

'Connected Learning' and the Equity Agenda: A Microsociology of Minecraft Play

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ABSTRACT

We present a microsociology of Minecraft play based on ethnographic observations of a 40-hour co-located Minecraft camp for 28 low-income and minority children in July 2015, supplemented by usage statistics and follow-up interviews. We consider the equity challenges presented by (1) Minecraft itself and the ecosystem supporting it; (2) the multiplayer server we used, which was founded on principles of 'connected learning'; and (3) our own attempts to promote equity by providing scheduled access to the game in a computer lab. We were partially successful in overcoming players' at-home computer access limitations and improving their computer/technical literacy. Still, we found that language literacy, parental abilities and involvement, racial and gender identities, and diverging interests set our campers apart from others on the server. Overall, the in-game invisibility of our campers worked against the equity aims of connected learning and point to broader patterns of bias in games like Minecraft and other communities of/for children.

Author Keywords

Diversity; children; class; digital divide; ethnicity; families; feminist HCI; gender; Latinx; Minecraft; online communities; race; SES; videogames; youth.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Since its debut in 2009, Minecraft has become one of the most popular videogames ever. Though there are few definitive use statistics, estimates place the number of paid downloads across console, mobile, and PC platforms at over seventy million as of summer 2015, making it the third best-selling game of all time [45]. Minecraft passed 100 million registered accounts in February 2014 [26], and 'minecraft' was second only to 'music' in YouTube searches that year

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CSCW '17, February 25-March 01, 2017, Portland, OR, USA

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ACM 978-1-4503-4335-0/17/03 \$15.00

DOI: <http://dx.doi.org/10.1145/2998181.2998318>

[15]. Like videogames more generally [12,43,51], it is reportedly popular across many ages and income levels [44].

Alongside this meteoric rise has been a groundswell of excitement over the game's educational potential. A growing number of resources geared toward teachers and parents characterize Minecraft as a game that will foster a new generation of engineers through the power of interest-driven learning in and out of the classroom (e.g. [6,13,19,37,40]). Such stories echo through the popular press as well: an April 2016 article in *The New York Times* described Minecraft as "a throwback to the heady early days of the digital age ... [that] gave rise to the first generation of kids fluent in computation ... a stealth gateway to the fundamentals, and the pleasures, of computer science" [44].

But what will it take to ensure that the educational potential to be found or cultivated through Minecraft play is equally available to all? Could Minecraft play facilitate interest in computing and a deepening of technical skills among groups underrepresented in technical fields? What would it take to ensure that Minecraft does not become a platform for perpetuating current privilege in exposure to computing? We evaluate one effort toward realizing the educational possibilities of Minecraft that is mindful of equity. Connected Camps, co-founded by Mizuko Ito, Katie Salen, and Tara Brown, is dedicated to using Minecraft for connected learning [19]. In partnership with Connected Camps, we ran a four-week in-person affiliates camp in July 2015 at a computer lab in Richmond, California to provide underrepresented youth with access to Minecraft play on a multiplayer server. Our camp was attended by 28 primarily Latinx children ages 8-13, including 11 girls and 17 boys.

In the course of running the Minecraft summer camp, we saw our campers grapple with issues of identity and belonging, implicit bias and cultural expectations, language literacy, and tacit technical knowledge. We untangle the equity challenges we observed by evaluating the camp at three levels:

(1) At the level of Minecraft itself. We observed that despite claims that Minecraft was a more gender-equitable game, it did not entirely escape barriers posed by a general gaming culture. Subtle racial and gendered biases in Minecraft culture as a whole starting from the default characters – Steve and Alex – was to some extent mitigated, but with significant limitations, by the broader ecosystem of Minecraft play such as editable player 'skins.'

(2) At the level of the Minecraft server we used. We found that even with Connected Camps' explicit commitment to equity, the largely middle-class-oriented expectations around language literacy, children's interests, and parental involvement in facilitating children's play on the Connected Camps server differed from the realities of our campers.

(3) At the level of our own camp. The computer lab model is often proposed as a solution for overcoming differential at-home access and support [25,31], yet we found challenges posed especially by the competing communication environments of the kids and mods on the server vs. the kids in the computer lab that complicated our inclusivity goals. While the co-located camp model was successful in certain ways toward leveling participation, we found access to the in-person camp itself – in terms of who joined and who did not – as well as a dependence on the camp infrastructure for participation limited its broader impact.

Altogether, we found the challenges faced at these three levels rendered our campers largely invisible on the multiplayer Minecraft server they used during camp, an outcome of structural and configurational barriers to participation, recognition, and ultimately equity.

To the CSCW community this study contributes an analysis of a popular videogame, one that has been celebrated for its inclusiveness and educational potential, using sociological frames focused on equity. It corroborates and extends related work on how diversity plays out in online communities, and calls attention to ongoing implications of access and the racial, class, and gender biases in kids' online cultures.

CONNECTED LEARNING AND EDUCATIONAL EQUITY

Connected learning “advocates for broadened access to learning that is socially embedded, interest-driven, and oriented toward educational, economic, or political opportunity” [19]. It draws from situated learning theory [21,48] and, in particular, the work of Jean Lave whose ethnographic investigations highlight learning processes in everyday work and life [22,23]. With connections back to the student-centered learning theories of Piaget and Dewey, this theory argues that *relationships* among experts and novice learners (in communities of practice) and *learning environments* that are personally meaningful to learners are both critical to effective learning.

Connected learning, Ito *et al.* state, “centers on an equity agenda” [19]. This theory, its predecessors, and related Marxist critiques (e.g. [49]) show how formalized, institutionalized education serves many students poorly, especially those from ‘non-dominant’ populations [19]. In contrast, Ito *et al.* point to the possibilities for new media to more effectively reach non-dominant youth since learners may join diverse communities of interest online and access information and knowledge from anywhere, so long as they are Internet connected. The connected learning approach advocates for an educational environment that is more inclusive, in part, by respecting “diverse pathways and forms

of knowledge and expertise” [19]. Connected learning's equity agenda is thus about supporting the interests of diverse learners through “multiple entry points,” especially (though not exclusively) through digital media.

The equity claim in connected learning is less fully elaborated than other aspects of the approach. Our research focuses on examining the possibilities and limitations of a particular implementation of connected learning using Minecraft in relation to questions of equity. In particular, we find it necessary to complement connected learning's framing of equity with two other approaches to research on equity and digital inclusion: (1) a foundational concern with material access, generally found in work that uses the label the “digital divide” (e.g. [38,47]); and (2) issues of self-representation and dynamics of interaction in online communities that affect the inclusion of minority populations [7,8,29], particularly in multiplayer gaming [12,51]. While the research on identity and self-presentation among *children* in online spaces is limited, these two approaches help us to address the way connected learning as a framework defines the problem of equitable learning environments and to further specify what we mean by ‘equity’ and what threatens it.

USING MINECRAFT FOR LEARNING AND EQUITY

Often described as ‘virtual legos’ (e.g. [6]), Minecraft is an open-world ‘sandbox’ videogame that involves players navigating around a procedurally-generated world, ‘mining’ various raw material blocks, building with them, and combining them to make various tools, armor, and other items (‘crafting’). The game also includes tamable animals; various friendly and hostile monsters, mobs, and villagers; and optionally other players. Its emphases can vary by mode of play and include imaginative building (especially in creative mode), managing scarce resources (survival), and competitive play (player vs. player or ‘PvP’).

Progressive educators have embraced Minecraft as a learner-centered environment to develop problem-solving and other creative, technical, social, and coding skills. Online forums and teacher-focused accounts of using it in the classroom have proliferated in the last few years. Some approaches focus on co-opting the popularity of Minecraft into fairly traditional educational approaches (e.g. [6,13,37,40]), where the focus is on mastery of specific concepts by individual learners, usually in a classroom environment.

In contrast, Minecraft was seen by the founders of Connected Camps as well-suited for implementing a connected learning environment through the design and configuration of a multiplayer server and through mentorship provided by camp staff and volunteers. From a connected learning perspective, the open-ended nature and varied gaming modes in Minecraft could be leveraged for learner-led and interest-driven skill-building. Connected Camps began its operations as a summer camp, which situated it outside of school hours, curricular constraints, testing regimes, and the many pressures on administrators, teachers, and students in traditional public

education. This allowed them, and us, to more easily explore alternative visions of learning and digital inclusion.

Scholarly literature on Minecraft is nascent but growing. In addition to the education-focused articles cited above, some scholars have examined the game from a more sociological perspective, as we do here. Dezuanni *et al.* explore identity construction among 8- and 9-year-old female players at a private school in Brisbane, finding that the girls organized themselves into fluid *affinity groups* according to their interests and desires to be seen as ‘expert’ [10]. Looking at another specific population, Ringland *et al.* describe how the policies and practices on one Minecraft server produce a ‘safe space’ for autistic players and their families [35,36].

Examining Minecraft culture more generally, Pellicone and Ahn conduct a connective ethnography centered on one African-American teen boy’s gameplay through the lens of *affinity spaces*, finding that online interaction between players, particularly through media-rich channels like audio- or video-chat, could take away participants’ choice in what aspects of their identities to reveal [32]. As a result, they could reinforce stereotypes about what ‘type’ of player belonged in this domain, as defined by perceptions of race and gender. Though we did not use audio- or video-chat in our camp, our findings echo these assumptions regarding who was participating and what resources they drew upon.

Building on this prior work, we consider the potential of Minecraft in relation to the ‘connected learning’ ideals of providing an engaged pursuit of meaningful interests for ‘non-dominant youth’ in a socially-embedded context, with supportive exchanges with peers and counselors in this online environment. Though we do not focus on learning per se, we relate this to questions about creating environments for learning aimed at (ultimately) developing technical skills.

BACKGROUND AND METHODS

In 2015, Connected Camps ran an online ‘Summer of Minecraft’ camp for children ages 8-13, which served 2194 campers. They ran two multiplayer Minecraft servers for campers who logged in from around the country using the latest build of Minecraft PC Edition. These servers were overseen by trained and paid online camp counselors (two women, nine men) who led challenges, provided guidance, and adjudicated conflicts. The collaborative building, play challenges, and other forms of social interaction that they facilitated were designed to give campers opportunities to learn design, engineering, teamwork, conflict resolution, and good digital citizenship.

We partnered with Connected Camps to offer an in-person ‘affiliates’ camp in the ‘Iron Triangle’ region of Richmond, California, whose residents are predominantly low-income Latinx¹ and Black families. Many in this community lack access to computing resources: a study by the Richmond

Public Library and nonprofit Building Blocks for Kids (BBK) found that while 80% of residents in this area owned a computer in 2013 (compared to 84% nationally), only 50% used it regularly, and 33% had no Internet access (compared to 21% nationally) [27,46].

Our camp provided co-located Minecraft play in a computer lab in Richmond City Hall, connecting via the city’s fiber backbone to a Connected Camps server. It also offered in-person guidance and mentoring from the two authors, a bilingual Latina research assistant from Richmond, and two African-American volunteer camp counselors also from Richmond (all women). While most participants in Connected Camps’ ‘Summer of Minecraft’ virtual summer camp paid a \$100-\$150 fee to participate and furnished their own computer, Internet connection, and Minecraft account, all expenses were waived for our campers. With the help of local non-profit BBK, we provided free lunches every day of camp through a district summer lunch program. We ran two hours per day, five days per week, for the scheduled duration of Connected Camps’ virtual camp, July 6-31.

A total of 28 campers participated, the full capacity of the computer lab. Twenty-one campers (75%) were Latinx and from families where Spanish was primarily or exclusively spoken at home. Five African-American and two white campers participated as well, though two of these African-American campers (a brother and sister) and one white camper dropped out the first week. In comparison, the local school district – which includes Richmond and several more affluent surrounding cities – is 52% Latinx, 20% African-American, 11% Asian, and 11% white, with 72% low-income [1]. We actively recruited girls and enrolled all girls who were interested, resulting in 11 girls and 17 boys, plus a waitlist of dozens more boys (a bias we explore in the findings). Our retention rate was high for camps in the area, according to our nonprofit partner BBK: average daily attendance was 22 campers. Our campers spent an average of 29.6 hours in Minecraft over four weeks, close to the overall camper average of 31.2 hours in that time period.

Data Collection and Analysis

While drawing on diverse sources of data, our approach is anchored by our ethnographic data – the day-to-day interactions of our campers (hence the ‘microsociology’) – as it reflects broader sociological issues of race, class, and gender. The two authors took daily fieldnotes of campers’ Minecraft play and interactions at every camp session, supplemented with screenshots, pictures, and short videos, across the 40 total hours of camp. We also asked an optional “question of the day” at most camp sessions regarding Minecraft play, technology use at school and home, aspirations, and family life. Once a week we recorded mini-interviews averaging two minutes with each camper who opted in, asking them to show off what they’ve been doing in camp the last week. Participation in the Question of the Day and the mini-interviews ranged from 75% to 90%.

¹ We use ‘Latinx’ as a gender-intersectional alternative to ‘Latino’ and the gender-neutral but still binary ‘Latin@.’

After camp ended, we obtained from Connected Camps aggregate logs of in-game camp activities and daily written logs from Connected Camps counselors of all players on the server, pseudonymized by Minecraft login name. This included logins, chat logs, some in-game actions such as deaths, and documentation of positive behaviors and behavioral problems. We also conducted follow-up interviews with seven campers and four parents in January 2016, and two Connected Camps counselors who were often online during our camp in April and May 2016. Interviews ranged from 20 to 60 minutes with an average of 35 minutes. All interviews were audio-recorded and transcribed by professional transcription services. Three parent interviews were conducted in Spanish and translated by the first author.

The authors collaborated in grounded data analysis of our fieldnotes and transcripts. In an initial round of analysis, the first author coded these documents using Atlas.TI, based on their contents without pre-selecting broader themes. In a second round, we collaboratively identified themes that these codes surfaced, and the first author did another pass through seeing whether these themes applied to or were contradicted by the rest of the corpus. In a third round, we collaboratively tested the presence of these themes in our quantitative data where applicable (e.g. hours played, chat logs) using Excel, and connected them to other literature addressing broader sociological questions of racial, ethnic, gender, and socioeconomic equity. To give an example of falsifiability in our process of analysis, one emergent theme, that our campers were being disciplined differently from other campers, we found was unsupported when we examined the full corpus of data. In keeping with our microsociological orientation, where we focused on how everyday interactions might reflect broader sociological patterns, we paid particular attention to the opportunities, differences, limitations, and conflicts that surfaced between our campers and other players, and how participating in the camp affected our campers' inclusion.

FINDINGS

Our analysis surfaced two clusters of themes. The first revolves around what access to computers and Minecraft our campers had prior to camp, what computer- and Minecraft-related abilities they brought into camp, how those who did participate differed from other Minecraft players as well as from the broader Richmond population, and whether and how they kept playing after camp ended. The second theme focuses on the more sociocultural elements of their play that emerged during camp itself. These include racial and gendered elements of the Minecraft world as well as the cultural assumptions made about how campers played, what their interests would be, and how involved their parents were (or could be) in scaffolding their play. Both of these theme clusters call into question the accessibility and inclusiveness of certain kinds of Minecraft play, as well as the ability of camps like ours to effectively address these concerns.

Access, Abilities, and Self-Selection

In this section we answer some basic questions about equity as a matter of access and abilities in our study of Minecraft play. The concept of the 'digital divide' posits that while those who are connected reap advantages, the uneven distribution of connectivity has the potential to exacerbate inequality since whether one is connected or not correlates with other kinds of disadvantage, such as poverty or lower educational attainment. Our camp itself was intended to overcome some of these barriers by providing access to Internet-connected computers, free Minecraft accounts, free access to a moderated multiplayer server, and mentorship in-person and on the server. Yet we uncovered constraints that determined who signed up for and was able to attend the camp (and who didn't), limits in the skills necessary to participate fully on the server, and difficulty in continuing similar Minecraft play at home after camp ended.

Computer and Minecraft Access

Our campers had varying degrees of exposure to computers and Minecraft coming into camp. On July 9th we asked the 16 campers who were present and willing to answer our question of the day about access to computers at home. All reported having a working computer at home, though three noted that they never used it because it belonged to an older sibling or because a parent disallowed access. Seven reported access with constraints: the computer was little used because it was not Internet-connected, the computer was shared with family, or parental concerns about online safety led to limited use. Six reported unencumbered access to a home computer.

While all but two of our campers had played Minecraft prior to camp, we found that none had exposure to more advanced features of the game, such as installing 'mods' (client-side modifications) or administering a multiplayer server. On July 7th, 22 campers answered whether they had played Minecraft and on what platform(s). Seven had (ever) played on a computer, the smallest number of any platform. In contrast, 11 had played on a game console (such as Xbox or PlayStation) and 12 had played the 'pocket edition' on mobile devices.

There are significant differences between the PC, pocket, and console editions of Minecraft. As of summer 2015, only the PC version had mods, multiplayer servers, downloadable maps, and user-created 'skins' (avatars) and textures. These same features have been heralded as the ones that are especially innovative and educational – the ones that can scaffold Minecraft play into programming (see e.g. [24,44]). These differences justify, in part, our effort to run an in-person camp to deepen campers' experiences with computers through use of the PC edition of Minecraft. However, we encountered other limitations that made it difficult to fully realize these benefits, which we turn to next.

Computer Skills, Typing, and Literacy

Because of many campers' more limited computer use, the body of knowledge many had to learn in camp was still significant despite prior experience with Minecraft. Many

campers lacked basic keyboard and mouse experience, as illustrated by this fieldnotes excerpt. On the first afternoon of camp, we gave each camper a nametag with a Minecraft username and password we had pre-made for them. As we guided them through the login process, hands started popping up around the room with questions about how to type the symbol (@, #, %, etc.) in the passwords we had created. We soon discovered that for many campers the first skill to be learned was how to use the shift key: unlike on a virtual mobile phone or tablet keyboard (which many campers were more familiar with), one must continue to hold down one key while typing another to access the symbols. While barriers like this may have also been issues for campers from more advantaged backgrounds, structural disadvantages likely exacerbate them for campers like ours.

Connected Camps did not require or expect experience with the game and the counselors we interviewed described being coached to help novice players in particular. Still, even basic communication on the Minecraft server, including talking with these counselors, required skills that our campers did not necessarily have, and we found that these barriers were more difficult to overcome than a quick demonstration of the 'shift' key. As is typical on multiplayer Minecraft servers, Connected Camps used text chat as the central mode of communication between players. When new events were announced on 'Broadcast,' comments were made to the 'global' chat channel, or messages were sent to particular players, they appeared in chat. Commands were also typed into the chat prompt (e.g. '/tpa' to teleport to another player, '/tpaccept' to accept a teleport request, '/warp' to travel to a designated area on the server, and '/w' to send a private chat message). The flow of chat was visible first at the bottom of the screen, moving upward and eventually disappearing as other text appeared (Figure 1).

We found that throughout camp, many of our campers consistently ignored this important communication channel, even when we repeatedly drew their attention to it. Server log analysis backed up our observations: players connecting from home (who were not in our camp) averaged 102 words per hour in chat, while our campers averaged a mere 14.2 words per hour in chat – a factor of seven difference (Table 1).

Part of the reason likely related to campers' language literacy levels, something that would not be overcome during a brief four-week camp. While we do not have assessments of our campers' reading levels, we do have firsthand observations of our campers' *in situ* efforts to use chat. In these encounters it became clear that some campers, especially younger ones (8-10 years old), struggled to construct sentences or spell basic words. They tuned out chat unless directly coached, and even then seemed to find that what was required of them to communicate via chat was either beyond their abilities or their interest. That said, problems with chat and language literacy were not uniform among our campers. By contrast, two Latina cousins (one 10 years old, one 11) who sat and played together devoted much of their camp time to short-



Figure 1. A screenshot from Minecraft showing chat (bottom).

story writing and journal-keeping in Minecraft books. Others lent their literacy skills to campers who needed them by typing messages or commands on their behalf.

Another point worth noting was that all chat communication and all Minecraft commands were in English, while fully three-quarters (21 of 28) of our campers spoke Spanish primarily or exclusively at home. The literature on bilingual kids in the U.S. where a language other than English is principally spoken at home shows that they are often behind in grade-level standards for English language literacy [34]. While these gaps can close by high-school for privileged students, this effect can be compounded by under-resourced schools, poverty, and low parental educational attainment – all prevalent in Richmond and among our campers. But looked at another way, our Spanish-speaking campers had a skill that other campers lacked: they were *bilingual*. The camp was not structured to support or celebrate this, which would be a worthwhile initiative in order to transcend what is often a 'deficit-model' framing of these kinds of challenges.

Our campers did make progress in computer literacy, a topic of great interest to our partners and to the education community more broadly. Over the course of the camp, we observed a set of skills developing that go hand in hand with 'learning to code,' which we called pre-coding skills. Commands were essential to play on the server, so even campers who never used chat for conversing at least learned to 'warp' to areas or 'teleport' to friends. The use of symbols (and the shift key) and the use of commands introduced to campers the requirements of precise spelling and the idea of a language written to effect action on a computer.

Overall, the setup of this multiplayer server relied heavily on the game's built-in chat features, as do most multiplayer Minecraft servers – and this rewarded players who were fast typists, familiar with computer keyboards, and fluent in written English. The need to communicate through chat is thus a potential problem for equitable participation in multiplayer Minecraft by players coming from non-English-speaking households. Connected Camps worked to create a welcoming environment for such players and we worked in-

room to call campers' attention to chat, but with limited success. Thus, while our 'affiliates' camp helped campers make gains in certain basic technical literacies (including basic keyboard skills, mouse use, and entering commands), this support could not overcome broader language literacy challenges in multiplayer Minecraft play.

Self-Selection, Advantage, and Opportunities for Continuing

We have focused so far on the challenges our campers faced that were linked to structural barriers, but it is also important to note that in any opt-in program such as our camp, participants tend to be among the more advantaged in the targeted community (even when the community as a whole is disadvantaged). In our case, though the families who sent kids to our camp were all low-income and all but one were minorities, most demonstrated high parental involvement. Fifty percent of our campers were enrolled in charter schools, though only 9.1% of district students were overall [18]. Seven campers (25%) attended one particular charter school that used computers almost daily. Most campers found out about the camp from the library, meaning that their families were library users. These were families that took advantage of available resources for educational enhancement.

These families were also relatively stable: most had two parents at home and a number of mothers did not work outside the home. While research has shown that working mothers actually confer advantages to children [28], a liability-related requirement that an adult be available to sign campers in and out at the beginning and end of the two-hour daily camp made it more difficult for children of full-time working parents to participate. Other families could not join or stay in camp due to other instabilities in their lives. In one case a family had experienced a violent incident and the children suffered from lingering trauma, making them too fearful to leave the house. Another camper participated enthusiastically but left camp halfway through. Custody had been transferred from his mother to his aunt and uncle and the upheaval of moving him into their home made the logistics of his continued participation in camp too difficult. There were likely additional untold stories of upheaval, distress, or instability that prevented other children from participating. Though our family interviews for this and another related initiative show that the families who did participate have also grappled with past and ongoing traumas related to immigration, violence, and poverty – and we want to acknowledge the very real effects of those in these families' lives – these families also talked about the luck and support of extended family that kept their aspirations and motivations alive and allowed them to participate in enrichment activities like our camp.

We are continuing to investigate the after-effects of this camp, including whether our participants continued Minecraft play with the accounts we provided. While camp was underway we provided installation instructions in both English and Spanish to campers' families to overcome some of their barriers to Minecraft play on a computer. While they

would need access to an Internet-connected computer, campers could install Minecraft, use the account we provided (rather than pay \$26.95 for one), and access the Connected Camps server, all for free. Server log analysis showed that eight campers logged in to the Connected Camps server at least once outside of camp hours. However, only one of these campers logged on to the server after camp ended on July 31st. All of the campers we interviewed had returned to playing the more limited pocket or console editions of the game. We thus find few signs that our camp facilitated different or deeper Minecraft play at home or a switch to the richer opportunities afforded by PC-based Minecraft play.

Overall, the ways that this confluence of access and abilities affected our campers' Minecraft play before, during, and after camp shows that there are still stark barriers to using Minecraft as a tool to guide a more diverse population into computer-related interests and proficiencies. These issues also uncover challenges to many intervention models premised on a short engagement with students, including summer camps, coding workshops, museum visits, 'bootcamps,' etc., which generally run for a few hours, days, or weeks and then end. Our experience joins a long tradition of educational research that shows that after such short-term engagements, youth often cannot benefit from the same tools and resources going forward, even when they would like to.

Who is expected here? Interests, Identities, and Culture

We have seen how issues of access and skills shaped our campers' experience of Minecraft. However, their experience was also influenced profoundly by a number of more subtle practices and norms in Minecraft culture more generally, as well as in the culture of the Connected Camps server and our own camp. While we were able to at least temporarily remove many explicit barriers to play, we found that our campers were still not the 'expected' kind of Minecraft player, and were relatively *invisible* to other players and to counselors on the Connected Camps server.

This invisibility manifested in various ways. Our campers seemed not to be the expected *race* for Minecraft players, and their cultural contexts differed from other players in a number of ways. Due in part to this and in part to the structure of our camp, the *norms of play* that developed within the room sometimes clashed with those online. Our campers also did not fit assumptions about *parental involvement* in Connected Camps and in Minecraft more generally. And in developing the camp we observed *gendered* aspects of Minecraft culture that echo broader patterns in gaming cultures. Taken together, these cultural issues further challenge the use of computer games such as Minecraft in learning or inclusion initiatives.

(In)Visibility, Race, and Cultural Norms

We turn first to race, which we will explore through a fieldnotes excerpt. It was the first day of camp. Everybody was finally logged in, and campers were acquainting themselves with the keyboard and mouse controls and exploring the server. One camper asked us how to change

their ‘skin’ (in-game appearance) from the default ‘Steve,’ a white character with brown hair and a green shirt. A cascade of others overheard this query and repeated the question. We asked ‘Anna’ (a pseudonym), one of the two players who had the most experience playing Minecraft on a PC – who was incidentally one of our two white campers (and the only one who stayed in camp). She showed us the multitude of skin choices on ‘The Skindex’ (minecraftskins.com), a third-party website full of user-contributed skins. Word spread through us and camper-to-camper, and soon everyone in the room was searching for new skins.

While the selection on Skindex was extensive – with many pop culture characters from movies and other games available – some in our camp found it lacking. One African-American boy in the back of the room called us over. Quietly and haltingly, he asked how he could change the skin *more – this part* – and pointed to the character’s white face. Not long after we got the same question from an African-American girl in the front row, who specifically asked for a skin who looked like her, indicating the skin color on her hand. We tried to help both with search terms that would unearth brown- or black-skinned options – using keywords, characters, celebrity names – but despite our collective search expertise over what appeared to be tens of thousands of user-contributed skins, our searches kept coming up empty. It seemed that at least as of July 2015, Skindex had extensive options for many popular nonhuman characters as well as many ‘girl’ skins (Figure 2), but their options for darker skin tones were seriously lacking.

The boy in the back row eventually selected a nonhuman skin, as did most of the other boys in camp: bacon, tacos, minions, creepers. We sat down with the girl in front to figure how to manually edit skins together. She picked a black-haired girl skin to start with, and then matched the colors available in the color selector tool with the dark brown color of the back of her hand. It was tricky to change all of the angles of the skin: the first time around, we changed the face but missed the hands; the second, we missed the back of the hands and the bottoms of the feet. When she was finally satisfied with the results, we posted it back to Skindex with some good keywords. She spent two more days in camp editing skins and showed several other campers how to do it.

This interaction surfaces several issues related to race and gaming cultures. Minecraft’s default white male character itself is telling, and the addition of gender-neutral ‘Alex’ as a second default character does not address the apparent whiteness of both. These two characters are available across all editions (console, pocket, and PC) of Minecraft. On the console and pocket editions, further skin selection is limited to predefined “skin packs” that players can download, often for a fee. On the PC version, in contrast, there are a huge number skin options available for free (though we found that the skin-changing interface was confusing for relatively inexperienced players like our campers to navigate). But these options had been outsourced to a volunteer platform,



Figure 2. A May 2016 screenshot excerpt of the “Daily Top Skins” on Skindex (minecraftskins.com), showing a typical assortment of all-white skin options.

where the selection appeared to reflect biases among the larger population of Minecraft players and the lack of nonwhite characters in youth pop culture.

We ran another Minecraft camp in July 2016 and did note that a relatively small number of nonwhite skin options had been added in the intervening year. Even so, in both 2015 and 2016 light-skinned campers could find practically any skin they wanted and would often have multiple choices for that skin that looked like themselves. In contrast, in 2016 our darker-skinned campers had to select from a much more limited selection of specifically ‘dark-skinned’ options or go through an involved and faulty skin editing process, in which there were often gaps and incorrect aliasing around the edges of the skin’s blocky pixels. These lacunae thus point to one way that certain players may (and, in our experience, did) feel marginalized in the game, and how important aspects of their identities may be rendered invisible in online spaces.

While marginalization through Skindex’s selection reflected Minecraft culture more broadly, we also found that Connected Camps, despite its commitment to diversity, also reflected cultural norms that at times marginalized our campers. A number of activities, including a roller coaster build, treasure hunts, Hunger Games-themed competitions, and horse race obstacle courses, had broad appeal. But some, such as a Harry Potter world build, held no appeal for nearly all of our campers. Most campers had heard of the series, but only Anna had any familiarity with the books or movies, and only she participated in the build – for the rest, Harry Potter was not a cultural icon relevant to them. And though it occurred after our camp ended and as far as we know none of our campers knew of it, in May 2016 Connected Camps offered a police station build with the tagline “The Glowstone server is getting a bit restless, build a police station to help keep the peace and order!” Had it been offered during camp, this could well have triggered strong feelings among our campers in light of Richmond’s extensive

African-American and immigrant history and ongoing #BlackLivesMatter activism.

(In)Visibility and In-Person vs. In-Minecraft Interactions

On the other hand, the flexibility of play in Minecraft, and the flexibility of Connected Camps (which offered, but did not require participation in, a variety of activities), meant that campers were free to instead pursue whatever interested them most. And our campers expressed many interests. We observed that most of our campers experimented with all modes of play – creative, survival, and player vs. player – though most also spent the bulk of their time in one mode in particular, often the one that they saw as easiest and most familiar. They taught one another and, as camp progressed, started designing their own activities, such as treasure hunts and parties. One Latina girl, excited about Mexico’s recent soccer victories, built a large pixel art trophy, used ‘redstone’ (a circuit-like block) to create a fireworks show, and invited fellow campers to a virtual party to celebrate. One day when the Minecraft authentication server was down due to a DDOS attack, a few campers showed the rest some online educational games to play until the server was back up. These interactions clearly enriched the experiences of those in the room.

However, much of this was not visible to the counselors and other campers online. The expectation on the server was that most campers logged in from home and that all interactions took place in-game, especially through chat. As noted above, many of our campers did not pay attention to chat, even missing communication that counselors or others directly addressed to them. They said seven times fewer words in chat than players logging in from home (Table 1). Both counselors we interviewed described our group as “very quiet” and as “keeping to themselves.” Our campers also rarely showed up in counselor logs relative to other players.

Our campers’ obliviousness to chat led to some misunderstandings, complaints from others in-game, and forced teleports to a ‘cool-down’ area, which was at first inscrutable and deeply frustrating to our campers (though based on counselor logs and interviews, we did not find that our campers were especially targeted or placed more frequently in the cool-down area, and none were among those labeled ‘troublemakers’). In the first week of camp, several campers called us over to ask why they were suddenly in this new place with this other player standing in front of them, and why they couldn’t teleport out or place or break blocks there. We then showed them the chat record that they had been missing, where a counselor had been explaining why they were in cool-down, and talked with them about what had happened and how to respond.

This blindness to in-game chat is partially a reflection of skill, as we discussed previously: our campers’ lack of experience with multiplayer servers, likely lower English literacy, and lack of fluent keyboard use. But it was also a reflection of the environment we created in our co-located camp. The face-to-face presence of other campers, and the

Our 28 campers, overall:	14.2
Other Connected Camps players, overall:	102.0
7 campers who connected from home, in camp:	23.8
7 campers who connected from home, at home:	73.4

Table 1. Words typed per hour in Connected Camps’ chat.

ease with which verbal communication could take place, meant that in-room interactions took precedence over in-game interactions – even when we actively encouraged them to use chat. This meant that our campers missed out on an important opportunity to practice reading and writing in chat, to accustom themselves to the norms of the game through it, and to get to know counselors and other players. In this way, our shared computer lab environment actually *inhibited* the achievement of equity in both skills and visibility between our campers and other Minecraft players online.

The small number of out-of-camp logins by our campers corroborate this finding. Seven of our 28 campers logged in for at least an hour from home. These seven were chattier to start with – they wrote an average of 23.8 words per hour, compared to 14.2 across all of our campers – but when logging in from home their average jumped *nearly three times* to 73.4 words per hour (Table 1). As we mentioned, only one of these players continued to log in after camp ended, meaning that this experience was limited for the rest.

Our campers’ reluctance to use chat tended to amplify the cultural mismatches between activities that resonated with them and activities that counselors chose to pursue and highlight. We witnessed other online players ask counselors to organize particular activities through chat and while we encouraged our campers to do the same, they rarely did. When they did, these requests were generally for competitive player-vs-player challenges such as Hunger Games or Capture the Flag, which were not a major emphasis on the server. They were duly noted but not particularly celebrated in the counselor logs, even though they were very popular among some of our campers. In summer 2016, when we ran the camp again, we found that Connected Camps had eliminated general player vs. player entirely, replacing it with a highly constrained “war” mod.

This primacy of in-person interactions and an interest especially in less celebrated player-vs-player challenges also meant that our campers’ accomplishments were less visible to others. They were never featured in the weekly highlights that Connected Camps posted online and emailed to participants, which typically focused on elaborate pixel art (often cleverly referencing geek or popular culture), impressive group builds, or feats of virtual engineering, generally in creative mode. Not present were the winners of player-vs-player contests, a mode many of our campers devoted most of their time to. This may be because it was easy to highlight that which was persistent: digitally constructed environments readily lent themselves to being

highlighted asynchronously as achievements to celebrate. But this also may have related to cultural notions of what contributes to ‘learning’ that precluded highlighting battle-based competition with its overtones of violence.

(In)Visibility and Assumptions of Parental Involvement

Our position as in-person counselors led us to sometimes serve as proxies for campers’ parents. In one sense this meant our ‘affiliates’ camp was successful in providing scaffolding of Minecraft play that wasn’t available at home, but in another sense it uncovered issues that would make it difficult for our campers to play multiplayer Minecraft on a PC outside of camp. To give one example of this, two of our campers, both Latina girls with similar screen names (‘Abemango’ and ‘Abeguwo’), independently started exploring the limits of the server’s rules, or ‘griefing.’ They visited others’ Minecraft houses without being invited and tried to take their things, they ignored (unintentionally) requests in chat to stop, and they spent some time in cool-down for it. One counselor, conflating the two similar usernames and thus further magnifying their offenses, banned Abemango from the server for 24 hours with a requirement that she sit down with her parents to re-read the server rules.

This took her, and us, by surprise. Conflicts between campers in the room tended to be called out and resolved in-person: if one camper killed another in-game, for instance, the killed camper would negotiate to get back some or all of the things (armor, weapons, food, other goods) dropped upon death. This fit into the broader in-room dynamic of negotiations that had developed in our camp, where campers split up mining and building tasks and shared the results, guiding the process verbally. But other players’ first inclination was to ask the counselors to punish the griefer, a process that was moderated through chat and involved authority figures and formalized redress procedures.

Second and more crucially, the parents of many of our campers were not in a good position to sit down with their children and make sense of the rules with them. Many spoke limited English and reported low computer literacy. While those we interviewed were optimistic about the role technology played in their children’s lives, echoing results from the working-class and minority participants in [3,50], they did not have the expertise to guide their children themselves. In this case, a workaround was easy enough: we instead discussed the rules with Abemango and then talked with her mother during pickup.

But there are other situations that demand much more parental involvement and technical fluency in the Connected Camps and broader Minecraft worlds. In the summer 2015 counselor logs there were frequent mentions of parental intervention for at-home camp participants in advocating for their child in cases of wrongful accusations, getting clarification on rules, and helping overcome barriers to participation. As Connected Camps grows and refines its offerings this involvement grows as well: their new “code camp” requires installation of a Minecraft ‘mod’ and a chat

tool that both require a fair amount of technical expertise, as we learned firsthand: installing a mod involved locating a hidden directory and copy files into it, and on one machine we had to manually edit a configuration file to get the mod to function, which we only discovered after considerable work. Our experience was not unique: there are many forums online targeted specifically at parents running into technical difficulties trying to install Minecraft mods for their children. Connected Camps can only do so much to counter the limitations of the tools involved.

Overall, the level of parental technical expertise needed as well as knowledge of Minecraft and gaming generally reinforce boundaries between those with technically-fluent parents who are able to access more advanced features of Minecraft, and those without this fluency: another instance in a long history of privilege begetting privilege.

(In)Visibility and Gender: Why a Few Girls Aren’t Enough

A month before our camp started, we heard from researchers at the 2015 Digital Media and Learning conference that Minecraft was at last a gender-neutral game with equal (or at least “more equal”) participation of women and girls. The same sentiment was echoed by one of the counselors we interviewed as well as in press about Minecraft (e.g. [10,44]). This was, we heard, due to the multiple modes of play, with something to appeal to everyone, and the game’s blocky appearance, which resisted the sexualization that seemed endemic in other parts of gaming culture (e.g. [44]). The girls in our camp in part corroborated this: far from passive observers or casual participants, they were as involved in exploring, building, mining, and competing as the boys. But despite actively recruiting girls and admitting all girls interested in the camp, over two thirds of those who expressed interest in the camp and 61% of those we admitted (17 of 28 campers) were boys.

Our experience reflects the few statistics we could find on broader trends in Minecraft. Some reports claim that up to 40% of players are women (e.g. [44]), and Connected Camps’ equity goal was to have at least 30% women. However, Potts estimated that many of the largest multiplayer servers are overwhelmingly male, and further found that nearly all of the participants in the Minecraft YouTube culture she studied were male [33]. Two gender surveys on MinecraftForum.net, a primary site for Minecraft discussion, found the number of self-reported female players between 14% and 18%.²

Our plans for future work include a detailed analysis of gender in Minecraft play. Claims of Minecraft’s gender-neutrality clearly need to be reconciled with evidence of a gender-skew in actual play. Educators using Minecraft who celebrate even 25% girls and do not seem to be troubled if no

² See minecraftforum.net/forums/minecraft-discussion/discussion/149698-minecraft-gender-poll (ongoing, started 2011, 14% women) and minecraftforum.net/forums/off-topic/general-off-topic/2462813-gender-poll (ongoing, started 2015, 18% women).

girls show up at all is a reflection of a broader culture in gaming [5,9,51], and often in technology cultures in general [4,30]. Gaming has been actively identified with boy culture by decades of marketing efforts (see e.g. [2,16,20]), and exacerbate the divide in computing generally. As is the case for many computer games, the gendering of Minecraft play may prevent girls from even logging in.

DISCUSSION

We have surfaced several factors that acted as barriers to participation for our campers and rendered them largely invisible on the Connected Camps server. At the level of Minecraft as a whole, players faced challenges around constructing a visible self in this multiplayer environment. This started with Minecraft's default skins, and continued with the limitations of the third-party skin provider Skindex, where campers experienced different degrees of distance between their desired appearance and the available skins. African-American campers, in particular, faced more barriers and fewer choices in trying to represent themselves in ways that reflected their real-world identity.

This invisibility continued at the level of the particular multiplayer server we used. This included some of the activities and challenges run by Connected Camps that relied on unfamiliar or insensitive cultural references, as well as what achievements were showcased in weekly highlight posts. Such activities reflect the way Connected Camps 'configured' its campers [17,30]. Yee [51] and others (e.g. [32,39]) have similarly uncovered blindspots or assumptions about users in gaming cultures, as have Ames *et al.* [3] and Yardi *et al.* [50] with technology use in low-income or ethnic minority families, Ames and Rosner with technologies designed for kids [4], and Burrell [8], Nakamura [29], and boyd [7] in online spaces more generally. Throughout our analysis we came to see many ways that the assumed user in Minecraft, as well as on the Connected Camps server, was unlike the kids in our camp.

The marginalization our campers experienced echo Sims's findings of how the interests and competencies of girls and youth of color were marginalized at what was intended to be an actively inclusive high-tech charter school. There, teachers' perceptions of what counted as technical skill rewarded white middle-class boys (who were doing things like programming) and devalued the skills of girls and ethnic minorities (such as sophisticated video-editing) [41,42].

The reliance on text-based chat as the primary mode for communicating between players on the server resulted in an especially pronounced contrast between our 'quiet' campers and the chatty campers connecting from home. While our campers' relatively lower technical and language literacy appeared to be factors, the ease of using verbal within-room communication was a factor as well. Our campers were consequently more likely to play with one another rather than interact with others on the server, and did not benefit from the literacy practice that chat afforded or the visibility that chat could have given them.

This brings us back to connected learning and the use of Minecraft as a platform to realize it. To reiterate, connected learning strives for "broadened access to learning that is socially embedded, interest-driven, and oriented toward educational, economic, or political opportunity" [19]. From our campers' perspective, the Connected Camps Minecraft server realized many aspects of a 'connected learning' approach. Our campers clearly loved the game. Many literally ran to their computers and played for a focused two hours every day at camp. They were able to pursue a diversity of personally meaningful and cultural resonant interests: writing and sharing short stories through Minecraft books, creating a trophy and fireworks show to celebrate Mexico's soccer triumph, forming teams to efficiently accumulate diamonds toward creating powerful weapons for player vs. player competition, or winning in Hunger Games. Our co-located camp was a realization of the socially-embedded environment emphasized by connected learning. There was also abundant evidence of peer-learning among our campers: they introduced each other to new activities, nudged one another to try different modes of play, and created challenges (such as treasure hunts) for their peers. They deepened their technical literacy with 'pre-coding skills' by using the more complex and flexible PC Edition of Minecraft, which few had used before our camp.

However, what do our observations about our campers' invisibility on the server mean for realizing *equity* specifically in a connected learning environment? According to Ito *et al.*, the 'equity agenda' is realized in the way connected learning platforms "support the interests and voices of diverse youth and their communities" and "value and elevate the culture and identity of non-dominant children and youth" [19]. In this light, the limitations of player skins available for authentic self-representation and the reliance on text chat as the primary mode of communication on the server disadvantaged our campers, muted their voices, and altered their visual self-depiction, thus compromising the realization of equity.

The segregation of our campers from other campers brings to light a tension in the connected learning approach between the value of being "socially-embedded" which can mean being part of relatively homogeneous communities composing "valued relationships, shared practice, culture, and identity" that "make learning meaningful" [19] and the reward and recognition (also consistent with connected learning) of reaching a broader heterogeneous audience. We may point out here that the *de facto* invisibility of our camp participants was not a result of intentionally protecting or creating a safe space for an underprivileged group vis-à-vis a dominant group. Rather, it was unwittingly an outcome of structural and configurational barriers to participation and to gaining recognition from the larger group. Our camp participants were in this way blocked from greater opportunities for peer-support from the broader diversity of campers and mods. This meant a lost opportunity for skill and knowledge sharing and perhaps cultural exchange.

CONCLUSION

We have taken a long hard look at how ethnic minority and low-income children fare (once provided access) in the online multiplayer game environment of Minecraft as part of a summer camp implemented on the principles of connected learning. How does this impact the design of such systems – of servers like Connected Camps, resources like Skindex, or games like Minecraft? While ‘implications for design’ is not the primary goal of papers like ours [11], the frictions we unearthed in Minecraft, on Skindex, on the Connected Camps server, and in our own camp point to the value of direct experience with and involvement of minority populations in the planning stages of projects in order to better design for inclusivity, rather than reproduce current dominant cultural norms. It also echoes culture-based divides between different ethnicities that other researchers including boyd [7], Nakamura [29], and Burrell [8] have uncovered in online spaces, and that Eglash has explored in math and computing cultures [14]. Like the communities that these researchers investigate, we argue that Minecraft culture was largely defined by middle-class Euro-American norms of interaction established by early adopters. Our findings, as well as Pellicone and Ahn’s [32], suggest that Minecraft tends to marginalize – whether intentionally or not – later arrivals who have other cultural norms and expectations.

This paper provides a small window on how non-dominant youth play Minecraft and what it may mean for equitable opportunities in online spaces and in education agendas more generally. More work is needed – both in studying the populations playing and in designing these worlds to be more equitable – to ensure that Minecraft can grow into the powerful educational tool that so many want it to be, particularly for diverse populations.

ACKNOWLEDGMENTS

We are deeply grateful to Mimi Ito, Sima, Victor, and the others at Connected Camps who made this research possible; our excellent assistant, Erika Jauregui; and of course our participants. We also thank Nancy Van House and anonymous reviewers for their feedback, and U.C. Berkeley’s Center for Technology, Society and Policy for financial support.

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