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# Chapter 18
# Virtual Worlds for Young People in a Program Context: Lessons from Four Case Studies

**Marina Umaschi Bers, Laura Beals, Clement Chau, Keiko Satoh, and Nauman Khan**

Developmental Technologies Research Group, Eliot Pearson Department of Child Development, Tufts University, Medford, MA, USA

## Introduction

In 2007 a report by the Pew Internet and American Life Project (Lenhart, Madden, Macgill, & Smith, 2007) revealed that 93% of Americans between the ages of 12 and 17 years are Internet users "and more of them than ever are treating is as a venue for social interaction—a place where they can share creations, tell stories, and interact with others" (p. i). In addition, the report found that 55% of online teens (ages 12–17 years) have a profile on a social networking site (e.g., Facebook or MySpace).

Prescott (2007) reported that of the five most frequented virtual worlds sites, four of them were youth focused[1] and furthermore, were ranked higher than adult-oriented equivalents such as *Second Life* and *World of Warcraft*. The Association of Virtual Worlds published a report entitled "The Blue Book: A Consumer Guide to Virtual Worlds" (Association of Virtual Worlds, 2008, August) in which descriptions, links, and categories for hundreds of virtual worlds are provided. A count of these worlds reveals that approximately 110 are categorized as for kids, 115 for tweens, and 140 for teens (some worlds, however, are designed for multiple age groups).

As examples of the increasing popularity of virtual worlds for children, the site Webkinz increased its visits by 1141% in a year (Prescott, 2007), and Club Penguin doubled in size, from 1.9 million to 4.7 million visitors (Shore, 2008). This popularity, however, for many of the sites is tied with commercial endeavors—for example, Club Penguin was acquired by Disney for $350 million (Barnes, 2007) and US retail sales of the Webkinz dolls in 2006 earned $45 million (Tiwari, 2007). As another

M.U. Bers (✉)
Developmental Technologies Research Group, Eliot Pearson Department of Child Development, Tufts University, Medford, MA, USA
e-mail: marina.bers@tufts.edu

[1] According to the report, the top five sites are Runescape, Webkinz, Neopets, Gaiaonline.com, and Club Penguin.

example, BarbieGirls.com, by Mattel, registered 4 million users in the first 3 months after its launch, with an average of 45,000 new girls a day.

From another perspective, KZERO Research, a UK-based company aiming to understand "the marketing dynamics relating to virtual worlds," examined the current state of virtual worlds by looking at the total registered accounts as of quarter two of 2008 and found how prevalent virtual worlds for youth are—the largest virtual world for adults (over age 20), has 13 million registered users, while the largest for children or youth has 90 million users (and there are six additional worlds with between 17 and 45 million users for people under 20 years). For a figure showing the year/month of the launch of the virtual world, its current size, and worlds that are currently in development, visit: http://www.kzero.co.uk/blog/wp-content/uploads/2008/05/virtual-world-numbers-q2-2008.jpg. As a final indication of the prevalence of virtual worlds for youth, eMarketer reports that 24% of the 34.3 million US child and teen Internet users will visit virtual worlds once a month in 2007, up to 34% in 2008 and by 2011, 53% (Williamson, 2008).

However, there are also popular virtual worlds with a less commercially focused approach. For example, ZulaWorld.com (though still based on the children's TV show Zula Patrol) focuses around math, science, and technology, and the Panwapa virtual world, immerses children "in a unique and novel exploration of self, community and cultures from around the world" in order to "empower a new generation of children, ages four to seven, to be responsible global citizens" (from the website). Other virtual worlds such as Quest Atlantis (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005), River City (Dede, Ketelhut, Clarke, Nelson, & Bowman, 2005; Dede, Nelson, Ketelhut, Clarke, & Bowman, 2004), Second Life in Education (http://sleducation.wikispaces.com/), MOOSE Crossing (Bruckman, 1996), Whyville (http://www.whyville.net/smmk/nice), 3DLearn (http://www.3dlearn.com/), Jumpstart (http://www.jumpstart.com/), and Zora (Bers, Chau, Satoh, & Beals, 2007; Bers, Gonzalez-Heydrich, Raches, & DeMaso, 2001a), to name just a few, are designed by researchers with the hope of engaging young people in learning and personal and social developments.

This chapter draws from experience in designing and evaluating the Zora virtual world for youth (Bers, 2001). Zora has been used since 1999 with several very different populations of young people, including those with end-stage renal disease undergoing dialysis treatment (Bers, Gonzalez-Heydrich, & DeMaso, 2003; Bers, Gonzalez-Heydrich, & DeMaso, 2001b), multicultural groups (Bers, 2008a; Bers & Chau, 2006), freshman in college (Bers, 2008a), posttransplant pediatric patients (Bers et al., 2007; Satoh, Beals, Chau, & Bers, 2007; Satoh, Blume, DeMaso, Gonzalez-Heydrich, & Bers, 2008), and participants in national and international after-school computer-based learning centers (Beals & Bers, under review).

Based on the differences of the sites and experiences, the chapter provides guidelines for understanding how to design and evaluate intervention programs that use virtual worlds for children by taking into consideration eight different dimensions: (1) curriculum, (2) mentoring model, (3) diversity, (4) project scale, (5) contact with participants, (6) type of assessment, (7) access environment, and (8) institutional context of usage.



First, we will describe the Zora virtual world and its design based on the Positive Technological Development framework (Bers, 2006, 2007). Then we will present four different case studies in which Zora was used which highlight different approaches to the eight dimensions presented earlier.

## Zora: A Constructionist Multiuser Virtual Environment

Zora is a multiuser virtual environment that was first developed as part of Bers' doctoral work at the MIT Media Lab. The overarching goal of Zora is to provide a safe space for youth to explore issues of identity (Bers, 2001). The name Zora was inspired by one of the imaginary cities described by Italo Calvino: "This city is like a honeycomb in whose cells each of us can place the things we want to remember. . .So the world's most wise people are those who know Zora" (Calvino, 1972). The hope is that by engaging with Zora, children will also become wiser by knowing who they are.

Zora is designed upon constructionist learning principles that promote children's creation of their own personally meaningful objects and sharing them in a community (Papert, 1980). Constructionism, as both a theory of learning and a strategy for education, offers the framework for developing a technology-rich design-based learning environment in which children learn by making, creating, programming, and communicating (Resnick, Bruckman, & Martin, 1996). Constructionism is rooted in Piaget's constructivism, in which learning is best characterized as an individual cognitive process given a social and cultural context. However, while Piaget's theory was developed to explain how knowledge is constructed in our heads. Constructionism, developed by Papert, pays particular attention to the role of constructions in the world as a support for those in the head. Zora provides easy-to-use tools for children to design and inhabit a virtual city (see Fig. 18.1).

Users can populate the virtual city by making their own virtual places and interactive creations, including 3D objects, characters, message boards, and signs, as well as movies and sounds. Although Zora provides tools for creating objects, the focus is not on the aesthetics of the 3D objects, but on the meanings assigned to them. Thus, Zora encourages users to create stories and values for every object they make in the world. Upon logging into Zora, users encounter an initial blank 3D world. Their task is to create the virtual world's public and private spaces and populate it with interactive objects. While using building tools in Zora, users learn basic computer programming principles as well as gain technological fluency (Barron, 2004).

One of the design goals of Zora is to support children in their thinking about who they are, who they want to become and what kind of community they want to be part of. For this purpose, Zora provides opportunities for users to create models of identification and counteridentification (called heroes and villains in the virtual world), as well as personal and moral values linked to objects and a collaborative values dictionary. Furthermore, the community values dictionary prompts users to share

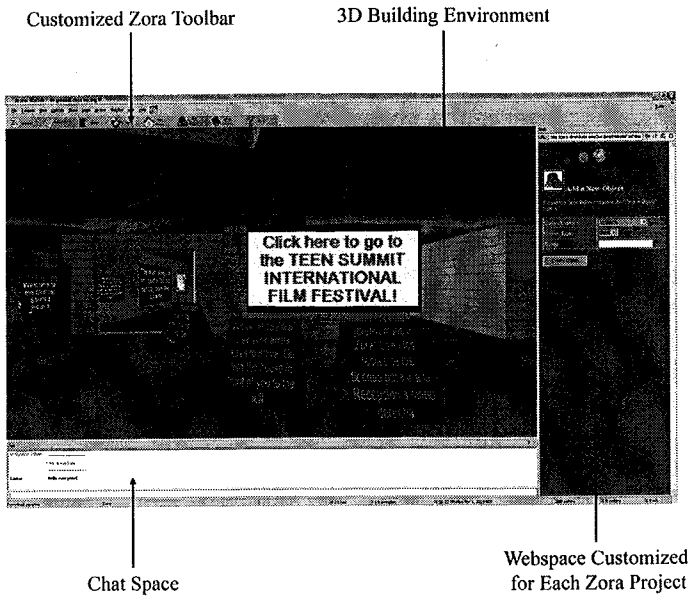


**Fig. 18.1** The Zora virtual world

values and their multiple definitions, which are seen as personally meaningful as well as important to the community. The dictionary also reinforces discussions among community members about contrasting points of view for similar value entries or definitions (Bers & Chau, 2006).

In addition to making virtual objects and narratives, Zora provides a real-time chat system for participants to communicate with each other while navigating throughout the virtual world. The environment is purposefully designed to provide both synchronous and asynchronous modes of communication in order to accommodate different personalities and time zones, as well as to afford participants a chance to self-reflect on their narratives, values, and stories.

While the constructionist philosophy of learning informed the design of Zora as an environment for children to create their own virtual city, a most recently developed educational paradigm, computer-supported collaborative learning (CSCL), inspired the need to incorporate in Zora tools for community building and community scaffolding of learning (Koschmann & Kolodner, 1997; Preece, 2001). For example, the creation of theme houses and public spaces give grounds to develop social connections with others who share similar interests.

CSCL shifts the process of cognition as residing within the head of one individual, which was rooted in Piaget's theories, to the view of learning as a social process, which is rooted on Vygostskian's theory, and of cognition as situated within a particular community of learning or practice (Lave & Wenger, 1991). Thus the focus is on creating social environments in which constructionist types of learning activities using technologies can happen.



From a pedagogical perspective, Zora affords opportunities for developing educational interventions in which the curriculum can be emergent or explicit based on the needs and experiences of the population using Zora. For example, in terms of explicit curriculum, we have developed a system that provides online modules with activities aimed at exploring particular powerful ideas. The curricular modules and activities are designed by the researchers or practitioners running the project and can be setup on the basis of the population needs as well as the project goals. For example, each activity can be specified to be for individual or groups, for synchronous or asynchronous participation, for learning new content or engaging in social interactions. As users start to engage with the activities, the system automatically checks for status, updates the completed activities, and displays new ones based on what has been done previously. A rewards mechanism is also established to motivate youth to complete the activities. Each activity is associated with Zora-based online questionnaires to assess participant's learning as well as the activity itself.

From a technical perspective, the first version of Zora was developed in 1999 using the Microsoft Virtual Worlds development platform (Bers, 2001). The current version of Zora used in the *Active Citizenship through Technologies* (ACT) program has been revised and developed using the ActiveWorlds platform (Satoh, Mc Vey, Grogan, & Bers, 2006). This platform for developing educational multiuser environments is used by educational research projects such as Quest Atlantis (Barab et al., 2005) and River City (Nelson, Ketelhut, Clarke, Bowman, & Dede, 2005). Zora has similarities with the growingly popular Second Life® virtual world (Ondrejka, 2004) in presenting a 3D environment for users to develop a virtual community. However, unlike Second Life©, Zora is a secured and password-protected world in which only youth engaged with a particular research program can view the world and contribute to it. This provides a secure environment for children who are sharing emotionally charged personal situations (such as having a transplant or expressing personal opinions about political life) and for researchers who can have full access to the data.

Each action performed by the participants in Zora is logged into a database and analyzed with a customized log parser. The log parser is divided into four subcomponents: population demographics, search data, reports, and graphs. A search component provides access to various types of information about users, such as conversations, objects, number of times they logged into Zora, and the time spent on Zora, while also being able to filter for date ranges. Figure 18.2 displays a snapshot of the search page as well as a sample result page for objects created by a user. This information is not only displayed as a web page but it is also available in the form of an Excel worksheet. This facilitates researchers to perform further analysis on this data. The graphs component extends the results to a graphical format. Figure 18.3 shows the snapshot for the graph page and the data displayed in a graph. The reports component generates the reports for objects and conversations over time in the form of pdf documents.

From a theoretical perspective, Zora is designed upon Bers' Positive Technological Development (PTD) framework that addresses the question "how can we

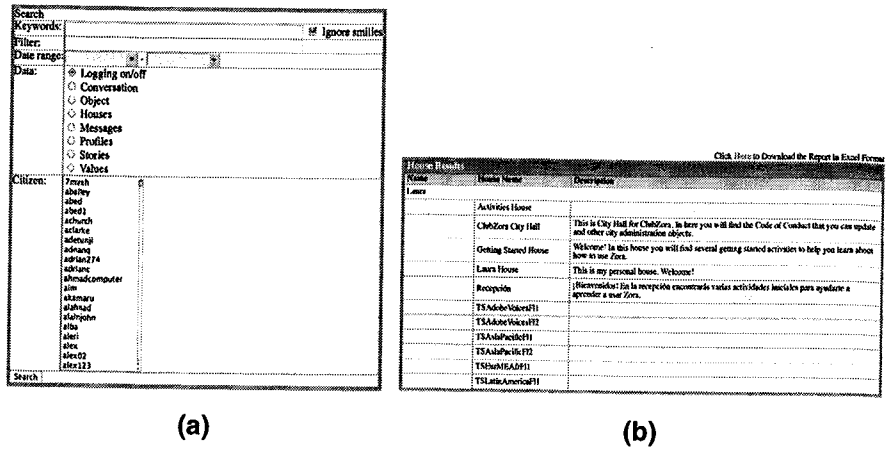


**Fig. 18.2** (a) Log parser search page. (b) Results for query

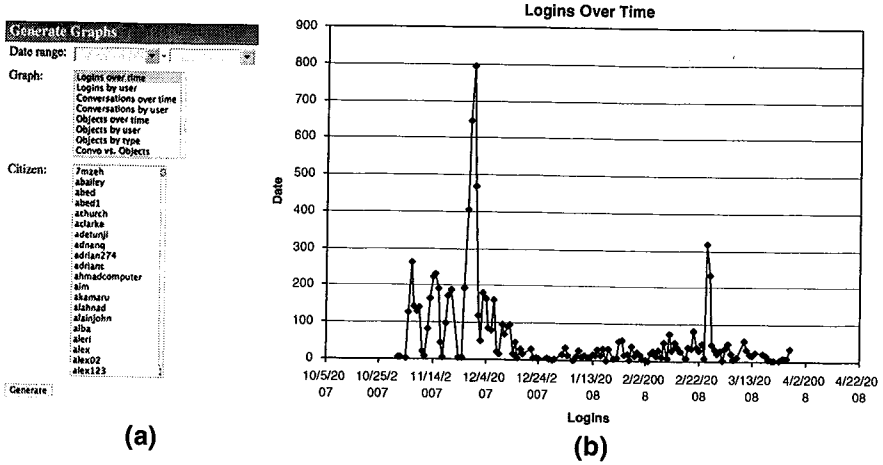


**Fig. 18.3** (a) Log parser graphs page. (b) A sample graph of login time of all users over a time period

develop interventions to help children use technology in effective ways to learn new things, to express themselves in creative ways, to better communicate, to take care of themselves and each other, and to contribute in positive ways to self and society?" (Bers, 2006; 2008c). Informed by the strengths and assets of young people and by what goes right in children's use of technology, PTD focuses on supporting them in developing positive attitudes, predispositions, and skills for using technology with the goal of becoming contributors to their own personal growth and to society (Bers, 2008a, b).



In the following sections, we present four different case studies in which Zora was used since 1999: with a diverse group of children in a multicultural summer camp, with incoming freshman at a northeastern university, with transplant patients at Children's Hospital Boston, and with children in after school programs all over the world. By presenting each of the case studies, we focus on eight different dimensions of intervention programs that use virtual worlds specifically aimed for children's development and education: (1) curriculum, (2) mentoring model, (3) diversity, (4) project scale, (5) type of contact with participants, (6) type of assessment and evaluation, (7) access environment, and (8) institutional context of usage.

## Case Study 1: Multicultural Summer Camp

This summer camp was held in a university lab during 3 weeks in 1999. Participants in the Zora summer camp were recruited through postings in different e-mailing lists. Interested candidates had to complete an application. The goal was to obtain a self-selected highly motivated group. It was made explicit to them that the goals of the workshop were "learning about computers as well as exploring issues about youth identity."

The selection process favored diverse cultural and religious backgrounds, gender balance, as well as the quality of the submitted biographies. Previous computer experience was not a factor for selection, but participants were required to have access to e-mail. There was a diverse group of 11 kids between ages of 11- and 15-years-old to participate in the summer camp, which was offered for free. Selecting a diverse population served two purposes. First, the educational goal of conveying to participants that to explore issues of identity and values, different voices need to be represented. Second, to observe if diversity would generate interesting discussions when conflict would surface, and how motivated participants would navigate those conflicts.

Eight of the participants came to the university lab and three of them worked remotely from their homes and met face-to-face only on the first and last days of the summer camp. An older child, Elisa, served as a mentor and helped to informally coordinate the activities. Elisa was only 1 year older than the oldest of the participants, but she had good social and technical skills and had had previous experience with Zora. Her role in the workshop was to mediate between the kids and the researcher and act as a peer mentor.

The workshop followed a flexible syllabus that helped Elisa guide the online activities. Kids worked on their virtual city at their own pace regardless of the activities planned in the syllabus. As the workshop evolved, kids proposed new activities. For example, they discussed and voted on rules to organize community life. Kids working remotely were able to connect during any other day and time, as well as during the workshop hours.

Overall, kids created a total of 33 virtual places divided into 12 personal homes and 19 public temples, such as the Jewish temple, the Sports arena, the Video game

room, and the Dinosaur hall, and two community centers, the City hall and the Junk shop. Participants created an average of two temples and one personal home per person, with the exception of one of the kids working at home who created 10 virtual places but did not finish any of them. The Zora virtual homes evolved and dynamically changed as participant's developed different ways of understanding their identity through interactions with others community members. For example, the objects created by users became "tangible" representations of the multiple aspects of their identities. The use of storytelling helped kids to think about the personal and moral values associated with the self. (Bers, 2001).

During the last day of the workshop, every participant left a legacy with advice for future Zora users in the entrance to the city. Legacies were grouped into three categories. Those giving advice about technical issues, about how to design expressive artifacts and places, and about how to handle social issues in the community. For example, participants shared their differing points of view about death penalty, and then debated about the punishment they would implement in their virtual city.

Although Zora's design based on PTD enabled the participants to explore issues of self, Zora's design was not enough to make a successful learning experience. Other factors also had a positive influence and shaped the way the experience was conducted and the evaluation was made possible. These factors are organized in terms of the eight dimensions mentioned earlier.

(1) *Curriculum.* The curriculum used in the workshop focused exclusively on a child-centered approach to learning. This worked well because the participants were a highly motivated and self-selected group already thinking about issues of identity. The presence of a flexible, emergent curriculum provided Elisa, the mentor, with guidelines for possible activities based on children's interests. This curriculum was solely based on the possibilities for making objects and narratives afforded by Zora. For example, children could create personal and public spaces with objects and stories, values and definitions, models of identification ad counter identification. They could also engage in discussions about the social organization of their virtual city and the needed public spaces.

(2) *Mentoring model.* One of the goals of this work was to observe to what extent a virtual world with design features informed by theories of identity formation and moral development, such as Zora, would engage kids in exploration of identity and personal and moral values. Because the presence of an adult with background knowledge about this area and who would behave as coach or guide would bias the results, it was consciously avoided (Bers, 2001). Thus, the role of Elisa, the mentor, was conceptualized as someone of similar age who would work as a peer and who would also explore issues of identity and values while participating in the workshop. This model worked well in this experience in part because of the personality of Elisa, and in part because of the commitment of the participants. However, if the focus of the experience were to switch from a child-centered model of learning, such as the one taken in this case study,



to one where an adult has a more predominant role, new questions need to be answered. Should the adult indoctrinate learners about personal and moral values as the bag of virtues approach proposes (Chazan, 1985) Or should he or she be a neutral facilitator who does not interfere or reference personal or external values, but helps young people clarify their own values and engage in the valuation process such as "Values Clarification" argues for (Raths, Harmin, & Simon, 1978) For example, should the facilitator seed the Zora virtual city with particularly controversial cases to foster debate and be an advocate of moral content and a model of moral behavior or only a process facilitator? When and how a facilitator should intervene if participants decide to take an intolerant stance about a particular social, religious or racial group?

(3) *Diversity.* Since the goals for this study were to expose children to an environment in which conflict would emerge and interesting discussions about identity would happen, even more important than the curriculum was having a self-selected, highly motivated, and diverse group to work with, as was the case of the summer participants, who were screened during the application process. Although it was a diverse group in terms of ethnic, racial, religious, and socioeconomic composition, all participants spoke English and were first- or second-generation American. Thus, there all shared core characteristics and values, expectations, and demands, which made the work possible, even with such a diverse group.

(4) *Project scale.* The experience presented here is a small-scale intervention with only 11 participants and a mentor. Thus, there were no technological problems resulting from scalability, neither major issues in terms of self-organization and management of the experience. The small scale of the study allowed participants to be in control of most of the decisions regarding the virtual community without the need of institutionalization of policies. Since the virtual community was small, it was relatively easy for participants to reach consensus. What will happen when scaling up? What mechanisms need to be put in place?

(5) *Type of contact with participants.* Participants in the summer camp were self-selected, highly motivated, and went through an application process, namely, they all wanted to be there. Researchers had direct access to them and their families and were able to work with most of them face-to-face as well as online. This type of contact facilitated data collection via videotaped interviews and assured a 100% return rate in all questionnaires. Participants felt lucky to have been chosen to participate in Zora and were happy to attend the summer camp and to contribute to the research at the time this study was done in 1999, virtual worlds were not as popular as today.

(6) *Assessment.* In terms of evaluating the experience, the ethnographic approach with a natural observation method, analysis of system logs, pre- and postquestionnaires and a final extended personal interview was used. In order to avoid what Papert calls "technocentric questions," the evaluation was centered on what young people did with Zora and not what Zora did to them (Papert, 1987).

The topic of identity and values in education is controversial for a number of reasons. One has been that it is not easy to define what needs to be learned and how to evaluate the learning experience. A narrow definition of research questions and methods is hard to achieve, not to mention clear measures of success and failure. Thus the goal of this study was to show a range of fruitful possibilities with virtual environments such as Zora. However, this work only provided a window into children's thinking about identity and values and many questions are still unanswered: will the young people that participated in this experience carry their explorations of identity and values into the rest of their lives? Will the learning transfer to other contexts? How does the online experience compare with face-to-face only workshops? These questions are hard to answer and will require a different methodological approach.

(7) *Access environment.* The decision to use Zora in the context of an immersive summer workshop held at a university lab, instead of in a classroom or with all of the participants logging in from home was based on a reality. Zora makes special demands on time and technological infrastructure that were not always available in schools and homes in a reliable way back in 1999, when the workshop was held. As computers become cheaper and bandwidth for network became bigger, this problem was solved and other case studies reported in this chapter took on some of these new challenges. In the experience described in this case study, all the participants met face-to-face at least twice, and most of them were physically copresent when logged in. When difficult issues of sociodynamics arose online, it was common for kids to go off-line to resolve them. What is the right balance between online and off-line activities? What kinds of issues require face-to-face interaction? Did the learners continue the kinds of conversations about controversial issues that they initiated online once they were face-to-face?

(8) *Institutional context of usage.* During the experience reported in this case study, the institutional context was given by the university lab that housed the Zora summer camp. Thus, the rules and policies were set up by researches to easily accommodate the research agenda and the needs of the project. For example, on an occasion the children chose to create a stripping bar. This originated as a result of one of the kids finding an online cartoon character that when clicked on would strip. Although there were no body parts exposed, the gesture of the character was clear at conveying the idea of stripping. The stripping issue kept being discussed all along the Zora summer camp, maybe due to the fact that kids were in the teens, an age in which talking about sex is particularly appealing. However, the stripping bar was never created and stripping was outlawed by decision of the Zora community members. The process of discussing this issue had a clear educational value, but the outcome might have turned out different. Since the institutional context was the university lab, researchers had the freedom to let this issue evolve so it could be solved by the children themselves, as opposed by an outside power structure or policy. This might not be the case in different institutional contexts.



## Case Study 2: ACT

The *ACT* program was a 3-day orientation program for new first year students at our university. The program was first held in 2006 and then again in 2007 (Bers, 2008a, b; Chau & Bers, 2007). A flyer was included in the new student orientation packet during the summer prior to their arrival and all incoming students were eligible to participate in the ACT program. The flyer included information about program activities and the goal of the program to use a virtual environment to *design a campus of the future.* Interested students completed an online application form that collected demographic information including gender, age, hometown, and previous experience with various computer software programs. These questions were intended to help screen and select a student group to represent a variety of technological backgrounds. Because of the nature of university orientation programs, participants were a self-selected group of students who were interested in what the program offered.

Each year, 18 participants attended the ACT program. Participants ranged in age from 17 to 19 (mean = 18), and included three female students during the first year and four female students during the second year. All participants were fluent in English. Based on the background questionnaire, participants of both years represented technical competences ranging from basic word processing tasks and e-mail communication to web programming and graphic design. During postinterview, we also learned that while none of the first year students were familiar with the Active Worlds platform, two students from the second year program had had experience with Active Worlds environments as a user prior to the program.

During the ACT program, participants were divided into two groups who logged onto the ACT Zora world from separate computer labs on campus. Two peer leaders who were upperclassmen at the university guided each participant group through the ACT curriculum to build a *campus of the future* in the Zora world. Over the 3 days, participants logged onto Zora for ACT activities for approximately 26.5 h, and spent approximately 27 h in noncomputer orientation activities such campus tour, orientation lectures, dining out, and social activities. All Zora activities were recorded automatically using the Zora log system, and peer leaders documented out-of-computer activities with photographs and field notes. A researcher who did not take part of the Zora curriculum was also present during computer and noncomputer activities to observe and take field notes.

Throughout the ACT program, students use the Zora virtual environment to create a virtual campus of the future in which they graphically display information gathered from their visits around campus and the surrounding neighborhoods in the form of 3D virtual exhibits. They create virtual public and private spaces populated by objects, stories, and discussion cases, and engage in both synchronous and asynchronous discussions about a variety of civic and campus topics. In reflection of discussion cases, the activities on Zora encourage students to choose and work on the issues that are most personally meaningful to them and then share their ideas

and data with others. This is a central tenet to the constructionist approach to learning (Papert, 1980) that has been carried to virtual communities designed with the constructionist framework (Elliott & Bruckman, 2002). At the end of the intensive program, students make a short digital video or infomercial about their virtual campus to share with their peers, faculty, and administrators. Each year participants host an open house in the semester following the preorientation program where they show their infomercials to the campus community and invite campus faculty, staff, and students to visit the *campus of the future* that they created during ACT.

Participants introduce the audience to their virtual creation and to learn about their ideas for building a stronger community within the campus as well as strengthening the relationships between campus and surrounding neighborhoods. This open house demonstrates students' work in Zora and invites participation and discussions in the virtual environment from guests from the wider academic community. As such, the ACT project provided students with an experience during the program to grapple with issues dealing with their civic life as they think through the design of the *campus of the future*, and it also served as an object to think with and talk about during the open house discussion. Much like the previous case study, Zora afforded an opportunity for these students to reflect and introspect through design and community building; in addition, the ACT program empowered participants by providing them an innovative tool to share their ideas with other members and faculties of the university.

From the participants' point of view, the ACT program might have seemed focused solely on their technology-based activities, in their research, and their design. However, participants' experience in the program was influenced by the many other activities included in the overall intervention, some that took part in outside of the computer labs, student's interaction with each other online and off-line, and the design of the overall 3-day program.

(1) *Curriculum.* The ACT curriculum was focused on the specific theme of designing the *campus of the future*, and peer leaders created a list of activities for students to explore and to guide their building of the *campus*. However, these activities were designed to be broad so that participant engagement remained flexible and open-ended. For example, in one activity participants were asked to consider the role of the university and its students in the lives of youth in the community surrounding the university. Some participants took the task to learn about the various early childhood education programs in the community and research about the different roles that university students could take to help educate young children; other students created objects and collected news articles to reflect on how campus and community police to work together to prevent rowdy college students to disturb community neighbors. While the curriculum had in its design specific topics that we wanted students to explore through the medium of discussion cases (e.g., youth programs, safety, equity, and private–public funds), participants were able to create the *campus* to reflect particular issues that they were most interested and felt most connected.



(2) *Mentoring model.* Because the ACT program was designed as an orientation program and its goal to guide participants to think about their role in the campus community, mentoring was a crucial element. Besides providing technical support and guiding participants through the activities, peer leaders took part in designing the curriculum and activities outside of the computer labs. For the ACT program, including peer leaders in the design process was critical in fostering the mentoring relationship between the peer leaders and participants. Peer leaders had the opportunity to share their experience of being upperclassmen with participants through the activities and experience they designed. This included simple topics such as which ice-cream store to visit after a group dinner, to which administrative office to contact to most efficiently learn about what campus dining did with leftover food. The intention throughout was to provide a genuine experience for both the peer leaders and the participants through which to build a mentoring relationship that could last beyond the 3-day program. The success of the ACT mentoring model was evident in that over half of the first year participants volunteered, without prompt, to return as peer leaders for the second year.

(3) *Diversity.* One of the first tasks of the program was to decide on selecting a group of 18 participants. The issue of diversity for this program rested in technical competency, previous experience with civic or community related activities, and exposure to the community neighboring the university. Unlike the first case study where racial and ethnic diversity purposefully played a major role in the participant selection process, this study aimed to select students from a range of technological experience, and from different types of communities. We also intended to include in the sample two to three international students each year to align with the student population at the university. Initially, we hoped to recruit an approximately equal sample of male students and female students; however, the lack of female applicants caused us to remove gender as a recruitment criterion. Through our analysis of the Zora log and field notes, we found patterns of Zora interactions that could be attributed to the diversity of participants' background. For example, participants who reported to be less social media savvy, including one participant who had a difficult time keeping up with typing in the chat, tended to create and build more objects. Log data showed that they were more likely to take directions and take others' discussion and turn them into objects and 3D exhibits.

(4) *Project scale.* Because of the context of ACT as an orientation program, we were not able to test the technical issues related to scalability. This issue was addressed in a different case study. Instead, the ACT program was piloted to test whether the university could uptake this and could offer portions of the program for all students on campus for extended projects or as part of the typical student life experience offered. Only 18 participants attended each year of the program and thus we focused the scalability issue on whether students could find an interest in using the Zora interface as a tool to communicate and form a network, and at the same time use it as a space for sharing ideas about their campus life with administrators. The mentoring model was one of the outcome questions

remained to be addressed. While at the program participants had direct and face-to-face interaction with peer leaders. One key concern would be to translate the face-to-face experience into the virtual space.

(5) *Type of contact with participants.* Unlike the other case studies described in this chapter and similar studies conducted by other researchers using virtual environments (Barab et al., 2005; Dede et al., 2005), the ACT program included approximately equal time for online and for face-to-face interaction. This was purposeful in design to reflect the overall goal of the program and the curriculum. We felt that in order for a small group to form a peer network that could successfully work together collaborative in very brief amount of time and with hope that these relationships could extend beyond the program, face-to-face time was deemed equally as important. Face-to-face time allowed more channels through which participants could easily form relationships quickly. And thus, we designed the program to maximize the relationship building aspects of the program (e.g., social activities, learning about the community, and the campus environment) to face-to-face, out-of-lab activities while focusing participants on the building and the *campus of the future* aspects of the curriculum.

(6) *Assessment.* Assessing participants' experience included multiple modes of data collection. Participants' activities on Zora were recorded automatically through the Zora log system, and raw data were analyzed by using the Zora Log Parser. Participants also completed the *Positive Technological Development Questionnaire* (Bers, 2006) before, after, and during a 3-month follow-up to the program to assess changes in their attitudes toward technologies and their competencies and experience as a result of the program. Results relating to these data are reported in Chau and Bers (2007). In addition, participants were interviewed after the program and during the follow-up to reflect on their experience, including technical, curricular, and program aspects. One of the most pertinent level of assessment, although less systematic, was their presentation of the *campus of the future* to administrators and other faculties during the open house events. Their enthusiasm was evident that they felt empowered by the process. However, methodological questions remain as to how to assess their enthusiasm systematically, and how to evaluate the level to which their interests and engagement with the ACT program and the Zora interface influenced their civic life on campus.

(7) *Access environment.* The advantage of the ACT program being held at monitored and supported computer labs on campus added to the smooth operation of the various activities. While Zora could be installed on most student computers, the decision to hold the program at the labs was to ensure reliability and consistency and to secure support from the university IT staff. The environment posed a different sort of collaborative space than other case studies presented in this chapter. It was evident from the field notes that although most curricular activities were conducted in the Zora virtual environment, there were certain interactions that participants found to be more efficient, or more possible, via face-to-face discussion. Because participants only had a brief amount of time allowed, they were rushed to gain fluency over the Zora interface and



to design a virtual exhibit. Certain elements about the *campus* that participants felt were less pertinent, such as placement of specific virtual houses or signs, they decided to work out through face-to-face interactions. Although at the time participants and peer leaders felt that these were less pertinent as data, participants' experience would undoubtedly be different they were not afforded the same opportunity. It could be that they were not able to organize a well-planned virtual map and thus houses could not be easily accessed or objects may not be placed appropriately as exhibits. These were in reality issues for other case studies presented in this chapter but the ACT program enjoyed certain privileges due to the access model inherent in the program.

(8) *Institutional context of usage.* The ACT program presents a unique case for discussing the institutional context of usage. As a program offered for university students, the ACT program did not face the same level of challenge as other case studies in terms of language, consent, and content appropriateness. Participants were expected to have at least a minimal level of technical competence that was sufficient for operating the Zora interface. And because it was held at a monitored space, we received adequate IT support throughout the program. However, due to the nature of an orientation program and the open-ended curriculum, participants were free to interact with each other and with the virtual space as they would like in Zora. This posed a problem for several participants who got distracted away from the curriculum. One participant, in particular, took pride in leaving behind 3D objects in places where other participants were creating their exhibits. Because the peer leaders were his peers and they did not feel comfortable "disciplining" this participant, the lead researcher had to step in and talk with the participant. Even so, he did not feel obligated to collaborate with other students because his felt that his ideas were not appreciated. The researcher ended up giving him very specific tasks to work on that could contribute to the overall design of the *campus* yet unobtrusive to other participants' parts of the virtual world. This and other similar events might not have been as delicate of an issue if this was part of a graded course or part of a program where inappropriate participants could be disciplined.

## Case Study 3: Transplant Program

Virtual communities have the potential to support the personal and social development of youth with lifelong medical risk or chronic illness who due to their condition, may not be able to attend school regularly and thus have difficulty forming peer relationships (Bers et al., 2003). This case study examines how we can leverage youths' interests in online technologies to create a psychoeducational intervention to promote the overall well-being and health of pediatric posttransplant youth. The goals of the pilot study were to:

1. Facilitate peer networking building amongst same age pediatric posttransplant patients.

2. Encourage medical adherence through activities and environment that foster discussion, sharing of experience, and informal content delivery.
3. Support posttransplant patient's psychosocial adjustment to lifestyle changes by creating a community.

This research project started in late August of 2006 and ran through the summer of 2007 in collaboration with pediatric psychiatrists and medical staff in the pediatric transplant program at Boston Children's Hospital. Posttransplant patients were first referred to us by doctors based on their age (11–15) and health status. Those eligible patients and their families were then contacted and invited to participate in the project. Most participants used Zora from their homes (all over New England, and some other further states) and at times, during hospitalizations (Bers et al., 2007; Satoh et al., 2007; 2008).

Fifty-four patients were originally contacted through phone calls and mailings; 31 verbally agreed to participate and 25 returned the necessary consent and assent forms. Of these 25, we could not provide Internet to 3 due to their remote locations. Thus we worked with a total group of 22. Of the 22 patients, three never logged in into Zora, so our user group was composed of 19 children; however, 22 returned questionnaires. Forty-five percent of the participants were females and the average age at the start of the program was 13.7 years. Participants engaged in weekly online activities for the duration of the study. While they were free to log on at any time, the group activities followed a semistructured curriculum aimed at sparking conversations about transplant experiences by encouraging them to create virtual spaces such as a Health Museum and a Pharmacy.

During the project, each user logged into Zora an average of 60 times and spent an average of 39 h logged into the program. This represents almost 7 h more online than we had anticipated, as we had planned weekly online activities for 32 h. Users created a total of 4,027 objects and made 75 virtual houses. For example, they created a Legislature House where they put recommendations for hospitals to ease the stay of the patients, such as "soft pillows," "beds with comfortable mattress pads on them. . .especially in the cardiac cathlab, where you have to lay flat for 6 h," and suggestions for schools to ease transitions after prolonged hospitalizations, "so kids don't have to tell stories so many times" (Bers et al., 2007).

During the course of the study, three individuals underwent cardiac retransplantation. Their participation from the hospital both before and after the transplant added an extra dimension to group discussions. It also provided an opportunity for some of the participants to meet for the first time face-to-face.

During interviews, users reported positively about their experience with the project, especially about being able to meet other children who had received a transplant as made evident by a feedback from a participant:

> I believe that taking part in Zora did give me inspiration. I only had a liver transplant, and I cannot have tunnel vision that there's only me, but there are a multitude of other kids that have gone through similar experiences as myself. They inspired me to help educate others about organ donation, because there are kids like us whose lives have been saved through the gift of organ donation



Preliminary analysis of the data collected from the questionnaires reveal little change in the participants' medical adherence over the course of the Zora intervention primarily due to the fact that the participants were already exhibiting satisfactory level of adherence prior to participation in the project. However, it became clear that patients with high severity in their illness were the ones who used Zora the most and that participating in Zora helped in ameliorating children's fear of follow-up clinic visits. Based on log analysis and quantitative responses to questionnaires, we have also observed positive impact in terms of peer networking. For example, a social worker described Zora as providing ("something that none of [the patient's] Doctors or medical professionals could—a connection to other kids who knew exactly how he was feeling and experience the unpleasant things that go along with transplant each and every day").

In terms of the eight dimensions presented earlier, they played out in the following way in this study.

(1) *Curriculum.* As in the case of the multicultural summer camp, the curriculum for the study with the posttransplant patients was designed to be one of emergent nature. It provided guidelines for the mentors to facilitate activities throughout the 32-week intervention period on Zora. Besides activities meant to foster peer networking, other activities centered on the issue of medical adherence as well as getting the participants to become more comfortable discussing their transplant experience. For instance, when the moderator, a doctoral student in child development, noticed that the participants were starting to share experiences about their transplant history, she would encourage them to document these in a "Transplant House." When they would start sharing information about medication, she would encourage them to build a "Pharmacy" so they might post and share responses to questions such as "how do you remember to take your medication?"

While both the Transplant House and Pharmacy were included in the original curriculum, the moderator waited until she could see the online conversation naturally directed itself to one of these topics at which point she knew that participants were ready to talk about sensitive issues pertaining to their health. The components of the curriculum were conceived as general guidelines, and new ideas for projects coming directly from the patients were encouraged and welcomed. For example, during Halloween, participants chose to collaboratively build a Halloween virtual house with objects representing their own fears.

(2) *Mentoring model.* The facilitator was a child development doctoral student with experience in child health and a clear agenda in terms of the research and learning goals of the project. The facilitator coordinated weekly Zora online activities but spent most of her time, helping participants with the technical aspect of the program, from installing it to supporting creative uses. Although the goal was for the facilitator to progressively move toward getting the participants to help each other, this happened very slowly as children were on different schedules. Our mentoring model was composed of a facilitator and

several mentors, older teenagers who had had a transplant were identified as potential mentors for the Zora community and were invited to join. For example, when participants discussed online their worries about going to college and not having their mothers around to help them to remember to take their medications, we asked one of the mentors, a college student with a transplant, to come online to talk about his own experience. The long-terms plan is to have the participants, as they become older, to assume the role of mentors.

(3) *Diversity.* The diversity among this project's participants is found in terms of the type of organ they received, the types of medical situations that lead them to require an organ transplant, the time since transplant, and the severity of their condition. There were 13 participants from the heart transplant program, 3 from liver, and 6 from renal. Diversity is also present based on their location: 12 participants were from Massachusetts, 1 from Florida, 1 from Maine, 3 from New Hampshire, 2 from New York, and 3 from Rhode Island. They all had in common that they underwent the transplant procedure and received posttransplant follow-up treatment at Children's Hospital Boston. Regardless of their original ailment or organ received, they all share the experience of going through organ transplantation and thus were all committed to a life-long regimen of medications and follow-up invasive interventions.

(4) *Project scale.* Although 22 posttransplant patients signed consent forms, only19 used Zora and half of them participated on a regular basis. Although at the beginning of the project, scale was not an issue and children were happy to meet for the first time other posttransplant children, as the project evolved, children wanted to have more participants, as it was difficult to have synchronous activities and conversations. Throughout the study, we had to hold our weekly online meetings at two different times to accommodate different participants' schedules. In addition, the voluntary nature of the project meant that we could not enforce regular attendance. Thus there might be as few as one or two participants attending planned activities. However, participants would be online at other times to work on individual projects. Due to the "constant on" nature of this project, participants were welcomed to sign on at any time; however, our data showed that in many cases, a participant who logs on and finds that only one or two other members are on would sign off. This may be due to the lack of a minimum critical mass to sustain participants' engagement. Other researchers (e.g., Preece, 2000) have shared similar experiences for the need to have a minimum critical mass when building a social network or a virtual community. To increase the probability of having a minimum critical mass to sustain a discourse, we are increasing the overall user or participant pool by bringing on board a new site, Tufts Floating Hospital for Children.

(5) *Types of contacts with participants.* Besides regular online contact with the regular participants, we have made home visits to a few local participants' homes to gain an understanding of the environment and context in which Zora was being used. We also arranged to meet some patients at the time of their regular



hospital's clinical visits or while they were hospitalized for treatment. However, depending on the time since transplant, the frequency of the participants' routine visits to the hospital varied; therefore we could not arrange to meet every participant and their family. For those participants whom we could not visit either at home or at the hospital, interviews were conducted over the phone. In addition, users created a monthly newsletter, *Transplant Times*, that reported on some of the key activities that took place on Zora. The newsletter was printed and mailed to all participants, their families and hospital staff. At the end of the year, we organized a Zora group who would represent the virtual community of transplant patients at the hospital's annual fund raising walk. Five of the participants and their families joined for the walk which gave us, and them, the chance to meet other face-to-face.

(6) *Assessment.* Data collection included automatically generated logs that provided qualitative and quantitative data of user's online activities, self-report instruments, and semistructured interviews, as well as spontaneous feedback. We collected three sets of data: (1) data pertaining to Zora use and participant feedback through semistructured face-to-face or telephone interviews, as well as Zora logs, and home visits to check for fidelity in the way the system was used by the patients and the ways it was intended to be used; (2) data pertaining to the positive development of youth through the use of technology collected through questionnaires; and (3) data about patient's medical adherence and medical history provided by parents, medical staff, and children's themselves.

(7) *Access environment.* The participants were expected to log online from their computers in their homes. Since not every family had access to a computer suitable for using Zora, we provided computers to three families and also Internet service to one family. During hospitalizations, patients were able to participate from the hospital.

(8) *Institutional context of usage.* Participants were requested to sign a Code of Conduct which outlines some basic rules of Internet behavior (such as not disclosing personal information online) prior to logging into Zora for the first time. This was requested by the hospital IRB to ensure the safety of the participants. The initial items on the Code of Conduct signed by the participants are created by the researchers but once on Zora, we encouraged discussions about appropriate and inappropriate behavior on Zora (such as resolving issues of participants building on top of, or within someone else's "property" without notification). Once consensus was reached as a community, new items were added to the Code in the Zora world. The institutional complexity of hospitals and the interdisciplinarity of this work makes it difficult to be in full control of crafting an innovative educational intervention that, although might not meet the scientific review criteria of the medical field in terms of statistical significance of results, shows clear qualitative signs of having a positive impact. For example, based on feedback from participating children, parents, and medical staff, the CICU Cardiac Clinical Research and Education Fund at Children's Hospital Boston decided to continue funding the program as a free pilot clinical service, after the NSF funding finished, while we secured new funding.

## Case Study 4: ClubZora: An International Network

The ClubZora project began in November of 2007 in collaboration with The Intel Computer Clubhouse Network (http://www.computerclubhouse.org/), whose mission is "to provide a creative and safe after-school learning environment where young people from underserved communities work with adult mentors to explore their own ideas, develop skills, and build confidence in themselves through the use of technology" (http://www.computerclubhouse.org/about1.htm).

Began in 1993, as a collaboration between the Computer Museum (now the Boston Museum of Science) and the MIT Media Lab, the Clubhouses serve youth between the ages of 10 and 18. Each Clubhouse has a paid coordinator and volunteer adult mentors who share their experiences and serve as role models. There are currently over 100 Clubhouses around the world, serving over 20,000 youth. Some Clubhouse locations are stand-alone buildings while others are located within community-based organizations, such as YMCAs or Boys and Girls Clubs; some are urban, and some are rural. Thus, they attract a wide variety of youth from many different backgrounds and experiences. Though the members are all part of this organization, there is little opportunity for them to interact with members from other cities or countries or to build community.

The two main goals of ClubZora were (1) to provide a virtual space for Computer Clubhouse members around the world to build a strong community and (2) to help youth from different cultures learn about each other. During the project, participants created almost 52,000 objects, recorded over 35,000 lines of chat, and logged in over 9,800 times. For example, a two-story fully decorated personal house by an 18-year-old citizen from Guadalajara, Mexico; a multistory replica of her Clubhouse by a 17-year-old participant from Colombia; "Area 34," a multihouse compound for the "Commander" created by several members of a Clubhouse in California; a complex maze system by a Clubhouse Coordinator in Columbia; and a pyramid with an internal meeting room, made by a Clubhouse Mentor from Costa Rica. In addition, a special "Teen Summit" space was created to celebrate the organization's bi-yearly gathering of youth and Coordinators in Boston, MA. For this space, the metaphor was an "International Film Festival" where each region served by the Clubhouses had their own house in which to display videos created by the Clubhouse members for the Teen Summit.

(1) *Curriculum.* The curriculum designed for the project was based on the goals of the project—to encourage a community of users and to explore issues of diversity. Using existing classroom social studies curriculums and based on our work in other settings, we designed a set of activities for ClubZora around the theme of culture. In addition, these activities were designed to facilitate interaction amongst ClubZora citizens as members of the Clubhouse Network. Example topics at the beginning of the project included Music, Country, Zora Entertainment Center, Faith/Beliefs, Holiday Celebrations, Values Dictionary, "Heroes & Villains," "Myself & Technology," Art Museum, School/Academics, Sports, "Language & Communication," Vacation, and



Community Service. However, these planned activities were just ideas—as with the other projects, the activities were designed to be emergent (i.e., based on the interests of the citizens).

In addition, each activity was designed with three parts—the first part related to the individual youth, the second part to the Clubhouse, and the third part to the whole Zora virtual city. For example, if the activity was about music, for the first part, the citizen might create a playlist of his/her favorite songs and post on a message board in his/her house. For the second part, the members of the Clubhouse would work together to create a display of their favorite artists and albums. In the final part, participants would visit the Zora city center and create a display of the favorite artists from around the world, including links to radio stations that Clubhouses might have. As another example, if the topic was about food, in the first part, the participant might post his/her favorite dish and recipe on a bulletin board in his/her virtual personal house. In the second part, the members of the Clubhouse would work together in the virtual Clubhouse to make a display of food that represents their region of their country. In the final part, participants would visit the other virtual Clubhouses and vote for their favorite dishes in the global "Zora Kitchen."

Finally, we wanted to encourage collaboration in Zora, not competition, so we designed a recognition system to motivate members to work and learn with each other. Each part of the activity, as described above, was linked to a level of recognition for that citizen. If the individual activity (Part 1) was completed, he/she was recognized with a planet in their account. If the Clubhouse activity is completed (Part 2), he/she will be recognized with a sun. If the global activity is completed (Part 3), he/she will be recognized with a galaxy. Users cannot see each other's amount of recognition, though Tufts administrators can. This recognition system was intended to be used to celebrate the accomplishments of the group—for example, a Clubhouse who has strong completion of Part 2 will be able to request a new 3D model to be added into the object library.

Although our planned activities are important, we encouraged each member and each Clubhouse to create and post their own activities to have fun together and learn about each other's culture. In addition, we provided an online form through which members could suggest activities. The members' whose suggestions were implemented were recognized within the body of the activity for their contribution.

From a technical perspective, as originally designed, each week a new activity was released online within Zora, to be accessed from the "Activities" page in Zora, with the user alerted about the new activity on the Zora "Home" page (i.e., so that it would be seen upon log on). Because the activities were released in this way, it did not matter when a member started with Zora—they could catch up with the activities through his/her personalized account. However, participants were able to use Zora whenever they wanted and they did not have to just complete the activities—the Zora world was always open for exploring and building.

(2) *Mentoring model.* There were two types of mentors for this project (called "Zora Ambassadors"): Ambassadors who went to the local Clubhouses and met the youth face-to-face and online Ambassadors who worked with the Clubhouse members virtually through Zora only. Ambassadors to the local Clubhouses were undergraduate and graduate students who visited once a week to help install Zora, teach members how to use the software, and encourage them to use Zora. At the end of each session, they submitted field notes, based on a template, to the project coordinator.

The online ambassadors for this project were bilingual (Spanish and English) and were assigned one afternoon each to be online for approximately 3 h at a time. They were comprised of undergraduate students, an alumna of the Devtech research group, and a high school student doing community service credit in Miami. For the online ambassadors, their primary task was to interact and get to know the youth. They were to facilitate communication amongst the youth about topics that we as a research team have deemed important—for this particular project, these topics include culture (getting to know about each other), values, and identity. They were also to encourage the youth to complete the activities and feedback surveys.

In addition, online ambassadors were encouraged to work with "their" group of youth (i.e., those who were on Zora their scheduled day) to plan projects within Zora or to come up with new ideas harnessing the youth's interests (e.g., making a movie of Zora, building a new community structure, coming up with a survey for everyone to take, or writing a newspaper). While the above tasks were the focus of their work, part of being an online mentor was monitoring for the safety of members. This included monitoring for inappropriate language, bullying, aggressiveness, and violations of the Zora Code of Conduct, which all members had to agree to before enrolling in the project. At the conclusion of each session, mentors were required to submit a set of field notes, also based on a template, to the project coordinator.

(3) *Diversity.* The nature of the organization in which we were working—the Intel Computer Clubhouse Network, which has over 100 Clubhouses located around the world—meant that the ClubZora citizens would be diverse. We enrolled over 570 citizens, including over 430 youth and 130 Clubhouse Coordinators. The enrolled citizens represented 84 Clubhouses, 19 countries, and all 8 regions of the world that the Clubhouse Network serves, including the USA, Asia Pacific, Europe, the Middle East-Africa, and Latin America. Of the youth, 37% were female and 63% male; 77% selected English as their primary language and 23% Spanish; and the average age was 14 years (range: 8–19 years). In addition, it is part of the mission of the Clubhouse to work with youth in underserved communities, meaning that there was also a range of socioeconomic backgrounds.

(4) *Project scale.* The ClubZora project was a large-scale intervention that was run completely virtually. We were not able, per IRB requirements, to link the "real life" Clubhouse member to their virtual persona. Thus, all contact with the citizens was done over email or within Zora itself. In addition, there were citizens from a diverse range of time zones—since the project headquarters were in Boston, MA (EST), this meant that it was difficult to be online at the same time as many of the participants. In addition, the Zora-specific content, such as the activities, were supported in two languages—Spanish and English.



(5) *Type of contact with participants.* As mentioned in previous sections, contact with the citizens was done completely virtually, either through e-mail, from the organization's intranet, called *The Village* (which in many cases was not checked regularly by participants) or through Zora itself. Clubhouse members who had an account in The Village could request a ClubZora username and password via an online form in the Village. The project coordinator received these requests and examined them to make sure that they were only from Clubhouse members, in order to ensure the safety of the youth online. Participation in the project was completely voluntary and at the discretion of the youth to join.

(6) *Assessment.* Each part of an activity, as described in the curriculum section, was followed by a few questions that we invited participants to answer online. These questions related to the activity ("Did you like it?"), to the idea of positive development ("I believe that by using computer technologies people can find new ways to give back to their communities."), and to culture ("I like to learn about food from different cultures."). Participants were also encouraged to send feedback at any point during the project to the project coordinator. Finally, an online survey outside of Zora (in order to also reach those Clubhouse members who did not participate in Zora), in English and Spanish, was administered at the conclusion of the project to elicit feedback about the project as a whole. In addition, as described in the mentorship section, both local and online mentors were required to complete field notes at the conclusion of each of their sessions. Also, most activities within the software were logged and available for analysis using the Zora Log Parser.

(7) *Access environment.* While individual youth could request a Zora username and password, a Clubhouse Coordinator needed to install the software at the Clubhouse. All Clubhouses were invited to participate in the Zora project; however, there were two requirements: (1) The only supported languages were English and Spanish. Those speaking other languages were still able to participate, but support was only provided in those two languages. This included support documents, communication, and the Zora software itself (i.e., participants in those Clubhouses in which non-Latin characters were used had to switch to a Latin character set to be able to chat and modify text in Zora). (2) A high-speed consistent network connection was required. The software was only available as an online download and because of the heavy graphics load, a low-speed connection would have made it impossibly slow to use Zora.

(8) *Institutional context of usage.* Because this project was done within the larger context of an international organization, we had to be respectful and accommodating to their organizational rules and ideals. For example, in the online Zora Ambassador guide, we wrote:

> The culture of the Clubhouse is one in which "school-like" language or concepts as well as competition is not advised—for example, instead of the word "curriculum," the word "activities" is used. Instead of a "rewards" system we have a recognition system. Instead of "questionnaires" we ask for feedback. And, the word "research" is not used with the youth either. Remember, you are working with kids who are in a place that is not school (and specifically designed to be a non-school-like atmosphere)—we want Zora to be a fun and interesting place to be!

In addition, the Clubhouse Network provides access to a lot of extremely advanced and cutting-edge technology and is a testbed for many research projects that are competing to catch youth's attention and engage then in a sustained way.

## Conclusion

This chapter shows the prevalence of virtual worlds in the lives of young people and presents four case studies of a diversity of programs that used a particular virtual world, Zora. Zora was designed and implemented to be used by researchers and practitioners developing psychoeducational interventions. However, in order to have successful learning experiences, the virtual world by itself is not enough While all programs presented in the case studies utilized the same virtual world, as shown in each of the above sections, they all took their own approaches to the eight dimensions that should be taken into consideration when designing and implementing programs that use virtual worlds: (1) curriculum, (2) mentoring model, (3) diversity, (4) project scale, (5) type of contact with participants, (6) type of assessment and evaluation, (7) access environment, and (8) institutional context of usage.

For example, in some projects such as the multicultural summer camp and the ACT program, the virtual world was used by participants who had face-to-face contact. The role of the technology was to provide another way for youth to engage in conversations about their learning. Because participants and program staff were in the same room, technological support was easily provided on-site. The face-to-face contract with participants also allowed for easier data collection, as pre- and postquestionnaires were distributed out by hand and included as part of the intervention and the participants were accessible for in-depth interviews.

In other projects, such as the work with posttransplant patients and the ClubZora project around the world, participants were only able to meet each other and work together through the virtual world. Technological support was done online. This posed challenges for both projects. For ClubZora, we had to conform to each Clubhouses' technological limitations and restrictions, often which included local firewalls (to protect Clubhouse members from certain types of Internet content) that often unintentionally blocked the Zora software. In addition, when Clubhouse Coordinators or members asked for technological help, they themselves did not have the authority to make changes to the Clubhouse technology (i.e., a technical consultant may be used), nor did they know the vocabulary with which to explain the problem, thus making remote troubleshooting difficult. In the case of the posttransplant patients, they were using Zora from their homes. The availability and technical knowledge of the parents varied and there was need for one-on-one face-to-face support as some of the children where young and did not know how to install software, troubleshoot, etc. In terms of data collection, both of these projects presented challenges in terms of missing data and lack of access to the participants for pre- and postsurveys. The ClubZora project presented a different challenge, but also yielded a lot of learning, as it was the first of the studies to be conducted on a very much larger scale than the other three.



As another example, in terms of institutional context of usage, while the summer camp and the ACT program where run at the researcher's universities, the other two studies involved a strong collaborative component with the home institutions, such as Children's Hospital Boston and The Intel Computer Clubhouse Network. This posed new challenges as both interdisciplinary perspectives and cultural organizational expectations and mandates needed to be negotiated on a frequent basis. In some cases, negotiations slowed down the program and hinder children's sustained engagement.

It is our hope that this chapter will provide insights from our experience that will help designers, implementers, and evaluators of programs that use virtual worlds specifically aimed for young people, to take into consideration that thinking needs to be done, not only about the design and implementation of the virtual world, but also in terms of how the curriculum and the mentoring model will play out, what the scale of the project and the diversity of the population will be, how the project evaluation will be conducted and how this will influenced by the type of contact with participants, and finally, how the participant's access environment and the institutional context of usage will have a profound impact in the type of intervention program that can be designed, implemented, and evaluated.

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