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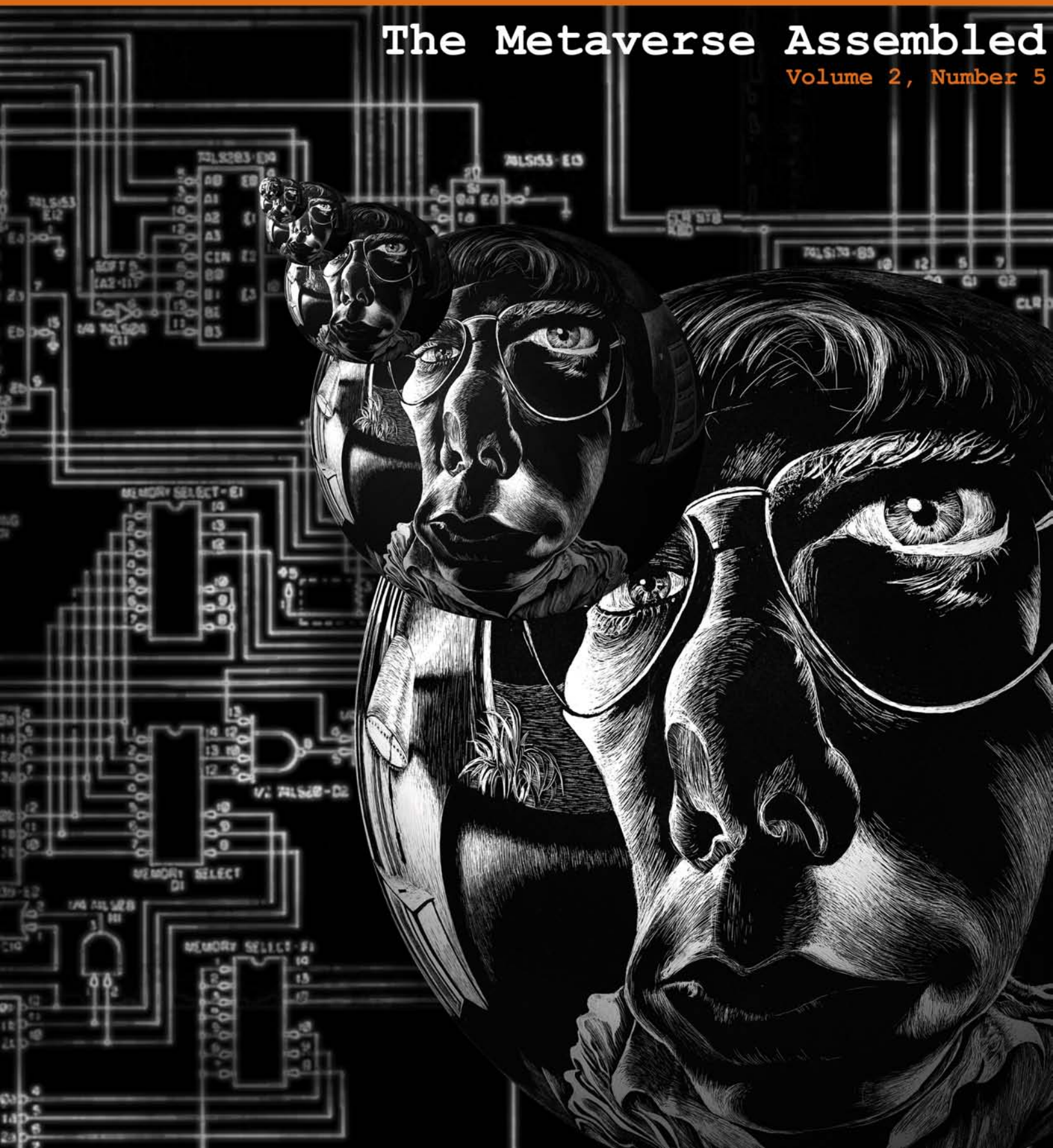

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Exploring Participation in ClubZora: An International Bilingual Virtual World Educational Intervention for Youth

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Abstract

This paper reports on an evaluation of participation in a complex, international, bilingual project called ClubZora. ClubZora was an eleven-month long educational intervention in which the Zora virtual world was introduced to an international after-school community of youth spanning 11 countries and two languages, English and Spanish. Zora is a multi-user virtual environment that provides a safe space for youth. In Zora, users can create and populate a virtual city by making their own places and interactive creations, using 3D objects such as picture frames, movie screens, houses, interior decorations, message boards, and signs. Zora provides both a real-time chat system and a message-board system for communication. This paper presents a case study of an evaluation of participation in this virtual world educational intervention. Through this case study, methods for determining participation will be explored. Using the data collected during the ClubZora project, this case study explores who used Zora and how, including statistical analysis of usage patterns in order to examine potential participation differences among demographic characteristics (i.e., gender, age, language, Clubhouse region, etc.). A discussion of the implications of the results as they pertain to development of the software and of the educational program supported by Zora is also presented.

Keywords: virtual world, evaluation, computer, technology, constructionism, youth, children

Exploring Participation in ClubZora: An International Bilingual Virtual World Educational Intervention for Youth

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Introduction

This paper reports on an evaluation of a project called ClubZora. As will be described in more detail below, this project was an eleven-month long intervention in which the Developmental Technologies (DevTech) Research Lab at Tufts University introduced a virtual worlds software, called Zora, to an international after-school community of youth who were members of a nonprofit organization called The Intel Computer Clubhouse Network. The DevTech team invited youth and adult coordinators and mentors involved in this organization to participate in this project on a voluntary basis. While interacting with the virtual world software, participants could build a virtual city and populate it with objects such as picture frames, movie screens, houses, and interior decorations. In addition, they could also communicate both asynchronously and synchronously. The next section describes the ClubZora project by providing information about the host institution for the project—The Intel Computer Clubhouse Network—and the Zora virtual world.

The ClubZora Project

The Intel Computer Clubhouse Network

The Intel Computer Clubhouse Network[1] is a program whose mission is "to provide a creative and safe afterschool 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" (The Intel Computer Clubhouse Network, n.d.-b). 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. There are currently over 100 Clubhouses around the world, in 21 countries serving over 25,000 youth (The Intel Computer Clubhouse Network, n.d.-a). In addition, "the Clubhouse represents a constructionist learning culture that creates a supportive space for its members to design, build, and share their projects and ideas" (Kafai, Peppler, & Chapman, 2009, p. 4). Each Clubhouse has a paid coordinator and volunteer adult mentors who share their experiences and serve as role models. Some Clubhouse locations are stand-alone buildings while others are located within community-based organizations, such as YMCAs or Boys and Girls Clubs. Thus, they attract a wide-variety of youth from many different backgrounds and experiences. Coordinators, mentors, and members also have access to an internal website called *The Village*. On *The Village* members can share projects, participate in discussions, and have access to a secure email system in which only emails from people within the organization can be received.

[1] http://www.computerclubhouse.org

The Zora Software

Zora is a multi-user virtual environment that provides a safe space for youth to explore issues of identity (Bers, 2001). Marina Bers first designed Zora as part of her doctoral work at the MIT Media Lab upon constructionist learning principles (Papert, 1980). The theory of constructionism is based on Piaget's constructivism (Piaget, 1965) and asserts that people learn better when they are engaged in building personally meaningful artifacts and sharing them with others in a community. Thus, Zora allows users to create their own virtual space and populate it with objects and stories. The DevTech Research Lab at Tufts University redesigned the new versions of Zora using the *Positive Technological Development* (PTD) framework that addresses the question: "How can we 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). Informed by the strengths and assets of young people and how children can use technology in important and meaningful ways, PTD focuses on supporting youth 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, Beals, Chau, Satoh, & Khan, in press; Bers, 2008a, 2008b).

In Zora, users can populate the virtual city by making their own virtual places and interactive creations, including 3D objects, characters, stories, message boards, and signs, as well as movies and sounds via easy-to-use tools (Figure 1).

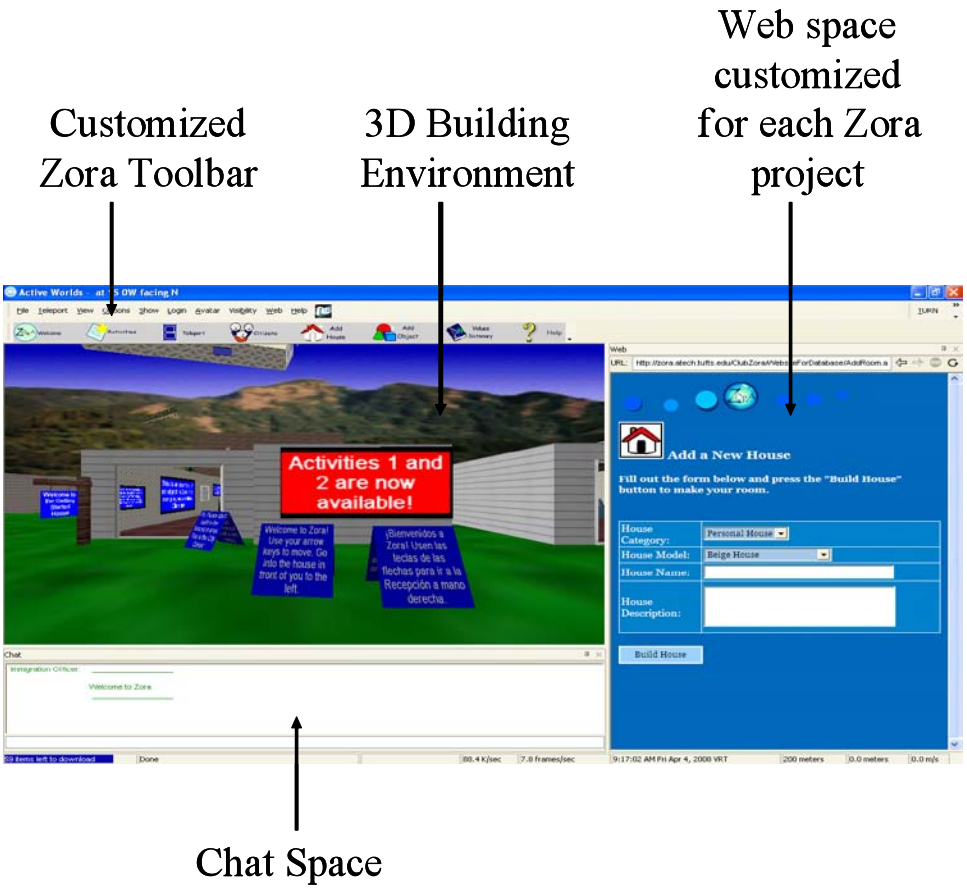

Figure 1. The ClubZora virtual world software.

At the beginning of each new DevTech project, 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). Zora is a platform that enables researchers and educators to run different educational programs using the virtual world. Over the years, Zora has been used with many populations including those with end-stage renal disease undergoing dialysis treatment (Bers, Gonzalez-Heydrich, & DeMaso, 2003), multi-cultural groups (Bers, 2008a; Bers & Chau, 2006), freshman in college (Bers, 2008a; 2006), post-transplant pediatric patients (Bers, Chau, Satoh, & Beals, 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, 2009, April).

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. Users can also communicate with each other via message board objects; the ability to leave messages allows for asynchronous communication among users. The DevTech team purposely designed the environment 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.

The Zora software allows users to incorporate movies, music, and pictures. For the ClubZora project, users were able to links to projects from their Village accounts. During the evaluation study reported this paper, this functionality in Zora gave users the opportunity to showcase the projects they completed in their Clubhouses. Subjects in the study included pictures, videos, and music from outside the Clubhouse that they added in order to represent themselves. The library of objects that were available to ClubZora users to populate the city was limited; generic objects, such as cubes, picture frames, and TV screens, allowed users to engage their imaginations to invent objects that were not available to them as models—though the Active Worlds library contains thousands of pre-made 3D objects, ClubZora users were only given 35 objects to use. The DevTech team enacted this limitation in order to encourage users to think creatively "outside the box" about what they wanted to build and how they wanted to portray themselves in the community. For example, one member created a pyramid that could be climbed or explored from the inside by using the generic cubes overlaid with a picture of stones (Figure 2). As many of the available objects allowed for personalization with the use of pictures, video, or sound, these objects encouraged users, for example, to "show off" their Clubhouse projects or to highlight their hobbies and interests.

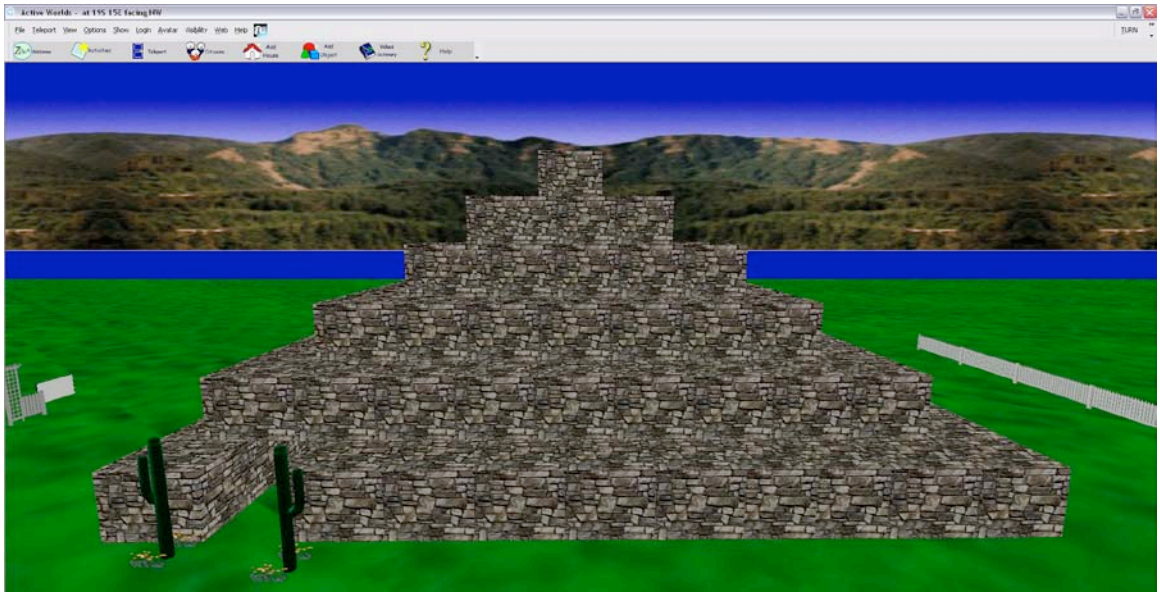

Figure 2. Pyramid created by a youth member from the CEDES Clubhouse.

Zora is a secured and password-protected world in which only youth engaged with a particular research program can view and contribute to the world. Because the community is constrained to a particular research project, and to users who have agreed to participate in the research, the research team has full access to data collected during the project. Each action performed by the participants in Zora is logged into a database and analyzed with a customized log-parser (Figure 3).

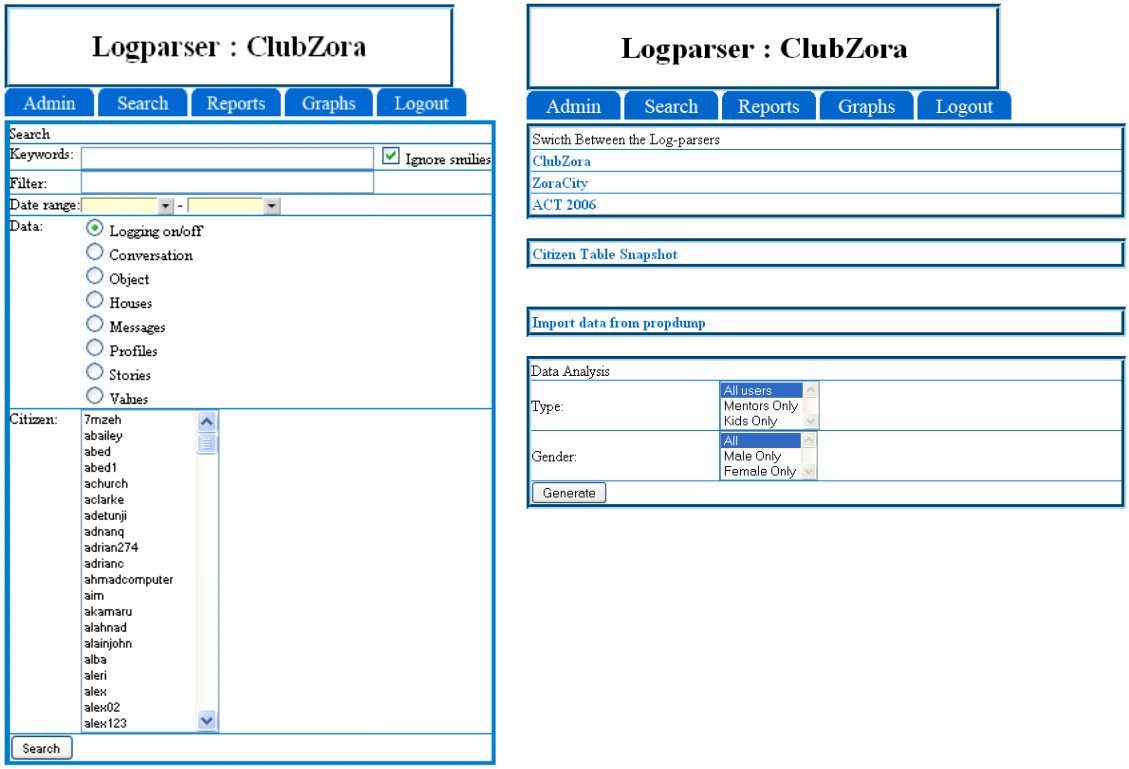

Figure3. The Zora Log parser search page for usage statistics (left) and participants (right).

The log-parser is divided into four sub-sections: (a) the *Administration* section, for exploring population demographics, (b) the *Search* section, for gleaning data related to software usage (i.e., logging on/off, conversations, objects, etc.), (c) the *Reports* section, for quickly viewing common queries, and (d) the *Graphs* section, for examining and downloading common graphs, such as logins over time, logins by user, etc. For the search, reporting, and graph functions, the data can be filtered by date range and/or by certain user. This information can be viewed directly on the webpage or can be downloaded in an Excel file for further analysis. In addition, a master registry of the objects created in Zora is contained within a file called a "prop dump." These prop dump files allow project administrators a more accurate representation of the world, as the files contain the date of creation, coordinates, owner, etc. of each object. These prop dump files can be used with third-party tools to create maps that can show a snapshot of the world at the date of the prop dump.

Method

The Evaluation Framework

The evaluation reported in this paper focuses on the ClubZora participants, who numbered over 550, represented 84 Clubhouses, 19 countries, and all eight Clubhouse

regions: the United States (including the Northeast, Southeast, Southwest, and West Coast), Asia Pacific, Europe, the Middle East-Africa, and Latin America. It is important to understand not only *who* participated, but also—in the case of this project—who did *not* participate, as well as *how* members participated in order to get a better sense of how the ClubZora project was implemented within the organization. This type of evaluation highlights whether there were differences, such as in age , gender, language or region in who decided to use, or not to use, the virtual world while also providing insights to how the program implementation could be improved. Furthermore, while the Zora software was open to all members of the Clubhouse community, it was designed for youth ages 11 to 14. Therefore, understanding who used the software and how they used it is important to a larger understanding of how to implement a virtual-worlds environment to an international organization of youth.

Data Collection Procedures

Data for this project were collected by two means: data provided by the Clubhouse Network—such as demographic information—and data from the Zora software (as described above, from the logs and prop dumps). For this paper, the specific usage data used included four variables: (1) total time online, (2) total number of logins, (3) total number of objects, and (4) total number of lines of chat. However, because enrollment in the project spanned 11 months, from November 2007 until October 2008, these usage variables needed to be weighted in order to account for the different lengths of time that enrollees had access to Zora. Therefore, a weighted variable for each usage variable was computed by using the following formula:

*Weighted Variable = (Original Variable Value) * Proportion of Days in Zora*

where

$$\text{Proportion of Days in Zora} = \frac{\textit{Number of Days from Date of Enrollment to 10/1/2008}}{\textit{Total Number of Days Zora was Available}}$$

where

Total Number of Days Zora was Available = 335 (November 1, 2007 to October 1, 2008).

From this point on, all usage variables presented in this paper use these weighted values, unless specified otherwise.

Furthermore, because there was an extremely large range in the time spent online (N = 563, minimum = 0 minutes, *maximum* = 1071.02 minutes, M = 39.88 minutes, SD = 103.75 minutes) and number of logins (N = 562, *minimum* = 0, *maximum* = 589.95, M = 12.93, SD = 41.13), combining all of the enrollees into one large group for analysis would not present an accurate picture of participation in the ClubZora project. Therefore, enrollees were first assigned to one of two groups, participants and nonparticipants. The criteria to be assigned to the participant group were (1) that an enrollee had to have logged into Zora two or more times, showing they had returned to Zora after their initial

experience, and (2) they must have spent four or more minutes in Zora. This four-minute cutoff was based on the fact that the Zora log rounds the time online to the whole minute; meaning, for each of the two sessions the user needed to be logged at for a minimum of two minutes in order to ensure that users spent more than one minute in the software at each session. For this determination, the unweighted variables were used because they represent a more accurate picture of a user's first experiences with the program.

Within the resulting participant group, several users had extremely high numbers of logins and time spent online. Including them in the analysis of "normal" participants would have resulted in an inaccurate understanding of user participation, so these participants were separated into their own group, called "extreme users." These extreme users were defined as participants whose z-score for time logged into Zora (the weighted variable was used here as it did need to reflect their entire experience with the program) was greater than 2.5.

To more accurately understand how the members of the Clubhouse Network—of which Mentors and Coordinators are an important component—participated in the project, the participant and nonparticipant groups were further divided into Coordinators/Mentors and youth. This resulted in a total of 5 groups (N for all enrollees = 562):

1. Youth nonparticipants ($N = 229$)
2. Coordinator/Mentor nonparticipants ($N = 60$)
3. Youth participants ($N = 201$)
4. Coordinator/Mentor participants ($N = 64$)
5. Extreme Users ($N = 9$)

Of the youths who enrolled in the project, 52% were nonparticipants, 46% participants, and 2% extreme users.

In this paper, results from two research questions will be presented and discussed. The first research question was: *Who were the youth who participated in the ClubZora project and how did they do so?* The second research question was: *What were the characteristics of the youth nonparticipants who enrolled in the ClubZora project?*

Results

Overall Enrollment and Usage

During the 11 months of the ClubZora project, 562 Clubhouse members requested enrollment: 437 youth and 125 Coordinators/Mentors. These enrollees represented 84 Clubhouses, 19 countries, and all eight Clubhouse regions as previously presented. Also, as described above, enrollees were divided into five groups: Youth participants ($N = 201$), Coordinator/Mentor participants ($N = 64$), youth nonparticipants ($N = 229$), Coordinator/Mentor nonparticipants ($N = 60$), and Extreme Users ($N = 9$). Overall, participants logged in over 9,800 times, spent 430 hours in Zora, created more than 52,000 objects, and recorded over 35,000 lines of chat.

To illustrate the growth of the world, Figure 4 shows three birds-eye view maps, which were created using the propdump files.

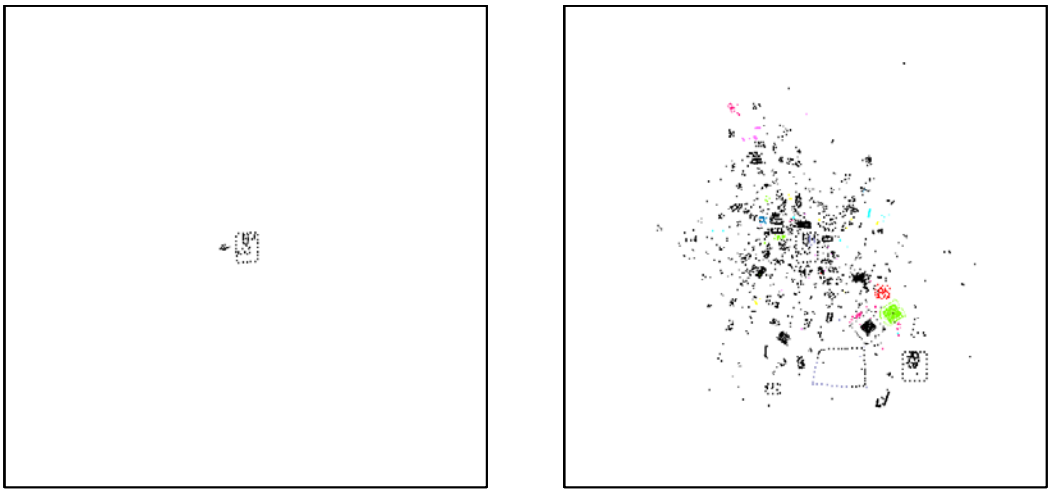

Figure 4. Growth of the ClubZora world, November 1, 2007 to October 1, 2008.

The first is from before the project started; the only objects in the world are those that the project administrator added to pre-populate the world. These objects included an English-language Welcome House, a Spanish-language Welcome House, a Zora City Hall, an Activities House, and a personal house of the administrator. The public houses were surrounded by a fence in order to indicate to users that this was an area that was reserved for the City Center and that personal houses were not to be built in this area. The

second map shows the world one month into the project and the third map shows the world during the last month of the project.

Youth Participants

Overall, there were 201 youth participants (36% of enrollees total), with 130 (64.7%) males and 71 (35.3%) females. In addition, 150 (74.6%) indicated English as their preferred language and 51 (25.4%) indicated Spanish. The average age of the youth participants was approximately 12 years (*SD* = 2.56 years), with a range of 8 years to 18 years (all ages served by the Clubhouse). The youth participants represented 40 Clubhouses, 11 countries—including the United States, Colombia, Costa Rica, Jordan, Mexico, Australia, Panama, Philippines, Ireland, New Zealand, and the United Kingdom—and all eight regions represented by the Clubhouse Network. Table 1 provides information about usage of Zora for youth participants.

	N	*Minimum*	*Maximum*	*M*	*SD*
Time Online (min)	201	1.21	415.03	56.16	74.00
Number of Logins	201	0.18	109.34	18.50	26.24
Lines of Chat	128	0.29	1,401.18	81.35	170.62
Number of Objects	116	0.21	2,085.72	57.39	227.52

Table 1. Usage of the Zora Software by Youth Participants in the ClubZora Project (N = 201).

There was a significant difference between youth participant males and females in the time they spent online and the number of logins ($F(1,199) = 8.48$, $p < 0.01$; $F(1,199) = 7.35$, $p < 0.01$), with boys spending more time online and logging in more (N = 130, $M = 67.19$, $SD = 79.79$, $M = 22.15$, $SD = 28.72$) than girls (N = 71, $M = 35.96$, $SD = 57.21$, $M = 11.82$, $SD = 19.43$). However, there was not a significant difference between males and females in the number of objects they created or the lines of chat recorded ($F(1,114) = 1.76$, $p > 0.05$; $F(1,126) = 0.12$, $p > 0.05$).

There was a significance difference between the number of objects created by Spanish speakers than English speakers ($F(1,114) = 4.28$, $p < 0.05$), with Spanish speakers creating more objects ($N = 34$, $M = 124.27$, $SD = 378.04$) than English speakers (N = 82, $M = 29.65$, $SD = 112.32$). However, there was not a significant difference in the time online ($F(1, 199) = 2.11$, $p > 0.05$), the number of logins ($F(1, 199) = 0.35$, $p > 0.05$), or the lines of chat ($F(1, 126) = .82$, $p > 0.05$) between English and Spanish speakers.

There were no significance differences in usage based on region or age for participant youth. Furthermore, a Pearson correlation addressed the relationship between lines of chat ($M = 81.35$, $SD = 170.62$) and number of objects ($M = 57.39$, $SD = 227.52$) for participant youth. The correlation between lines of chat and number of objects was

found to be statistically non-significant, $r(97) = .178$, $p > .05$. This indicates that lines of chat and number of objects for youth participants are not related.

Youth Nonparticipants

Of the enrollees in the project, 229 (41%) were nonparticipant youth, defined as participants who logged in less than two times and spent less than four minutes logged into the program. In addition, 143 (62.4%) were male and 86 (37.6%) were female. The average age of youth nonparticipants was 13 years ($SD = 2.7$). One hundred seventy-eight (77.7%) youth nonparticipants indicated English as their first language and 51 (22.3%) indicated Spanish. They represented 56 Clubhouses, 16 countries and all eight regions of the Clubhouse Network. Of the 56 Clubhouses that were represented by nonparticipant youth, 18 Clubhouses did not have a participant youth (i.e., the remaining 38 had at least one participant youth). Of these 18 Clubhouses, 10 also did not have a participant Coordinator/Mentor.

Discussion

General Findings

Participants and Nonparticipants

Of those who enrolled in the ClubZora project, there were approximately equal numbers of youth participants ($N = 201$) and nonparticipants ($N = 229$). As will be discussed in more detail below for each group, having information about the youth who enrolled but did not participate in the project is important, as it may provide information about how to improve appeal and retention for future projects. In addition other projects that have similar information about nonusers could attempt to contact these enrollees in order to survey them as to reasons for not using the software. This would provide invaluable feedback to a project to allow for a better understanding of how the target audience perceives the software.

Region Representation

The Clubhouses most represented by enrollees were from the United States, though there was a large Latin American representation for this project. The large number of enrollees from the United States is not unexpected, however, because over two-thirds of the Clubhouses are located within the United States and the primary language of the software and project administration is English, naturally drawing members from the United States. In an ideal case, the software and support materials should be available in all of the languages used by potential participants. However, this ideal case is one that is very expensive—for example, the materials, software, and logs would have to be translated, additional programming may be required for the software to support different versions, and it may require staff who are fluent in those languages—and time-intensive. Thus though Zora only supported English and Spanish users, these languages are the most prevalent in the Clubhouse Network.

The high prevalence of enrollees from Latin America may be because support materials were provided in both Spanish and English and that Spanish, using the Latin character set, could easily be integrated into Zora, as opposed to languages using a non-Latin character set, such as Chinese or Arabic. In addition, the United States and Latin America, for the most part, share time zones. The project was based in Massachusetts, and thus many of the activities were planned

during the afterschool hours of members in those common time zones (Eastern Standard Time through the Pacific Time Zone). Though members from other time zones could use Zora whenever they wanted, it was less likely that there would be someone else online during that time. Informal feedback from Coordinators, regarding what they thought members liked the least about Zora, provided two quotes supporting this idea: "*They* [members] *didn't profess any dislikes other than they wished more people were on there at the times they were on there*" and "*Not having enough people to interact simultaneously*." If staffing allows, international projects in which it is important for participants to use software synchronously should attempt to have activities during times that cross all time zones represented by participants. Barring that possibility, perhaps engaging the time of a Coordinator or Mentor in each of the other time zones to lead an activity during that zone's afterschool hours would be helpful. However, in projects working within nonprofit programs, where staff members are already stretched thin with responsibilities, this may be an unreasonable request. Therefore, targeting the time zone in which the majority of users would be online would probably be a better use of staff time and resources.

Zora Usage Over Time

Results show that the project had an initial surge of participation, with a decrease in enrollments, logins, object creation, and chat over time. During the time that ClubZora was in the Clubhouses, several other network-wide projects were occurring simultaneously. Because members are encouraged to participate in activities that are interesting to them, the youth had many choices at any given time. This decrease in usage may also be due to participants not knowing "what to do" in Zora once they entered the world.

Communication is clearly an important aspect of a virtual project; however, the method of communication, and the unexpected challenges, is just one facet of examining the decrease in project usage over time. As members participate in the project, there needs to continue to be a sense of purpose—why they are using the software and participating in the project (Beals & Bers, 2009). When the ClubZora world was originally conceived, the project staff used a model similar to previous projects they had completed, in which very little of the world was pre-populated, in order to allow participants to develop the world as they imagined. However, this turned out not to be an ideal model for such a large population for several reasons.

The first reason was that object permissions were set so that members could put objects "on" other objects, even those that they did not create. Permissions were set this way in order to allow collaborative building of houses and objects (the converse of this option would not allow members to work together). However, users would often build objects on top of other users' objects, sometimes on purpose but often times not. Only the creator of the object, or the project administrator, had the ability to move objects and users may not have known how to contact the other user or the project administrator to remedy the situation.

This inability to move objects owned by another user was frustrating to users who had spent time building a space within Zora, only to find that someone else had added unauthorized objects to the area. Informal feedback from users supported this, with participants responding about what they did not like about Zora: *"houses being built over [other] houses," "not being able to delete things that people built in my house,"* and *"Ugh... Having to clean up after others...."* In an ideal case, there would be mediation between the two users with the help of the project coordinator, allowing the two users to work together to fix the situation. Taking it one step further, ideally the project administrator would then work with all participants to create a method for dealing with this situation that was publically posted and agreed upon by all

participants. However, as it was often difficult to get users online at the same time, especially if they were located in different regions of the world, this was a challenging task that most often resulted in the project coordinator moving objects at the request of a user. Perhaps the best solution would be increased education, monitoring, and support from the project administrators as well as stronger reinforcement of internal Zora policies regarding where buildings and objects could be placed in order to reduce overlapping buildings and objects.

The second reason that a minimally pre-populated world was not successful with a large population of users was that the world might have become too large and too cluttered for new users, making them feel overwhelmed upon entrance to the world. Even experienced users may have been unsure of how to proceed over time in such a large and unstructured world. As there was little sense to the layout of the resulting world, with the users often haphazardly placing objects and houses in the world, it was difficult to find objects and other people who were online. Informal feedback supported this notion, with the following responses pertaining to the purpose of the project and what was liked the least about the project: "*no map, getting lost*," "*It was hard to find a piece of land to build [a] house*," "*It seems like there were no land left,*" "*It seemed like a 3-D extension of the Village, but it never really seemed to get there - it seemed like a lot of people building houses on top of each other,"* and "*The confusion about finding other Clubhouse members' houses."* Though mapping software is available from several third-party sources, in which the prop dump files can be used to create a birds-eye view map of the world, these maps are static and do not reflect the dynamic and constantly changing nature of the ClubZora world. In an ideal situation, the Zora software would have a map that was updated regularly to allow members to better understand the layout of the world and navigate it more easily. For future projects, it would be suggested that the world, if possible, be pre-populated with additional city-planning features, such as roads, street signs, and landmarks. Depending on the specifics of the population and the goals of the project, this process could also be implemented during the first few group activities to encourage community involvement. Of course, this suggestion also comes with the need to increase education regarding where objects and houses can be built and methods for working together when objects are not placed correctly. This would possibly allow for a less chaotic world that would be easier to navigate. Perhaps these measures would make it less overwhelming for new users to know "what do to" as well as allow them to easily find open land in which to build their own creations.

Finally, in relation to the size of the world, the enormous number of objects built in the world caused the program to work very slowly even on computers with more than adequate equipment and a high-speed Internet connection. Users, when opening Zora over the course of the project, may have become frustrated with how slowly the program ran, and therefore, in combination with the other factors described above, may have abandoned the project. Unfortunately, this may be a difficult challenge to improve upon for future projects, as it would be difficult to completely control the computers being used and the Internet connection available at the computer clubhouses..

Youth Participants

Age of Youth Participants

The Zora youth participants ranged in age from 8 to 18 years, encompassing all of the ages served by the Clubhouse Network, with the average age being approximately 12 years. Though all Clubhouse Network members were allowed to join the project, Zora and this project

were aimed at youth between the ages of 11 and 15 and thus this average age is within expectations. Similarly, the most recent Youth Impact Report (Gallager, 2008) from the Clubhouses reported that half of the members responding to the survey were between 11.7 and 15.5 years (median = 13.6 years) (p. 7). In addition, the Quarter 3 and 4 Clubhouse Report (The Intel Computer Clubhouse Network, 2008), as discussed in the introduction, reported that the daily average percent of teens members was 58, indicating that 42 percent were younger than 13 years, which is quite a large proportion of the population of youth attending the Clubhouses. This finding is further supported by a recent Pew Internet and American Life report regarding video games usage by teens which found that younger teens, 12 to 14 years, were the most avid gamers and that furthermore, younger teens are more likely to use virtual worlds than older teens (Lenhart et al., 2008, pp. 10, 19-20). Though Zora is not in itself a video game, it may appear to be similar to one for participants and thus the report findings may support those from this project.

Though it was anticipated that this age group was the target audience, these findings confirm that Zora is appealing to this age group. However, it does suggest that for future projects such as this, to which a wide range of ages could be catered (i.e., 8 years to 18 years is a large range for an intervention), the curriculum for and methods of communication with younger subjects should be explored in more detail.

Informal feedback from Coordinators further reinforces that Zora was best enjoyed by the younger members of the organization: "*Zora was really popular with the Under 12s. The activities on Zora were a good way to put some focus in Zora and learn about how to use it, but they really had fun just wandering around*" and "*I encouraged members to complete the activities in Zora, but it was most appealing to the younger members who enjoyed building houses and walking around."* However, there were no statistically significant differences in how the program was used based on age, at least for the usage variables that were recorded (time online, number of logins, number of objects, and number of lines of chat). This suggests that while it might be used more by younger subjects, those who did decide to interact with Zora use it the same regardless of their age. The Zora software has been used with older youths, including college students (Bers et al., in press; Bers, 2008a; Bers & Chau, 2006; Bers & Chau, under review), suggesting that it can be used, in conjunction with an appropriate curriculum, for a wide range of ages. The results from this evaluation do suggest that Zora is initially more appealing to younger youth, though this may be due to the organization's population. Therefore, future projects of a similar nature should attempt to understand the ages of the target population for the intervention, as well as the ages of the youth who, based on the history of the organization, are most likely to engage in projects such as this one, as the two ages may be different. Improved knowledge of the distribution of the ages of the target population would allow for the curriculum, and surrounding supports—including staffing, materials, etc.—to be best tailored to the youth who will be using the program.

Gender of Youth Participants

Regarding the gender of the youth participants, two-thirds were male. This finding is supported by the 2008 Clubhouse report for Quarters 3 and 4 (The Intel Computer Clubhouse Network, 2008), which indicated that the daily average percent female attendance in the Clubhouses was 40, only a slightly higher percentage than was present in this population. These findings, especially considering the statistically significant difference in comparison to *The Village* population, suggest that Zora is more appealing to male users. As the aim of most

interventions are to be equally appealing to all potential users, and in that certain technology in particular can exacerbate gender differences in program usage, it would be important for future projects to better understand the aspects of Zora that do and do not appeal to males and females, perhaps in the form of a focus group.

Despite there being more male participants in the project, and while boys did spend more time online and logged into the software more, there were no differences between males and females in the number of objects they built or the lines of chat recorded. The difference between girls and boys in terms of time online and number of logins is reflected more general trends about gender differences in video game use (Lenhart et al., 2008, p. 9). However, the lack of differences in usage is similar to findings presented in the Clubhouse Youth Impact Report, in which only one of the seven activities listed had more than a 10 percentage point difference between boys and girls (Gallager, 2008, p. 11). The resulting statistics showed no differences in building or chatting between boys and girls though there was a difference in terms of logins and time online suggests that girls, when using the software, were more focused on building and chatting, while the boys spent more time engaging in other types of activities in Zora, such as playing chase, just walking or running around, or engaging in role-playing like activities. This is supported anecdotally, as the project coordinator spent many sessions playing hide-and-seek, tag, or racing a male youth in the world. Other sessions were spent in engaging in role-playing-game-like activities in "Area 34"—a compound created by several members from the same Clubhouse in which the project coordinator had to navigate through several rooms and wait her turn to speak with the commander. Informal feedback from two male youth support this notion, in their response to the question, "What kind of games do you think their should be in Zora *"Like racing games or something"* and *"mmm.....like game finding each other…someone disappear and we have to search for him and catch him."*

These differences in time spent online and number of logins further support the use of a focus group to explore in more detail how males and females use the program. Unfortunately, the Zora software is currently unable to track a user's movements through the world over time, though this has been done with other projects using the Active Worlds platform (Penumarthy & Borner, 2006). Therefore, a focus group, or series of focus groups, in which the actions of the youth were recorded and feedback gathered based on their experiences with the program, may allow for a better understanding of how males and females use the software. This would in turn allow for the software design and curriculum development to be best tailored to the needs of each group.

Language of Youth Participants

As for the language of the participants, there were more English-speaking youth participants than Spanish-speaking. However, this is not unexpected due to the number of Clubhouses located in the United States. Despite this difference in the numbers of participants speaking each language, it is of interest to note that the only difference in usage of the software was that Spanish speakers built more objects than English speakers. This may suggest that Spanish-speaking youth participants felt more comfortable using objects, but it is unclear whether this was because they preferred to express themselves by building rather than by chatting or because they just preferred to build more. Much like the discussion above about the potential use of a focus group in order to better understand gender differences, further exploration into the use of Zora by Spanish-speaking participants may be warranted. This was the first implementation of Zora with support for Spanish; therefore, this is an interesting result

for the pilot project, as it suggests that Zora was used by Spanish-speaking participants without difficultly, though additional testing with Spanish-speaking youth may be helpful for future projects.

Youth Nonparticipants

As with the participant youth, two-thirds of the youth nonparticipants were male and approximately three-fourths spoke English. This similarity suggests that there were no gender or language reasons for not choosing to participate in the project. The average age of youth nonparticipants was 13 years, one year older than the average age of youth participants though still on the younger end of those youth served by the Clubhouse Network.

In addition, 18 of the Clubhouses in which there was a nonparticipant youth did not have a participating youth or Coordinator/Mentor, suggesting that the software may not have been available in the Clubhouse, perhaps due to technical issues with the software. Since Zora is a stand-alone application, it needs to be installed on each computer before being used. Often Clubhouses around the world have different computer setups (both in terms of hardware and software), and even within an organization computers may have different configurations, possibly making it difficult to install the software consistently on all computers available to members. In addition, several Clubhouses reported difficulties in connecting due to firewall and security settings in place at the Clubhouses for the protection of members. For example, one Clubhouse Coordinator with whom the project coordinator worked was able to connect to Zora via his laptop on the wireless connection to the Internet, but was not able to get the computers available to members, which were on a wired connection, connected to Zora.

As one may imagine, this inability to connect to Zora, combined with the various levels of technical expertise of the Coordinators, was likely frustrating to both Coordinators and members, causing them to discontinue use of the software. While this issue does not pertain only to nonparticipants, and could possibly be the reason for low participation in other groups, the technical difficulties surrounding Zora present challenges to the implementation of projects such as this. While other 3D virtual world programs, such as Second Life, also require a stand-alone application, many programs popular with youth are accessed via a web-based interface, such as Habbo and Club Penguin, with no additional software needed. However, a web-based interface does increase the chance that the software would be used in a location other than the Clubhouses, which for this project was not desirable. While there are, of course, pros and cons to each of these methods of software delivery, it would behoove those interested in future projects such as this one to explore their particular organization's technical status and abilities, as well as the requirements for program access in order to determine the best tool.

Ideally, it would be valuable to be able to get more information from these youth as to why they did not participate in the project—was it by choice, was it because they just clicked the "enroll" button because it was there but did not know what it was for, or was it because their Coordinator was not able to install the software? Taking it one step further, gathering information regarding the appeal and use of the project from those members who did not even enroll in the project would be valuable. However, this information would be difficult, if not impossible, to obtain.

Limitations and Future Directions

There are several limitations to this evaluation study. Due to various limitations by the university Institutional Review Board, we were unable to connect the "Zora person" to the "real-

life person," and therefore we were unable to associate a user's activities in the Clubhouse with his/her experience in Zora. In future studies, however, it would be important to gather more real-life information about participants and be able to connect them to their virtual person. This could perhaps be done with a separate study, having its own methodology and consent process, with the members of a local chapter of the organization. In particular, information about participants' use of the program, in relation to other activities, would give a better sense of the project implementation and how it could be improved for the future.

Second, as there are some challenges and limitations in what the software can record, we may have an incomplete picture of what "really" happened in the project. Therefore, our findings and conclusions can only be based on what data were available. Perhaps for future projects, we would increase the "bots" (background programs that run as part of the Zora software) that record information about how participants use Zora; in particular, knowing information about their movements within the program over time may be important. Finally, much of the demographic information that was used came from user-reported data, and therefore the accuracy of it is unknown.

Third, this was a unique intervention that was piloted with an organization that has its own mission, principles, and methods of practice. Therefore, while many aspects of the implementation, and in particular suggested implications for future projects, could be applicable to other programs of a similar nature, some aspects were specific to this particular project which was completed within a single organization. Therefore, because it was a pilot intervention with a specific population, the results are not generalizable to other populations.

Finally, a lot of rich data was collected during this project; this evaluation aimed to only explore one facet of the program, the overall participation. However, future evaluations about this project could, for example, examine the extreme users, the virtual projects that were built, or the chat logs. In the latter case, both the content of the chat as well as a social network analysis (Rosen, 2009) may provide interesting insights into the implementation of this virtual world for youth.

Conclusion

This paper presented a case study of an evaluation of participation in the virtual world educational intervention ClubZora. Due to the international population of the Computer Clubhouse Network, this intervention was very complex in nature, as users were located in different timezones and spoke both Spanish and English. Through this case study, methods for determining participation were explored. Using the data collected during the ClubZora project, this case study specifically explored who used Zora and how, including statistical analysis of usage patterns in order to examine potential participation differences among demographic characteristics (i.e., gender, age, language, Clubhouse region, etc.). The implications of the results as they pertain to development of the software and of the program were discussed, thus showing how these methods for examining participation can be used to improve software and program design.

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