essays. On one occasion he drew from the use of repetition in the work of Dr. Martin Luther King, Jr., and, as he put it, "applied it in my own way" in the next paper he wrote. His professor had noticed and applauded the technique. When I suggested that an ability to notice patterns might help him in both writing and architecture, he immediately saw the connection and said that he was interested in "noticing certain things on buildings an how things were put together, arranged." Of all of the collaborators, Marcus seemed most to echo ideas forwarded by Turkle (2007) in that objects, whether written texts or buildings, were objects "to think with." He seemed to be a student who could benefit from an immersive world where concepts could be visually rendered and manipulated in constructive processes that would support learning.

The Proposal Process

Further discussion and visits to other virtual sites, allayed some of the students' fears about interaction in virtual environments. As we discussed opportunities for learning their resistance to the idea of a virtual library dissipated. I invited students to participate in proposing ideas to the student architects. Students responded with

imaginative visions that revealed their conceptions of literacy and their struggle to grasp the complex relationship between the virtual and the actual.

Many students imagined grand places modeled after ancient architecture. One suggested that the library resemble the Pantheon. One proposed that it be modeled after "the Acropolis or the Coliseum." Another student imagined a library "inspired by old fashioned castles, including a drawbridge and a moat, complete with live alligators." Many agreed that the library should be spectacular. Only a few imagined a contemporary design. One said, "I would like the library to take the shape of a modern, dynamic structure such as the Disney Concert Hall in Los Angeles, California, or the Strata Center at the Massachusetts Institute of Technology in Cambridge. Another student who had completed over eighty hours of construction building a home with Habitat for Humanity, described a structure comprised of glass cubes. He wrote, "I would make it look modernized to help attract the younger generations."

Many students drew from their experiences of new media in proposing designs. One student who had earned a college scholarship for his skills as a sports videographer modeled his proposal on *iTunes*, an online store that allowed shoppers to view album covers and sample brief selections of music. This student envisioned an entire library devoted to music. "It would be cool if it were set up like a standing art gallery with the artists' album covers presented as their piece of art...it would be a cool vibe if you could make the library look like you were inside of *iTunes*." Another student, interested in the possibilities of a digital, multimedia environment wrote, "The library hopefully would be much more like an enormous media center, a virtual *Wikipedia* if you will, concentrated with vibrant pictures and state of the art imagery. A library for a new generation truly stretching the limits, leading to a new era in imagination and education."

Practical Considerations

Students also drew naturally from their ideas about what was beautiful, functional and sustainable in their physical worlds. They did not stop to consider the elements from actual worlds that would be different in virtual worlds. For example, one student wrote, "The walls of the library will be made of soundproof glass so that the sounds of the busy world are nonexistent to the library inhabitants." Sound is, of course, a design feature that that can engineered into virtual space. It might seem to a student, entering a virtual library from a busy street, that the walls were made of soundproof glass, but the student described the process as though the actual glass would be an issue.

In general, students responded as though they were being asked to design an actual library, perhaps an ideal one, or one that might be built in the future. One student paid considerable attention to the products that would be used. She provided a detailed list that included: "recycled wood, called engineered wood…lots and lots of windows so there would be less electrical light and more natural light…The floor would be a wood floor until you reached the shelving areas, then it would become 3/4 inch carpet, nice yet still easy to clean." Many students were concerned with light and physical comfort. Most students wrote about the need for many windows and comfortable furniture. They envisioned the libraries on a scale that would allow for interactions between many patrons. Another student, unfamiliar with the features of virtual environments wrote, "The bookshelves should not be so tall that even with a stool you can't reach the top

shelf." She ignored the fact that in a virtual world your avatar could fly to the heights of any shelves.

One particular student's suggestions spoke to a number of issues implicit in the declining use of libraries by middle and upper middle class communities. Though other of his comments clearly indicated that he understood that the assignment required writing a proposal for the design of a virtual library, his thoughts also reflected his consideration of problems in actual libraries. He wrote:

> One of the reasons many people avoid libraries is due to the homeless population that often frequent the library. These people are often just looking for a place to sleep during the day. This is understandable; we would all do the same. So my belief is that we shouldn't just kick these people out, we should provide them with a few beds in another room and a sanitary place to wash up. This will help create a better environment for everyone.
>
> A library must have an inviting atmosphere so others can concentrate. If people are worried about being comfortable, their seats sanitary, and their safety, we must rethink what a library is. If we implement these ideas we will always have a place to go, just to get away from the rest of the world. For the few of us who have really been immersed into a great book, it is our duty to provide others with the same experience.

The source of this student's concern seems to have originated in wondering how, in a virtual world, he could address an issue he has encountered in his actual library. He imagined that the users of his virtual library would not only be teenagers like himself, but homeless people who would have needs very different from his. He seemed to struggle with an internal conflict. On the one hand, he wanted to provide homeless people with comfortable refuge in a public space. He also recognized that the library offers a refuge for readers who want "just to get away from the rest of the world" and may be made uncomfortable by the presence of homeless people. For this student, addressing his sense of "duty" to potential readers was tied up in his sense of responsibility for those who use the library for other reasons other than to discover "great books."

Layout and Design

Students drew from their experience of actual libraries and of their study of literature in considering design features. In those descriptions that included a plan for the layout of the library, the idea of organizing the space by subjects, genres or themes was popular. Arguing for a genre based design a student wrote, "…on the bottom floor would be the mystery section of the library. The lack of windows and subtle light would put the reader in the perfect place for enjoying a mystery. In the background, the reader would hear suspenseful music to heighten the mood."

Another student whose design included rooms devised to represent American life during particular decades of history, decided to include a wing in which rooms were devoted to particular countries. Though she had conducted Internet research for our course, and understood that many people could access the same digital file at the same

time, in designing the library, she nonetheless believed that there would need to be multiple copies of books. She wrote, "While I realize that it would be hard to place the various books in the various rooms, for many of them would overlap, there would be "card catalogs" of sorts, and as many copies of the book necessary would be bought, so at least one can go in each room." She could imagine ways that would make the virtual library more compelling than traditional approaches to the study of history and wrote, "I am not a student who finds history "exciting" so I am looking for ways, visual ways, where I would be intrigued to learn, and given all the skills to do so…these rooms would be a living history book."

A surprising number of students felt that there should be food because, as one student wrote, "it's difficult to think on an empty stomach." Several students mentioned cafes such as Starbucks that would serve hot chocolate. One student expressed an imaginative idea that included, " Large dining halls will also be available for study groups and other grand accommodations. For an extra charge, our personal chef will prepare some food for your thoughts, along with a vintage wine and other spirits." Two students even included the suggestion for "clean bathrooms," which one claimed, "make a huge difference in how people view institutions." Another student, concerned with attracting youthful patrons, wrote that the library should include sun decks and swimming pools "because tanning and reading go hand in hand for me and many other girls I know."

Underlying their concern with comfort and enjoyment was the idea that the library must be made an engaging place. A number of comments suggested that students were not enticed by the possibilities of experience offered in a library. One explicitly stated, "The library must be reformed into a place that inspires people." Another wrote, "Libraries are in desperate need of change. They need the kind of change that will make people want to be there. The world is beginning to lose its love for learning. This is incredibly unfortunate and calls for drastic measures." Few students claimed to use their local libraries and when I asked how many students carried library cards in their wallets, fewer could produce them. One student felt that the library was not "interactive" enough. Another suggested that if a library offered a computer program that would match a patron with a book by assessing his interests, more people might enjoy a library.

Suggestions regarding layout and design spoke to changes in literacy learning that influences these students. Affluent students can afford to purchase any book they desire and many are more likely to use Amazon.com than patronize either a local library or a bookstore. The main street of the town from which we derive most of our student population boasted four bookstores ten years ago, now it has two—one, a member of a nation wide chain and the other a small, used bookstore. When one selects a book on Amazon, one can read reviews by ordinary readers and those published in major magazines. Amazon keeps track of a customer's purchases and makes suggestions for other books on the same topic. The online store also offers titles in a variety of forms, new, used, audio and film versions. Of course, students can visit Amazon at any hour of the day or night, whereas our local libraries have suffered budget cutback that force them to reduce their hours.

Social and Physical Resources

Students clearly drew from both their experience of actual libraries and their online experiences in drafting proposals. With regard to social interactions, students proposed that the library facilitate:

- Study clubs
- Interest groups
- Research parties
- Weekly book club discussions
- Speeches
- Lectures

With regard to technology that supported learning, students suggested that the library include:

- Movie theaters
- Music studio
- Displays of special collections
- Art galleries
- Private discussion rooms
- Public discussion rooms
- Message boards
- White boards
- Televisions

Though no one stated it explicitly, the suggestions they made suggested the design of a library opened less than ten years ago on a local state university campus. This actual library offers all of the resources proposed by the students including a sundeck where students can take study breaks and a café where students can purchase food that they are allowed to consume in the library.

The Building Process

During the first month of the university semester, architecture students learned how to use the programs necessary to build the virtual libraries. At the end of this phase, high school students began to visit the class. During the first class, the high school students participated in a tour of three of the university libraries and met with the 12th grade architecture team. With regard to building the library, Sam was clearly on the side of those who wanted to build something grand, something that could not be built in an actual world. He said,

> In the library sense, I thought that in reality that everything costs money. Buildings cost money. So, in a virtual world it's completely free—you have infinite space, infinite resources why not make this big, grand building that takes up many square miles and distance doesn't matter so you can get from point A to

> point B in zero time, so make this huge structure that is amazing to look at and it's a feat that you can accomplish relatively cheap. So, in that sense I was saying, "Don't limit yourself. Expand. Make something new.

Amelia, was, at first, unconvinced. With regard to the design process, she said, "I remember initially I had wanted something a lot more simple. Me and Sam disagreed over that. Sam was, you know, "Why not, if you have no limits, go all out and do everything?" And my philosophy was, "Just because you can, doesn't necessarily mean that you should."

Zanidi later confessed, "I'm not going to lie…it was Amelia and I against Sam and Cody. Sort of boys versus girls. I definitely favored the more traditional…I remember the example we used was the traditional *Harry Potter* (Rowling) library as opposed to a futuristic, sort of virtual, completely technological space."

Sam felt that the team of architects was receptive to the wide range of student ideas, "I think that they went into it very open-minded and they weren't really trying to put expectations on it. They got a whole bunch of different ideas and made up of it what they could."

As the process of building the library got underway, I acted as an intermediary between the university teams and the high school classes. As I attended the university each week, I would report back to the high school students and keep them abreast of their team's progress. On the occasions that the high school students attended the seminar, they would participate in a critique session and afterwards meet with the team to discuss their ideas**.** During English classes, the next day, they would convey to their classmates the suggestions and criticisms they had made. Discussions evolved about nature of reading, methods of teaching literature and the affordances and constraints of encounters in virtual space.

Very few students allowed their imaginations to run wild. One addressed the student architects directly in his written response. He wrote, "I have many ideas on how this library should be constructed. Some of them are silly and childish where as others are more sophisticated and educational. I hope that you take these ideas to heart and use them in your class. The first idea I have is edible books." In his vision, a student would eat a book that would then "play" in his head as though it were a film, "It would allow you to sit down and watch your favorite books like you were part of them." Farfetched as they might seem, this student's ideas suggest imaginative possibilities of the kind of affordances available in a virtual environment.

Only a few students ventured beyond the realm of what they had already experienced in an actual library. Only one student, an avid player of video games, imagined a role for non-playing characters (NPCs). He wrote, "a historical figure should greet people at the entrance asking what they are looking for."

One student, an avid reader, imagined what it might be like to encounter novels she loved in a virtual library. She wrote,

> For the romance and drama area, it might be in the shape of a rose with the books having a rose petal motif… another aspect I would include would be that you could actually enter into your story. A virtual world within a virtual world! For instance I would choose to enter into the mystery department. I find my favorite

> mystery novel *The Heart of India* by Linda Chaikin (1990). Before proceeding into the book, I assume a character's identity, for example, the leading female, Coral. I then live the story through her perspective. However, as the story unfolds, I decide that I do not like my character. I decide I can use the exit door at the bottom of each page. I could choose a different role from the list of characters and then proceed into the story. By living someone else's story you can develop a deeper appreciation for reading and experience what it really means to be in another's shoes.

The fact that this student alone, among the many who participated, imagined the experience of a particular book in the virtual library suggested the degree to which most students failed to comprehend the imaginative capacities of the place.

Obstacles

The university architects who worked with the students had little knowledge of the intellectual or social practices of the twelfth graders with whom they worked. Their initial idea for the library was that it would be a site for competition, where taking quizzes on books they had read would earn them points. The team drafted a plan to include the public posting of points so that patrons could display their score to one another. Reflecting on this strategy, Cody commented,

> The point thing, was something that they came up with. We didn't really say, 'Oh, we think this is a good idea.' The architects created that. We kind of said that it wasn't what we really envisioned or something that we thought would be good…At St. Finnbar, they had a program where you read and got points. And you could only get an "A" in your English class if you got a certain amount of points. You would get points by taking quizzes on the books that you read. It was a really good program but… all it was, was an incentive to get kids to read books. And they would read *Harry Potter* because that was worth the most points because that was the biggest book.

Separately, Zandi, who had attended the same elementary school, commented on this program. She said**,**

> At St. Finnbar they had an accelerated reading program where you have to read a certain number of books, worth a certain number of points to fulfill your grade requirement. In that sense, it forces them to read. But, I don't know, I was never sorta for that, because, you should want to read. You should be engaged in it. As opposed to, "Oh, I have to do this to get my grade.

In relating memories of recreational reading and school, neither of these students commented on the pleasures of reading or of role-playing the characters or discussing the books with friends. What they most remember is being forced to "read for pleasure." Or rather, being forced to take tests on books that otherwise might have been read for pleasure.

Plans for the library met several other obstacles. Sam reflected:

> When we first began the project we really didn't know the limitations of the program—that's where I got the grand idea of making this huge library and I realized we didn't have much time. It's really simple, graphics wise. So then we had to adjust our focus. That's where your programs do really limit what you can make. But then we still kinda kept with the idea—might as well make something that's not physically possible, cause you're in a computer environment. That kind of allowed us, some people, to think more freely. That's how we got some abstract library that wasn't really a library in a typical sense.

Eventually, Amelia was won over to the idea of a more imaginative place than the one she had initially envisioned. "I'm starting to go more towards Sam's end of constructing things because it is something that you can't have in your life necessarily."

The Completed 12th Grade Model

Of the three virtual libraries created, the 12th grade library, called *Mybrary*, was unique in its cosmic dimensions. Designed as a universe, it existed inside a translucent membrane lined with the covers of books. Individual or group home-spaces were constructed as floating planets that could dock with other planets whose members might want to join in a discussion or facilitate an activity related to the book. Settings from the book would literally rise up out of the ground when members gathered for group discussions. There were also commons, theater spaces where people could gather to watch films or attend lectures relating to topics of interest. Members of the *Mybrary* community would be able to access profiles of other readers. The machinima created by the student architects in order to display the features of the library, captured the sense of an expanding universe that nonetheless held a place for individuals and communities of users. Though they were given copies of the novels that the 12th graders were reading, no place in the *Mybrary* depicted a novelistic setting or represented a particular book.

Through the more direct participation of the key collaborators, their classmates were provided with insights regarding the project. As the design process unfolded, students were able to discuss and question the five students about their experience—an opportunity that would not have generated the richness of responses had I only reported to my classes on the work of the design team.

In response to viewing the final model, student comments were mixed. Cody said, "If it works on everyone's computers and if everyone's on it and their friends were on it, I think people would go to it. And I would go to it. I would probably go to something like that as an alternative to *Amazon*. To have a new way to look at books and things like that. Because I still like…as much as I like the digital stuff, there's still value in books."

Amelia was moved by the model to reconsider her original resistance. She said she could imagine "choosing the virtual library over the real life one if it were more extravagant and offered more things, even if I was going to get the same material out of it."

Ultimately, Sam, one of the active readers in the group, could see little value in the opportunity the library presented. "A virtual library is almost a contradiction of what

people are using the internet for… If people want to look up information fast, then a virtual library isn't the way they would do it, they'd just look on *Wikipedia* or something like that." In his mind, a library was a place for accessing information. It did not need to be a place at all. Sam was not persuaded that a virtual library was worth the effort that it would take to build. He said,

> …creating a virtual library, you are creating a lot of graphics just so someone can read a book and so it's almost an unnecessary waste of bandwidth. Just downloading a lot of memory…If someone wants to read a book, then just download the text for them, not build a whole environment. Maybe for a discussion they could go into a virtual environment with other people.

Zandi agreed. She said, "I like it, but me personally, I'm not the kind of person that's going to go on this virtual library, I'd rather go to a real library or a study hall." After a few minutes she came back to re-state her position. "My argument would be that it takes away, the technology takes away from what you are actually trying to do which is read from books, learn what you are trying to learn."

Marcus expressed the most enthusiastic response to the virtual library. He said, "I think it would work. Maybe you'd have to have some motivation for people to get on here—I don't know what that would be, but it definitely allows more freedom within the books, I think, so it makes it more interesting to do, more fun to read books." He had enjoyed the opportunity to discuss a book in an online setting during the independent book project. While we watched a video of the final library project, he commented, "It definitely opens up more conversation, I think. It's more laid back. You can discuss books with more people that you may or may not even know, like in this setting too," he said, gesturing toward the screen where the virtual library was displayed. "And you just overall gather more information from the book that you may or may not have thought of before."

Summary

The virtual libraries project provided an opportunity for students to learn about architecture, to learn about how technology is influencing changes in architecture, and to see how a college seminar interacts. Reflecting on the experience Cody wrote that before he attended the class, he worried about meeting the professor and students: "I thought that it they might be intimidating, but they weren't at all. Sitting in on the class helped me understand what the students were trying to accomplish in the project…sometimes I had to be encouraged by the architecture team to disregard physical and financial constraints…I was also glad to have participated in the project if only to get a feel for what academia is really like. The project was my first insight into how high-level academic collaboration works, and it made me look forward to being in college myself." (email 11/21/09).

The focal students have had little direction in using digital tools in high school. They have depended on a mother, a grandfather or friends for direction. Zandi was critical of the school's adoption of technology—once she could see how it was

implemented at the university she attended, she could see how poorly it was taken-up in high school. She was also critical of other digital tools such as white boards when teachers used the technology only to duplicate material they had already provided with print. School has lagged with regard to their interests and, often their abilities. The students viewed new media as providing tools, tools they could use well, in fact, often better than most of their teachers—but they had little imagination for the use of virtual places for sharing a love of literature. Comfortable in online settings, and experienced with social media, they generally do not associate online activity with literature. Their involvement in the project highlighted the difference in understanding that can be captured by the metaphors or tool and portal. While they are adept at using digital tools, they did not as easily imagine their computers as portals to literary worlds. Discussing the project with them reveal limits in how they could conceptualize learning in these places. They had not encountered virtual worlds designed as settings for discovering the pleasures of a book.

As more research reveals the role and significance of social networking in the lives of young people, educators can draw from these digital literacies both to support academic outcomes and goals and to re-imagine them. Pempek et al. (2009) makes a critical point in their study of users of Facebook when they write,

> …adolescents and young adults are creating and disseminating material on social networking sites as using a one-to-many communication style, similar to the way television and radio have been used in the past but with the novel capacity for personal control and creation of the content being "broadcast." This unique communication style blends the interactive qualities of newer media with the observational ones of the past. Thus, social networking sites, like *Facebook*, allow a coming together of observational and interactive media, which may become even more pronounced as students create videos such as those found on *Youtube.com*.

It was clear from the final model of the virtual library that young people's interest in methods of social engagement afforded in social networking sites were, for them, essential components of design. They drew from literacy practices in online settings involving social networking and research in order to contribute to a library that would meet needs they experienced during their high school years.

Though it existed in a cosmic realm, "Mybrary" offered little in the way that would allow patrons to experience a work of fiction. Though imaginative, library replicated and linked worlds rather than generate them. Many literacy practices have changed since the 12th graders came of age. The decline in resources of public libraries and the rise in online shopping have changed how many children first encounter books. Schools too, by situating even recreational reading in a competitive context, change how children experience books. On track and college bound, the students in this study found little use for the kind of experience a virtual library might offer.

Chapter 5

The Fifth/Sixth Grade Findings

The Classroom Context

The collaboration between Mrs. Olestra's 5th/6th grade "Architecture/Structures" class and the university architecture team created a unique opportunity for the younger students to participate in and contribute to the design of a virtual environment. Playing the role of "clients," the 5th/6th graders enjoyed aspects of relationship, agency and power rarely offered students in school settings. The 5th/6th graders enacted the kind of role-play that students find exhilarating in virtual, immersive environments. Participation took the form of written responses, drawings, reported conversations and audiotaped responses.

Because distance would not allow close collaboration between Mrs. Olestra's class and the architecture team, I facilitated participation by designing lesson plans that would introduce the 5th/6th graders to the concept of virtual worlds for learning and invited them to share ideas that I would then transmit to the architecture team designing their library. As the team learned the software and began producing first, virtual books and then, virtual places, I was able to provide progress reports of the architects work to the 5th/6th graders. Once the team settled on the design of a "Vending Machine Library," they visited the class to explain their model and to elicit feedback and input from the students. Upon completion of the model, I presented a machinima made by the architecture team to the 5th/6th graders who critiqued the library.

Further investigation allowed me to contextualize the project, first, in relation to the school and second in relation to outside school activities from which students drew in contributing to the design process.

First Meeting

At my first meeting with the students, I began my presentation by talking with students about how virtual, immersive environments can be used for learning and showed them a video of the Virtual Smithsonian project, ("Cool 101 Virtual Smithsonian UC Berkeley" http://www.youtube.com) a highly imaginative place, which possesses a string of galleries that suggests the vertebrae of a prehistoric animal. The Air and Space Museum was represented in the "tail" of the structure; with a model of an Apollo rocket blasting through the roof of the gallery. Students were excited about the design and eager to contribute ideas to the university architects. Many of these younger students were active on the internet and enjoyed both learning and playful online activities. In response to the video, students produced design ideas that featured many of the applications, programs, games and books with which they were familiar. While in the first session, students drew inspiration from the Virtual Smithsonian, as the design process became

more dialectical with the architecture students, the 5th/6th graders began to contribute more original ideas and ideas from their experiences of technology.

I asked students tell me about their activities online and they generated lists that included: social networking programs that allowed them to email one another, games, research tools, tools for creating texts and artifacts, programs such as *Powerpoint*, *Garage Band* for creating music and *iTunes* for downloading music. Many students had older brothers and sisters who had introduced them to these activities. Some had learned particular programs such as typing and *Powerpoint* at school.

Clearly the high level of interest and the suggestions that were offered by the 5th/6th graders were influenced by their participation in virtual environments. Through an informal survey students claimed to have experience with both single player and multi-player games that included: *Horse Isle*, *Webkinz*, *WolfQuest* as well as games for more mature audiences such *Call of Duty: Modern Warfare*.

Given students familiarity with these worlds, it was no surprise that they found it easy to contribute suggestions for the design of the library. One student submitted two drawings. In the first he envisioned a "series of houses" accessible by means of stairways lined with books. When I suggested that his design reminded me of a drawing by the artist, Escher. He said, "I know!" The second drawing demonstrated a path from the houses, through triangular shaped portals that were labeled "book wing" to an "aquarium wing" and an "art wing." From there, one traveled to a "history wing." He had taken the idea from the virtual Smithsonian which had different wings for art, natural history and transportation.

Perhaps because students are familiar with the way information is organized in virtual environment, or because the teachers had used icons to represent key themes in social studies and literature, students developed symbols that would represent the books. One student drew a picture he labeled, "Harry Potter's Room (inside)." It included a mirror in which Harry sees his parents and on the glass was written the title of the book in which the event takes place, *Harry Potter and the Sorcerer's Stone*. Another book, *Prisoner of Azkaban* was inside a jail cell next to a figure labeled "Sirius." And a third book, in a square with a snake, was labeled "*Harry Potter and the Chamber of Secrets*." His idea was that by clicking on these icons, a reader could access the novels. In a second drawing, the student elaborated his ideas of a place called "Hagrid's Hut (inside)" that included Hagrid standing between a table and chairs and a fireplace. The drawing included a fireplace and Hagrid's dog, "Fang." Another student, also a fan of the Harry Potter series, drew the castle, Hogwarts.

One student drew only a rectangle labeled, "Library," with a door that said "Enter," but he wrote a clear description of what would happen inside: "It would be just like any library, but you would have a character and you walk around the library and click to zoom in. If you want to read a book, you click "check out." Then it opens the book. When you finish a page, you click, "next page." When you are done, click "return book." Another student submitted a spiral of squares that he called "book spiral" and explained that a teleporter would take patrons to from room to room. He wrote, "Each portal has a different genre of books."

One student drew a schematic diagram that included four steps. In "Step 1" was an image of a bookcase, with the arrow that represented a cursor poised over a particular book. "Step 2" was an open book depicting the cover of the book. In "Step 3" illustrated

the inside of the book and "Step 4" depicted a quiz with the question, "Who was the author?" and multiple-choice answers A., B., and C. listed below. At the top of the page she had written, "You could make a real library so when you click on a book you can read the whole book! Then after you finish it take a trivia challenge, than talk about it with friends that have a membership to the library."

Three students collaborated on a design about which they were very excited, though it seemed to have little to do with libraries. They wrote, "A flying mansion with an indoor pool in the roof, rollercoaster, horse back riding rink, ferris wheel, mini golf course, giant food court, books that you can go inside of, 12 TVs as big as a classroom, giant trampoline, bunji jumping, any animals you dreamt of running around, arcade, huge hot tub, big living room, water park, giant bathrooms, HUGE MALL." They wrote, "P.S. The virtual people have wings." On a second page, they drew square room with a triangular roof. They drew wings on the room. Inside, the room included a swimming pool, mini golf course, a roller coaster, flat screen tv with an image of "Spongebob," a bungee jump and a ferris wheel. They wrote, "P.S. We couldn't fit everything."

One student did not draw anything but submitted a written description. She wrote, "You could read books online and watch the movie if the books have them. Then there should be a game where there's a big library and you have to find certain books. Then you unlock a secret game. Then when you go through rooms, you go through a book spiral. Also there are themes for each book and room. So if it's a horror book, the room would be black and you would need a flashlight to get around the room."

Some students in class suggested imaginative figures and objects in which the library could be housed. These ideas included: a giant toaster, a cupcake and a creature that resembled a pot-bellied cat. No student expressed skepticism about the use of a virtual library, they all seemed to think that it could be viable and were excited at the prospect of advising the architecture students.

Focal Students: Darwin and Liesle

On my next visit, students continued to develop their ideas. Though I established no rules for participation in class activities, most students chose to work with partners or in small groups. As I toured the room, looking over students' shoulders, I came upon two students working together over one piece of paper. Their library existed on three levels. It included a very tall stack of books next to which was a box labeled "Brooms to fly to big stack of books." They included beanbag chairs, a leather couch and something labeled "bubble chairs." The lobby was lit by orange, green, red and blue lights. Doors labeled "Adventure" and "Romance" would lead a library patron to those genres. The design included two staircases, one of them labeled "swirly stairs." In a second drawing, the space included "hangy chairs" and more doors labeled "mystery," "nonfiction" and "realistic fiction." I sat down with them spoke with them while they worked.

I asked Darwin what books he would want to include in his virtual library. He said,

> The *Harry Potter* (Rowling) series. Why I like the series is, I like it because they're really magical and cool. I also like it because J.K. Rowling. The author

> did a perfect job using the words to describe things so you can visualize what's actually happening. Plus you can tell what the people look like from the movies, too. These books are so good that I read them all 5 times and I can recommend them to anyone because they're really awesome.

I also have one of the *Warriors* (Hunter) books in my backpack... This is the second one out of all of them, I started reading them not too long ago. It's called Fire and Ice. These books are about cats, there's four clans where they have to fight for survival and every full moon they come together at a spot they call "Four Trees"…there's clans called Thunder Clan, Shadow Clan, River Clan and Wind Clan. In the first one, Shadow Clan chased away Wind Clan, because their leader was evil-ish and killed his own father to become leader.

I asked him if he were to enter the world of *Warriors*, whose persona would he assume. He said,

> I would be Fire Heart or Blue Star. Blue Star is the leader of Thunder Clan. This book sort of bases around Thunder Clan mostly. It talks about the other ones, but it's in the Thunder Clan pretty much. He pointed to a picture of a cat, "He's Fire Heart. He's orange and Grey Stripe is grey. They call cats that were, that used to be owned by people, they call them "kittypets," and Fire Heart used to be a kittypet. And he fought Brave Star one time and now they're best friends. And so then their leader—they all have weird names. They train to become warriors—which is why it's called Warriors. All the leaders names end in "Star." And all the apprentices learning to be warriors end in "Paw," and then there are seven different things to end in when you become a warrior.

I responded by saying that it seemed to require the ability to categorize and Darwin turned to a section of the book that listed the names of the cats. He told me,

> In here, in every book, it has the names of the cats. It says "Thunder Clan and has the leader, deputy, medicine cat—which is the doctor, and then the warriors, and then there's apprentices and there's queens—which are girl cats that are expecting to have or are nursing babies—which are "kits" or kids, and there's also "elders" which are former warriors or queens that are retired.

Darwin proceeded to go into an elaborate description of the plot while Lindsay worked. He encouraged me to visit the website and told me that he had written his own *Warrior* novel. Once Darwin had finished, I asked her to tell me what book she would include in the library. She said,

> I would make a room based on these books too (gesturing to the *Warriors* book), but I think if you could read the books, or you find the books in the rooms, you should also be able to pick them up, and put them in something like a backpack or something or a bag. And then you could walk into this really big room that had

> bean bags and stuff and it's really cool and has purple lights and everything and you could just read your book.

I asked Liesle what other books she would want to include in the library and she took a book out of a backpack and said,

> It's the *Eleven*, *Twelve* and *Thirteen* (Myracle) series. This is a girl that faces challenges that girls around those ages, like 11, 12 and 13, face and I think I can really relate to her because, you know, I'm almost 11 and some of the things that she goes through are like some of the things that I go through, too. I said it I could go inside any book, it would be one of these books because she just seems like a really cool character and when I finished the last book, I was really sad, cause it was over and it was no more, and she still hasn't written any more. So I just hope the author keeps writing more.

Liesle noticed that Darwin was working on drawing the lobby and she stopped talking to tell him, "I want to help with the lobby." I asked her if she could include a setting from the novels as a place in the virtual libraries, she said, that she would want to include a den from the house where the main character lives. She began a detailed description of the character's family, but her attention was drawn back to the library. She and Darwin began to discuss the design:

Darwin: I think that you could do rooms to fly up to stacks of rooms…There would be brooms you could use to use to fly up to certain rooms. There would be leather couch and big lights…Icons—romance." He began drawing and said, "In this area I could draw a little ghost.

Liesle: No, you'd just have seats and cool lights and where you could read the books that you collected on the way.

Darwin: No, I'm just saying there should be all the different *genres*.

Liesle: Oh, right.

Darwin: And I'll try to make these all the same size (pointing to the icons that represented genres).

Liesle: Yeah and like there could be stairs coming right here. And there's three storeys. Here's the lower part and here is the stairs.

Darwin: There could be a ladder, that'd be cool.

Liesle: No, stairs.

Darwin: Okay.

Darwin: Over here could be a check out desk.

The two continued to sketch and discuss their ideas. They seemed more comfortable sharing the same space and collaborating in the process of design. Neither took the role of teaching the other, rather they seemed to continually test each other with ideas and back off if the other expressed firm resistance. While they were working, a classmate left his work and leaned over their drawing. He asked them to explain its features. When he turned back to his own work, Liesle began discussing the option of having music in the library. Darwin said that it "wouldn't be very library-like," but Liesle suggested that the music could be jazz. She began quietly scatting a piece of music familiar to Darwin and he joined in. He said, "Now it's stuck in my head," and laughed. Mrs. Olestra rang the bell signaling the end of class and the beginning of lunch. I shifted my attention to collecting the work of other students. Darwin and Liesle must have continued to discuss the possibility of music, because after a few minutes they came to me with a CD. They said that Mrs. Olestra used the music when students were participating in silent reading and they wanted to know if the architects could use it in building the virtual library.

Whether it was because of my attention or their genuine interest, over the course of the months during which the library was constructed, they continued to express keen interest in articulating a vision of the virtual library.

Books for the Library

When I next visited the class, I presented slides of initial assignments that the architecture students had completed: virtual books and the beginnings of designed places. I asked the students to elaborate on a particular book that they would like to see included in the library. Each student offered a brief written description of the plot of the book, a drawing of an important scene and a reason "why someone should read the book." Students responded with titles that extended the list the sixth graders had provided. In addition to the *Warrior* series, there were other books from series that students insisted must be part of the collection: the *Series of Unfortunate Events* (Snicket) collection which includes thirteen volumes and a novel called *The Ruins of Gorlan* (Flanagan) part of a *The Ranger's Apprentice* series of nine books as well as *Percy Jackson and the Olympians*, the first in a series of three books. There were humorous book, by Dr. Seuss and comics including *Calvin and Hobbes* (Watterson) and *Diary of a Whimpy Kid* (Kinney) and *Geronimo Stilton* (Dami). Two students wanted Newberry award winner E.B. White's classic *The Trumpet of the Swan* and another wanted to include the Newbery Medal winner, *Hoot* (Hiaasen).

The range of books was surprising. While some students selected books by the same author, all but two students suggested an original idea. Asked to write why they wanted the library to include their chosen book, students wrote persuasive statements. Of the *Percy Jackson* series, a student wrote, "It is suspenseful, and it is a roller coaster of ups and downs in the main character's life." Arguing for a book titled *The King in the Window* (Gopnik) a student wrote, "It has a very complex plot and plenty of intriguing riddles that will keep readers wired." Others argued more simply that the book they chose was "really funny," "great for everyone," or "it's by E.B. White."

Completing the Model

Once the architecture team designing the 5th/6th grade library had devised a working model, they came to the class and made a presentation. They drew the model of a vending machine on butcher paper and explained their ideas. They invited the 5th/6th graders to develop the design. The students were very excited by their presentation and busily got to work drawing ideas that contextualized the library and explained how it would be accessed. The created drawing that explained how they imagined a reader would experience the inside of the library. Some students sketched ideas for a playground environment that would allow the reader to access the machine by means of a giant slide. Another group can up with a suggestion for making selections of books, or elements of books through an ipod inside the machine. Many of students stayed after the lunch bell had rung; they wanted to talk to the architects and finish their designs.

Within a few weeks of the session with the architects, the model was complete. Because the students were unable to travel to the university, I presented machinimas (films made inside of virtual worlds) of the final projects that had been recorded on dvds. I also brought posters that had advertised the presentations. Students were very excited to see their class named on a poster. At the screening of the three libraries, they shouted out when they identified a feature that they had suggested.

The 5th/6th grade Vending Machine Library was red and of vintage stock as though it might have been shaken loose in the wreckage of planet earth and found a haven on a swath of cosmic netting. A patron would enter, it was not clear how, the "brains" of the machine where cogs and wheels spun cables overhead. One could ask a librarian for advice, though she seemed not attached to any particular station. Descending a flight of yellow, spiral stairs, a visitor would find himself on the "horror" genre level. Flying candelabras and spooky statues—grimly carved pumpkins, graves and a giant statue of Frankenstein all contributed to the mood. In another section of the machine, one could select, using an ipod, a book, or the ingredients for a book. The book would be mixed in a bottle and then the library patron could climb in. Magically she would be transported to the world of the book.

Though, of course, not every idea suggested by the students made its way into the final model, the students were impressed. I asked students for brief critiques and one student wrote, "I think it's all perfect. I think it's awesome." Though they saw films of all three models, many wrote that they liked the 5th/6th grade model best. One student felt that the library could have been "more centered around the books themselves." Time and the steep learning curve had allowed for the design of only one novel's environment—the world of *Goose Girl* (Hale). One student wrote of the library, "I thought it mixed many ideas. It was creative and I thought the whole idea of the vending machine was very clever. Some of the worlds were abstract and strange, but it was cool how we could create our own list of books on an ipod."

In the School Context

As the process of designing the virtual libraries unfolded, I began to consider the particular attributes of the school that made it a place receptive to the kind of flexible and

imaginative work the project demanded. Programs that encouraged construction and play had found homes in much touted after school settings such at MIT's Computer Clubhouse (Resnick, Rusk & Cook, 1998) and UC Berkeley's Digital Underground Story Telling (Hull & Nelson, 2005). But it was rare to find an elementary school that 1.) that offered an elective in architecture and 2.) that was so welcoming of such an unusual project. Interviews with three of the school's four core teachers, provided insights regarding changed views of literacy learning that were reflected in the dispositions of the teachers and in the curriculum offered to the students. In their own quiet ways, the three teachers were working hard to create an environment where new forms of technology was as natural as pen and paper, a paintbrush, or calculator for discovering and expressing meaning.

Founder and Language Arts Teacher: Mrs. Wilbert

Mrs. Wilbert, a tall woman with tousled honey-colored hair, a wide smile and a penchant for wearing eclectic accessories had taught elementary school for over a dozen years when she'd finally had enough. She recalls the faculty meeting that became a turning point in her career. She said,

> They kept talking about having fidelity to the program and how it was so essential that everybody have the same posters up on the wall—that no kid ever looked at (they were like wallpaper.) And they even kind of wanted your desk to be a certain way and the lessons to all be so that if you were in a third grade class it didn't matter which one you were in, you were still going to get the same thing. And you know, I understand that, but that wasn't why I went into teaching…they sat us down and said, "Your job is to *conduct* and not *compose*, and I thought, 'Oh, you should have not said that to me.'

She took what had once been only "a sweet little idea" and founded the Advanced Charter School, in 2004, for 5th and 6th graders. She began with one class of thirty to whom she taught language arts and social studies and shared her students with her husband, a math and science teacher. In the six years of operation, the school's population has grown to over one hundred and twenty students, and there is a waiting list. Housed in a small portable building divided into two classrooms, the school shares additional facilities including two classrooms, a small, well designed theater space, a gymnasium and library with a public junior high that enrolls over one thousand students. Because the two schools have different bell schedules, not all facilities of the junior high, except the classrooms, are consistently available for use by the charter school.

Like all public schools in the county, enrollment is prioritized by the proximity of students' residences to the school. The neighborhood in which the school is situated, however, ensures that most students will be white and middle class. There are apartment complexes and lower-income homes in the neighborhood, but as many people still do not understand that charter schools are public schools, not all socio-economic levels of the school's neighborhood are equally represented.

Mrs. Wilbert was strategic in marketing her school. Both the name and the description of the school's programs have attracted parents looking for a "Gifted and

Talented Education" (GATE) curricular model that has been available in California public schools since the mid- 1970's. According to the California Department of Education (http://www.cde.ca.gov) students may qualify for special programs through designation of GATE status. "Categories for identification may include one or more of the following: intellectual, creative, specific academic, or leadership ability; high achievement, performing and visual arts talent; or any other criterion that meets the standards set forth by the State Board of Education (SBE)." Furthermore, students designated "gifted and talented" can be "high achieving or underachieving" which means that they can qualify for special programs if they test high, but do not appear to be achieving their potentials. Parents of such students gain support and lobbying power from schools that welcome, rather than stigmatize, their children. Differentiated instruction is a critical component of teaching students designated "gifted." In this age of intense academic competition, many parents of children not designated as gifted, would prefer to have their children taught in the company of those who are. Especially in programs like the Advanced Charter that aim to recognize and nurture the uniqueness of every child.

While Mrs. Wilbert understands how a brilliant child who struggles with autism would require a teacher to draw on different methods and strategies than those necessary in teaching a child without those particular characteristics, she believes that all children need to be taught with sensitivity to their particular conditions. She told a story to illuminate this point:

> I had a third grader once. We were studying Sonoma County History and she was not interested in history whatsoever and it was this really tragic thing where she came from a really dysfunctional family and her mother was giving her up for adoption, cause she really didn't want to deal with her anymore, and I said, "You know, there's this thing called the orphan train, and there were these kids whose parents gave them up because they couldn't take care of them and maybe you would want to investigate that." And she took to that like a duck to water. She read all the stuff I had on the orphan train and interviews with the people later on, and it was this entry point for her where she was able to do the Sonoma County History Project that everybody was doing, but her perspective was on these kids that had been abandoned.

In formulating her personal philosophy, Mrs. Wilbert has drawn from brain research on hemispheric dominance to conceptualize learning. In a review of the research on hemispheric laterality Szirony et al. (2008) list differences between what is commonly referred to as the "left brain" and "right brain." They write, "More specific to language and to learning, the left hemisphere in most people is better at handling syntax and meaning, more literal translation, and in reading and processing. The right hemisphere is more contextual, perceiving drawing and art, manipulating shapes, and recognizing faces, for example" (p. 171). Mrs. Wilbert observes that many teachers seem to be left brain learners. She says, "They tend to do more of the 'dot the "i" and cross the "t" kind of process and product with the kids."

She believes that recognition of hemispheric dominance in students is helpful in suggesting styles that could direct teachers to entry points for learning. Familiar with Gardner's (1983) theory of multiple intelligences, Mrs. Wilbert is more influenced by

Sternberg's (1985) notion of the "triarchic intelligence" that is articulated in a model that includes creative, practical and analytical modalities. While contemporary research in education seems to favor more socio-cultural than neurological theories, and indeed, more recent studies aim to refute what one research refers to as "neuromythologies" (Geake, 2008) in favor of models describe the lateral nature of brain functions, notions of both learning styles and modalities seem to have found a home in most progressive education. Common to each of these theoretical strands is the idea that students both learn and express knowledge in multiple ways, and that it is the responsibility of educators to identify, develop and expand students' preferences and repertoires. In talking specifically about the use of technology, Mrs. Wilbert says,

> I always try for there to be lots of opportunities for kids to be able to demonstrate knowledge based on what learning modality they have—so it could be technology, which of course opens up to a huge array of different choices right there. Of course, the kids know more about it than I do, but I just feel that I kind of stand around with a light and say, 'Okay, here's a door. You could go here, or you could go here.'

A love of the experimental and the playful nature of learning inform the curriculum of the Advanced Charter School. But Mrs. Wilbert also discussed key themes, reinforced through visual icons, that guide critical inquiry. She spoke too of alternating between deductive and inductive methods, specifically in regard to teaching literature.

And it seems that Mrs. Wilbert takes the same approach with teachers as she does with the students; in crafting electives and extra curricular activities, she encourages teachers to draw on their strengths in order to create curriculum they will be excited to teach. Mrs. Walker, a former professional in the field of technology, offers a Media/Technology elective that introduces students to, among other things, "animation software, programming languages, presentation software, and digital cameras." Mr. Wilbert teaches a "Math/ Science Enrichment" that has included such topics as "aeronautics, model rocketry, instrument construction, chemistry, electronics and optics." He also offers a popular Lego robotics program through which sixty students compete in teams at the county level. Wandering into his classroom, one is like to have the sense that she has stumbled upon *Mr. Magorium's Wonder Emporium*, a magical workshop, rather than a traditional classroom. Depending upon the topic under study, one will find students building rockets, or huge roller coasters of Styrofoam and pvc pipe, and Mr. Wilbert, alternating between setting off explosions and facilitating a contest to see how much weigh students' hot air balloons would carry.

Architecture/Structures Teacher: Mrs. Olestra

The virtual libraries project found a home in Mrs. Olestra's elective whose title had changed from "Architecture" to "Structures" and now was a combination of each. The class met two days a week for eighty minutes per session. Mrs. Olestra explained the source of her ideas about the class:

> The "Structures" class started as, my first year, they said… 'You get to teach an elective, what would you like to do?' So I was trying to think of things we don't do—where could I build something up. I had a personal interest in architecture because I lived with a family in England that were architects and they took me all over Europe…Anyway so, I thought, 'how can I bring that to kids?' So, of course, I'm making up my own curriculum for this elective two days a week.
>
> It started off as architecture and then the next year, I really focused on that, in as much as I knew, classical kind of way, but then [the Wilberts] said, what if it were more, "Structures" where you built things, that kids could use in projects, and sort of see their own work in different ways. So I thought, that's great too, and that brought in paper engineering and books and that kind of thing, so that's good too. So this year's kind of been a hybrid of both of those things…"

Though neither Mrs. Olestra or any other teacher at the charter school spoke about their work in relation to a constructionist approach to learning developed by Papert (1993) or the idea of "epistemological pluralism" that Papert developed with Turkle (1992), it was clear that much of their work could have been described this way. As Resnick (1998) observes,

> Constructionism is based on two types of "construction." First, it asserts that learning is an active process, in which people actively construct knowledge from their experience of the world. People don't get ideas, they make them. (This idea is based on the constructivist theories of Jean Piaget.) To this, constructionism adds the idea that people construct new knowledge with particular effectiveness when they are engaged in personally meaningful products. They might be constructing sand castles, LEGO machines, or computer programs. What's important is that they are actively engaged in creating something that is meaningful to themselves or to others around them" (p.6).

Children at the charter, while schooled in the conventional literacies, were also given many opportunities to make things—models, stories, displays, pieces of art, collections of poetry, jewelry, food. A mathematics unit focusing on business involved students creating products and selling them at a small, schoolyard fair. Mrs. Walker's "Media Tech" elective provided students with the opportunity to create a variety of media artifacts including animation and claymation films. Teachers assigned tri-fold board displays and PowerPoints with the intention of instructing students in the skills of organizing and demonstrating their knowledge. Sometimes teachers used the creation of objects and products to be used in competition, as they were in Lego robotics.

In the case of the "Structures/Architecture" elective, Mrs. Olestra talked about making a conscious decision not to have the students build structures competitively; she wanted her elective to foster creativity and joy. She said,

> The first year I did it, I had so many kids who had never built anything. That surprised me. When my kids were bored and little, you know, I'd say, here's a stack of newpapers what can you do with them. Or it was cheap thrills for a box

> of popsicle sticks, but there were some kids who really had not had that. And I think that it might be something that's undervalued in terms of putting things together. And I think it's valuable and so it's kind of what we do. And it's kind of exciting to see a kid who's ten or eleven and just having a good old time with a bottle of glue and some paper and just seeing what, you know, and I try to make it so that they're learning. Someone wanted to learn how to make a cone out of paper and so I said, "What do you think you do?" instead of telling him.

While she had only three desktop computers in her classroom, Mrs. Olestra looked forward to next year when she would receive sixteen laptop computers. Though she was far from an expert user, she was not averse to using technology to prompt student creativity. Contemporary research often depicts teachers, especially those who graduated from college before the wave of new media began to influence schools of education as being fearful or skeptical of technology, but this was not the case with Mrs. Olestra. Using her laptop and a projector, she introduced students to an online program called, "Architect Studio 3D from the Frank Lloyd Wright Preservation Trust" (http://www.architectstudio3d.org). While students were not able to access the program in class, she walked them through it, using her computer and projector, in order to demonstrate,

> … that architects have somebody in mind that they build for. And so the first part of that is that you get a client and then you have to choose this client and you look at his needs and then, from there, you say, this is what I'm going to build for that person so, I was trying to emphasize that these things were not just random, somebody doesn't just say, "Hey, I'm going to build a really big building."

The program positions each player as an architect who is working for a particular client. Choices and preferences that the clients express contribute to the design options available to architect. The website was useful in having students conceptualize their role in the virtual libraries project. They understood that they would be acting as clients for the university architects who were very interested in their particular needs.

During each of the "Structures/Architecture" classes, Mrs. Olestra became a quiet mentor to the students. She never asked to preview my lesson plans, but trusted that as I was an experienced teacher, and the students were highly engaged, she could turn the class over to me. She moved quietly about the room, gently encouraging students and re-directing those who became boisterous or wandered off track. She tolerated a high level of noise as long as students were engrossed in drawing, writing or discussing their designs. At the end of class, she drew students' attention by ringing a pleasant sounding bell. In five visits to the school, I never once heard her raise her voice or express annoyance, though there were sometimes as many as thirty-two students in the classroom.

Once, when a student was being disruptive by shouting out responses, she gently reminded him to raise his hand. When he continued to disrupt, she took him aside and sent him to study hall. As the class was an elective, there was no requirement of attendance nor were grades given; students who either chose not to take an elective, or who could not maintain focus in the elective they had decided to take, attended study hall instead. As far as I could tell, there was no stigma attached to study hall and when

students needed to complete an assignment for a core class or to work on a project with classmates, they arranged with their elective teacher to attend study hall instead of class. As "Structures/Architecture" was interesting and fun, most students chose to attend every session.

Media Tech Teacher: Mrs. Walker

Mrs. Walker who taught the Media Tech class observed the final presentation. She was delighted with the project and could imagine how technology might advance to make available the features the students and architects included in the design. She said,

> Google is, right now, a lot of words and a lot of text and a lot of links to a lot of places…There is some video and photo ways of getting information, but it's still a heavy text-laden experience. Yet, it is very close to what you're describing in terms of a virtual library. So what I hear you looking for is that more visual spatial navigation metaphor and there are some search tools that you've probably seen that do that do that more visual, spatial interface… where you see related topics mapped out and how close they are in terms of relevance or relationship…It's as though you are looking for that more visual spatial way of experiencing all that material that's out there.

Mrs. Walker had begun her career in technology in the early 1980's. She spoke about her experience:

> I worked on one of the first web servers ever produced for personal computers. And then I worked on one of the first forum software packages that was designed really for nonprofit and educational sorts of applications. So it was supposed to be really easy for anyone to use. And I remember all kinds of problems with trying to do that kind of work with education. And it was all around privacy, and access, and security and confidentiality and having to monitor everything before it was posted. It was so labor intensive for the teachers that I kind of abandoned that and went with the project approach more because it put the responsibility for producing stuff back on the kids and instead of me having to worry about was I going to walk into a landmine, because of something that I put on the internet, or something that the students put on the internet. I wish it was simple, in our society, to do more like that, because there's so much value in it. But I didn't find that it was possible in a public school setting. It's really sad.

Mrs. Walker's frustration with the barriers to expanded use of technology in educational settings did not inhibit her enthusiasm for what she was able to do in the charter school. She looked forward to the purchase of sixteen additional laptops that would mean that an entire class set would be available to share between the school's four teachers. In her elective, she was impressed with the skill and imagination students were bringing to their current project, claymation films of simple literary texts.

While Mrs. Walker did not tie her ideas about education and the possibilities of enhancing learning through technology, to any particular pedagogic theory, her work

resonated with the ideas of Eliot Eisner (2002) who suggests a vision of education in which educators imagined that their aim was "the preparation of artists." By "artists" he means not only visual and performing artists, but individuals who have developed the ideas, the sensibilities, the skills, and the imagination to create work that is "well proportioned, skillfully executed, and imaginative, regardless of the domain in which an individual works." He writes,

> It seems to me that the computer has a particularly promising role to play in providing students with opportunities to learn how to think in new ways. Assuming the programs can be developed, and it is my impression that many already have, operations are performable on the computer that cannot be executed through any other medium. New possibilities for matters of representation can stimulate our imaginative capacities and can generate forms of experience that would otherwise not exist. Indeed, the history of art itself is, in large measure, a history studded with the effects of new technologies (www.infed.org).

The openness of teachers at Advanced Charter to learning through methods that encouraged creative as well as critical thinking, indicated their commitment to the sharp detour they had taken from more traditional schools where scripted a curriculum tries to ensures that teachers are in lock-step.

The Favorite Book Project

The wide range of books and the excitement with which the students discussed them, incited my curiosity about the availability of young adult novels at the school. At the same time that the students were beginning to develop ideas about the virtual library, the 6th graders in the Architecture/ Structures class happened to be making presentations to their classmates in Mrs. Wilbert's class about their favorite books. I discovered that she had an extraordinary library of young adult fiction, mostly paperbacks, some with multiple copies, tightly squeezed into the drawers of a large wall unit. Describing her library, she said,

> I started teaching in 1984 so that's a pretty long time, so when my own kids were cleaning out their shelves, I got to take a lot of their books. And so, what, six years now, at the charter school and with everybody's generosity, and because we don't buy expensive textbooks, we get to use taxpayer money to buy novels. So, I can, you know, go to the bookstore all the time to buy books. So between what I've brought and what I've gotten since, I've been able to make a pretty phenomenal library.

Mrs.Wilbert allowed students time, every day, for reading. Her library included multiple copies of some books for children who liked to read with friends. Mrs. Wilbert expected students to read quietly, but was not averse to their whispering. "On Fridays," one student reported, "we're allowed to read comic books!" When I interviewed 6th graders on the playground during lunch, they were so excited to talk about their books that they lined up to have their responses recorded. Favorite books included magical tales *Inkheart*

and *Inkspell* (Funke), realistic fiction about adolescents facing contemporary problems, the vampire series, *Twilight* (Meyer). In describing their favorites, boys included the latest adventure series, such as *Percy Jackson and the Olympians* (Riordan). A few students included titles of historical fiction. Striking was the range of titles. There has been an explosion in adolescent literature since the success of *Harry Potter* (Rowling). Many of the books are produced as a series. Many students seemed compelled to tell me either how many of a particular series they had read, or the number of times they had read a beloved book.

Mrs. Wilbert agreed to let a few students come outside during class and talk further about the books that they had chosen for the project. Several students had constructed visual models for their presentations. Sophia created a stage-like setting that depicted a dining room with a chandelier and cut out characters from the book *The Tale of Desperaux* (DiCamillo). Sophia described the plot of the book and then, speaking about how the world of the book could be created in a virtual environment, she said, "It would be really cool if the setting were "a giant bowl of soup with a spoon because the whole story is some soup, a spoon, some thread and then him and the princess. You could jump in and swim to find the books."

Helene had read the novel, *Goose Girl* (Hale) and she thought it would be interesting to experience the natural settings where the protagonist encountered the animals she tended. In an immersive world one could actually see the magical words that floated on the wind and were heard by the girl. She also hoped that another setting could be included: "the room, by the lake where a lot of the action happens, I think that would be awesome too…It's sort of a throne room…I love that book, I read it eleven times."

Students who were enthusiastic about the *Warrior* (Hunter) series echoed Darwin's fascination with the world they inhabited. One girl said, "I would like to go with Thunder Clan and live with Thunder Clan. I would like to live in the place they move to—by a lake, more than live in forest." Another student reported that she and her friends often played games that included the lore of the book. She encouraged me to visit "the official website" and said, "The author is three people. You read it so well you lose track of time and sometimes you just imagine a camp where there are lots of trees."

Outside School Activities: *Warriors* and *Webkinz*

Warriors

It was clear from student responses that the 5th/6th graders were drawing from non-school experiences of virtual environments. The number of students who expressed enthusiasm for the *Warrior* series persuaded me that exploration of the site would be useful in understanding the context of their literacy practices. Students had also provided me with the names of a number of multi-user virtual environments (MUVEs) in which they played that included *Webkinz*, *Horse Isle*, *Pony Island* and *Wolf Quest*. When the parents of a student invited me to observe him playing *Webkinz* with a friend, I took advantage of the chance to learn how the game world influenced students' ideas about the virtual library. In both website and in MUVEs, literacy practices differ from traditional ones.

Investigating the *Warriors* series, I discovered that it is a collection of twenty-nine books, including a manga comic series, a couple of "guide books" and a few "super collections" written by three women, Victoria Holmes, Cherith Baldry and Kate Cary under the pseudonym "Erin Hunter." Students who told me of the site seemed to find nothing unusual in the collaboration. Two students, in fact, told me that they were collaborating in writing a book about a girl with magic powers. An action packed series, *Warriors* chronicle the adventures of six warring clans of cats. The "official website" offers a variety of activities of the kind one might easily imagine teachers using in a literature class including:

- Warriorcats Community Forum: Where fans can introduce themselves, post opinions, create polls to which other fans can respond, ask questions of Erin Hunter, propose "an idea for a new forum topic" check for important announcements such as information about a new book or about an actual event such as a reading, book signing or celebration of the books.

- Interactive Maps: provide gain access to information about events that occur in particular settings.

- Quizzes: allows a reader to take quizzes to determine their own cats' warrior names and clans as well as send an email to a friend and invite them to do the same.

- Genealogical Charts: organize the cats using family trees and profile pages.

- Videos: highlight one of the writers discussing her favorite books, in response to questions young readers might ask. In another video an artist demonstrates how he draws the casts for the Manga version of the *Warrior* series.

- Adventure Games: position the player as a cat in a variety of challenging and dangerous quests. One game is represented as a board game where players click an icon to "roll the dice" and gather "vital items" as they find their way to a designated location. While this particular game is single player, the instructions indicate that "the computer also gets a turn to keep things active in the forest."

- Challenge Questions: provided opportunities to that test fans knowledge and award prizes.

- Off-topic Discussions: Participants are invited to post anything they like.

While the games were very limited and involved considerably more "clicking" than thinking, the site, taken as a whole, offered readers both range and depth in methods to responding to the texts. Through the forum and discussion features readers could participate in conversation with fans in other parts of the world. They could distinguish themselves as experts through the contests and challenges. They could offer suggestions for narratives they would like to see written. Readers enjoyed a degree of interactivity

with the texts and with fellow readers that supported a sense of community one could not have known twenty years ago. Features of this website appeared in many design suggestions offered by the students. It was clear that they were drawing from their experience of the Warriors webpage in imagining their virtual library.

Webkinz

On a warm, spring Sunday, Serafina and her parents visited the home of friends whose son, Will, introduced Serafina to *Webkinz*, an online video game. The two children had lived next door to one another in a small city, in Northern California, for the first year and a half of their lives. At about the same time, both families moved, one to the north the other to the east. The families have remained friends for over a decade despite the fact that each family now lives a couple hours drive apart. Will is an only child born when his parents were in their late 30's. Serafina' mother was 37 and her father was 50 when she was born. Serafina's father has a daughter from a previous marriage, but she is eighteen years older than Serafina, and had moved out of state to attend college and law school the year Serafina was born. Both children are voracious readers. Much of thelives are scheduled with organized activities and sports.

The Katz family lives in a wealthy suburb of San Francisco in a residential neighborhood that is less than fifteen years old. From their house on a hill one cannot help but notice the incredible suburban sprawl of nearly identical homes stretching out, gird-like over the distant hills. The houses are uniformly large, stucco and painted earthy shades of tan and pale yellows and built very close together. Large garage doors are prominent features on the front of all the homes. Electronic doors made it possible for residents to drive into their garages and access their homes without ever leaving their cars. All the homes have small "postage stamp" front gardens the shrubs and plants that are regularly tended by gardeners assigned by the community foundation to maintain consistency of design and upkeep. Backyards are enclosed by fences. No people were observed on the street either at the time of arrival or departure of Serafina's family's visit.

Ironically, though the houses are close together, certain carefully designed features tend to work against the development of social ties between neighbors. No one needs to garden in their front yards as it is done for them. The bulk of yard space is shielded from view. The price of the homes suggests that anyone needing work done on his/her car would have the financial resources to pay for it—in other words, one would not be likely to see neighbors working on their cars in their driveways. And finally, the construction of garages is such that one need never see his or her neighbors coming or leaving the house.

The children allowed me to observe them as they convened in the family's computer room to play *Webkinz* online. As Druin (2008) observes, "*Webkinz* is a "convergent toy" in that children enter the online setting "via a password that is provided through the purchase of a stuffed animal." (42). Each of the children had several of the toys and was planning to collect others. The computer room where they played was outfitted with the latest technology. Will's father works for a major technological firm and on the main desk sat his state of the art computer. On the small table, next to the desk was an unused laptop and while Serafina worked at the large, desktop computer, Will worked at a third laptop that he placed on the corner of the desk.

Will had given Serafina a new *Webkinz* stuffed animal as a present and she logged-on with the intention of registering it in the virtual environment. Each stuffed animal came with a code number (on a tag around its neck) that when entered would activate a virtual version of the animal. After logging on, Serafina was presented with a "shopping coupon" which she could use to by furniture and accessories to decorate her new pet's room. The screen displayed a large duck at a desk with the title "Adoption Center" printed on a card facing the viewer. The duck spoke, inviting Serafina to "tell us about your pet." A clipboard appeared with a form "Starting the Adoption Process." The stuffed animal was a beagle, and Serafina discussed calling it "Bagel" but then decided that the name was too masculine and so she settled on the name "Sesame." After typing the "secret code" the duck announced, "The adoption is complete" and biographical information about Sesame appeared on the screen. Virtual balloons floated from the bottom to the top of the screen. The game has subtle ways of requiring that participants log-on with some frequency. If a participant neglects to feed his pets they can become "ill" and need to be taken to the doctor. The doctor charges for services and for medicine—costing the player a loss of revenue. Serafina told me of friends who make their parents go online and care for their pets when they are not at home.

The "characters" who appear in the game are all animals, ducks, dogs, alligators, and all have adult voices. Interestingly, they speak with accents-- "Dr. Quack" has a Scottish accent and the proprietor of the Curio Shop has what sounds like a Texas accent. Sounds that help give a setting context tend to emanate sporadically. One might hear the sound of a car revving up while one is "inside" a shop or the sweep of a broom when the janitor is cleaning the classroom.

In *Webkinz*, two participants can "go shopping" by looking at the same screen—even if they are in remote households. Their pets can visit one another in private rooms. They can send one another messages and gifts. Though Will and Serafina sat side by side, none of their "pets" interacted together on the screen. They conducted their own housekeeping, checking on their pets in various rooms and shopping. Will revealed that he collected items whose values were high. He said, "I've got two rooms with all exclusive items." He looked over Serafina's shoulder to see what she was doing. On her screen was a display, similar to the kind of catalogue, a cartoonish display of what one might find in an L.L.Bean or JC Penny catalogue. Will advised her, "Get the carnival (bed) it's the first exclusive bed." Then they told each other what styles beds each of them had bought for their various pets. Will claimed that he needed to purchase a new room "cause it's getting really crowded" in the rooms he already had. He said that he owned a wishing well and a Christmas tree. Serafina asked him how he got these items and he replied, "You have to be at the Curio shop at just the right moment."

The two children played cooperatively together for just under an hour, during which time they tended to instruct each other in the ways of the game. While Serafina was "previewing" particular items, Will attempted to send her an online message. He asked her how to spell her name and began spelling it out loud. She told him, "It doesn't matter" and he replied, "Yes it does." He told her, "In a second, you'll get a message" and she replied, not unkindly, "Yes, I know I've done this before." While Serafina was decorating a room into which she put her new pet, Will told her, "You can only feed them when you've in the room," to which Serafina replied, "Yeah, I know." Will went on to explain the difference in the quality of items. He said that "rare" items were sold at the

Curio shop, but that "exclusive" items were sometimes given to you along with money, food and tokens. Both children, each on a separate screen, then went to the Curio shop where Serafina encouraged Will to purchase a coffee table. He hesitated saying that he had never spent more than $5000.00 on any one item. He said that one of the first "theme rooms" was Egyptian and that it was considered rare and that the items in it cost a lot. He encouraged Serafina to collect rare items. At that point she sent him the gift of a race car and a welcome balloon. He decided to purchase the coffee table.

In this particular environment, participants cannot openly contact one another except through scripted dialogue. Serafina's pets might have visited Will's in the rooms he had created for them, but the two children chose to tend their own households separately while communicating with each other both verbally and through messaging. One way that online games for younger children address these dangers is to limit the social interaction between participants to scripted dialogue. Meyers (2009) conducted an overview of the shared features of seven shared virtual environments (SVEs) for children that included *Club Penguin* and *Webkinz*. He explains,

> While sociability is a key part of the allure of these worlds, activity is balanced by concerns for safety and anonymity for all users. Moderated chat with parental controls is another common feature of preteen SVEs. Parents have the option to permit open, moderated chat for their children, or "safe" chat, which limits the user to preselected words and phrases, such as "Hi!" or "Want to be friends?" Children are discouraged (or disallowed in some SVEs) from providing any personal information during chat with other participants. General rules of politeness and speech are enforced by adult moderators, who may be either volunteers or employees. Violators are given warnings, or banned from the site for flagrant and persistent bad behavior (p. 229).

Of course children in virtual environments, as they do in actual environments, find ways around rules. They log-in to games and worlds without their parents' permission and find ways of enacting false identities. Serafina admitted to testing what one could say with the game's scripted dialogue. She and a friend typed in "bad words" to see whether or not they would be blocked by filters. She told of friends who had accounts on other games and programs that their parents didn't know about. Even though the environments have monitors, it is not possible for all play to be mediated by adults. In a virtual environment one can never be entirely sure of the identity of one's interlocutors.

Even though the only way to contact another participant in *Webkinz* is through scripted dialogue, Will said that it's "not safe to invite people to play in the tournament arena," so he calls friends on the phone and asks them to join him via their characters online. I asked him how he spent his time on *Webkinz* and he said that he earned money by playing games, that he remodeled and redecorated his rooms and that he went to *Webkinz* school. Serafina chimed in to say, "School is fun." In school for example, children can play a typing or spelling games that award them money for improved levels of accuracy. While Serafina continued to shop and play games, Will read "the news."

More scholars are investigating the ways that technology can compliment literacy education rather than detract from it. Druin (2008) observed children "playing" school in an actual school with the *Webkinz* animals children had brought from home. She

suggests that "today's children move seamlessly between television, online environments, printed books, and stuffed animals" and that what compels them is both a love of stories and their imagined relationships with characters" (p. 43).
The virtual world of *Webkinz* was clearly a place where Serafina and Will could re-enact the familiar game of "house" that children in many times and places have played. Interestingly though, the game is not only about collecting, feeding and maintaining the health of pets, but also about decorating their rooms, shopping, playing school, competing and winning prizes.

In many ways, *Webkinz* is a place for learning skills, attitudes, behaviors, and dispositions through a carefully designed discourse on capitalism. In immersive games, the teacher is invisible, imbedded in the design. He speaks to the child through the advice given by Dr. Quack or the encouragement given by the janitor who sweeps up the letters of the alphabet that have magically fallen from the classroom's chalkboard. The players are advised, encouraged, rewarded in words and symbolic capital. They teach each other how to negotiate, compete and, on occasion how to beat the system. As Meyers (2009) points out, "We are moving into an age marked by new styles of interaction and communication, where the distinction between "play" and "learning" may be altogether meaningless (235).

Aspects of the kind of play that children enjoyed in Webkinz found their way into suggestions for the design of the virtual library. Students felt that books should not only be catalogued in the library, but should serve as portals to role-playing worlds where one could participate with others as characters from the books they loved.

Summary

In this unique school setting, teachers valued multiple forms of expression. Reading and writing, though important to the curriculum, were not the only methods of learning or expressing knowledge. Teachers saw themselves as looking for ways, both through technology, and through other means of expression, to differentiate the curriculum, to address learners' needs by assessing their individual strengths and weaknesses. With block scheduling and the opportunity of teaching two subjects, teachers cut down on the number of student contacts to approximately sixty students. Meeting fewer numbers of students for longer periods of time allowed teachers the opportunity to know the students and to tailor assignments to their interests and abilities. Because they work in a charter school, the teachers are free to adjust their lessons to embrace opportunities, such as the virtual library project, that present themselves. Mrs. Olestra did not need to request permission from an administrator or school board in order for the collaborative project with university students to occur. She enjoyed levels of respect and trust unparalleled in most public schools.

We tend to think that of the integration of technology as a generational problem that will be solved with the education of young teachers who, raised as "digital natives" will be more fluent than their predecessors have been. But I would argue that more important than age, are the dispositions with which teachers are encouraged, or in most cases, permitted, to approach their work. The three teachers interviewed in this chapter were all in their mid-late forties. They were seasoned teachers who have the confidence to promote investigation and discovery through processes that were not always directly

under their control. Their enthusiasm for technology was not unbridled; their concerns for the quality of engagement and their understanding of the barriers to implementation were born not out of fear, but out of experience. Understanding the dangers as well as the affordances, these teachers were committed to learning, through experimentation, how to best integrate technology into their lessons. Mrs. Wilbert expressed some skepticism regarding the value of the time students spent on some sites. She said,

> I think the thing for me is that is so great, for getting all those kids together who are interested in the *Warriors* series, but in my classroom, it keeps being this thing where I feel like, yes, that is really cool, but being able to have face-to-face conversation is so cool and it seems like so many kids—I used to say this to our kids when they were little…"You've had your screen time, now do something else. I was always like, "You're being raised by appliances. Be authentic!"

Her comments, at first, surprised me, given her openness to using technological tools to enhance literacy and support learning. But she did highlight a critical issue regarding the role of teachers. How will virtual activities compliment or compete with activities in traditional classrooms? If a student could, for example, demonstrate meeting all of the standards enumerated by a state's department of education, through his interaction in a virtual environment, would he need to go to school at all? Face to face interaction is certainly necessary, but will school remain the primary place for students to engage in this kind of interaction? It seems that through her example of experiences with her own children, Mrs. Wilbert was making a claim for both parents and educators; she seemed to be suggesting that young people will continue to need to learn how to use and break away from technology.

The successful integration of technology has a better chance in schools where learning is guided by theories that support multiple entry points for both learning and expressing knowledge. Implicit in the educational theories expressed by Mrs. Wilbert is the assumption that intelligence is not always enhanced or expressed with traditional tools. Teachers must discover entry points. Once these entry points are accessed, a good teacher will encourage the development of other methods, teaching a child how to extend his repertoire—as well as widen the range of his interests. If digital tools are as valued as traditional ones, there are unlimited possibilities for experimentation. It was clear that the theoretical underpinnings expressed in the dispositions of the school's teachers increased the viability of the project and encouraged students to draw from personal experience as they engaged in the design process.

The passion with which students at the Advanced Charter expressed their love of literature must certainly be attributed to many factors. The market for literature aimed at the 5th thru 8th grade age group has certainly boomed in the wake of Rowling's success with *Harry Potter*. The children of this school are from socioeconomic backgrounds that support not only traditional literacies, but would be able to purchase the games, gear and gadgets marketed with the books. Even so, it is clear that market forces and income levels are not the only factors contributing to the excitement students expressed when talking or writing about books. Teachers at the charter have cultivated an environment where stories are valuable, where choices are many and where excitement about books can be shared through a variety of modalities.

Chapter 6

Analysis / Implications

Viability

As the virtual library project demonstrates, teachers can create viable ways for elementary and high school students to participate and contribute to the design of virtual environments. Through forming a partnership with a university and positioning students as "clients," the project provided students with an opportunity to articulate and reflect on literacy practices in a range of virtual experiences from the novel to the video game. Guided in structured activities, they imagined how their experiences could be integrated into schools settings. Individually, and in collaborative design sessions with classmates and with university teams, students contributed to discussions and produced written responses and sketches that demonstrated the richness of their visions of how immersive technology could support the goals of understanding and enjoying literature.

Though the logistics of facilitating collaboration between schools and universities can offer serious challenges, service-learning programs, like the one that supported this project, are now making it more feasible to construct working relationships. Projects that employ the use of immersive environments, may soon take more advantage of "third spaces" as a way to overcome the constraints of time and distance. Just as email radically increased the possibilities of communicating with large numbers of interlocutors—persons, organizations and corporations, the opportunity for people to meet in virtual worlds will reduce the barriers to collaboration. Had the virtual libraries been built in *Second Life*, for example, it may have been possible for students to actually visit the construction site and participate more actively in the design and building of the libraries.

While the viability of the project was supported by institutionally developed methods of facilitating collaboration, as this project demonstrates, its instantiation was equally dependent on dispositions and attitudes expressed by the participating teachers. Mrs. Olestra and I both enjoyed school environments where we were given power to develop our practices in ways we saw fit—a privilege afforded fewer and fewer teachers today. We were both allowed to take experimental approaches, to allow our students to devote time to the work of imagination, and to trust our students as guides, directing us toward enhancement of our methods. While I first suspected that it was only luck that brought me into contact with Mrs. Olestra, further investigation revealed that all of schools core teachers shared dispositions toward teaching that embraced innovation. Indeed, as Ms. Wilbert revealed, it was the stifling climate of public school teaching that compelled her to start her own school. Observations and interviews with the other teachers confirmed that they supported her vision of a more future-oriented school, one in which new media was not the enemy of education, but useful in providing multimodal tools that supported students in discovering and expressing knowledge.

Finally, the viability of the project was supported by positioning students as "clients." This role was well suited to them in that they participate everyday in the use of VEs outside of school settings; they are both knowledgeable and opinionated. Indeed, as

users of a wide range of technological tools, they seem to enjoy more power as gamers, fans and networkers than they do as students. In game worlds and social networking sites, young people respond to the creators and producers with the choices they make. *Facebook*, for example, recently changed its privacy settings in response to complaints by their clientele. Since its inception, *Webkinz* has added new options for communication that include scripted and guided methods of chat. The frequency of new books in the *Warriors* series suggests that the lively discussions among fans must serve to generate ideas for new books. Because these sites are sponsored by profit-based corporations, their existence depends upon user satisfaction. The fact that Internet based products change in response to users' preferences, contributes to higher degrees of engagement. Schools, of course, are not as sensitive to user satisfaction; they change very little over time. Key to the high degree of student involvement in this project was the fact that students were positioned to draw from their enjoyment of virtual environments as they collaborated with designers in building a library that would directly address their needs.

The project challenged students to adopt a meta-cognitive approach to the problems of design. Gee (2007) argues, "active, critical learning in any domain should lead to learners becoming, in a sense, *designers*" (p. 96). His description of this transformation aptly describes what happened in the virtual libraries project when we asked students to draw from their experience of VEs in order to contribute to the design process:

> In critical learning, the learner comes not just to form an appreciative system through practice and interaction with an affinity group associated with the domain but to reflect overtly on the goals, values, feelings, and desires that compose this system, to compare and contrast this appreciative system to others, and to make active and critical choices about the system. Of course, these choices must either remain within the confines of what the affinity group associated with the domain will recognize as acceptable or transform what the group finds acceptable. In either case, the learner is taking on a projective identity—actively, reflectively and critically interfacing, at a meta-level, his or her real-world identities with the new identity being formed in the new semiotic domain (p. 94).

In developing ideas for the library, students argued the merits of particular proposals. They questioned which elements of a traditional library would be useful or necessary in a virtual one. Would, for example, one need an actual librarian, acting through an avatar, who would direct patrons, or could a virtual one suffice? Should the collection be organized thematically or by genre? In addition to providing meeting rooms, as actual libraries do, could the virtual library offer rooms in which one experienced the setting of the book he chose to read? What does it mean to enter into a book? Neither Mrs. Olestra nor I had to persuade the $5^{th}/6^{th}$ graders of the value of the project, they were ready to tackle it. While the 12^{th} graders demonstrated more skepticism, the opportunity to view the process of design and building from the inside intrigued them. In class discussions, written and sketched responses, students attempted to define and to bridge the semiotic domains represented by library and virtual world, game and book, reader and writer. From a pedagogical perspective, we, as teachers, both forwarded our students' critical

skills and gained insight into areas of understanding that are rarely included in classroom discourse.

Prior Experience

Students drew from their outside school activities in contributing to the design of virtual libraries that forwarded literacies and literature. The younger students drew from games and websites devoted to their favorite books. They could easily see how features of these virtual environments could re-mixed to support academic aims. The library they imagined would be a place of adventure, magic and literature. As one student insisted, "Why can't it be for learning and for fun?" It would be a place where, through challenges, quizzes and forums they could demonstrate their mastery of the books they read. The virtual library would hold worlds within worlds and just as they could don the avatar of a cat and pretend to enact scenes from the *Warrior* series, they could role-play other characters in books they loved. And, just like the three writers who worked under the name "Erin Hunter," they could collaborate in writing fiction. The virtual library would be a place that they could customize to suit their changing interests. Just as in *Webkinz*, they could design individual rooms; they would build places for themselves inside an immersive, literary world.

Very few of the high school students envisioned how literature would be transformed in a virtual library. Their experiences of reading had been less social than the ones the younger students currently enjoyed. Perhaps the demands of a college preparatory school had left them little time to enjoy novels. Or perhaps reading loses its pleasures in environments where most experiences are translated into points that are tallied in order to determine a student's worth. More at home in social networking sites, the 12th graders imagined a library that mirrored their online interests; they wanted to customize features of the virtual libraries in order to broadcast their preferences, responses and artifacts. Their library resembled the world they dreamed of, a kind of floating university with planets of resources, galleries and auditoriums. A mash-up of a wiki and *Facebook*, their "Mybrary" was a place where resources were organized. There were intricately and beautifully rendered places to convene, to attend lectures, to view art, but there were no places one might traverse for an experience that did not resemble one in actual life.

Changes in Literacy Learning

With regard to the central change in literacy learning, the project revealed the power of new technologies to influence literacy practices of young people. The 12th graders have come of age in a time of innovation and they have learned to master some of the most current digital tools. They can conduct research on the Internet and craft a *Powerpoint* to present their findings. Some can collaborate through the use of *Googledoc* in writing a paper. Though they may read websites and participate in blogs, they consider novels as texts that one reads individually and about which one writes when given an assignment by a teacher. The younger students who participated in the project are experiencing much greater exposure to new media than the current 12th graders did at their age. The virtual library designed by the 12th graders suggests that they view online

and offline literacies as dichotomous, while the model library created by the younger students clearly indicates that they are experiencing converging literacies and through them, converging worlds (Jenkins, 2006).

The problem with "either/or" thinking with regard to traditional and digital literacy is that it fails to capture the experiences of youth. It is no longer uncommon to find an eleven year old who not only reads novels from a traditional text, but who listens to it on her ipod, downloads it onto her e-book, visits a website where she can play a game as a character from the book, participates in a forum discussion, and answers challenge questions, reads a manga comic, watches a film of the book, posts a link to an interview of an actor in a new film of the book using her *Facebook* account. She and her classmates are transforming the practices of reading and writing.

In many schools the reader and writer she is at home, bears little resemblance to those roles she plays between the hours of the school day. She is not allowed to bring her e-book to school, even though some of her classmates wear outfits that cost more than her *Kindle*. She only sees a computer when her teacher beats out the thirty other teachers attempting to sign-up for the school's only computer lab on Wednesday, after lunch. Though at home, she rarely writes with a pen, during the school day it is the only tool she is allowed to use in many of her classes. Even her cell phone must be kept in her locker or it will be confiscated. The animation she creates in response to her book report assignment is applauded by the teacher, but he has no idea how to introduce this technology to the other students in his class.

Challenges to Integration

Constructing a framework that supports the integration of virtual environments with pedagogy demands that educators identify and address critical issues regarding the meaning and value of engagement in virtual environments with regard to: community, the role of teachers and student identities.

A. Changing Communities:

In order to begin to understand how the newest technologies might be used to forward educational aims, teachers must learn how to analyze and assess not only virtual environments, but the relationship between virtual communities and actual ones. Teacher training should include the study of VEs popular among youth. Teachers who study how members of a game world or website are mentored, recognized, rewarded will not only be given a rich opportunity to reflect on the kinds of actual environments they hope to develop in their classrooms, they will also begin to imagine how they might extend and enhance their classroom into cyberspace.

Teachers, researchers and theorists need to consider the ways that students enter VEs, as they do actual ones, with different purposes and resources. The child whose parents will purchase two dozen *Webkinz* toys for him is provided with more capital than other players of the game. The high school student who can make films with his state of the art cell phone can post more attention grabbing media on his *Facebook* page. Just as students come to school possessing varying degrees and type of resources, so do they come to virtual environments. Schools that aim to use virtual environments, be they blogs or immersive worlds, will need consider the degree to which participation

replicates social inequalities or addresses them. The addition of a virtual environment, like the addition of a school garden, an outdoor stage or a science lab should be an inclusive place that extends and enhances the goals of a school. Attention must be given to the training necessary to support full participation by students in virtual environments.

Particular emphasis on literacy practices in virtual environments will also contribute to an understanding of the kinds of communities they foster. In *Facebook*, a participant can post a paragraph about himself, but only a few lines of his text will be initially visible to his selected audience. Anyone who chooses to read more than a few lines must click the word "more" to read his entire post. While the amount of written text is constrained by the design of the *Facebook* page, there is, by comparison, much more space for visual media. Members can "tag" or label by name people who appear in their photographs so that viewers can discover the others with whom a "friend" is connecting. In *Webkinz* there are options that allow for different kinds of exchanges. A child, or his parents, can elect to communicate in scripted dialogue only. This limiting might direct focus on another method of communicating in the game, gift giving. The key point is that these three virtual environments are designed very differently with regard to features that promote literacy practices. By limiting or expanding the options for communication, designers can influence the development of very different kinds of community. In order to fully participate in using VEs for learning, educators will need to understand the design and the rationale for enhancing or constraining literacy practices.

In our current system of education, student communities are becoming more and more homogeneous. Building VEs that could make permeable the barriers that separate students across ethnicities, languages and social classes, would address a serious inequity which constrains the development of world views in many school age children. The *Warrior* series is the work of British authors whose fandom extends to many parts of the globe. Young children who interact in VEs, are excited by the realization that they are "meeting" people from all over the world. Participants of *Facebook*, keep in close contact with their friends when they travel and when they matriculate to colleges and universities in other parts of the country and abroad. VEs offer methods of extending school communities across time and distance.

Activities in virtual environments might serve to foster engagement in actual school communities if they are designed to respond to the needs of particular students. As Mahiri's (forthcoming) research suggests, the opportunity of learning how to build a place in a VE maybe a viable strategy for "re-engaging students who are having critical academic or discipline problems in schools" (p. 201). Having constructed a place for themselves, students might feel that there is a place for them in schools. Educators must examine features of VE could be leveraged to support stronger ties to school community. As educators study the features that engage students in VEs, they might be able to customize or build those features in response to student interest. Younger students in *Webkinz* seemed keen to play games, shop and furnish their own places. Through play, they developed financial literacies (Kozdras, 2009). Educators might explore the activities students enjoy and build environments around their interests. A world for teens, for example, focused on music, could also become a place to learn history, culture, and literature. Rather than consider curriculum first, an innovative school might think begin with the students and build worlds they will find compelling.

B. Role of Teachers:

Teachers must be allowed to play a role in the design and use of technology for learning. They must participate in deciding when, where and how students will interact in virtual environments. If VEs are delivered to us, as a replacement for our textbooks, if we only instruct students to turn on the computers and watch them proceed, lock-step through simulations, we will have failed to tap their potential to stimulate meaning-making in the actual world. The obstacles are great—we need more clarity about the kinds of interactions we want to facilitate. We need to demand opportunities to customize and eventually to build the places to which our students will be given access.

The issues are not limited to figuring out how to train teachers to use equipment, but about developing theory that encompasses digital technologies as providing both tools and places for learning. We must begin to explore how digital artifacts--*Powerpoint* presentations, documentary and creative films, multi-modal re-mixes, photographs, podcasts, might be considered as equivalent to the worth of products created by using traditional literacies—essays, reports, reflective or creative writing. And, as immersive environments become available, we much organize places where students can easily access these resources.

Given the resources of an environment like the *Warriors* website, a place with a multitude of possibilities for individual or group interactions, how a teacher would leverage those resources in the classroom would contribute to determining the richness of the experience. Perhaps she would allow students a class period to explore the site and afterwards, choose particular activities that they found interesting. Maybe she would decide that all children needed to read and respond to a thread in the Forum discussion, but they could choose between answering Challenge questions and taking a quiz in order to assess their understanding of one of the books in the series. Perhaps she would decide to break the class into groups and assign a *Warriors* related project to each. One group might stage a *Warriors*' drama using a script provided on the website. Another group might create a manga comic based on a fanfiction episode written by a classmate. The teacher would use her expertise to direct particular students to the use of tools and participation in activities that would support their individual needs; she would mediate the convergence of digital and actual interactions.

Teachers should be provided with options to choose when and how to stand outside a VE and direct activity and when to join students in a their worlds. A teacher participating in an environment such as *Facebook*, must define, for students, the nature of their interactions in the setting. What does it mean to have a teacher as a "friend" in a virtual environment? While there are those who would argue that teachers have no place in virtual worlds, others might discover opportunity for teaching young people about how to communicate in a "friendly" way with people who represent authority in their lives. The process of learning how to interact socially in relationships of power involve the development of skills that are critical to success young people high school for college and careers. If we participate in building worlds where students are given opportunities for expression, creativity, collaboration and problem solving with tools that have not been normally available in the classroom, we may witness transformative possibilities both in the roles we play and in the identities our students assume.

If educators were to build a framework for the development of digital fluency, how would it look? Would we want all students, for example, to be able to collaborate in

the writing and production of a documentary using *Scratch* or *imovie*? At what age? Would we want every child to be able to build a website and host a blog? Deliver a *Powerpoint* presentation? Construct a setting from a novel in an immersive world? Our first concern should be that all students are given access to the necessary tools. The digital libraries project took place in privileged environments, with students whose parents and teachers assume that these students will be college-bound. What will happen if only these students are allowed to use the tools available in VEs, allowed to investigate virtual worlds? We should not wait ten years in order to observe what happens; we have an obligation to facilitate every child's interaction with technology that promotes learning.

C. Student Identities

Virtual environments compel students to investigate, express and perform multiple identities. In designing immersive libraries, students who positioned as clients, also drew from their experience as experts and projected identities as future patrons. We must consider ways of fostering other identities we want students to experience as VEs become more accessible in school settings. The trends in game use seems to have influenced designer to position students as problem-solvers (Warren et al., 2008; Dede, 2009). Programs and projects through which students might explore other roles—of creators, mediators or problem-posers could provide compelling challenges for performance and learning.

We need to consider not only the virtual roles we create for our students, the actual ones that offer affordances and constraints. Schools tend to assign a particular station to students they characterize as "geeks." These young people are called upon as repairmen and women when a teacher's screen goes blank or the connection between the computer and the projector fails. But tech-savvy students have a more critical role to play in the future of education. If literacy instruction will be effective and meaningful in the coming years, teachers need to treat student experts as colleagues, to draw on their expertise and to actively strategize with them in promoting innovation. How have we leveraged the talents of students who make films, podcasts or fanfiction?

It is only within the last ten years that I have encountered student experts whose digital fluency includes skills and practices with which all students should become familiar. The teacher who had no knowledge of *Googledoc* when she assigned the group essays should have consulted Cody and invited him to make a brief presentation to the class. With regard to technology, why should he, as he said, be the only one "pushing it"? Should it be a matter of luck, that if a student finds himself in Cody's group, he will have the tools to effectively address the assignment? And what do we make of Darwin's experience in the *Warriors* series? His quiet admission of having written a *Warriors* novel deserves attention. All students need to be offered the skills that geeks develop on their own.

Support and instruction in literacies should be bi-directional across perceived digital-traditional boundaries. That is, we should be learning how digital tools can support traditional academic literacies as well as how traditional academic literacies can support activity in virtual environments. Students with excellent traditional literacies will likely achieve higher degrees of competence in using digital tools, both in-world and out. But we will fail to realize the potential of virtual environments if we only draw tools from

them for use in actual settings. For some students who have mastered traditional literacies but who struggle to express themselves in face-to-face encounters, a virtual environment might be the optimal place for learning how to interact with others. Further investigation is necessary to determine how the online disinhibition effect (Barak, Bonie-Nissim & Suler, 2008) that many people experience in VE, might relate to literacy practices that support actual life. It may be that the selves students discover in virtual worlds could shape and define the persons they long to be in actual worlds.

Moving Forward

The fear of new media and the technologies it employs is nowhere as strong as in those who advocate the reading of literature as an essential component in the development of an individual's highest potentials. Essayist and critic, Deresiewicz (2010) in a lecture delivered on the theme of "Solitude and Leadership" to the plebe class at the United States Military Academy at West Point exhorted the students to turn off their computers and take up literature. He drew from Conrad's *Heart of Darkness* to develop his points and told the students,

> It seems to me that *Facebook* and *Twitter* and *YouTube*—and just so you don't think this is a generational thing, TV and radio and magazines and even newspapers, too—are all ultimately just an elaborate excuse to run away from yourself. To avoid the difficult and troubling questions that being human throws in your way. Am I doing the right thing with my life? Do I believe the things I was taught as a child? What do the words I live by—words like *duty*, *honor*, and *country*—really mean? Am I happy? (p. 27).

His words seem ironic, first because, of all places, the U.S. military's use of virtual environments seems to have been a critical feature of education for many years (Hillis, 1999). Second, because, knowing that many of his listeners would likely not have read the novel, he referenced *Apocalypse Now*, a more contemporary re-telling of Conrad's book set in an entirely different time and produced in an entirely different medium. In doing so, he rather undercuts his point, and causes one to wonder whether he purposely excludes films from his list of dangerous, time-wasting media, or whether he would make the distinctions between films of value and films that only cause you to "run away from yourself." What he seems to think is best would be for a cadet to spend his days learning from state of the art technology, perhaps participating in role-play of war game simulations or learning how to remotely operate the most advanced weaponry in the world, and then return to his room to settle down for an evening of quiet contemplation. And if he did elect to read Conrad, or for that matter, watch *Apocalypse Now* would he be able to answer the questions Deresiewicz poses? Or would he discover, as Barthes (Lazar, 1993) is alleged to have pointed out, "Literature is the question minus the answer"?

A central issue in Deresiewicz's problematic exhortation concerns the bridge between thought and action, between the solitary pleasures of literature, and the meaning-making activities that necessarily involve interaction with other people. Should we all passively accept the technology that is delivered to us through institutional or corporate

channels and trust that they will devise appropriate experiences so that we may achieve the designated goals? It seems to me that the radical simplification that results in such dichotomies: "Twitter=Bad" and "Reading Conrad = Good" is indicative of the most dangerous thinking with which we struggle today. It ignores the reality that technologies of all shapes and descriptions can be used to support or to destroy human life. It ignores the fact that reading novels, even those whom people in power decide are the "right" novels, is no assurance that one will develop into a moral individual, much less a leader.

Jenkins (2007) understands this problem and offers some direction:

> Media are read primarily as threats rather than as resources. More focus is placed on the dangers of manipulation rather than on the possibilities of participation, on restricting access—turning off the television, saying no to Nintendo—rather than in expanding skills at deploying media for one's own ends, rewriting the core stories our culture has given us… We need to rethink the goals of media education so that young people can come to think of themselves as cultural producers and participants and not simply as consumers, critical or otherwise (p.270).

As educators, our most essential challenge is equipping students with the tools and resources they need to enhance communication with others and to seek answers to the questions that all serious work—including reading novels, ignites. In order to do that, we should focus on building both actual and virtual environments where useful tools are easily accessible. We should instruct students in using these tools in order to realize greater possibilities in their lives. We should build worlds that facilitate collaborative inquiry and creation, places where students might access a variety of roles that allow them to understand the shape and scope of the humanity they share with others. The students who participated in the virtual libraries project engaged in imaginative activities through which they sought means of meeting practical, social and intellectual needs. Their expanded experiences of literacies must direct future place-making and ensure that learning more actively supports living.

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