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Beyond Mischief Managed: Understanding Socio-Technical Forms of Governance in Kid-/Family-friendly Minecraft Servers Using Mixed Methods

DISSERTATION

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for the degree of

DOCTOR OF PHILOSOPHY

in Informatics

by

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2021

DEDICATION

To
all my research participants, and to Chimit: may his soul rest in peace
&
To
my family

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Writing an acknowledgment for a doctoral dissertation is like thanking people for a life. While I knew well that it would be a marathon, I didn't realize until now that it was full of joyous sprints!

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VITA

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Du, Y., Grace, T. D., Jagannath, K., Salen-Tekinbaş, K. (2021). Connected Play in Virtual Worlds: Communication and Control Mechanisms in Virtual Worlds for Children and Adolescents. Multimodal Technologies and Interaction, 5(5), 27. http://mdpi.com/2414-4088/5/5/27 (journal paper, peer-reviewed)

Katie Salen Tekinbaş, Krithika Jagannath, Ulrik Lyngs, and Petr Slovák. 2021. Designing for Youth-Centered Moderation and Community Governance in Minecraft. ACM Trans. Comput.-Hum. Interact. 28, 4, Article 24 (October 2021), 41 pages.
DOI:https://doi.org/10.1145/3450290 (journal paper, peer-reviewed)

Katie Salen Tekinbaş Krithika Jagannath. 2020. Minecraft and Socially Situated Student Centered Learning. Book Chapter. Teaching in the Game-Based Classroom. Practical Strategies for Grades 6-12. Edited by David Seelow, Ph.D. 2021. Routledge (book chapter)

Krithika Jagannath, Katie Salen Tekinbaş, and Petr Slovák. 2020. "(We) Can Talk It Out...": Designing for Promoting Conflict-Resolution Skills in Youth on a Moderated Minecraft Server. Proc. ACM Hum.-Comput. Interact. 4, CSCW1, Article 049 (May 2020), 26 pages.
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ABSTRACT OF THE DISSERTATION

Beyond Mischief Managed: Understanding Socio-Technical Forms of Governance in Kid-/Family-friendly Minecraft Servers Using Mixed Methods

By

Krithika Jagannath

Doctor of Philosophy in Informatics

University of California, Irvine, 2021

Professor Katie Salen Tekinbaş, Chair

This dissertation endeavors to deeply understand the features of Minecraft servers explicitly created for youth through three studies using mixed methods research. Human-Computer Interaction (HCI) research shows that sandbox-style virtual world games like Minecraft operate as interest-driven spaces where youth can explore their creative interests, build technical expertise, and form social connections with peers and near-peers. Despite their popularity among youth (ages 6 - 14), we know little about the social and technological features of "in-the-wild" Minecraft servers that present themselves as "kid-friendly" or "family-friendly." The aims of this work are three-fold:

1. To investigate the rhetoric of kid-/family-friendliness and the socio-technical mechanisms of such servers (Study I: 60 servers),

2. To understand the lived experiences of server staff who moderate on such servers (Study II: 8 youth and 22 moderators), and

3. To explore a design paradigm for technological mechanisms that leverage the strengths of a kid-/family-friendly server community while also supporting moderators' practices (Study III)

I draw from interdisciplinary theories and structure this dissertation around two main arguments about kid-/family-friendly Minecraft server ecosystems. First, I argue that they are instantiations of play-based affinity networks created by adults that promote opportunities for youth to explore their interests and social connections. Second, I argue that the social and technological mechanisms reflected in the server rules and moderators' practices are characteristic of servers that self-describe as kid-/family-friendly.

Study I contributes a taxonomy for understanding server rules and an empirical characterization of three server genres – kid-/family-friendly (n1 = 19); general-family-friendly (n2 = 20); and general (n3 = 20) in Minecraft. Study II reveals moderators' motivations and socio-technical practices in kid-/family-friendly servers. The findings show that adult moderators encourage youth-led creative role-plays, support the interests of young players (e.g., Hogwarts virtual world, virtual Pride Day celebrations, etc.), and offer mentorship to youth moderators on their servers. Study III theorizes the potential for automated prosocial tools in play-based spaces through a Discord Bot called "UCIProsocialBot" within OhanaCraft, one of the kid-/family-friendly server communities. Together, these findings provide a set of social and technological features that may substantiate a model for designing kid-/family-friendly online playgrounds. This work theorizes that kid-/family-friendly servers can actualize positive youth development when their self-narratives, social practices, and technological mechanisms are aligned with adolescent developmental needs.

Chapter 1

Introduction

Human-Computer Interaction (HCI) research shows that sandbox style (i.e. open virtual worlds) games like Minecraft may serve as online proxies for real world playgrounds, operating as interest-driven (i.e. "intrinsically motivated") spaces where youth can explore their creative interests, build technical expertise, and form social connections with peers and near-peers (Reich et al., 2014; Ringland et al., 2017; Ringland, 2018; Slovak et al., 2018; Jagannath et al., 2020; Tekinbaş et al., 2021). According to the official fact release statement by the publisher (Microsoft), 90 percent of the "online population" in the U.S. has heard of Minecraft and more than 50 percent of youth, ages 9-11, in the U.S. and Europe play Minecraft (Microsoft, 2021). We also know from public blogs and news article that for many youth, their journey into Minecraft starts when they are much younger (6-7 years) and continues well into their teens (e.g., (Thompson, 2016; Knorr, 2020); Seattle Public Library [1]). Despite Minecraft's popularity among youth (ages 6 to 14), we have little empirical research about "in-the-wild[2]." Minecraft servers that present themselves as "kid-friendly" or "family-friendly" (Doyle, 2014; Salen, 2017). Given that Minecraft is also popular among

[1] https://www.spl.org/programs-and-services/fun-and-games

[2] The use of "in-the-wild" in this work refers to servers that have been created by users as opposed to the creators (Mojang) or the publisher (Microsoft) and in not intended to imply the research context used in HCI (Crabtree et al., 2013; Rogers and Marshall, 2017)

adults (Microsoft Fact Sheet 2021), is there something specific in the design of servers that define themselves as "kid" or "family-friendly" that support the unique needs of younger players? How do these servers differ from servers that self-describe differently like HyPixel[3] or Mineplex[4] in terms of their social and technological features? Knowing more about such features can inform our understanding more generally about how online play-based platforms could be designed to take into account the interests and needs of youth (Beals and Bers, 2009; Cowan; Depping et al., 2018; Kidron and Rudkin, 2017; Du et al., 2021a).

Building on prior HCI research[5], I endeavor to deeply understand the social and technological features of Minecraft servers explicitly created for youth. The overarching aim of this dissertation is to understand and highlight particular features of digital playgrounds, like those represented by Minecraft servers, that provide developmentally appropriate support or "scaffolds[6]" (Wood et al., 1976b; Azevedo et al., 2005) for youth. The emergent nature of this work led me to adopt an interdisciplinary approach to understand theories and approaches in related disciplines. In it, I view the fields of Developmental Science, Game studies, HCI, Learning Science, and Positive Psychology as allied disciplines. Following the main thesis statements below, this introductory chapter presents three stories from the study data to introduce the research context and working definitions for such servers. Then the chapter describes the motivation and proposed contributions of this work, chosen study approaches, research questions, and an overview of the remaining chapters.

[3]https://hypixel.net/

[4]https://www.mineplex.com/home/

[5]Some of the text in this chapter appears in published work that I co-authored/authored: (Tekinbaş et al., 2021; Jagannath et al., 2020)

[6]Defined for now as the adequate level of support from a person or entity that is just the right amount to help an individual advance in their goal. I provide an expanded definition for this term from the literature in Chapter 2

1.1 Thesis Statements

This dissertation is structured around two main arguments about Minecraft server ecosystems[7] explicitly created for youth. For now, I use the terms kid-friendly and family-friendly interchangeably to imply the same meaning.

First, I argue that these "in-the-wild" kid-/family-friendly servers are instantiations of play-based affinity networks created by adults that promote opportunities for youth to explore their interests and social connections (T1).

Second, I argue that the social and technological mechanisms reflected in the server rules (i.e. social norms) and moderators' practices are characteristic of servers that self-describe as kid-/family-friendly (T2).

This dissertation is structured around three studies. Study I characterizes online governance in kid-/family-friendly Minecraft ecosystems through an empirical analysis of rules. Study II highlights the ways in which moderators use social and technological mechanisms in kid-/family-friendly Minecraft server ecosystems, and Study III introduces an AI Bot into a specific kid-/family-friendly server ecosystem. The findings describe a set of social and technological features that may substantiate a model for designing kid-/family-friendly online playgrounds. This dissertation theorizes that kid-/family-friendly servers can actualize positive youth development when their self-narratives, social practices, and technological mechanisms are aligned with adolescent developmental needs.

Below are three stories of research participants from three different kid-/family friendly

[7]Online games like Minecraft are ecosystems comprising social (e.g., player culture, online communities) and technological (e.g., tools for communication) infrastructures (Gee, 2008), See Section 1.2 in this chapter

servers – The Sandlot[8], Ohanacraft [9], and FoxCraft[10]. These stories are drawn from Study II interview data and highlight different ways adults and youth engage in socio-technical practices related to online moderation of their respective servers. These stories exemplify the kinds of experiences that youth have on kid-/family friendly servers that include – playing Minecraft with peers and adults; pursuing interests in online gaming; and developing leadership roles. Participants consented to the use of their pseudonyms and quotes and server creators consented to the use of their server names.

1.1.1 *Story 1: KTango's journey from helper to moderator on The Sandlot*

> "...I didn't think I could really have that much to offer but I accepted as I knew I could grow as a player and, well, kind of be a mom and help hurt feelings" – KTango, a research study participant

KTango is a mom of two and a healthcare professional, whose journey on The Sandlot began nearly a decade ago. Inspired by her colleagues who spoke of playing Minecraft with their kids, KTango and her then-five-year-old son began to tinker with the game's mobile version. Soon, KTango invested in a "low-grade gamer laptop" and the PC version of Minecraft. She came across a timely local news article about kid-/family-friendly Minecraft servers where people, especially kids, could play together online. These kid-/family-friendly servers are managed by friendly, helpful staff and usually require players to complete an application and verification process, known as safelisting. A virtual Hogwarts world (Figure 1.1) on the Sandlot server matching the books that they were reading at that same time may have

[8]https://www.sandlotminecraft.com/ self-identifies as a family-friendly server and was founded by a parent and educator in Dec 2011

[9]https://ohanacraft.com/ self-describes as a family-friendly community; founded in December 2018 by server staff when their former server closed

[10]https://memetrolls.net/fc/ describes itself as a small family-friendly community. Now mainly run by a youth (14 years)

drawn KTango and her son to the server. Feeling reassured by friendly and helpful staff, many of whom were parents themselves, she let her son independently connect and play with other people on the server. She remembers noticing that her son enjoyed playing socially when she was not present on the server. Six years ago, KTango was invited by the staff to join the ranks of an Elder - a tailored staff rank between an official helper and moderator on the server. By then, her son was playing less on the server but independently building complex virtual worlds and modifications (or mods) on their local server at home while KTango remained active on the server. During my interview with KTango, she reflected on how opposed she had been to the idea of her older daughter growing too fond of computer games. The Sandlot became a salient space to build things with and for kids and developed a slow but sure change in her outlook on computer games. She considers her time on the server as "volunteer work with kids and supporting a worthwhile program."

1.1.2 *Story 2: Youth growing up & growing into leadership roles on OhanaCraft*

Elbereth, a teen staff member on Ohanacraft, enjoys curating suggestions for role-plays, playing with and overseeing other players, and making builds for role-plays on the server.

> "Mainly bending rules in role-plays where I shouldn't have lol... one night in my bed I was like 'They keep telling me this...I need to try harder' ... and gradually I figured out ways to make myself remember the rules until I (for the most part) stopped breaking them." - Elbereth, research study participant

Role-play, an activity that kids especially love in Minecraft, is where players improvise or follow a scripted plan and pretend to play various roles. Elbereth reflected on her early days on the server where she was perceived as a semi-troublemaker due to her tendency to

Figure 1.1: A screenshot of the virtual world on The Sandlot Server, created as a replica of Hogwarts from the popular book series Harry Potter. Here players can go on adventures by completing certain "tasks", expanding their inventory with special prizes

Alt Text: An aerial night-time view of a castle with three towers and a rectangular gallery-like terrace, a door, and plants in the background. One of the towers has a clock that shows 9 pm. There is another multi-colored structure in the center and the castle is a replica of the fictional Hogwarts School of Witchcraft and Wizardry from the Harry Potter series.

stretch some of the server rules. She recalled getting players to virtually break something and mini-modding[11] a few times during roleplay. However a year ago, a staff member invited a surprised but ecstatic Elbereth to join the ranks of junior staff on the Ohanacraft server. Today, OhanaCraft serves a community of 200+ players and youth like Elbereth are invited by the co-owners to help out as staff on the server. Elbereth's journey offers a testimony for kid-/family-friendly servers like Ohanacraft that provide opportunities for its younger members to take on responsibility for interest-driven activities, never mind that the youth may have once been perceived to be troublemakers.

1.1.3 *Story 3: Chimit, a parent empowering their child to run FoxCraft*

Chimit, father and a systems programmer, does not consider himself as a gamer by any definition. Five years ago, when his son Meem wanted to start a Minecraft server to play with friends, however, Chimit readily helped facilitate the server setup. Meem developed the technical skills to run his server and learned how to moderate player experiences on it as the server opened up for other people. For Chimit, letting Meem run the server was analogous to letting his son ride a bicycle without the side wheels for the first time. Chimit set a basic expectation with his son before giving Meem full free rein to run the server. Chimit gave Meem complete autonomy in developing and operating their server and considered that the server could be fixed in the event of any technical breakdowns.

> "As long as you don't hurt people. If it's just the server that breaks, it doesn't matter, it's just a machine." – Chimit, research study participant

[11] When a player takes on actions that are typically carried out by (appointed) server moderators in Minecraft and wield authority over other players, which often triggers social conflict among players and is prohibited on servers.(e.g., https://www.planetminecraft.com/blog/minimodding—what-it-is-and-why-it-isnt-allowed/); (Lee et al., 2020)

As a fourteen-year-old with advanced programming and gameplay skills, Meem runs and manages most aspects of their small family-friendly server (˜30 members). Chimit explained that he helps out with technical issues and guides Meem, if and when the latter seeks support, on any interpersonal challenges among players on the server. Chimit described Meem as a shy but responsible kid in real life who has learned more skills through social interactions online than offline. Chimit explained that going online offers a nice escape for his son who dislikes too much attention in real life, and that there's always a switch to turn off should things go awry. Meem aspires to use his experience of running the server for professional opportunities in the future and loves helping other people learn new things in Minecraft. This young entrepreneur believes that Minecraft is a space where youth can learn to grow.

The three servers in the stories—The Sandlot, OhanaCraft, and FoxCraft— each offer an example of how the servers themselves have been customized to support social play for young players. KTango's story, for example, emphasizes the importance of an intergenerational community, which includes players with varying levels of expertise. Elbereth's story, on the other hand, is an example of how a server can support youth in developing friendships over time, while also learning about the social norms or rules on the server. In all three stories, the servers are managed by staff who present themselves as friendly and approachable people. The stories suggest that staff assist youth like KTango's son and Elbereth, who join online servers at very young ages (5 - 7 years), in learning to play Minecraft socially. Additionally, the presence of staff reassures parents like KTango and Elbereth's father about the safety of youth, given that Minecraft is popular among youth and adults alike (Microsoft, 2021). Lastly, Chimit's story focuses on the important role played by technological mechanisms in Minecraft servers. Users can tailor their Minecraft servers by modifying or "modding" the original versions (Lee et al., 2020) and develop additional technological controls to customize the game-play experiences on their servers. These stories highlight several key themes that I elaborate in Chapter 4: Friendly and Helpful Staff; Keeping Kids Safe; Emphasis on Having Fun with Others in Minecraft; and Using Technology for Designing Innovative Scaffolds in

a Virtual World.

The three vignettes about KTango and her son, Chimit and Meem, and Elbereth are not merely anecdotal. Their described practices and motivations resonate with those of other youth and adults interviewed in this work (Study II). The study participants identify as part-time or former educators, parents or family members of youth, professionals, avid gamers, or youth Minecraft enthusiasts. They volunteer their time, expertise, and resources to take on various roles and responsibilities on their servers. These three servers and other kid-/family-friendly servers in this work are intergenerational servers (young adolescents, older adolescents, and adults including parents, family-members, and grandparents). KTango and Chimit exemplify parents who do not see themselves as gamers, but self-learn or support Minecraft to encourage youth in their lives. Youth like Elbereth are also included in the server staff team. Experiences that Elbereth described around having opportunities to explore social norms and develop friendships on the server are not automatic, however. Given that such servers are specifically constructed as interest-driven spaces for youth, understanding their socio-technical features and the practices of server staff is a foundational step towards understanding how online playgrounds might support the developmental needs of youth. Throughout this dissertation I will refer back to the three individuals, other participants, and their server communities, as I work to deepen my understanding of the features and socio-technical practices guiding moderation of select Minecraft servers designed explicitly for youth.

1.2 A Background on the Minecraft Server Ecosystem

Minecraft is a sandbox style virtual world game that is playable as a single-player or multi-player experience. The gaming platform allows any licensed user to create their own multi-

player Minecraft server[12]. This feature has led to a proliferation of servers that range in size from very small to very large (e.g., servers with 50 or fewer players to servers like Hypixel and Mineplex that host 100,000 online players at a time). Most servers are locally managed or governed, as opposed to being centrally managed by the game's developer (Mojang) and publisher (Microsoft). Online multiplayer gaming platforms like Minecraft can be viewed as a collection of rich socio-technical ecosystems comprising the "big G" and "little g" (Gee, 2008). The social infrastructure (big G) corresponds to an online gaming community and a variety of socio-cultural practices that include playing games, talking about games, creating and sharing game-related content, and watching game play by others. The technological infrastructure (little g) corresponds to the gaming servers, their underlying software technologies, and may include online communication tools such as in-game chat, discussion forums, and external multimedia (i.e. text, voice, video chat) applications. Each server ecosystem in Minecraft can be considered as an independent community with distinct rules, social norms, and practices that can vary widely from server to server. As a result, multiplayer Minecraft servers can produce different kinds of experiences for players depending on how the servers are being governed. This research is concerned with the multiplayer version of Minecraft, one of the most consistently top-ranked video games among youth (Doyle, 2014; Ellison and Evans, 2016; Thompson, 2016; Salen, 2017). Doyle 2014; Ellison and Evans, 2016; Thompson 2016; Salen 2017).

Posited below is a **working definition** for this unique genre of Minecraft servers tailored for youth, some characteristics of which are reflected in the three stories presented earlier in this chapter. I delve into servers' self-representations as a kid-/family-friendly Minecraft server in Chapter 3 and refine how I operationalize the genre throughout subsequent chapters.

> Kid-/family-friendly Minecraft servers are servers tailored for young players, typically between ages 7 through 14, in a few distinct ways in that they are managed by friendly

[12]https://help.minecraft.net/hc/en-us/articles/360058525452-How-to-Setup-a-Minecraft-Java-Edition-Server

and helpful server staff who not only reassure parents about kids' safety on the server through their presence, but also play with and help kids with any interpersonal challenges they may encounter on the server. Server staff (administrators, moderators) promote kids' unique and creative interests whether it be playing as ardent fans of Harry Potter in a Hogwarts' themed world, celebrating special events like birthdays and graduation ceremonies, role-playing with other kids, tinkering with, or developing server infrastructure, and so on. The stories reveal that the staff facilitate opportunities for youth, usually teenagers but may include younger kids, to take on additional responsibilities if they choose to by volunteering as junior staff. The server ecosystems are designed to provide a sense of community for youth and adults to play Minecraft together, be it as a group of friends in real life or just on the server, as a family with parents and even grandparents, across diverse geographic regions, and so on. The kid-/family-friendly Minecraft servers studied in this research include other online spaces such as discussion forums and platforms like Discord[13], TeamSpeak[14], or Mumble [15]. These extended spaces facilitate multimodal asynchronous and synchronous communication (e.g., voice, text chat) among players and staff.

Throughout this dissertation, I use the term kid-/family-friendly Minecraft server ecosystem to include not only the kid-/family-friendly gaming server, but also adjacent platforms where players connect, the details of which are described in Chapter 3 (Study II).

Before describing the motivation for this work, I pause to reflect on why there is a lack of research on developmentally appropriate online playgrounds for youth. First, the ongoing debate about the potential harmful effects of technology on youth, especially young adolescents, dominates popular media (Bell et al., 2015). Discussions around screen time (Marsh et al., 2013), social media, and concerns around toxicity online (Mishna et al., 2010; McInroy and

[13]https://discord.com/
[14]https://www.teamspeak.com/en/
[15]https://www.mumble.info/

Mishna, 2017) tend to crowd out any empirical work looking at actual effects. Second, the study of youth and video games still carries with it various socio-cultural stigma (Holtz and Appel, 2011). As a result, many researchers are wary of the subject areas. Third, policy, like COPPA[16] limits the extent to which platform and game developers are able to acknowledge players under 13 years (cite). Consequently, youth use technologies that are not developmentally appropriate by design (Kidron and Rudkin). More work is necessary to address such issues that are however beyond the scope of this dissertation. In reviewing prior work in the following chapter, I present the case for why virtual world games like Minecraft merit our attention (Mnookin, 1996; Lastowka and Hunter, 2004; Bourgonjon et al., 2017). At the same time, the above perspectives do not help us understand kid-/family-friendly servers nor help inform how we might respond to the increasing uptake of multiplayer Minecraft among 7- or 8-year olds, or in some instances, even younger children, as reflected in the above three stories (Thompson, 2016; Kessel et al., 2019; **?**). Furthermore, youth have every right to play and identify as gamers should they choose to do so (e.g., (Salen Tekinbaş, 2020); UN rights of Child [17]; Digital Futures Commission [18]). The early set of studies on the potential of Minecraft for supporting youth development have been focused within classroom settings (Short, 2012; Schifter and Cipollone, 2013; Cipollone et al., 2014a; Bos et al., 2014; Niemeyer and Gerber, 2015). But recent HCI research offers promising evidence for "in-the-wild" Minecraft servers as feasible spaces that promote social competencies in youth (Ringland et al., 2016b; Ringland, 2018; Slovak et al., 2018; Jagannath et al., 2020; Tekinbaş et al., 2021). This dissertation examines a unique opportunity to further understand the rhetoric of kid-/family-friendliness and how such servers leverage social and technological design to engage youth and adults in Minecraft.

[16]https://www.ftc.gov/enforcement/rules/rulemaking-regulatory-reform-proceedings/childrens-online-privacy-protection-rule

[17]https://www.ohchr.org/en/professionalinterest/pages/crc.aspx

[18]https://digitalfuturescommission.org.uk/play-in-a-digital-world/

1.3 Motivation

Youth today are coming of age at a time when there is, in principle, a growing abundance of access not only to knowledge and information, but also to social connection (Ito et al., 2013; Lenhart et al., 2008; Reich et al., 2014; Ringland, 2018; Magis-Weinberg et al., 2021a). However, children and adolescents are disproportionately affected by the risks of the digital world due to their developmental vulnerabilities and their status as "early adopters" of emerging technologies (Livingston et al., 2011; Kidron and Rudkin, 2017; Magis-Weinberg et al., 2021b). Research in Developmental Science and related fields shows that the quality of activities, particularly during early and middle adolescence (ages 6-14), are strongly correlated with brain development (Goel et al., 1995; Lehto et al., 2003; Crone and Dahl, 2012; Immordino-Yang et al., 2018, 2012; Immordino-Yang and Gotlieb, 2017; Dahl et al., 2018). The development of one's socio-emotional, cognitive, and physical abilities are aided through healthy social relationships with peers and other caring adults (e.g., parents, teachers, coaches) as youth begin to expand their social connections (Ito et al., 2013; McCarthy et al., 2016; Dahl et al., 2018). Online communities, gaming servers, social and online media, for example, offer youth opportunities to connect with others around a shared interest or engage in a common activity (Ito et al., 2013; Reich et al., 2014). However, we do not fully understand which combination of social and technological features might promote healthy online social behaviors in youth. With youth reporting increased time spent online—including playing games with others—parents, educators, and technology developers are eager to better understand what shapes behavior online, positive and negative behavior alike (Lenhart et al., 2010, 2008; Reich et al., 2014; Ringland et al., 2016b; Thompson, 2016; Ito et al., 2018; Knorr, 2020; Salen Tekinbaş, 2020; Kessel et al., 2019). The growing discussion surrounding management of behavior in online spaces is tied, for example, to concerns about the impact disruptive and harmful behavior may have on children and adolescents (Campbell, 2005; Li, 2007; Lenhart et al., 2011; Harker et al., 2013; Livingstone, 2013). These perspectives should

be factored and addressed, but given the rise in online gaming among youth, it is just as important to understand how we might better support youth in interest-driven online spaces (Cowan; Salen Tekinbaş, 2020; Beals and Bers, 2009). In the current research context, safe environments are characterized as spaces where youth can take social risks and experiment around identity and interests within a trusted social setting with peers and adults (Dryfoos, 1998; Larson, 2000; Damon, 1984, 2004; Damon et al., 2003). Addressing this need within an ever-evolving online world can be complex and challenging since multiple stakeholders including youth, parents and caregivers, facilitators, researchers, designers, practitioners, and policymakers may have competing goals and interests (e.g., Salen Tekinbaş (2020)). Be that as it may, this work is a worthwhile endeavor because it could inform how we might support adolescents' social development in today's networked and interconnected world.

Online spaces, including play-based virtual worlds like Minecraft, have been suggested as viable sites for youth to develop their social identity and other social and emotional skills that can positively shape their behavior online (Maczewski, 2002; Kann et al., 2007; Kahne et al., 2012; Reich et al., 2014; Depping et al., 2018; Ringland, 2018; Jagannath et al., 2020; Tekinbaş et al., 2021). These include skills related to social competence, the ability to build positive and healthy interpersonal relationships, and to resolve interpersonal conflicts. Such positive outcomes are not automatic; however, nor should they be expected to occur in every online setting. Rather, the literature suggests that positive outcomes are much more likely to develop, if at all, within spaces where youth can feel a sense belonging, can contribute and earn social status, can share interests with others, and have access to activities that sustain their involvement (Goldman et al., 2008; Montgomery et al., 2008; Dahl et al., 2018; Fuligni, 2019a; Ito et al., 2018). Prior work in Minecraft has recognized the role of social norms and moderation as mechanisms that shape player behaviors and experiences (Ringland et al., 2017, 2016b; Slovak et al., 2018; Tekinbaş et al., 2021). In a study on Autcraft for example, a server for children and adults who are neurodivergent, Ringland et al. (2016b) found that social norms created by administrators were essential for facilitating positive social play on

the server. This work acknowledges the skepticism towards governance mechanisms in online virtual worlds (e.g., terms of service, code of conduct, etc.) as structures that hinder play (Taylor, 2006; Grimes, 2015a) or ineffective without legal policies (Bartle, 2006; Fairfield, 2008). Despite this awareness, researchers have sought to understand the features of virtual worlds that support social play (Reich et al., 2014; Ringland et al., 2016b; Ringland, 2018; Tekinbaş et al., 2021; Du et al., 2021b).

These findings are consistent with work in HCI and related disciplines that have recognized the role of norms and community moderators in shaping community culture (Paluck and Shepherd, 2012; Seering et al., 2019; Matias, 2019a; Kraut and Resnick, 2012a; Kiesler et al., 2012). Matias (2019b; 2019a) and others, for example, have found that information about norms is influential when a person cares about a group or they feel like they belong (Perkins, 2002). In a Minecraft study, Slovak et al. (2018) found that moderators play an important role in servers for youth and note the need for a deeper understanding of the social and technological governance features of such moderated servers. These studies contribute to significant research on community norms and moderation including the foundational work on a set of Minecraft servers (Ringland et al., 2017, 2016b; Slovak et al., 2018; Tekinbaş et al., 2021). More research to understand the narratives of kid-/family-friendly and social and technological mechanisms "in-the-wild" Minecraft servers could help advance our understanding of how we might design developmentally appropriate online playgrounds for youth (Beals and Bers, 2009; Slovak et al., 2018; Cowan; Kidron and Rudkin, 2017; Du et al., 2021b). The present work aims to address this opportunity.

This dissertation is a deeper investigation into a particular genre of Minecraft gaming servers known as kid-/family-friendly or family-friendly servers that have been tailored for youth typically 13 + years, but often as young as ages 5 and upward as the stories of KTango and Elbereth reveal (Doyle, 2014; Salen, 2017). In this section, I outline the interdisciplinary theoretical framework that informed my research design and analysis approaches and the

proposed contributions of this work. I then present an overview of the three studies, the corresponding research questions and conclude with describing the structure of the remaining chapters.

1.3.1 Domains and Proposed Contributions

Theories and empirical approaches from five main disciplines (Figure 1.2) are used to inform my research approach and serve to position the contributions of this work. The fields of Developmental Science, Learning Science, and Positive Psychology offer a wealth of knowledge to understand the developmental needs of youth, particularly in the social realm. HCI has a long-standing interest in advancing our understanding of how social practice and technical design might serve vulnerable populations such as youth (Resnick, 2001; Blackwell et al., 2017; Seering et al., 2017b; Tekinbaş et al., 2021). Relevant literature in play and games studies, including those that present critical counterarguments (e.g., why rules may be rigid systems that diminish the potential of play; (Taylor, 2006; Grimes, 2015a)), enrich our understanding of how play and games foster innovation in technology (Wuertz et al., 2018; Targett et al., 2012; Charleer et al., 2018). I draw from this multidisciplinary approach, elaborated in the next chapter, and approach this work with two main assumptions. The first draws on the well-established concept of "affinity networks" that can be defined as social spaces for interest-driven learning (Gee, 2004, 2018, 2005; Ito et al., 2013, 2018). Using a mixed-methods approach, I first identify the social and technological features of kid-/family-friendly Minecraft servers including server metadata. Server metadata is data that describes attributes about a server and is written by users who create or manage the server. An example of server metadata is a headline or mission statement (e.g., "Cubeville [19] is a family friendly, survival server. We have almost 24/7 staff coverage to ensure everyone is safe and has help when they need it. We have a main world where players can settle to build alone

[19] cubeville.org/

or together, a games world where people can play and plenty more to experience.") Then, I compare their features against Gee's model (2005) to determine the extent to which kid-/family-friendly Minecraft servers can be said to be play-based affinity spaces. The second assumption is that the social and technological mechanisms in kid-/family-friendly Minecraft server ecosystems created by adults not only serve as governance approaches to manage the online ecosystem, but also reflect adults' goals for promoting safety and social play among youth.

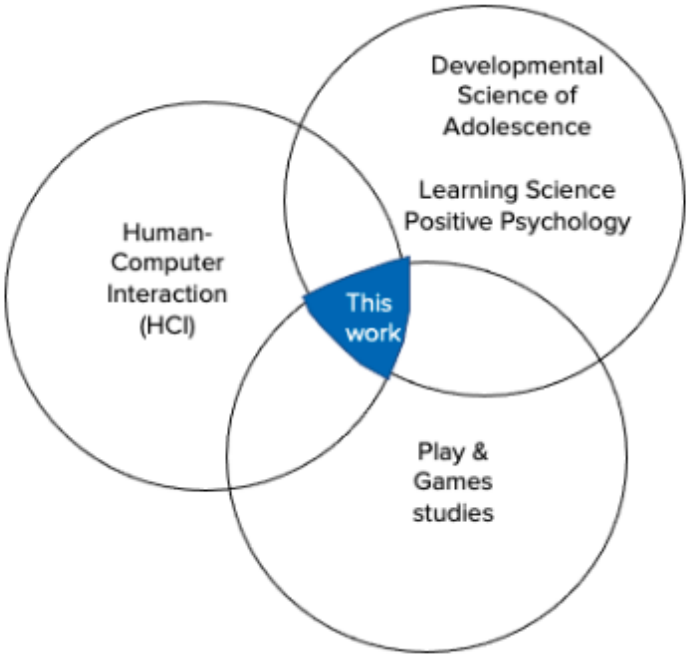


Figure 1.2: Connecting Developmental Science, HCI, Learning Sciences, Play and Games Studies, Positive Psychology as allied disciplines through this work

Alt Text: a Venn diagram showing three intersectional circles and the center common area, shaded in blue color, labelled "this work". One circle is for Human-Computer Interaction (HCI), the other is for Play and game studies, and the third is for developmental science of adolescence, learning science, and positive psychology

Questions guiding this investigation include: What are the salient characteristics of kid-appropriate or "kid-/family-friendly" online play spaces, like Minecraft servers? What social and technological features characterize kid-/family-friendly communities online? How might

these communities, through their specific socio-technical design, support the developmental needs of youth? I designed three studies, outlined below, to investigate the socio-technical characteristics, social practices, and technological governance mechanisms within the kid-/family-friendly Minecraft server ecosystems. I apply multiple methods – empirical meta-analysis of rules and server metadata using a grounded theory approach (Creswell and Miller, 2000; Creswell and Poth, 2016), virtual and epistolary text-based interviews using a thematic analysis approach (Debenham, 2007; Braun and Clarke, 2012; Brinkmann and Kvale, 2015; Bailey and Bailey, 2017; Mishler, 1991; Seidman, 2006), and design-based research (Boehner et al., 2007; Olson and Kellogg, 2014) in carrying out the three studies. Each study is aimed to incrementally advance our understanding of kid-/family-friendliness in Minecraft to help answer the overarching question posed at the beginning of this chapter. All three studies in this work were approved by the Institutional Review Board (IRB) at the University of California, Irvine (Appendix B).

I aim to make three main contributions to HCI through three corresponding studies focused on the following

i a nuanced understanding of socio-technical features within and across kid-/family-friendly Minecraft server ecosystems through an analysis of server metadata,

ii an understanding of online moderation practices within a subset of kid-/family-friendly server ecosystems, and

iii a technological design probe of an AI chatbot to explore how automated tools might make positive social interactions more visible to players in one of the kid-family-friendly communities as a means to foster healthy social behaviors and also assist human moderators in their practice within the server ecosystem.

These findings may advance our understanding of certain design affordances [20] of kid-family

[20] Affordances can be defined as the most prominent features of an entity or environment (Gibson, 1977)

friendly game servers and help inform future research into governance approaches for youth within developmentally responsive online playgrounds. This work may also help identify newer opportunities in socio-technical design, research, practice, and policy work for promoting youth interests in online gaming. Finally, the results of this work may offer approaches to help stakeholders including youth, parents, and practitioners understand how they might navigate opportunities and challenges in online play-spaces.

1.3.2 Overview of Study I: Server Rules and Self-Narratives

Study I investigates the rhetoric of kid-/family-friendliness through the lens of server metadata, which I refer to as self-narratives. The Minecraft platform does not mandate server metadata be published[21] by server creators and shared with their players. In that sense, Minecraft users can not only tailor their servers (i.e. "modded" servers cf., Section 2.2.2 in Chapter 2, (Lee et al., 2020)) but also create and control its self-narratives (i.e. metadata) and share them with other players on their servers should they choose to do so. Self-narratives, by virtue of being written by users, reflect the goals and views of their author(s), typically server owners or server staff, that may or may not align with those of players on their servers. In light of my second assumption stated above (cf., Section 1.4.1), the premise of Study I is that self-narratives can reveal the features of their corresponding kid-/family-friendly servers and be useful to investigate patterns across such servers. In that sense, self-narratives too correspond to their authors' conceptions of kid-/family-friendliness which may or may not align with the self-narratives of other members on the server.

Based on a study sample of 60 Minecraft servers, I examined the relationship between server rules and server metadata as a way to understand the rhetoric of "kid-/family-friendliness" present in the servers I studied. Doing so was a first step towards understanding what

[21] https://help.minecraft.net/hc/en-us/articles/360058525452-How-to-Setup-a-Minecraft-Java-Edition-Server: Per the information on the official Minecraft website, the steps to create a server do not require hosting a web page with additional server information (i.e. server metadata)

kinds of social and technological features were reflected in the server metadata. The findings suggest that rulesets (i.e. sets of rules) are an important analytic tool for understanding the characteristics of Minecraft servers and the rhetoric of kid-/family-friendly servers.

Further, my research contributes a taxonomy for understanding server rules through an empirical characterization of three server genres – kid-/family-friendly (n1= 19); general-family-friendly (n2=20); and general (n3=20) in Minecraft. Study I findings will only allow a speculative revised version of the term kid-/family-friendly servers. Depending on what the metadata reveals, we can surmise whose conceptions of kid-/family-friendly the corresponding servers reflect. Findings based on a rhetorical analysis of described metadata do not permit me to make specific claims about whose conceptions they really are.

1.3.3 Overview of Study II: Moderators' Lived Experiences and Practice

Study II is focused on understanding the underlying motivations and moderation practices of 30 moderators (22 adults, and 8 youth including 2 minors) across a sub-set of ten "in-the-wild" kid-/family-friendly servers. This study contributes insights into socio-technical forms of moderation in the studied "in-the-wild" kid-/family-friendly Minecraft server ecosystems. The findings reveal a set of challenges that many moderators described during the interviews around the tools available for supporting their practice. This finding provided the inspiration for Study III. In Study II I revise the working definition of kid-/family-friendly servers to include youth moderators' perspectives on the kid-/family-friendly rhetoric from four kid-/family-friendly servers.

1.3.4 Overview of Study III: Prosocial Bot for OhanaCraft as a Technological Design Probe

The dominant approach to moderating online communities, including games, has been to deploy automated mechanisms to penalize bad actors, or remove dubious communications (Fairfield, 2008; Gillespie, 2020; Gorwa, 2019; Gorwa et al., 2020). In the context of online games, these approaches tend to subvert the inherent emergent nature of play and diminish opportunities for players to learn from any failed social interactions (Salen et al., 2004; Taylor, 2006; Grimes, 2015a). In my third study, I explore a new way forward for automated moderators tools in kid-/family-friendly gaming platforms using a technological design probe, defined in HCI as a tool used to inspire possibilities for future work (Boehner et al., 2007). To address a design opportunity, Study III takes on a design-led research perspective to explore how technological mechanisms might make positive interactions more visible to players as a way to foster prosocial behaviors (e..g, being polite, saying something nice or kind to others, etc.). This work theorizes the potential for prosocial automated tools in play-based spaces through a Discord Bot called "UCIProsocialBot" within OhanaCraft, one of the kid-/family-friendly server communities. Based on the observations from Study III, I present a third, and final for the scope of this work, version of how we might define kid-/family-friendly servers.

I present a summative version of the rhetoric of kid-/family-friendly servers in Chapter 6. The study-specific research questions are outlined in Table 1.1.

1.3.5 Research Questions

Research Questions grouped by Subtopic	**Study I**	**Study II**	**Study III**	**Thesis Statement**
Characterizing Online Governance in *Kid-/family-friendly* Minecraft Ecosystems through an Empirical Analysis of Rules				
RQ 1: What are the various types of rules that Minecraft server ecosystems call upon? How similar/dissimilar are these rules across the servers and the Mojang platform?	X			T1
RQ 2: What are the social and technological forms of governance reflected in these rules? How do they contrast across such servers?	X			T1
Understanding the Rhetoric of *Kid-friendliness* in Minecraft Server Ecosystems				
RQ 3: How do the various kid-/family-friendly servers present themselves as a kid-/family-friendly online space? How does this contrast with other traditional servers?	X			T1

Research Questions grouped by Subtopic	**Study I**	**Study II**	**Study III**	**Thesis Statement**
RQ 4: Does the self-narration around "*kid-/family-friendly*" or "*family-friendly*" correlate with different forms of rulesets? If so, how?	X			T1
Understanding Lived Experiences of People's Governance Practices in *Kid-/family-friendly* Minecraft Ecosystems				
RQ 5: How do server staff, moderators in particular, describe their **motivation** for moderating on kid-/family-friendly servers?	x	X		T1 & T2
RQ 6: How do moderators describe their **practice** in regulating rules related to social norms on their servers?	x	X		T1 & T2
RQ 7: How might we characterize their approach to moderating on the server? (i.e., **style**)	x	X		T1 & T2
Design-led Research of an AI Bot in a *Kid-/family-friendly* Server Ecosystem: Prosocial Bot for OhanaCraft as a Technological Design Probe				

Research Questions grouped by Subtopic	**Study I**	**Study II**	**Study III**	**Thesis Statement**
RQ 8: How might a technological governance feature be designed to leverage the strengths or assets of the target community, a *kid-/family-friendly* server in this case?			X	T1 & T2
RQ 9: How might such a feature be designed to support moderators' current practices?			X	T1 & T2
RQ 10: How does the target community respond to such a feature that highlights positive social interactions?			X	T1 & T2

X = The main study designed to address the corresponding RQ(s); x = A supplementary study that supports the main study

Table 1.1: Mapping of Research Questions (grouped by topic) to the three studies and how they connect to the Thesis Statements

1.3.6 Overview of Chapters

This dissertation, primarily aimed at investigating social and technological forms of governance in kid-/family-friendly Minecraft servers, is organized into seven chapters, which are

outlined below. Following the first two chapters in which I describe the motivations, research context, and discuss relevant prior literature, I present three chapters corresponding to the three studies in this work. In Chapters 3, 4, and 5, I provide a brief background, followed by descriptions of the study approach, research setting, chosen methodology, and research findings along with a brief study related discussion for studies I, I, and III respectively. The last two chapters include a general discussion around three core concepts – adolescent development, youth in online gaming, and server governance, a summary of contributions and recommendations for future work.

Chapter 1: This first introductory chapter covers the broad motivations, the research context, and goals of the dissertation. Drawing from examples in the data, I posit a working definition for the term kid-/family-friendly in the context of Minecraft server ecosystems. Table 1 summarizes the research questions and proposed studies (Studies I, II, and III)

Chapter 2: Owing to the nature of research questions, I take on an interdisciplinary approach to understand the theoretical and empirical approaches in the disciplines of Developmental Science, Play and Game studies, HCI (social norms and online moderation), Learning Science, and Positive Psychology (See Figure 1.1). I discuss relevant prior work and delve into the theoretical framework comprising three main concepts – social norms, online moderation, and affinity spaces as a way to frame the study findings in Chapters 3, 4, and 5 and the broader discussion in Chapter 6.

Chapter 3: Describes Study I, which is an endeavor to understand the self-presentation of kid-/family-friendly servers and the rhetoric of kid-friendliness in Minecraft Server Ecosystems through an analysis of server metadata (mission statements, server rules). Using thematic analysis, I present a taxonomy of server rules and delineate the characteristics of kid-/family-friendly server ecosystems.

Chapter 4: Accounts for the lived experiences of server staff who moderate on kid-/family-friendly and family-friendly servers. Study II, presented in this chapter, corresponds to an interview study with adult and youth moderators to understand their motivations, practices, and moderating styles.

Chapter 5: Presents Study III, an exploratory study using an AI bot as a technology probe in one of the kid-/family-friendly server ecosystems. The probe study applies a strengths-based design paradigm used in community interventions to tackle the question of how technological moderation might promote positive interactions and assist moderators in their practice.

Chapter 6: I reflect on the findings from the three studies and present a general discussion of the implications of this work from three main perspectives – the developmental needs of adolescents; online play-based affinity spaces; and socio-technical mechanisms for HCI. The interdisciplinary approach implicates the five disciplines as allied fields that can help shape future work (Fig 1.1)

Chapter 7: In this concluding chapter, I summarize the contributions of this dissertation and share a set of recommendations for future work.

Supplementary information including a reflection on my research positionality; approved research protocol documents by the Institutional Review Board (IRB) B at the University of California, Irvine; servers' list and additional relevant analysis for Study I; and a select glossary of key terms are organized as Appendices A-G.

Chapter 2

Related Work

This dissertation aims to provide a deeper understanding of the social and technological features of multiplayer Minecraft servers explicitly created for youth. It derives its motivation from the pressing question of which features online playgrounds like Minecraft might include to be responsive to the developmental needs of youth. The relationship between technical design and social practice has been a focus of much research in HCI (Resnick, 2001; Pinch and Bijker, 1984; Olson and Kellogg, 2014) and related fields concerned with the impact of online participation in online communities (Kraut and Resnick, 2012a; Massanari, 2017; Ringland et al., 2016b; Seering et al., 2017a). The emergent nature of the research questions in this work led me to examine additional prior work in disciplines concerned with the developmental needs of youth and with the impact of online gaming on youth. The science of adolescence or Developmental Science, an interdisciplinary field in and of itself, offers a wealth of evidence-based insights about the developmental needs of youth, particularly during adolescence (Crone and Dahl, 2012; Blakemore et al., 2007; Dahl et al., 2018). Game studies, Learning Science, and Positive Psychology offer theoretical and empirical knowledge on play and its significance in youth development (Rogoff, 1994; Rogoff et al., 1995; Larson, 2000; Lerner et al., 2002; Damon, 2004; Salen et al., 2004; Prensky, 2006; Flanagan et al.,

2008; Beals and Bers, 2009; Itō, 2010; Ito et al., 2013; Reich et al., 2014; Grimes, 2015b). These disciplines may bear different perspectives on the broad question posed above, but lend theories and empirical approaches that not only ground the analytical work in this dissertation, but also enable a richer discussion of the findings towards the goal of supporting youth in online play.

The review of prior work in this chapter is organized within three main sections. The first section provides an overview of the core principles of adolescence drawn from Developmental Science to help understand the needs of youth. Insights contributed by the fields of Learning Science and Positive Psychology relevant to the core principles are then described. Through this understanding, play emerges as an area that is interest-driven (i.e. intrinsically motivating for youth) and well-suited for supporting those developmental principles. This understanding necessitates a review of relevant literature on play and online games. The second section provides a background on the Minecraft server ecosystem and recent HCI research ((Ringland et al., 2016b; Tekinbaş et al., 2021) to reorient the reader on why this dissertation is focused on socio-technical forms of governance in Minecraft servers. The third section reviews related work that forms the theoretical basis for the current research and a brief overview of methodologies that informed the chosen approaches for the three studies. Within this section, I discuss select literature drawn from HCI and related disciplines on three theoretical concepts – i) social norms (Coleman; Cialdini and Goldstein, 2004b; Kraut and Resnick, 2012a; Coleman, 2018); ii) online moderation (Fiesler et al., 2018; Gillespie, 2018; Ringland, 2018; Slovak et al., 2018; Gorwa, 2019; Seering et al., 2020a; Tekinbaş et al., 2021); and iii) affinity spaces for youth development (Rhodes, 1994a; Gee, 2004; Lerner et al., 2002; Gee and Hayes, 2012; Ito et al., 2013; Gee, 2018; Ito et al., 2018). I describe HCI's design-led research and the use of technological design probes as a way to ground my approach for Study III. Finally, I conclude this chapter with a brief synthesis and note addressing how the expected findings aim to advance prior knowledge. I provide definitions for frequently used terms including social status, positive risk-taking, autonomy, and Minecraft

related terms in Appendix H.

2.1 An Overview of Development in Early Adolescence

Adolescence is a formative developmental period marked by dramatic biological, cognitive, socio-behavioral, and physical changes as individuals prepare to grow out of childhood and transition into adulthood (Crone and Dahl, 2012; Blakemore and Choudhury, 2006; Blakemore et al., 2007; Blakemore, 2007; Dahl et al., 2018). The science of adolescence or the developmental science of adolescence is a growing interdisciplinary field in its own right concerned with advancing our understanding about adolescence and their needs to inform research, practice and policy (Dahl et al., 2018). In the following subsections, I first clarify how I use the terms "adolescents", "(very) young adolescents", and "youth" in this chapter. Then, I describe a set of principles drawn from the literature to help understand adolescent developmental needs. Following, I review related concepts from Learning Science and Positive Psychology as a way to connect theories on youth development with the core developmental principles. In the final subsection, I discuss how play-based contexts, recognized by prior studies, lend themselves as interest-driven social spaces that can be leveraged to support youth development.

2.1.1 Defining Terms Related to Youth

Precise definitions of the terms "youth," "young adolescent" and "adolescent" are infeasible for two reasons. First, there is a lack of consensus for the age ranges for each of these terms within research (Sawyer et al., 2012, 2018; McDonagh et al., 2018) and policy (e.g., UN Conventions Rights of A Child, UNESCO [1]). Furthermore, the use of each term may vary

[1] http://unesdoc.unesco.org/images/0006/000684/068409eb.pdf

by cultural context (Sawyer et al., 2018). Throughout this dissertation, I use the term youth to refer to both children in middle-childhood (6 - 12 years; (National Research Council (US) Panel to Review the Status of Basic Research on School-Age Children, 1984)) and adolescents (10 - 24 years; See Figure **??** (Sawyer et al., 2018)). Other terms used in this chapter and subsequent chapters include "Very Young Adolescents" or VYAs, young adolescents, and pre-adolescents (ages 9 - 14 years; (McCartney et al., 2016; Dahl et al., 2018). Despite the lack of consensus on definitions, these scholars concur that youth, young adolescents in particular, have specific developmental needs that produce serious consequences for health and well-being that last throughout adulthood (Sawyer et al., 2018; McDonagh et al., 2018). Increasing evidence from the field emphasizes that next to early childhood, early adolescence is a critical "window of opportunity" for focusing on healthy development (Immordino-Yang et al., 2018; Dahl et al., 2018).

2.1.2 Insights & Recommendations: Developmental Significance of Social Needs in Early Adolescence

But why does early adolescence matter so much? The field of developmental science offers a key explanation, drawn from decades of research across related disciplines including developmental psychology, neuroscience, biology, and behavioral sciences (Barnett, 1990; Eccles and Wigfield, 1997; Steinberg and Morris, 2001; Immordino-Yang et al., 2009; Crone and Dahl, 2012; Blakemore and Mills, 2014; Immordino-Yang et al., 2018; Dahl et al., 2018; Fuligni, 2019b). Young adolescents are highly sensitive to a number of changes taking place, often simultaneously and rapidly, in their physical (i.e., in the brain and body) and external social realms (Eccles et al., 1997; Nelson, 2009; Blakemore, 2007; Crone and Dahl, 2012; Blakemore and Mills, 2014; Dahl et al., 2018). Consequently, young adolescents are a particularly vulnerable group that need adequate support from responsible adults including parents and caregivers, teachers, mentors or coaches, and so on. Given that adolescent developmental

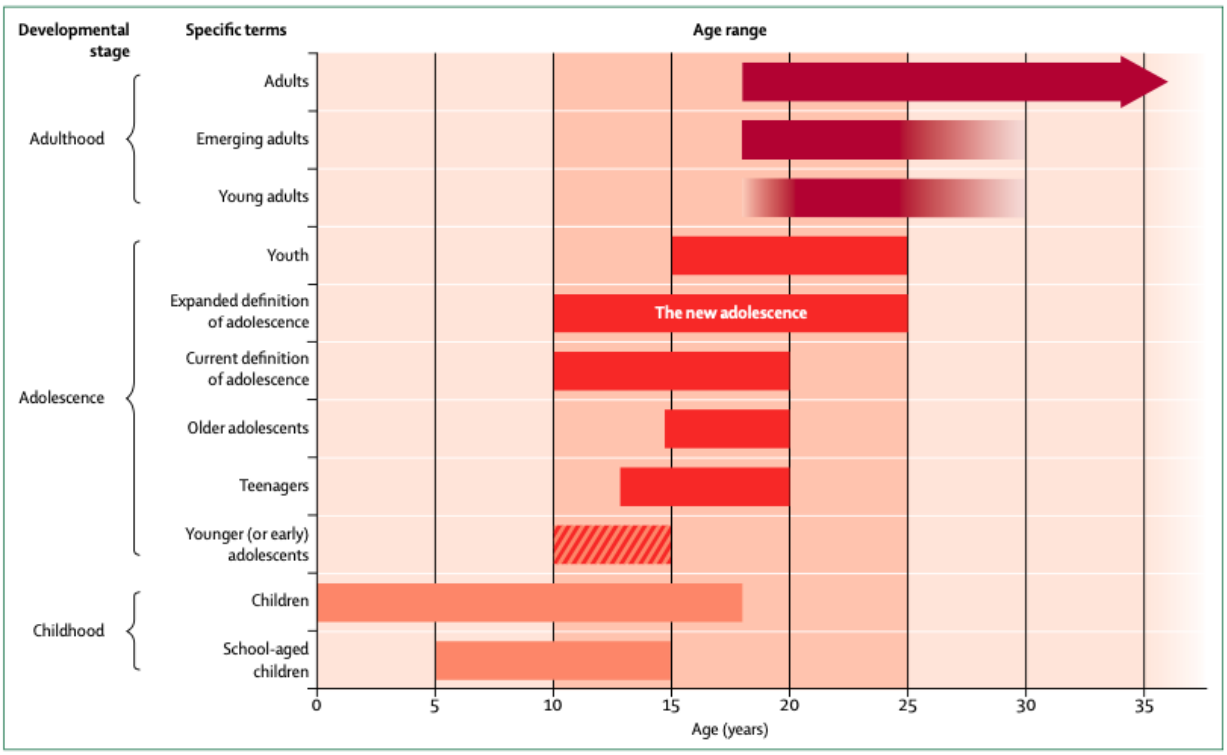


Figure 2.1: Terms used to refer to adolescents (Sawyer et al., 2018)

Alt Text: A graph with age in years as the x axis and developmental stages as y axis, representing childhood (0-18 years); adolescence (10 -25 years); and adulthood (18 years +) but how various terms within these stages are used

needs in the social realm are relevant to the research questions posed in this work, I summarize five key principles drawn from the Developmental Science literature (Brown, 1986; Brown and Lohr, 1987; Eccles et al., 1997; Tarrant, 2002; Crone and Dahl, 2012; Knoll et al., 2015; McCartney et al., 2016; Foulkes and Blakemore, 2016; Meltzer et al., 2018; Dahl et al., 2018; Pfeifer and Berkman, 2018; Schwartz and Petrova, 2018; Yeager et al., 2018; Fuligni, 2019b). For each core principle, I include recommendations from the literature for how the principle can be applied to support adolescent development.

- **Supportive social environments are vital in early adolescence**: Young adolescents are influenced by peer groups and adults that they can trust and look up to. Positive social interactions with peers and trusted adults shape healthy behavioral de-

velopment and help young adolescents feel a sense of connection beyond their family and school settings. Such friendly adults and peers become valuable support networks that can guide young adolescents to learn new things, develop problem-solving skills, and other socio-emotional competencies (e.g., Dahl et al. 2018; Muriuki et al. 2021). Based on this principle, the literature recommends providing adolescents with opportunities for developing connections with peer groups and adults within their everyday contexts. These opportunities should offer adequate guidance on social rules or norms and ways for developing communication skills through which adolescents can strengthen social ties with supportive networks.

- **Positive social feedback shapes development at various levels**: The evidence-based research shows that social feedback (i.e. what others think about a person) shapes identity development and behavioral development (Muriuki et al., 2021). Social feedback can motivate young adolescents to learn and apply new skills. As mentioned earlier in this subsection, brain development asserts its influence on identity and behavioral development in early adolescence. Notably however, emerging evidence suggests that social feedback, especially positive learning experiences, can shape the ways in which brain development occurs. This principle is vital because young adolescents are intensely attuned to social feedback; positive feedback is known to increase perceived social value (Foulkes and Blakemore, 2016) whereas negative feedback diminishes social value that has detrimental implications in early adolescence (Foulkes and Blakemore, 2016; Dahl et al., 2018). Based on this principle, the science suggests that young adolescents should be afforded opportunities to give and get feedback from peers and adults. The research suggests that adults can model positive feedback behaviors and provide necessary guidelines and tools for adolescents to learn how to share feedback effectively.

- **Young adolescents have a propensity for novel learning experiences and**

risk-taking: Young adolescents are motivated to look for new experiences as a way to learn new skills and gain more independence. Relatedly, they have a propensity for taking risks to seek those new challenges (Knoll et al., 2015; Do et al., 2017). Research shows that risk-taking behaviors can be harnessed to help youth cultivate the drive to learn and overcome challenges or failure as long as adolescents are able to practice risk-taking within safe environments. The presence of supportive peers and adults who can intervene when necessary to mitigate any possibility of harm is crucial in this principle. The research suggests that young adolescents be provided safe spaces where they can explore new areas of interests or try out different ideas or skills with social support for recovering from potential failures. The role of responsible adults is emphasized as they can provide adequate "scaffolding" (Wood et al., 1976a; Luckin, 2008) for helping adolescents develop decision making skills and learn to take healthy social risks (Dahl et al., 2018; Muriuki et al., 2021). It may be noted that the term "scaffolding", originally derived from practices used by educators, is defined in the literature as an approach where a more experienced individual lets the learner maintain control of their activities as long as they are able to accomplish a said goal but also takes away that autonomy if the learner makes an error until the learner can correct their course of action (Wood et al., 1976a; Luckin, 2008) . Given that the research context involves an online multiplayer game, I define the term scaffolding as, an approach where an individual or an entity (e.g., a bot) supports an individual carry on with their activities and is ready to intervene when the individual is unable to make further progress or needs more input to accomplish additional goals.

- **Young adolescents are motivated to earn social status and autonomy**: The evidence-base shows that adolescents value social recognition, from peers and adults alike, and they believe that risk-taking is a pathway to gain such social status. New evidence suggests that this social status and autonomy can be promoted by offering adolescents opportunities for "mastery learning" (Block and Burns, 1976; Dahl et al.,

2018). Mastery learning is a principle which reinforces the idea that everyone can master (i.e.learn) a concept or skill, with adequate support, and that the mastered concept or skill prepares each individual for "social success" in the the near- and long-term (Block and Burns, 1976)(p. 4). Consequently, young adolescents should have opportunities for experiential learning whereby they can practice and reflect on their learning as a way to develop mastery over skills in areas of interest. The research shows that supportive peers and adults can provide social feedback to help young adolescents recover from any mistakes (e.g., without being made to feel shame etc.)

- **Young adolescents seek to earn value and respect through their contributions:** Young adolescents are motivated to earn recognition and social status for their contributions (Foulkes and Blakemore, 2016; Dahl et al., 2018; Fuligni, 2019b). This desire to gain acknowledgement from peers and other adults drives them to seek opportunities where they can contribute to their social settings. At the same time, research suggests that young adolescents have a heightened sensitivity to positive and negative social feedback (Foulkes and Blakemore, 2016).

2.1.3 Connecting Learning Science and Positive Psychology to Adolescent Developmental Principles

The principles outlined above resonate with theories on youth development pioneered by learning scientists and positive psychologists, of which I summarize relevant ideas below (Rogoff, 1994; Lave, 1991; Rhodes, 2008; Gee, 2005; Lerner et al., 2005; Itō, 2010; Ito et al., 2013, 2018; Campbell et al., 2016).

The period from around 8 to 18 years is a critical time when individuals form interests and social identities (Buckingham, 2007; Choudhury et al., 2006; Itō, 2010; Ito et al., 2013, 2018). Research on youth development emphasizes the importance of participation — choice and

voice—for adolescents (Pittman et al., 1991a,b; Halpern, 2002; Council, 2012). According to Pittman, development is triggered by engagement—"young people learn best when they are engaged with their heads and their hearts, and where they have real choice in the situations in which they are involved" (Pittman et al., 2011). Further, the learning sciences have increasingly recognized the role culture, social relationships, and shared practice play in the discovery of interests and persistence in pursuing them (Council, 2013). Research also documents how the availability of shared activities (Azevedo, 2011, 2013), familial support (Crowley and Jacobs, 2002), and rapport with teachers, mentors, and other caring adults (Rhodes, 1994b) form protective factors in youth development. Damon and others (Bundick et al., 2006; Damon et al., 2003; Mariano and Going, 2011; Ito et al., 2013) further emphasize that a central indicator of youth thriving is engagement in pursuits that serve the common welfare and make meaningful contributions to communities (Lerner et al., 2005, 2011). Youth go beyond their own self-centered needs and extend outward to the pursuit of goals that benefit the world. Decades of research in educational and positive psychology in offline settings, including schools and after-school programs, emphasize the role of community, agency, and interest of the learner as key enablers of personal growth (Rogoff and Lave, 1984; Larson, 2000; Lerner et al., 2002; Wenger, 2011; Ito et al., 2013).

Positive Youth Development or PYD is a philosophy and approach in Positive Psychology that advocates for providing youth with contexts and opportunities tied to their interests and focused on their strengths as opposed to their shortcomings (Larson, 2000; Damon, 2004; Safran, 2006; Guerra and Bradshaw, 2008). PYD has been used in both formal and informal learning settings like schools and after-school programs over the past 20 years, with promising results (Pittman et al., 1991a; Blechman et al., 1995; Kirby and Coyle, 1997; Seligman, 2002; Gestsdóttir and Lerner, 2007; Lerner et al., 2009). Studies of offline PYD programs highlight approaches to promoting positive development (Catalano et al., 2004; Lerner et al., 2011; Camiré et al., 2014) but offer little information on how offline PYD interventions specifically track contexts and activities that youth partake in (Larson, 2000). Within HCI there is

limited work (Tekinbaş et al., 2021) that has focused on approaches to PYD in the context of online communities. These concepts are related to the developmental needs of youth, which take on a similar strengths-based approach, as discussed above. Their emphasis on positive social or prosocial interactions is critical to note given the ways in which the quality of social experiences impact brain development and overall well-being during adolescence (Damon 2004; Immordino-Yang et al. 2018, Dahl et al., 2018; Muriuki et al., 2021; Ito et al., 2018). In this sense, the three fields of Developmental Science, Learning Science and Positive Psychology are already allied disciplines that I draw from in this work.

The term prosocial is conceptualized differently by various scholars. For example, prosocial is used to reference social behaviors at a system level for the common good (Ostrom and Ostrom, 2014) or to enable groups to work better together (Atkins et al., 2019). In this work, I draw from Flanagan and Nissenbaum's (Flanagan et al., 2008) notion of values expressed in digital play and define it as social actions that can benefit individuals and the community writ large (e.g., seeking and giving help, being respectful to everyone, owning accountability for oneself, etc.)

2.1.4 Online Play as a Context for Adolescent Development

In summary, the research from the three allied disciplines shows that supportive peers and other adults play a significant role in influencing the social development of young adolescents (Rogoff, 1994; Rhodes, 1994b; Damon et al., 2003; Viner et al., 2012; Ito et al., 2013; Dahl et al., 2018). Studies show that these needs are further potentiated, for better or worse, with the role that technology plays in the life of adolescents (Keyes et al., 2015; Shapiro and Margolin, 2014; Dahl et al., 2018). Research shows that positive social or prosocial behaviors are correlated between face-to-face and online interactions, suggesting that online spaces can support the development of prosocial behaviors in adolescents (Wang and Wang, 2008;

Wright and Li, 2011). More recent work in Developmental Science has sought to understand how games, when designed well, can support developmental principles and be integral to adolescents' social experiences (Goh et al., 2008; Barker and Munakata, 2015; Giovanelli et al., 2020). At the same time, another set of studies call out problematic aspects of gaming in adolescents (Holtz and Appel, 2011; Ferguson, 2015; Choi and Tausczik, 2018; Uçur and Dönmez, 2021). Other scholars in related fields have sought to explain the lack of consensus on video games to extend theories on concepts like moral panic (Ferguson and Colwell, 2017; Paulus et al., 2018) or debunk the myths around video gaming (Przybylski et al., 2009, 2010; Przybylski, 2014; Colder Carras et al., 2018). Furthermore, the latter set of studies have been focused on action and adventure games but none have looked at sandbox-style virtual world games like Minecraft from a developmental lens.

Relatedly, Learning Science research has recognized games for their potential to promote positive social behaviors (Finlinson, 1997; Przybylski et al., 2010; Velez and Ewoldsen, 2013; Reich et al., 2014; Velez, 2015), learning (Prensky, 2003; Steinkuehler, 2004; Gee, 2006, 2008; Salen and Tekinbaş, 2008; Squire, 2013; Granic et al., 2014), civic engagement (Kahne et al. (2012) and healthy behavioral changes (Baranowski et al., 2008, 2011) suggest that digital games do have the potential to encourage healthy social outcomes and youth well-being.

Yee and others Yee (2006) have shown that social behavior and norms in virtual environments are comparable to those in the physical world, suggesting that online games can be used as valid platforms to study—and perhaps impact—social interaction. Online play-based communities mediate social experiences for youth (Cole and Griffiths, 2007; Ringland et al., 2016b) and offer authentic contexts for developing social skills (Slovak et al., 2018). Such experiences are linked to apprenticeship within communities of practice Gee (2005); Lave (1991); Wenger (1998) that emerge as part of the social interactions around the game—such as when new players are 'shown the ropes' by other community members. Through such cognitive apprenticeship Kou and Nardi (2014); **?**); **?**, players are 'enculturated' into both

the technical practices of the game, as well as the dominant cultural perspectives: "this includes adopting the 'right' set of values and attitudes toward the game, its content, its goals, world, and other players" (Gee, 2008) (p.123). Previous work has examined how these processes might impact gamers' perspectives toward collaborative problem-solving, digital media practices, computational literacy as well as social dynamics in online games (Depping and Mandryk, 2017; Ducheneaut et al., 2006; Duncan, 2011).

The translation of this research into the design of digital environments, and games more specifically is still in an early stage (Christel et al., 2013; Craig et al., 2016; Slovák et al., 2018; Tekinbaş et al., 2021). This leaves open the question of what social and technological features enable youth to socially interact with peers and other adults for growing their social competence. Given that an increasing number of children (6-8 years) and young adolescents (9-14 years) play virtual world games like Minecraft (e.g., KTango's son, Elbereth (cf., Sections 1.1.1-2 in Chapter 1), and others: (Mavoa et al., 2017; Slovak et al., 2018; Tekinbaş et al., 2021), investigating kid-/family-friendly servers through the lens of the above developmental perspectives is paramount for understanding how we might better support youth in such play-based contexts.

2.2 Minecraft as a Context for Adolescent Development

In this section, I briefly review literature on virtual world games to help explain why they deserve our attention both in a general sense and within the scope of this research. Then, I describe an overview of Minecraft, which is a virtual world game, and review relevant prior work in HCI that motivates the work in this dissertation.

2.2.1 The Case for Virtual World Games in Research

Virtual world games are open-world or sandbox-style computer games that are inherently social spaces where its inhabitants (i.e. players, lurkers, visitors) can play, connect socially, build or create virtual entities, exchange virtual or real-world assets, and do much more (Lastowka and Hunter, 2004). They are, as Lastowa et al. explain, sustained but continually evolving social spaces. In a virtual world game like Minecraft for example, this means that the characteristics of a server are subject to change dynamically without players necessarily being aware of those changes or new players may leave or enter the world, and so on. Unlike regular computer games, virtual world games are "networked" computer games or multiplayer games (Lastowka and Hunter, 2004; Boellstorff et al., 2012). They include features for personalization of virtual identities (e.g., customize names, virtual costumes and appearances or "skins") and multi-modal interactions among players (Lastowka and Hunter, 2004; Reich et al., 2014; Du et al., 2021b). Prior work offers strong evidence that supports how sociality (Nardi, 2006; Ringland et al., 2016b; Ames and Burrell, 2017; Ringland, 2018) is supported in such online multiplayer games. A set of nuanced insights on why virtual worlds merit our attention (Lastowa et al. 2004) are presented below as a counter-argument for studies that generalize games in a negative light, particularly for adolescents.

Lastowa et al. (2004) point out that virtual worlds may seem artificial or insignificant to some in the real world as players are constantly constructing and inventing their own versions of socio-cultural realities. The authors present three main compelling reasons why virtual worlds ought to be investigated (Lastowa et al., 2004; pp 6-13). The first reason they cite is human-centric – a growing number of people consider social interactions in virtual worlds highly valuable. For them, the virtual world is more than just a game. This perspective concurs with other scholars whose work illuminates the nature of social connections in virtual world games (Reich et al., 2014; Ringland et al., 2016b). The second reason is socio-economic in nature. Lastowa et al. (2004) explain that players may use real-world assets (e.g., time,

money) for various reasons to build or strengthen their social ties with other people in the virtual worlds they inhabit. The authors clarify that through such phenomena, virtual worlds begin to transcend into the real world. Players can make purchases with real world money to buy physical merchandise (e.g., an outfit with the logo, etc.) that mirrors their in-game identity or helps them advance in the game, and so on. For example, the story of Elbereth in Chapter 1 shows that a variety of books on Minecraft are available for youth to develop more expertise on the game. The third, and perhaps most compelling reason the authors provide is that the socio-cultural simulations in virtual worlds players may serve as spaces for reconceptualizing changes in the real social worlds (Mnookin, 1996; Lastowka and Hunter, 2004; Bourgonjon et al., 2017).

In light of the above aspects that view virtual worlds as authentic social spaces, Lastowa et al. (2004) advocate for understanding the social rules or norms of such spaces and how they are actualized through governance practices. This view is similar to that of Beals and Ber (2008) who explain that rules are a vital aspect in virtual worlds for youth not only to enforce behavioral norms but also to reinforce moral values. Other scholars contend that rules and governance structures limit or even impede players' ability to freely produce socio-cultural meanings through play (Taylor, 2006; Grimes, 2015a). Although among these, Taylor's criticism is aimed against design and governance structures at the game platform level that tend to hold views of players as mere consumers of the game. To that end, Minecraft is an exception as it allows users to contribute to the development of the game. Research shows that users of Minecraft are one of the critical factors for its success ((Duncan, 2011). These opposing views suggest potential friction between governance structures such as social rules and how players may seek to subvert such restrictions in virtual world games (Reich et al., 2014; Grimes, 2015b). Nevertheless, this is a promising research direction that may produce critical insights about future governance mechanisms in virtual world games like Minecraft that are an integral part of social life for many youth (Cipollone et al., 2014b; Thompson, 2016; Ringland, 2018; Knorr, 2020; Du et al., 2021b; Microsoft, 2021).

2.2.2 Minecraft servers as a domain of study

Minecraft supports endless creativity in that players, represented by block-like characters, can construct a variety of three-dimensional (3D) virtual worlds. Virtual computers, virtual university campuses, and so on, although such complex architectures that mimic entities in the real world and require expertise and collaborative efforts are examples of the almost infinite potential of the game. Minecraft can be played as a single-player or multiplayer experience, the latter of which is considered in this work. The game supports various configurations (e.g., Survival, Creative, Adventure, etc.) that each outline what players can and cannot do in both single-player and multiplayer modes (Duncan, 2011). Survival mode, the original game mode in Minecraft, challenges players to collect resources, build structures, battle mobs, manage hunger, and explore the world in order to survive and thrive. In Creative mode, players have access to unlimited resources and player avatars cannot die or be damaged by other players or creatures in the world. Additionally, users can modify or "mod" the original game binaries (i.e. package or software) to produce newer "mod packs" (i.e. modified versions of the game; (Lee et al., 2020)) for altering the gameplay experience. As described in Chapter 1, Minecraft is supported by an ecosystem that includes multimodal communication tools (text, audio, and video chats) or platforms such as TeamSpeak, Discord, and Mumble (cf., Section 1.2).

Servers in Minecraft yield different experiences depending on how they may be configured (game modes, modded versions). Several studies on Minecraft have been focused on educational contexts to explore how the game supports STEM learning and design thinking (Bos et al., 2014; Duncan, 2010, 2011; Duncan et al., 2017; Lane et al., 2017) and creativity ((Cipollone et al., 2014b; Niemeyer and Gerber, 2015). Such classroom-based approaches leverage the game to foster creativity, logical thinking, and STEM concepts (Nebel et al., 2016; Lane et al., 2017). However, these studies include servers that are managed within the scope of educational programs or in classroom settings and are insufficient to help us

understand more persistent in-the-wild servers. Findings from more relevant HCI research on a few in-the-wild servers motivate the work in this dissertation, which I summarize below.

2.2.3 HCI research in Minecraft: Social Norms and Moderation

Ringland's work focused on Autcraft, an exclusive kid-friendly server designed for youth who are neurodivergent reveals that the careful curation and administering of community rules enable a new form of social play for its youth who otherwise tend to experience social stigma online (Ringland et al., 2016b, 2017; Ringland, 2018). Ringland describes how vital the strict code of conduct became for the functioning of the server in that the rules had to be so explicit for parents and caregivers to not have reason to misinterpret based on their personal practices. Rules have to consider potential differences in parenting approaches (e.g., being more permissive to sexual references as a part of growing up versus objecting to such content) for example. Ringland's work also surfaces the role of administrators on the server who see themselves as responsible adults in charge of enforcing the rules with the aid of technological mechanisms.

Parents are not the only stakeholders that Minecraft servers have to consider on such servers where youth play. Players also encounter conflict, engineered both by the game and through interactions with others, often referred to as "social drama" (Tekinbaş et al., 2021). Slovak et al. (2018) analyzed server logs to understand how moderators responded to player conflict. Their findings, consistent with Ringland's work, shows that prevalent approaches involved authoritarian techniques (to surveil through logs and punish players). Drawing from interdisciplinary theories, the authors contend that such punitive approaches diminish autonomy and opportunities for learning in youth. In a follow up study, the authors designed an intervention to translate a proven alternative problem-solving paradigm in Prevention Science ("I Can Problem Solve" or ICPS; (Shure, 2000)) within the context of the same Minecraft

server. While their findings establish the viability of such offline design strategies in online settings, the authors note that several other changes are necessary for such approaches to be effective. For one, adult moderators must be willing to relinquish their inclination to solve conflicts on behalf of youth. Similarly, youth must recognize their own potential for solving interpersonal problems with peers and others.

In a related study, Tekinbaş et al.2021 used design-led approaches to understand how youth might respond to an opportunity in which they were made responsible for contributing to rules on the same kid-friendly server (Slovak et al., 2018). Adult moderators present on the server, scaffolded the creation of youth-led community agreements or norms. Notably, despite the lack of technological controls and opportunities designed to maximize conflict on the server in this study, youth did not engage in social drama. Although the chosen methodological approach limited correlational claims in this study, the findings suggest that, with adequate support and opportunities to reflect, youth are competent in developing shared norms and internalizing how their individual behaviors can impact their peers. A salient example of such an agreement from this study was "Be mindful of the environment so we don't run out of resources.", which reflected how youth wanted to conserve and protect their virtual world so everyone ("we") would have sufficient resources.

Collectively, these studies surface a number of noteworthy and interesting findings around the role of social norms, server administrators or moderators, technological mechanisms, and youth in shaping the social experiences on the server. They note that there is much to be learned about the social practices of moderators in Minecraft and the ways in which they deploy technological mechanisms to moderate on such servers for youth. These servers include online applications that players must fulfil before they can gain access to the server ecosystem. This process is known as safelisting or "whitelisting" (Ringland, 2018; Slovak et al., 2018). Understanding these and other such socio-technical features can help us understand how servers tailored for youth are being managed or governed. Given what we know about

the developmental needs of young adolescents and a set of best practices to support those needs, what can we understand about the qualities and characteristics of their play? How do norms and moderation practices relate across such servers? Are there features that characterize these servers into a certain type, kid-/family-friendly in this case? No work till date has analyzed server rules across servers that self-describe as kid-friendly or family-friendly. As a first step to address this opportunity, this dissertation seeks to deeply understand rules or social norms and moderation practices across kid-/family-friendly servers.

2.3 Theoretical Framework & Methodological Approaches

In the context of governance in online communities, HCI offers a wealth of knowledge on the role of social norms or community-defined rules and community moderators. At the same time, these theoretical, empirical and design approaches for online communities reviewed in the following two subsections are not adequate to help us understand the nuances of online social spaces for youth. Here, the concept of affinity spaces posited by Gee (2003), is well-suited for the current work. In this section, I describe the theoretical framework drawn from prior work on three key aspects – social norms, online moderation, and affinity spaces, as a way to ground my analytical approach for the three studies in this work. Finally, I review HCI literature on probes as a way to inform my design approach in Study III and conclude this chapter with a summary.

2.3.1 Social Norms or Community Rules

Norms are inherent features of any social settings that convey behavioral goals for a given social system (Coleman, 1990; Cialdini et al., 1995; Cialdini and Goldstein, 2004a) Norms provide guidelines for people to accomplish personal and social goals in a constructive man-

ner citepcialdini1995preference. Norms can be expressed more formally as explicit rules and expressed more tacitly through practice. As Coleman explains, norms and formal rules establish social rights whereas laws establish what is legally right, although each right can exist independently without the other, support or even be in conflict with each other (Coleman, 1990; Coleman et al., 1993; Rimal and Lapinski, 2015). The fundamental difference to note is that legal rights by definition are non-negotiable (they may be in practice) but norms and rules are negotiable by definition (Rimal Lapinski, 2015). While legal rights are not in the scope of this work, rules and social norms are relevant given what we learned about the role they play in Minecraft servers created for youth (Ringland et al., 2016; Tekinbaş et al., 2021). In the context of the current work, Coleman's definition of rules and norms apply. He states that norms describe "actions regarded by a set of persons as proper or correct, improper or incorrect. They are purposively generated, in that those persons who initiate or help maintain a norm see themselves as benefiting from its observed or harmed by its being violated. Norms are ordinarily enforced sanctions, which are either rewards for carrying out those actions regarded correct or punishments for carrying out those actions regarded as incorrect" (Coleman 1990, p.242).

As Kiesler et al., 2012 specify, norms are salient for existing and new members in online communities. The authors emphasize that effective norms articulate appropriate and inappropriate actions to equal extents. In Minecraft, the persons that Coleman refers to are the server administrators and moderators, whom I refer to throughout this work interchangeably or by the term "server staff."

Norms have been studied on the basis of distinct categories as a way to theorize or empirically analyze social systems in prior work. For example, Cialdini et al. (1991) specify that norms are descriptive (i.e., more implicit and expressed through examples) or injunctive (i.e., explicit). As Lessig 2006 cautions however, norms can and should be understood through studying what they mean and how they arise in practice. Prior work in HCI has investigated

norms defined by communities or users across a wide range of social networking and content-based platforms including Facebook, Twitter, Reddit, online fandom communities, Twitch, etc. (Chandrasekharan et al., 2017b; Seering et al., 2017b; Chandrasekharan et al., 2018; Fiesler et al., 2018; Dym et al., 2018). In the context of multiple communities that exist within a platform (e.g., subreddits on the Reddit platform, Facebook groups on Facebook, etc.), these studies illuminate the ways in which norms are shared or distinct across those sub-communities and the platform. For example, Chandrasekharan et al. (2018) grouped norms in Reddit based on an ecological perspective - in terms of norms within a given subreddit ("micro"), across a group of subreddits ("meso"), and more generally across the Reddit platform ("macro"). Similarly, in a study of community rules to characterize subreddits, Fielser et al. (2018) developed two codes – restrictive and prescriptive based on how rules were formulated as "do-not" and "do" statements respectively. These are relevant to this work as Minecraft servers and the Minecraft platform are analogous to subreddits and Reddit or Facebook groups and Facebook. These empirical studies illustrate how norms have been investigated in online community contexts. These prior studies show that user-defined community rules hold vital clues into the ways in which governance goals for within the corresponding user communities are articulated. A deeper understanding of norms or server rules across servers designed explicitly for youth may provide insight into salient areas that moderators in Minecraft are focused on and how rules might contrast across various servers (Study I).

2.3.2 Online Moderation: Socio-Technical Approaches

Existing literature on online community moderation suggests that communities evolve over time, "as a result of rule-breaking, rule-making, and rule-enforcement" (Sternberg, 2012). Consistent with Ringland's findings (2018), HCI research shows that moderators are tasked with defining and maintaining norms (Grimmelmann, 2015; Grimme et al., 2017). Rules in

games are defined as formal and explicit whereas rules invoked in playing games (i.e. through play) are abstract and emergent (Salen et al., 2004). The latter quality of rules suggests that moderators in Minecraft are expected to manage emergent actions (i.e. not predefined or predictable) through the gameplay (Study II). As rules and norms develop and change, often in response to short-term events or transitions, they affect moderation decisions. These decisions, according to Seering et al. (2019) and others who study platforms like Twitch, Reddit, and Facebook, are most often made by moderators, without input from general community members. In contrast, recent research on online affinity networks reveals that youth participate in moderation and governance of such affinity spaces, which I review in the next subsection.

As game communities continue to grow in size and complexity, so have the challenges around online moderation, which are well documented in the HCI literature and elsewhere (Foo and Koivisto, 2004; Smith, 2004; Aponte and Richards, 2013b,a; Kwak et al., 2015a; Almerekhi et al., 2020). Governance is typically top-down, autocratic, and punitive (Zhang, 2018; Zhang et al., 2020) and such social moderation approaches are also present in games and virtual worlds specifically designed for tweens—such as WebKinz, Neopets, Club Penguin, Whyville and others— where stable social bonds and on-going relationships among peers are among the key features (Salen and Tekinbaş, 2008; Kafai, 2010; boyd, 2014; Ito et al., 2018). As prior HCI research on Minecraft reveals, the practices of moderation in online play-based virtual worlds designed for adolescents have not been investigated so far (Ringland 2018; Tekinbaş et al. 2021). The widespread use of authoritarian techniques by software developers, educational technologists, and others has been also likely encouraged by parental fear and anxiety around screen time, online predators, and potential for cyber-bullying within multiplayer games (Ringland 2019; Ringland et al., 2016). While these interventions effectively regulate the worst behavior that could emerge in online spaces, they do so at a cost of limiting learning opportunities for youth (Hasebrink et al., 2009, 2011; Slovak et al., 2018). Another challenge in social content moderation that has been expressed by scholars includes

the notion of labor and research reveals the points of conflict between participation and labor ((Roberts, b; Caplan and Gillespie, 2020). . In the case of fandom communities, research also shows that fans who produce texts do not view their actions as labor (Milner, 2009). Minecraft is akin to such fandom communities in that it enjoys its status, in part, because of users who have contributed to its modifications and improvements over time (Ngyuen 2016; Lee 2020). In summary, while there is a growing body of literature on governance and moderation in online games, little of this research has focused on understanding how moderators' practices in Minecraft relate to the developmental needs of youth (Study II).

Current models of human moderation are expensive and inconsistent at scale and automated approaches currently lack the sophistication needed to support a diverse community of players. A uniting feature of the existing strategies to manage player behavior online is the reliance on technological deterrence approaches (Kwak et al., 2015b; Birk et al., 2016; Maher, 2016b,a; Slovak et al., 2018; Gorwa, 2019; Gorwa et al., 2020; Gillespie, 2020): the threat of bans or other in-game punishments for infractions, which can be based on crowd-sourced decisions by other players (e.g., the "Tribunal" in League of Legends (Maher 2016)] or machine learning approaches (Kwak et al., 2014, 2015). There is at least one plausible reason for why platform-based and other third-party developers remain focused on improving tools that can detect, prevent or mitigate negative behaviors. Hate speech; threatening harm or violence; discrimination based on race; gender or other attributes; trolling; flaming (i.e., abusing or harassing one or more individuals), spread of false information are a few examples of harmful behaviors that are exacerbated in online settings (Kraut and Resnick, 2012b). One common belief among platform developers and publishers is that the adverse impact and serious harm caused by certain behaviors necessitate swift and urgent counter-measures in community moderation (Gillespie, 2018). These automated moderation mechanisms are, at best, reliable for detecting and flagging questionable content or user behavior in online communities (Gillespie, 2018). Emergent work particularly across social media platforms caution against automated approaches that are designed to privilege certain kinds of con-

tent and behaviors and eventually reconfigure the culture and climate within a given online community (Pilipets and Paasonen, 2020; Gillespie, 2020; Gorwa et al., 2020). Although technological mechanisms against disruptive behaviors partially alleviate community moderators' burdens, they are far from ideal (Roberts 2016). Limited work to date has sought to understand how technology might support social interaction in online communities from a positive or strengths-based paradigm. Rho et al.2017 examined how Facebook moderators incorporated socio-technical practices to empower group members to connect and reflect on their shared experiences around stigmatized experiences. In a different community context, Seering et al.(2020) developed a chatbot to explore how community members might influence the social behaviors of a chatbot. These suggest how moderators have sought to deploy socio-technical mechanisms for supporting social connections and positive social behaviors in community contexts. Unlike the algorithmic approaches in content moderation (Gorwa, Gillespie), game studies reveal that developers leverage user-interfaces to automate actions related to moderation (Targett et al., 2012; Wuertz et al., 2018; Charleer et al., 2018). For example, Wuertz et a;. (2018) developed a framework to provide awareness cues for promoting collaborative play among gamers in multiplayer games. The rise of platforms like Discord that provide end-users with a higher degree of autonomy in configuring their social spaces (e.g., text, voice, and video channels, AI Bots, integration with other media apps like YouTube, Twitch, etc.; Oliy Barret, 2018) presents an opportunity to investigate how newer forms of socio-technical and automated mechanisms might be developed (Study III).

2.3.3 Characteristics of Affinity Spaces for Youth

Gee's concept of affinity spaces draws from "communities of practice" reviewed earlier in this chapter. Although Gee 2004 did not limit the concept of affinity spaces to only youth, he noted that youth are most experienced with it and many have widely accepted this concept (Gee 2004, p.223; Ito et al., 2013, 2018). Gee defines affinity spaces in terms of a

set of features that are characteristic of affinity spaces (Table 2.1) and suggests that they can be applied as a rubric. He clarifies that the rubric of features is not meant to be an all-encompassing checklist. Rather, a candidate social space can be described as an affinity space in terms of the extent to which its features correspond to Gee's rubric. In the following, I present the features of affinity spaces and briefly discuss prior empirical work as examples of affinity spaces.

Characterizing Affinity Spaces by Features

Features of affinity networks (Gee, 2005; Gee & Hayes, 2013)	**Definition of the feature; Features are interrelated and some are self-explanatory**
Shared endeavors, interests, goals, and practices	Rather than connecting with each other by way of shared gender, race, age, and other such attributes, people in affinity spaces share common goals and interests. In other words, Gee asserts that identity in affinity spaces is established primarily by such shared interests.
Not segregated by age or experience	As the title of this feature suggests, affinity spaces do not distinguish between young and old, experienced and new, etc.
Various levels of expertise coexist in the same space	Affinity spaces do not exert assumptions on how much people will engage. Instead, everyone in the space has the autonomy to pursue goals and learn from each other to the extent that individuals seek.

Features of affinity networks (Gee, 2005; Gee & Hayes, 2013)	**Definition of the feature; Features are interrelated and some are self-explanatory**
Affinity spaces promote participation and production (but not forced)	This feature relates to how the space is designed to enable everyone in the affinity space to engage with it. People can participate or spectate or do both.
Content is transformed by interaction	The qualities and content within the affinity space are constantly shaped by social interactions. This idea of continuous transformation in affinity spaces is related to Lastowa et al.'s (2004) description of virtual worlds.
Intensive (highly specialized) and extensive (more general) knowledge are both encouraged	This feature refers to how the space is designed to support various levels of expertise on shared interests.
Encourages individual and distributed knowledge	As the title of the feature suggests, affinity spaces are designed to support individual and collective growth. People can give and get feedback or share ideas to advance on their goals.
Encourages dispersed knowledge	This is to say that the design allows people to apply knowledge acquired within the affinity space to external sites. Likewise, people can bring in external knowledge into the affinity space.

Features of affinity networks (Gee, 2005; Gee & Hayes, 2013)	**Definition of the feature; Features are interrelated and some are self-explanatory**
Uses and honors tacit knowledge, encourages explicit knowledge	This feature explains that the affinity space is designed to support learning by trial and error or practice that may not be explicitly stated (in documents or guidelines, etc.)
Many forms and routes to participation	This principle or feature states that people in affinity spaces should be able to engage in a number of different ways and to whatever extent they choose to. The concept of "lurking" or peripheral participation is also addressed by Rogoff (1994).
Many routes to status	Like the title of the feature suggests, this aspect is about social status and affinity spaces are designed to allow for people to take charge of their goals to earn status, or not.
Leadership is porous and leaders are resources	Affinity spaces are designed to allow for more flexible forms of leadership, where anyone can assume initiative. It lacks hierarchy or rigidity in how roles are designed in the affinity space.

Table 2.1: Features of Affinity Spaces (Gee's checklist or rubric, Gee 2003; Gee & Hayes 2005)

In this work, these features are beneficial to the extent that they can help us understand the social characteristics of kid-/family-friendly servers. For example, as candidates of play-based affinity spaces, they should be designed to support all forms and levels of participation.

However, these features alone are not sufficient to help us make sense of how the social and technological features of kid-/family-friendly servers actualize youth development. The principles and theories reviewed earlier in this chapter can help us understand how the server features might support youth development. Another point to clarify is that online social spaces or affinity spaces are referred to as online communities in HCI, particularly in online moderation work. Although Gee explains that the terms "community" and "members" limit diverse forms of participation (2003), I use the terms online community and affinity spaces to refer to kid-/family-friendly servers in subsequent chapters interchangeably. I do so for two reasons – one, some of the servers refer to themselves as kid-/family-friendly communities and two, to position the contributions of this work within HCI moderation research.

Examples of Affinity Spaces or Networks

Recent research on youth participation in online affinity networks—networks organized around an interest in gaming, political organizing, fan fiction, or hip hop, for example—highlights community-based models of moderation and self-governance (Gee, 2008; Black and Steinkuehler, 2009; Curwood, 2013; Ito et al., 2018; Literat and Kligler-Vilenchik, 2019). Effective networks build in ways for participants to take ownership of community values and model them for others, giving youth agency over their environment, addressing safety concerns, and ensuring that the values and norms remain culturally relevant and resilient (Gee 2005, Ito et al., 2018). In effect, participants in such networks share an interest, a culture, and a purpose; and it is the combination of values, norms, and practices that makes the culture of each affinity network unique, drawing on the cultural knowledge, prior experiences, frames of reference, and performance styles of its participants (Ito et al., 2013). The autonomy afforded through such a process has been shown to provide a strong foundation for social and personal development in youth (Ito et al., 2018). The present work aims to contribute to the literature on rules, norms, and moderation through a focus on governance

structures kid-/family-friendly servers.

2.3.4 HCI's Research Through Design Technological Design Probes

The primary question posed in Study III seeks to understand how automated moderation tools might be designed to foster positive social interactions, or prosocial interactions, in kid-/family-friendly servers. This question is important in light of the developmental principles reviewed at the beginning of this chapter and the fact that players express positive and negative values through social interactions in online games that can influence their social realities in the real-world (Lastowka and Hunter, 2004; Flanagan et al., 2007; Flanagan and Nissenbaum, 2014). However, as discussed in the theoretical framework and prior studies above, prosocial automated tools in games like Minecraft constitute an under-explored area in the research. Additionally, Study III aims to explore how automated tools, like bots, might support moderators in their practice. Given the emergent nature of these questions in the current work, a desired approach would allow for an exploratory design and critical reflection on how prosocial moderation tools might be designed for kid-/family-friendly servers.

HCI's Research through Design (RtD) is an ideal approach that may be well-suited for this need (Olson and Kellogg, 2014). RtD can be defined as a reflective research approach that produces knowledge by deploying the "methods, practices, and processes" of design (Zimmerman Forlizzi in Olson Kellogg, 2014; p.167). The authors note several nuances of practicing RtD as opportunities for researchers to become "active and intentional constructors of the world they desire" (p.168), by reflecting on existing theories and work and imagining new possibilities that can improve the outcomes for stakeholders—in this case, kid-/family-friendly servers. RtD is the process of developing "the thing that proceeds theory" rather than the other way around (pp. 167 - 170). The authors explain that the RtD approach or model can produce several possible outcomes:innovative technologies or oppor-

tunities to inspire designers; theoretical gaps especially when technology is used in a new way; motivation to investigate how a given design might transform existing practices; and in some cases demonstrating multiple designs for solving a given problem. In this current work, I use RtD as a way to produce those "technical opportunities" for developers (p. 177) and motivate future work by introducing an AI bot in one of the kid-/family-friendly servers. To that end, the way I use RtD in Study III deviates from the suggested model in that I do not evaluate the AI bot (i.e. Step 3-5; p. 184) but rather use it to envision, or speculate, as the authors state, about how automated moderation tools might be designed.

The design of AI chatbots for groups or online communities is not a novel approach. Scholars in the learning sciences, for example, have explored its use for one-on-one assistance in classrooms (Benotti et al., 2014). Relatedly in HCI, Seering et al. 2020b designed a social chatbot to explore how AI chatbots might be purposefully integrated to engage online communities at a collective level and inform machine learning approaches. In the current work, I draw from the concept of design probes as a mechanism to answer the research questions in Study III. I now turn to describing how probes, technical probes in particular, have been suggested and used in HCI.

Although probes in HCI have been used in a number of different ways (Boehner et al., 2007), the concept was pioneered by Gaver et al. 1999 as cultural probes. Cultural probes were introduced as a design-led approach by Gaver et al. (1999) for gathering inputs from participant communities that were constrained by geographical boundaries. These probes were created to evoke responses from their participants, viewed as key stakeholders in their design process, which could inspire and inform the eventual design for the specific community. Since then, many HCI researchers have created various adaptations of the cultural probe. For example, in an early study, Moser et al., 2011 co-developed data-collection probes with young children. One of the most influential works on design probes was reported by Wallace et al. 2013 describing how their probe served as a design tool. More recently, Segura et al. 2019

developed a technology probe as a way to explore tools and concepts for physical training. Beohner et al., (2007) offer an analysis of why probes have been so widely adopted but more importantly, emphasize that design-researchers clearly articulate how they appropriate the concept in their work. The authors define one of the most popular adaptations of Gaver et al.'s cultural probes in HCI – the "Technology Probe" as low-fidelity technical designs that may be used to gather usability information and uncover newer design opportunities (p. 1078). In this sense, the bot in Study III is not a mere tool to gather data. Rather, the bot is deployed as a probe to explore how positive social interactions might be made more visible to engage youth and help reframe the possibilities for automated moderation approaches in kid-/family-friendly servers.

2.4 Summary

The current research aims to contribute to a growing body of interdisciplinary work that is focused on enhancing opportunities for digital play among youth. The three studies in this work contribute an understanding of the socio-technical mechanisms – server rules or norms, moderation practices, and potential for prosocial automated tools, as a way to characterize Minecraft specifically tailored for youth. Ongoing research within the fields of Developmental Science, Learning Science, and Positive Psychology continue to advance our understanding of youth development and call for more work that can advance our understanding of how social practice and technology are being deployed in online settings for youth, kid-/family-friendly servers in the current case. Decades of research on play and games undergird the motivations for framing this work in the context of Minecraft, one of the most popular virtual world games among youth today. Game studies lend themselves to interdisciplinary work (Bray and Konsynski, 2007) and help us understand socio-behavioral and socio-cultural phenomena, and may inspire new applications for technology. Similarly, the substantive line

of work on socio-technical moderation in HCI has been predominantly focused on content moderation. While this is inadequate to help us understand how moderators in Minecraft manage actions and behaviors emergent through play, they offer insights into how norms and moderation have been approached in empirical work. HCI recognizes the need for understanding moderation in a wider range of communities (e.g., "context moderation"; (Caplan, 2018)), which the present work aims to address. The findings of this work are expected to reveal nuanced perspectives into socio-technical moderation practices in play-based contexts.

Each field lends nuanced perspectives to the current research in this dissertation. For example, research in Developmental Science, Learning Science, and Positive psychology helps us understand the role that adults may play in supporting youth development and contextualize why adults are so integral to mediating the quality of social experiences for adolescents (Rhodes, 1994a; Dahl et al., 2018; Ito et al., 2018). Game studies present ways in which governance in virtual worlds are important (Lastowa et al., 2004) and problematic (Taylor 2007; Grimes 2010). The theories of play remind us of the qualities that should be amplified in the design of play-based spaces for youth (Salen and Zimmerman 2008; Flanagan and Nissenbaum 2014). These five disciplines (c.f., Figure 1.1 in Chapter 1) might marshall different theories and empirical approaches on various facets of adolescent development and online community governance, but they share an affinity in the context of the research problem. To this end, I have discussed relevant work from these allied disciplines and explained how they lend a theoretical framework to ground the three studies in this dissertation (Chapters 3-5). In Chapter 6, I discuss how the current research offers implications for three main areas of adolescent development, youth in online gaming, and community governance in HCI. Based on the results of the three studies, I suggest opportunities for synergistic future work across these multiple disciplines in Chapter 7.

Chapter 3

Study I: An Empirical Analysis of Minecraft Server Rules & Metadata

3.1 Chapter Abstract

Minecraft servers tailored for youth have existed for nearly a decade. Despite the growing popularity of Minecraft servers, we have little empirical insight into the features of servers designed specifically for youth and families. These servers self-describe as kid-/family-friendly using metadata such as origin stories, mission statements, and server rules. I refer to these metadata as self-narratives in this work. However, the concept of self-narratives are not necessarily unique to kid-/family-friendly servers. Many other kinds of moderated servers include such metadata, server rules in particular. Server rules are a set of do and do-not statements about the expected behaviors (i.e. norms) on a given moderated server. Building on prior HCI approaches, I investigate the features of such servers and the rhetoric of kid-/family-friendliness through the lens of server metadata. Study I investigates i) types of server rules; ii) the socio-technical forms of governance reflected in those rules; and ii) the

relationship between self-narratives and server categories based on a sample across 60 multi-player servers, a subset of which self-present as kid/family friendly. The contributions of this work include a taxonomy for understanding server rules and an empirical characterization of three server genres – kid-/family-friendly (n1= 19); general-family-friendly (n2=20); and general (n3=20). The current chapter begins with a background and describes the chosen research approach and study setting, methodological approach, and empirical findings. Then I conclude with a brief study-related discussion and revisit Study I findings.

3.2 Study I Background

Minecraft servers tailored specifically for youth, including those from the three introductory stories in Chapter 1, present themselves as kid-/family-friendly through select forms of server metadata. These forms of server metadata may include server origin stories; mission statements; information about server administrators and moderators (i.e. staff roll); server rules (i.e. a set of do and do-not statements for players on a server); and other information about the server. I refer to these forms of metadata (i.e. published information that describe a given server) as self-narratives in this work and elaborate the concept with examples in the subsequent section of this chapter.

Self-narratives may be unique to their corresponding servers in that the metadata describes features about its server ecosystem and its player community. However, the concept itself is not unique to kid-/family-friendly servers. Moderated servers that do not identify as kid-/family-friendly, such as HyPixel and Mineplex for example, also include self-narratives. The three stories of Elbereth, KTango, and Chimit in Chapter 1 suggest that self-narratives in kid-/family-friendly servers provide information on salient features that might be of interest to youth and parents looking for Minecraft servers. For example, information embedded in their self-narratives include the following: the servers are free to play on; may be safelisted

where players are required to sign up before they join the server; are moderated by friendly server staff; and are designed to appeal to youth (e.g., information on their website describing a Hogwarts themed world on The Sandlot server). Self-narratives from across servers help to reveal a rhetoric of kid-/family-friendly servers, which is reflected not only in descriptions of the servers but also in the rules and social norms that govern the server.

3.2.1 Defining Rules in the Context of Minecraft: Platform and Server Levels

Researchers in HCI have leveraged user/community-created rules and social norms to understand the governance mechanisms in those corresponding online communities including Minecraft (e.g., Kraut and Resnick 2012; Ringland et al., 2016; Chandrasekharan et al., 2018; Fiesler et al. 2018; Tekinbaş et al., 2021). For example, Fiesler et al.'s analysis of a large dataset of community-created rules on the Reddit platform enabled the authors to produce a nuanced understanding of governance in sub-reddits (Fiesler et al. 2018). The present examines governance mechanisms reflected in server rules in moderated Minecraft servers. Here I define server rules or rules in the study context as follows:

At the platform level, rules are regulatory statements authored by Mojang that convey the terms and conditions of use. They appear under various clauses including Services of Agreement, Code of Conduct, and Community Standards (https://www.microsoft.com/en-us/servicesagreement, https://www.minecraft.net/en-us/community-standards).

At the server ecosystem level, rules are statements that convey expected behaviors and in some cases outcomes of non-compliance. Rules are usually authored by server staff as reflected on the corresponding server websites. Server rules may also be referred to as Code of Conduct or Community guidelines.

I briefly discuss the role of rules in online social spaces, which build on the discussion on social norms presented in Chapter 2.

3.2.2 The Role of Rules in Online Communities

We encounter rules as formal statements or unwritten rules in various settings in everyday life – at school or work, on the playground, on the freeway, at the dinner table, and so on. They help establish an understanding of common practices for what people can or cannot do, how they might be expected to behave, and consequences of their behaviors (Kraut and Resnick, 2012; Paluck et al., 2016). Prior HCI studies across various content-based and social networking platforms have sought to understand how rules defined at the platform and user-level shape values, social norms, and governance practices within corresponding online communities, reviewed in the previous chapter (e.g., Seering et al., 2017; Fiesler et al., 2018, Chandrasekharan et al., 2018, Matias 2019). These studies suggest that formally published rules are an important component of community governance and help facilitate a better understanding of shared social norms, especially among new members.

Connecting back to the Reddit example above, Fiesler et al.(2018) found that user-defined community rules are unique to their corresponding subreddits but also share some common attributes across those subreddits. In the same sense, Minecraft is analogous to the Reddit platform. The Minecraft platform stipulates a set of rules at the platform level and also enables its users to define rules for their servers. Server rules may be authored by adults on the Minecraft server as in the previously discussed example of Autcraft in Chapters 1 and 2 (Ringland 2018), or by youth (Tekinbaş et al., 2021). In a study of other virtual worlds for youth, Beals and Ber (2009) emphasize on rules as a key feature for regulating an effective and safe community and suggest that rules can be authored by adults, youth, or both. In a design-led research study, Salen et al. 2021 observed that community rules or

agreements created by youth were effective without the traditional technological mechanisms on an after-school kid-/family-friendly Minecraft server. Research shows that children are capable of understanding (well-formulated) rules starting at ages seven or (Girotto et al., 1988; Lagattuta, 2005). They begin to construct their own rules or interpretations of rules especially through play (Hughes, 1988; Salen et al., 2004; Thornberg, 2008).

The overarching goals of Study I focused on server rules are two-fold. The first goal is to understand social and technological features of such servers reflected in their rules and how these features might contrast with other moderated servers. The second goal is to examine the rhetoric of kid-/family-friendly Minecraft servers using rules as the analytical tool. This work aims to expand the literature on online governance through the lens of server rules in kid-/family-friendly Minecraft servers. It does so as a way of expanding our understanding of the role played by rules in such servers and the rhetoric (e.g., norms, values, and motivations held by the community) reflected therein. For parents and children looking for safe, empowering places to play online, this understanding can help guide their choice of server and inform their overall participation.

3.2.3 Study I Research Questions

In light of the above goals, the first study seeks to understand how servers self-describe as kid-/family friendly (i.e. the rhetoric of kid-/family-friendliness) through the lens of server metadata including rules. Study I asks, Goal: Characterizing Online Governance in kid-/family-friendly Minecraft Ecosystems through an Empirical Analysis of Rules

RQ1 What are the various types of rules that Minecraft server ecosystems call upon? How similar/dissimilar are these rules across the servers and the Mojang platform?

RQ2 What are the social and technological forms of governance reflected in these rules?

How do they contrast across such servers?

Goal: Understanding the Rhetoric of Kid-/family-friendliness in Minecraft through an Empirical Analysis of Rules

RQ3 How do the various kid-/family-friendly servers present themselves as a kid-/family-friendly online space?

RQ4 Does the self-narration around "kid-/family-friendly" or "family-friendly" correlate with different forms of rulesets? If so, how?

To answer these questions, in Study I I drew from a study sample of 60 "in-the-wild" Minecraft servers that self-describe with labels including kid-/family-friendly, family-friendly, unspecified, and general. Based on a grounded theory approach, I analyzed server metadata (self narratives and 1932 server rules) corresponding to the servers and generated a taxonomy of server rules. The analysis reveals similarities and differences in the types of rules or rulesets across the servers. Initial findings suggest that i) self-narratives alone may be insufficient for accurately representing server types such as kid-/family-friendly, family-friendly, general, etc. and ii) server rules offer nuanced clues that characterize a server type even though some statements may appear to be a verbatim copy across Minecraft servers. The contribution of this work is an empirical characterization of three server genres - kid-/family-friendly (19), general-family-friendly (20), and general (20).

In the following sections I describe the research approach and setting, chosen methodological approach, and empirical results. Through the analysis of rulesets, I characterize kid-/family-friendly servers in lieu of a definition and conclude this chapter after a brief related discussion of Study I findings.

3.3 Study I Approach

In this section, I first define metadata or self-narratives and its scope in this work. Then I outline the typical elements that are encapsulated within server narratives with their described purpose in Table 3.2. In reporting the findings, I use five servers as examples to further unpack the concept of self-narratives (RQ3).

3.3.1 Self-narratives and their Significance

I define self-narrative as the metadata for a given server. Server metadata is defined as categories of information that describe or provide more information about the server. Table 3.1 clarifies some examples for what metadata is and is not in the scope of Study I.

Metadata Type	**Metadata relevant to Study I**	**Metadata not relevant to Study I**
Server statistics	X	
Log file of text chat among players		X
Server rules	X	
Discussion forum content		X
Application to become a moderator on the server	X	

Table 3.1: Scope of Metadata to illustrate what constitutes metadata and what does not

Self-narratives, when present, are published on corresponding server websites. A screenshot of Indiesquish, a family-friendly server, in Figure 3.1 illustrates how the metadata may be organized on a Minecraft server. That said, a server can present its metadata online in a number of different ways (e.g., as one consolidated web page, with or without visuals,

grouped under specific labels, etc.) Given that there is no template or standard nomenclature for server metadata, I inductively coded the server metadata noting the salient categories. Metadata that are typical of servers that self-describe as general are included to contrast them with metadata in kid-/family-friendly servers. This perspective lends a rigor to my empirical analysis in that it surfaces patterns that are present in one type of server but not in others. The labels assigned in Table 3.2 are, to the extent feasible, as they appear on the servers. In other cases, I generated the labels by inductively coding the metadata. These labels for the metadata types appear in the left-most column and are self-explanatory phrases or in some cases inspired by how the servers refer to them in text. I note that this is not a strict classification as some servers consolidate their origin stories and mission statements into one element. While these labels are by no means a comprehensive list, given that there are nearly countless multiplayer servers, I was able to achieve a "saturation of categories" (e.g., Swanson & Holton 2005, p.238) through the coding process of metadata from 60 servers.

Labels or Assigned Name for the Metadata	**Alternative names (if applicable)**	**What it describes**
Origin story or server origin story	Who we are; About us	Year or date when the server was formed; back story on how the server was formed
Mission statement	About us, our goal	Gives an overview about the server; what players can expect from the server or what the server staff aim to offer

Labels or Assigned Name for the Meta-data	**Alternative names (if applicable)**	**What it describes**
Server rules	Code of Conduct; Guidelines; Terms of Service	A set of do and do-not statements or guidelines on how to play and interact with others on the server; consequences of violating rules
Server roll	Moderators; Staff; Team; Administrators	Minecraft names or pseudonyms of server staff and roles. Server staff may be known by different terms.
Servers	Also Server modes	IP addresses or links to the game server(s); Survival or creative servers, etc.
Forum	Discussion Forum	One or more discussion categories in which members can ask or get answers to questions; members can share information; akin to community Wiki pages; FAQs answered by server team. Not in the scope of Study I data set (See Table 3.1)

Labels or Assigned Name for the Metadata	**Alternative names (if applicable)**	**What it describes**
Blog		Similar to forums where staff may post announcements or information and invite members to comment or respond
Safelisting Application	"Whitelisting" application; Whitelisting Process; Registration process	An online form or instructions on how to join the server community. On some servers, the safelisting application is mandated for players. Other servers may include an optional registration application to grant players more privileges on the server
Link to join on Discord	Mumble; Teamspeak	A link or instructions on how to access other online spaces that are a part of the server ecosystem

Labels or Assigned Name for the Metadata	**Alternative names (if applicable)**	**What it describes**
Ban-appeal Process		Server policy about player bans (i.e., conditions when a player may be banned from the server); Instructions and a form for appealing bans if applicable.
Members	Community; Players and Visitors	Some servers mention all registered members
Events	Mini-games	Announcements about special games, contests, or events planned on the server (e.g., Halloween themed mini-games)
Support Ticket Process	Support Hub; contact us; submit a ticket;	Information about how to contact moderators for help with troubleshooting issues
Staff Application		Servers may invite players to apply to join their staff team.

Table 3.2: Typical Components (i.e., metadata types) of a Server's Self-Narrative

A preliminary analysis reveals that there are many possible relationships between self-narratives, server rules in particular, and types of servers in Minecraft. We know little

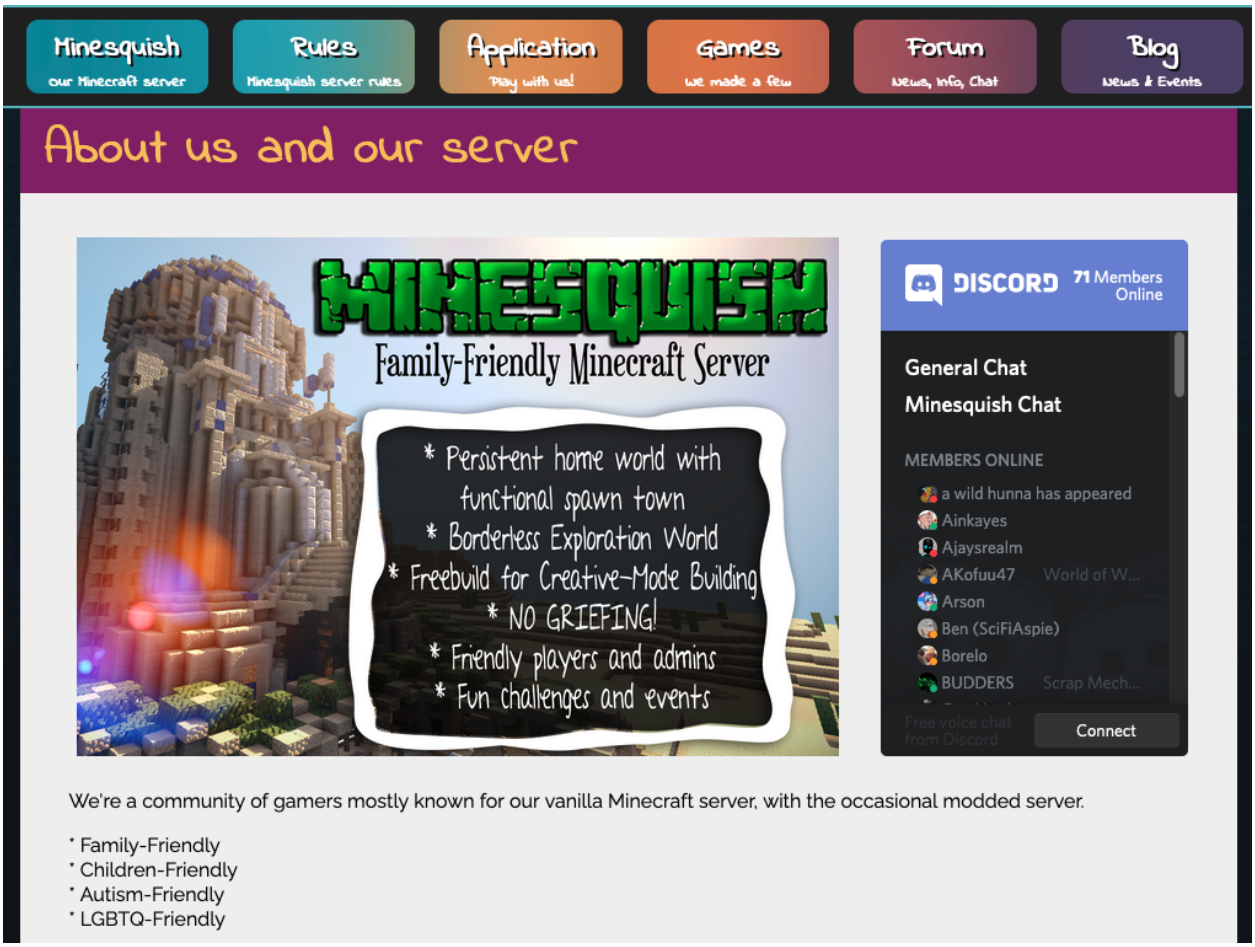


Figure 3.1: Illustrative example of Self-narrative on Indiesquish, a family-friendly server

Alt Text: Screenshot of Indiesquish server homepage that has 6 clickable tabs on the top pane with metadata including information about the server, server rules, an application to join the server, information about games on the server, a link to a discussion forum and a blog on the server. An image of the virtual world with bullet headlines about the server, a link to their Discord server, and a more elaborate textual description of the community follows on the main page

about these relationships and how server rules contrast across such servers. An empirical analysis of server characteristics drawn from self-narratives may help us understand the rhetoric of kid-/family-friendly servers in a more nuanced manner. Such a characterization may inform future work on online gaming platforms and communities for youth. Study I posits that interrogating self-narratives is a worthwhile endeavor as the metadata may help enrich our understanding about how kid-/family-friendly servers present themselves to their

players, prospective new members, and to the Minecraft community writ large.

3.4 Study I: Research Setting & Chosen Methodology

In this section, I describe my process for selecting the 60 servers in Study I, the methodological approach for data collection, ethical considerations, and my analysis approach.

3.4.1 Discovering kid-/family-friendly Minecraft Servers

I began my investigations for Study I with eleven popular kid-/family-friendly servers (Salen 2017; Matt Doyle 2011) around November 2019. I developed an initial rubric (See Table 3.3) based on a preliminary analysis of metadata in those servers. All these criteria were set as mandatory in this initial rubric. Throughout the analysis, I began to refine the rubric and add more servers in the study sample until I was able to achieve saturation with the codes for the metadata and server rules (Swanson & Holton 2005). In the following two subsections, I explain the process and rationale for including 60 "in-the-wild" servers in Study I sample (Appendix C) before delving into the data collection and analysis procedures.

Criteria (meta-data)	**Description of Server Criteria**	**Rationale**
Kid-/family-friendly or Core Audience: Youth	The server is described as *kid-/family-friendly* or *family-friendly* in mission statements, server origin stories, or listed along with the server rules; is for youth (8 yrs and above); may include families	The premise of this work is to investigate the rhetoric of servers explicitly created for youth. The age was determined based on prior work (Jagannath et al., 2020; Tekinbaş et al., 2021).
State of server	Is currently active (or was active in the last six months, i.e., June 2019)	This parameter was for potential follow-up interviews (Study II) with moderators having a certain baseline experience in their role (i.e., at least 6 months)
Code of Conduct	Has a clear code of conduct	As discussed in 3.1 and Chapter 2, well-defined rules in social settings enable youth to develop social competencies (Salen & Zimmerman, 2008; Thornberg, 2008; Beals & Bers, 2009)

Criteria (metadata)	**Description of Server Criteria**	**Rationale**
Entry criteria	Players *may* have to apply online before they can connect to the server. This is known as safelisting, greylisting. Note: Many other servers use(d) the term "whitelist" to denote the same thing. It is a process for verifying players before they can join the server.	Based on prior work (Ringland et al., Jagannath et al., 2020; Tekinbaş et al., 2021)

Table 3.3: Initial Search Criteria/Rubric Developed for Dataset in Study I

3.4.2 The Lifecycle of Servers in Minecraft: Study I Sample

Many servers like The Sandlot featured in KTango's story in Chapter 1 have existed for nearly a decade while others may range from five or six years to more recent times. This is inferred based on server metadata. However, not all servers sustain the same lifecycle over time for various reasons that may not be revealed. Stating that Minecraft servers are being launched, migrated under a different franchise, or closed permanently every day or week would be an exaggeration, but such changes do occur over time. For example, two of the 11 kid-/family-friendly servers in the baseline sample for Study I, Intercraften and Yams, announced a server closure and a third server, OhanaCraft (cf., Elberth's story in Chapter 1) was migrated under a different server name. Another server self-described as a family-

friendly server that was active during the analysis of Study I (CapeCraft) announced its end of life in late 2020-early 2021 ("CapeCraft has been running for 3 years, and sadly, it has reached the end of it's life. We want to personally thank you all for your time and dedication put into this server."). Finally, during Study I, a former kid-/family-friendly server that had been closed seven years ago was revived, although with a different self-narrative.

I learned about these changes during regular checkpoints I had set at the start, middle, and end of Study I as a way to discover any new kid-/family-friendly servers and any changes among those within the dataset. I decided to retain those servers' metadata that I had gathered for analysis even though the servers had closed for two reasons. First, the phenomena itself reveals that Minecraft servers may come, go, and change form for various reasons. This has implications for young players like Elbereth who seek to play with familiar friends and maintain social connections. To the best of my knowledge, two servers in the study sample fit this criteria – i) Capecraft, which closed towards the end of Study I and ii) Towncraft, formerly a kid-/family-friendly server, reinstated itself as a friendly server. The second and more pragmatic reason for retaining those servers was that replacing any closed servers with other comparable ones would not still guarantee an ideal study sample with all servers being active. I acknowledge this aspect to highlight a well-known problem of a moving dataset in content analysis on the Internet (McMillan, 2000; Lewis et al., 2013).

3.4.3 Process for Building Study I Dataset

From the stories that KTango and Elbereth shared, we might surmise that parents and youth discover kid-/family-friendly servers through popular blog posts or community news blogs. I used these sources and a few additional ones to identify servers for my study: popular blog posts or community news blogs (e.g.,Salen 2017; Matt Doyle 2011), websites that list servers and corresponding server websites if any (Planet Minecraft, Minecraft Servers Org,

and Minecraft Server List), and platforms used by gamers to find servers to play on (Enjin and Discord). These websites and platforms offered search engine-like features that allowed me to actively discover servers based on keywords like "family", "kid", and optional filters for "whitelisted" or "safelisted" servers. I used the five aforementioned sources to identify a set of servers that self-described as friendly, general, or unspecified.

During this time, I refined the rubric for kid-/family-friendly search criteria based on a constant comparative analysis of the codes and review of codes in the-then evolving study sample (Swanson & Holton 2005; Cresswell 2013). I revised the rubric to make two specific changes – I dropped the "state of server" criteria and made the safelisting feature optional rather than mandatory. As explained in Section 3.2, three servers in the dataset were closed (CapeCraft, Intercraften, and Yams) but their metadata had already been collected. Also, Study I does not claim any correlation between life-time of a server and its meta-data in understanding the genre of servers. As for dropping the safelisting criteria, the ongoing analysis revealed that some kid-/family-friendly servers did not use safelisting. This informed my interview protocol for Study II where I included a question to understand if servers did/did not include safelisting. These changes enabled me to include different kinds of family-friendly servers (i.e. described themselves as family-friendly, but rules and metadata surfaced some differences against servers in my baseline sample, which I elaborate in reporting the results). Through the analysis of server rules and meta-characteristics per the revised rubric (Table 3.3), Study I generates a more nuanced understanding of the terms kid-/family-friendly and family-friendly in Minecraft. A complete list of servers in Study I is presented in Appendix C.

3.4.4 Study I Dataset

Drawing from the initial study sample of 63 multiplayer servers, I collected the published metadata from each server between March 2020 and February 2021 in the form of text excerpts of metadata including server rules and screenshots when applicable and noted the server links, names, and other available information (e.g., source where I found the server). Using a copy of the master dataset, I organized the raw data into two different streams –

i Rules data: comprised all available server rules along with corresponding server names and their unique web addresses (URLs); and

ii Other metadata: included all other metadata with links to the server rules pages and the corresponding server names and server URLs to prepare the dataset for analysis.

I also collected the rules from the platform page, which the publisher refers to as Code of Conduct or community standards for all users of Minecraft. The platform includes rules-like statements under their terms of service page, which I do not include in this dataset because those statements correspond to end user license agreements (EULA). In preparing the final dataset for analysis, I began with the second stream of metadata to scan for any anomalies and to better understand the components of my dataset. The latter is a strongly recommended practice in qualitative research where the researcher develops a fluency or familiarity with the data as a way to engage with it before even coding (Swanson and Holton, 2005; Bailey and Bailey, 2017; Creswell and Poth, 2016). As Bailey (2007) lucidly explains, and many others note, data analysis begins from the time that a researcher conceptualizes the project although it generates the results during the formal analysis phase.

During this phase, I deleted three server entries based on their metadata – PokeSaga, a Pokemon themed server that facilitated discussions, FeedTheBeasts (FTB), a community that is focused on developing "modpacks" (i.e. customizable modifications) in Minecraft;

and MineHut which is a community that enables its members to host servers. This yielded the final dataset to include 60 servers with a total of 1993 rules including 12 rules stipulated by the publisher at the platform level. I set my unit of analysis to match the way that rules were published on server websites - resulting in rules that were either 1-2 sentences or in some cases, longer paragraphs (with examples, sub-rules and so on). As part of the data cleanup process, I removed 61 statements that were not rules or complete meaningful statements from the copy of the dataset such as "About Player shop plots"; "Spawn Protection", and "Maturity".

3.4.5 Ethical Considerations

Engaging with data available freely on the internet (i.e. a public domain) poses sensitive and serious implications for individuals or entities being researched and the researcher (Convery and Cox, 2012; Stambe, 2015). As Convery and Cox 2012 explain in their insightful review, and Whiteman addresses some of these issues, although the internet is perceived to be a public space that is exempt from informed consent procedures, it does not relieve researchers who have to grapple with the potential risks and harm that may compromise the rights of people who produce content online. Until a broader consensus or practice can be developed, Convery and Cox suggest a framework for considering before commencing such research. I use their concepts in Table 3.4 to express my rationale for the chosen approach in Study I. To also be clear, the IRB process entailed discussions around most of these aspects during the review of my study protocol.

The final dataset in this chapter draws from data published on the Minecraft platform website and 60 Minecraft servers listed online in the public internet domain (cf., Section 3.3). Server rules for three servers are listed on their corresponding Discord servers, to which I gained access to through an invitation link by joining the server. Upon joining,

I made my entry (and researcher position) known by sharing my Minecraft ID, a real-life profile picture, and a short blurb for inviting prospective participants to join my research study, similar to Ringland's approach (Ringland, 2018). While the rules for the remaining 58 servers are publicly accessible on their corresponding websites, I continued to register with my Minecraft ID where possible and similarly shared recruitment posters with either the server owner or one or more of the server staff members. As stated in Chapter 1, all studies in this work were approved by the Institutional Review Board (IRB) at UC Irvine B. It is worth calling out that Study I aims to characterize the genre of servers based on patterns in their social and technical features reflected in the metadata and not appraise the servers for any other qualitative aspects.

Ethics' related concept (Convery & Cox, 2012)	**Considerations Summary (Convery & Cox, 2012)**	**How does it apply to Study I? My approach is summarized in the above text**
Intrusiveness	Whether research includes passive or active participation; deception/honesty about the researcher's role	Study I takes on a passive analysis to analyze texts (i.e., not involved in the production) and there was no deception involved.
Public/Private	Whether or not the community is closed for members, checking if participants believe their community is private.	I did not include servers whose rules and basic metadata was not available without registering. Although I registered where possible, I did not collect data (e.g., discussion forums) for Study I.

Ethics' related concept (Convery & Cox, 2012)	**Considerations Summary (Convery & Cox, 2012)**	**How does it apply to Study I? My approach is summarized in the above text**
Vulnerability	How vulnerable the community is (e.g., children, victims of abuse)	Servers that are kid-/family-friendly include vulnerable populations and potentially other groups. Through the analysis of metadata, I excluded any content from discussion forums from this study.
Potential Harm	Whether the research could cause harm to individuals or the community, or provoke emotional reactions	As stated at the start of Section 3.1, this research aims to characterize the server genres. I recognize that servers may not necessarily agree with the labels. I limit my analysis to what is reflected in the metadata. My hope is that the characterization is useful for developing interventions and designs that can benefit kid-/family-friendly servers (and potentially other kinds of servers)
Confidentiality	Protecting the anonymity of participants	Study I uses metadata at the server level (See item 2 in this table)

Ethics' related concept (Convery & Cox, 2012)	**Considerations Summary (Convery & Cox, 2012)**	**How does it apply to Study I? My approach is summarized in the above text**
Intellectual Property Rights	Whether permission is required to use the materials online	To the best of my knowledge, I did not come across a clause. I cite the server source to reference materials (e.g., Figure 3.1)
Informed Consent	The above factors determined if informed consent is needed or not	The IRB determination for Study I notes my intent to reveal my researcher positionality and research goals and determined that informed consent is not needed

Table 3.4: Factors for ethical consideration when researching data from the Internet based on a framework in Convery & Cox (2012)

3.4.6 Study I Data Analysis Process

My data analysis process differed across server rules and server metadata:

Server Rules I applied an inductive-deductive grounded theory approach for analyzing 1932 server rules (1920 server rules and 12 publisher-defined rules) and the metadata for the 60 servers. As Swanson Holton (2005, p.238) explain, in the process of inductively generating codes and themes and then verifying it against the dataset, inductive and deductive techniques are invoked. Through an iterative process, I inductively generated eight axial codes for types of rules and seven codes for attributes of rules based on

a deductive process to finally produce a taxonomy (Appendix D) that can help us understand server rules and features of servers reflected in those rules (RQ 1 2).

Server Metadata Using an inductive approach, I parsed the server metadata systematically for all 60 servers that yielded a matrix of various types of metadata (Table 3.1). Then I filled out entries for each of those servers against the types of metadata. For example, under "Ban-appeal Process" category (See Table 3.2), I noted whether or not a server included this process. I added entries to note information such as Number of rules, Count of moderators, original server category, drawn from each server metadata. For coding the server rules. such as Original server type (i.e, how a server describes itself as family-friendly, etc. in the self-narrative), count of rules per server, and the note whether or not those metadata were present in the data sample.

For the initial few iterations of coding the data, I used a software application (MAXQDA) for coding rules and metadata but as I moved along the coding process, I used secure spreadsheets to carry out the remaining analysis. This was more of an arbitrary choice but allowed me to easily maintain and track iterations of the coding process. I presented the codes and themes regularly in research lab meetings with my peers and academic advisor to debrief my findings and incorporate feedback in my analysis process. Such debriefing with peers and experts is a strongly recommended practice for ensuring that the researcher remains open to other possible interpretations and as an audit mechanism (Swanson Holton, 2005; Bailey 2007). The main premise of this work is to investigate if and how kid-/family-friendly servers correspond to a specific genre of servers that differ from other traditional servers. To that end, I also applied quantitative techniques including frequency distribution (similar to Fielser et al.'s approach (Fielser et al. 2018; Table 2, p. 77), plotting graphs in R to test the assumptions for parametric data; and running non-parametric tests as a way to explore other ways to triangulate my qualitative findings (Appendix F). As Field et al. explain, plotting graphs is akin to the recommended process of reading the text or transcripts in qualitative

techniques to develop a fluency with the dataset (Field et al., 2012). This process enriched my ability to engage with the data in Study I. I include the frequency distribution table to support the findings on the unique features of kid-/family-friendly servers. Finally, I used triangulation (Triangulation, 2014) to converge my analysis of the metadata and the server rules in characterizing the 60 servers into three main categories summarized in Table 3.5 (RQ 3 4).

3.5 Study I Findings

Three key findings emerged from my analysis. First, I found that rules in and across servers can be organized into distinct categorical forms: Rulesets (or sets of rules) and Types of Rules. Second, I found that the server's genre can be ascertained from an analysis of its server rules. Last, I found that the social, technological, and socio-technological forms for governance are reflected in the server rules. In the following section I present salient aspects of a rules classification system developed for addressing the questions posed in this work as a way to help orient the reader before delving into the findings. This taxonomy draws from the empirical analysis of 1932 rule statements and is elaborated in Appendix E.

3.5.1 A Taxonomy as a way to Understand Server Rules

A preliminary analysis showed that 35 out of the 60 servers classify their respective rules based on where within the server ecosystem those rules apply. For example, rules might be shared as part of a welcome message on the Minecraft server, be embedded within in-game text chat, or be included on integrated platforms like Discord and Mumble or within discussion forums, etc. For example, Indiesquish (Fig 3.1) and The Sandlot provide links to server rules through their home page. Whereas, LucidDreams includes its server rules

embedded within a Discussion Forum. Some other servers like TetraBear include the links to their Minecraft and Discord servers, where the actual server rules are posted. It was important to recognize this aspect of server rules appearing in different locations to track how kid-/family-friendly servers present their server rules to youth. As Beals and Bers (2009) note, a desired feature of virtual worlds for youth include the presence of clearly articulated and visible rules.

Some server-based categories are useful to note as they begin to surface high level differences among the servers. For example, servers that self-describe as general have a greater proportion of rules about the norms of gameplay on the server (e.g., build rules, cheat rules, client mods and hacks, creative world rules, etc.). For example, Blocklandia and Autcraft that self-describe as kid-/family-friendly group their rules by such codes while Addstar, another kid-/family-friendly server has a shorter consolidated set of rules. Yet through the lens of these categories alone, rules appear to be similar across all servers regardless of how they self-describe (e.g., kid-/family-friendly, family-friendly, mature, competitive, etc.). They have do-and-don't statements applicable in-game (e.g., don't grief, don't build or claim someone else's land) or in text-chat (e.g., don't spam, all chat must be in English only, etc.) and so on. While these categories informed the coding process, they were not sufficient to help answer the questions posed by this work.

A deeper analysis shows that rules within and across servers can be organized as rulesets or types of rules based on how they are phrased and the kinds of information they include. The taxonomy I developed, presented in the next section, comprises eight codes for classifying rules based on their topic and seven codes based on their attributes or properties (elaborated in Appendix F). The codes are not necessarily mutually exclusive as one or more codes may apply to a given rule. For example, S18 which self-describes as a family-friendly server, includes a rule that states "Acceptable client mods include most minimaps, inventory tweak/sorting, and others that do not give you an advantage over other players. If

you are unsure about whether a mod is safe to use here, just ask a staff member about it and they'll be glad to help." Applying the taxonomy ascribes code related to three topics: Minecraft/in-game etiquette, Player-staff-interactions, and Tech Governance; and three attributes: prescriptive (do statements), descriptive (examples provided), and prosocial (i.e. proactively reaching out to staff for making sure).

3.5.2 Server Rules: Types of Rules, Similarities and Differences (RQ1)

In this section, I discuss the types of rules developed in the taxonomy and the results of applying this taxonomy as a way of contrasting rules in the data set.

Types of Rules

The findings show that there are eight types of rules based on their topics and seven types when grouped by their attributes. These 15 types of rules are defined below with canonical examples from the data. Servers are mentioned in these examples based on their self-presentation before the final server codes were applied to characterize them based on their rulesets (Tables 3.5 3.6).

1 *Minecraft/In-game Etiquette* applies to rules on how to play Minecraft on the server. They may be stated in terms of the gameplay alone ("No PvP unless both parties consent" – S32 and S55) or provide additional guidelines for playing with others ("Be respectful to all players, their belongings, and their builds. Griefing and stealing will be dealt with accordingly." – S49). Here S32 and S49 self-describe as family-friendly and friendly respectively whereas there was no specific label S55 self-ascribed (at least during the data analysis; See Section 3.2).

2 *Social Play Etiquette* refers to rules that describe how one is expected to play and interact with other people within the server ecosystem. These rules guide the behavioral norms in the server ecosystem. A rule in S01, self-described as a server for family and friends, states as "We ask our players to "be a good nugget". ..treat others as friends, and encourage positive behavior. Don't take away from another's ability to express themselves through fair play." (S01) and another server identifying as "fun family friendly" states, "Racism, sexism, toxicity, or otherwise vulgar and inappropriate chat is strictly not allowed. Kids play!" (S45).

Player Safety Account is related to what every individual is expected to do with respect to their personal information and account on the server, rules on how to protect oneself within the server ecosystem. Examples include: "Be safe. Do not share or ask for any personal information about you or real life: Real names (first name is OK) . . . " (S51, self-described as a kid-/family-friendly server) "Sharing account information in chat or private messaging is not allowed." (S03, self described as server for family and friends)

Player-ban-appeal conveys what players may expect from various staff/what staff do on the server (e.g., admins, moderators, helpers, etc.). Not all servers include the option to appeal. "You can appeal any ban on the forums, whether guilty or not. Be polite, apologize when appropriate and you might be allowed back on our server." (S15) and "No ban evasion If you believe you've been unjustly banned, you can appeal on the forums" (S13) are examples from servers that self-label as friendly and family-friendly respectively.

Player-Staff Interactions are codes applied when rules mention how staff and players may contact each other, when players may contact staff and how they might do so within the given server ecosystem. For example, S08 describes itself as a family-friendly server and invites players to contact staff for reporting issues ("Please talk to a member of staff if another player is bullying, trolling ...."). Another server, S18 that also describes

itself as family-friendly, cautions players that "persistent hassling of Staff members for anything is not allowed ... ."

Social governance: Explicit rules about staff managing the server; Conveying what players may expect from various staff, what staff do on the server, and what plugins are allowed on the server. A canonical example, representative of rules in this category for all three server genres is, "The staff is here to help. We volunteer ourselves to this community out of love and a desire to see it succeed. ..." (S24 - a general server)

Technological governance: Related to what players may expect from technological controls on the server; or conveying the purpose of tech controls used for moderation (e.g., chat filters, software to detect cheating, etc.). Only three servers had rules where this code applied. "No swearing or trying to bypass the filter." (stated slightly differently S4, S18, S53)

Socio-technological governance rules that convey how staff use technological controls to manage the server, activities on the server. The difference between tech governance and socio-tech governance is that the latter includes some aspect that is handled by server staff and the use of tech is often implied (e.g., banned immediately). A typical example from the general server category is, "We reserve the right to change our rules at any time, the moderation team may issue bans or mutes at their own discretion" (S14 - a general server.")

The next set of codes are based on attributes regardless of the topic referenced in the rules (e.g., whether or not outcome, consequence, reason is mentioned; do or do-not type of statement).

Positive social or Prosocial: Rules that mention desired outcomes or permitted actions for the group/community (e.g., Wilson et al., 2019) for a given server. I draw from

the Developmental Science and Learning Science literature in Chapter 2 to refer to the term prosocial more broadly to encompass positive social attributes (e.g., being helpful, kind, etc.). For example - "Respect others/be Respectful to all" (e.g., S01, S02, S07, S09, S12, S23, S34, S38: all kid-/family-friendly except S09 and S38: general-family-friendly). As a contrast, an example of allowed action on a general server that is prohibited in all kid-/family-friendly and many other servers is: "Swearing is allowed, but offensive remarks and spam are discouraged."(S49)

Antisocial: Rules that mention undesired behaviors, considered as breaking rules, or behaviors that will be punished. An example is from a general server: "Do not use client side mods, a hacked client, or circumvent server plugins in a way that gives an unfair advantage." (S43)

Providing Next Steps: Rules that mention next steps in a situation that can correspond to a. consequences or "punishments" for breaking rules; or b. guidelines or instructions on how to proceed. Examples from two kid-/family-friendly servers are: "...Not following the rules may result in a kick, mute, jail, temporary ban, permanent ban, or permanent IP ban... With exceptions, staff will always warn players before resorting to these punishments." (S37) and "...Any skins that can cause offence or upset will be monitored by admins and you will be asked to change them." (S17)

Providing Rationale: Rules that provide a reasoning or explanation for why the rule exists or a perspective from server staff. Examples from kid-friendly servers are represented in the 2 quotes: "... wearing inappropriate or grown-up Minecraft skins such as those depicting Herobrine, nudity, gore, or are scary to young children." (S07); and "Do not grief... When a player builds something, they should be able to leave and come back later without their work being destroyed." (S15)

Descriptive: This code was included for rule that explain or describe something or provide examples of something (Note: some rules include elaborate examples even though the

main rule may be restrictive or prescriptive)

Prescriptive: Rules written to convey "do" actions (Fiesler et al. 2018). An example from a general-family-friendly server is: "Avoid spam in the server chat (max. 4 lines at a time)." (S32)

Restrictive: rules written as "Don't do something...", "No...", "...not allowed" (Fiesler et al. 2018). Examples include, "Do not bully anyone in the server" (S19 - a general-family-friendly server) and "No excessive swearing, spamming or overusing caps, or bypassing the censor" (S41 - a general server).

An additional finding suggests that within the community rules defined by the Mojang platform (np=12), more than half correspond to how users should engage in social play. For example, "Treat other community members with respect. This is core to everything we believe in. When you express your opinions, please do so politely and respectfully." 10 out of 12 rules published by the platform reference desired behaviors and emphasize the notion of community as reflected in the example above. Relatedly, more than half of the rules (7 out of 12) are stated as do-statements (i.e. Prescriptive attribute) than don't statements. Of the 60 servers, two explicitly reference the Mojang platform in their rules. S21 which identifies as one of the largest server networks states that players may only access the server through their Mojang Minecraft accounts and S41, self-described as family-friendly states a rule related to donations made on the server "All donations made are to ProsperCraft server network and NOT Mojang/Minecraft."

Similarities and Differences

Based on the taxonomy, rules across servers in the dataset were assigned codes to generate a system to group rules into rulesets based on their topic and attributes. Using a similar approach that Fiesler et al. (2018) used to identify various types of rules on subreddits, I created a frequency distribution table (Table 3.5) to contrast the rulesets against the server types (Table 3.6). By this stage, servers were coded into categories based on their rulesets. These categories for rulesets (e.g., Social Play etiquette, Player ban appeals, Descriptive, Restrictive, etc.) and the categories of the server types (kid-/family-friendly, general-family-friendly, and general) were developed through continuous analysis in parallel.

Rule Types or Rulesets & Attributes (Manual Coding)	**Total Rules** $N = 1932$	%	**Rules in kid-/family-friendly** $n_k = 475$	%	**Rules in general-family-friendly** $n_{ff_g} = 707$	%	**Rules in General** $n_g = 738$	%	**Platform Rules** $n_p = 12$	%
Social Play Etiquette	731	37.84	185	38.95	253	35.8	285	38.62	8	66.7
Minecraft/In-game Etiquette	761	39.4	199	41.9	277	39.12	283	38.35	2	16.7
Player Safety & Account	186	9.63	55	11.6	56	7.92	72	9.76	3	25
Player-ban-appeals	26	1.35	5	1.05	9	1.27	12	1.63	0	0
Player-Staff Interactions	268	13.9	90	18.95	97	13.72	80	10.84	1	8.33
Social Governance	105	5.44	49	10.32	35	4.95	21	2.85	0	0
Socio-tech Governance	350	18.12	123	25.9	140	19.8	86	11.65	1	8.33
Desired/permissible (Prosocial)	521	27	227	47.8	162	22.91	122	16.53	10	83.33
Undesired/disallowed (Antisocial)	978	50.62	293	61.7	270	38.2	410	55.6	5	41.7
Next steps (consequence, help)	267	13.82	84	17.7	86	12.16	96	13.01	1	8.33
Rationale	201	10.4	109	22.95	65	9.19	23	3.12	4	33.33
Descriptive	1180	61.08	267	56.21	418	59.12	491	66.53	4	33.33

Rule Types or Rulesets & Attributes (Manual Coding)	**Total Rules** $N = 1932$	%	**Rules in kid-/family-friendly** $n_k = 475$	%	**Rules in general-family-friendly** $n_{ff_g} = 707$	%	**Rules in General** $n_g = 738$	%	**Platform Rules** $n_p = 12$	%
Prescriptive (e.g., *Do*, *is allowed*, *may*, *can*)	759	39.3	236	49.7	276	39.04	240	32.52	7	58.33
Restrictive (e.g., *Don't*, *No*, *cannot*, *may not*)	1046	54.14	295	62.1	369	52.19	377	51.08	5	41.7

Table 3.5: Frequency Table of manually coded rules defined across three genres of Minecraft servers and the platform

This frequency distribution is useful in two ways. First, it reveals the distribution of rules within each server genre according to the ruleset or types of rules and attributes (Columns 4-9, left to right). The analysis shows that restrictive (i.e. don't) rules, the mention of undesired behaviors, and descriptive rules (with examples or explaining something) are the top three rulesets in the kid-/family-friendly genre. Similarly, the top three rulesets in the general-family-friendly genre correspond to restrictive, descriptive, and a close tie between Minecraft/in-game etiquette and prescriptive (i.e. do) rule types. Whereas, the general category favors descriptive, rules that mention antisocial or undesired behaviors, and restrictive rules as its top three rule-types. The second use for this frequency table is in contrasting the rulesets across the three server genres. The kid-/family-friendly genre ranks highest in rulesets that mention desirable/permissible behaviors (227 out of 521 prosocial rules). Similarly, a majority of rules that mention a rationale/reason comes from the kid-/family-friendly genre (109 out of 201 rulesets coded as rationale) whereas only about 1/8th of such rules come from the general server genre. These findings suggest that self-narratives alone are insufficient to understand how servers might be classified into categories (e.g., kid-/family-friendly, or family-friendly, general etc.). This is important to consider in light of how prospective players, especially youth like Elbereth and KTango's son, might discover servers that align with their goals. Consequently, the servers in Study I dataset were organized under three main genres (Table 3.6). I unpack what these genres mean using examples throughout the rest of the findings section and hereon refer to the servers in terms of these final assigned genres.

Final Server Genres (labels identified based on rulesets)	**Brief Description of Genre (elaborated in RQ4)**	**Count of Servers**	**Total # of Rules (coded)**	**Average word count of rules**	**min # of words in a rule**	**max # of words in a rule**
kid-/family-friendly	are explicitly tailored for youth audiences; does not allow the use of mature language	19	475	42.11	2	562
general-family-friendly	may include young people but are not necessarily so; may specify ages 13+ or 16+ and may permit the use of mature language in certain places (e.g., a Discord channel or specific forum, etc.)	21	707	24.24	2	319

Final Server Genres (labels identified based on rulesets)	**Brief Description of Genre (elaborated in RQ4)**	**Count of Servers**	**Total # of Rules (coded)**	**Average word count of rules**	**min # of words in a rule**	**max # of words in a rule**
general	Tend to be more focused on gameplay and modded versions; larger server communities; may have youth players but does not explicitly address youth or families as an audience	20	738	26.18	2	303
platform	n/a	1	12	41	12	112
Total Servers/Rules		60	1932	n/a	n/a	n/a

Table 3.6: Overview of the Three Server Genres & Rules coded (1920 rules from 60 Servers, 12 platform-defined rules)

3.5.3 Governance mechanisms in Rules: Similarities and Differences (RQ 2)

The analysis shows that rules not only contain information about the server ecosystem and the mechanisms used for enforcing or regulating the rules (i.e. governance) within that

ecosystem, but also function as value statements about purpose of the servers themselves Rules in kid-/family-friendly servers not only mention socio-technical features like the use of certain kinds of plug-ins, for example, but also express the importance of moderators being friendly and approachable staff. Rules mention technological aspects (e.g., permitted client-side modifications that players can use); social aspects on how to report issues or seek help; consequences on potential "punishments" (being banned from the server, or muted in chat); as well as convey information on the types of play cultures they support The social and technological mechanisms stated in the rules are coded depending on whether the approach uses social and technological mechanisms independently or in a combination:

1 Social etiquette: among players

2 Social governance related: among staff, between players and staff

3 Technological governance: the use of tech plugins to define what players and cannot do, and tech governance for consequences

4 Socio-technical governance: rules where explicit references to staff practices and tech plugins

Server staff reveal that they author server rules either in the metadata or within the rules. For example, S37 that does not self-describe but was coded as kid-/family-friendly based on rulesets, states the following along with their rules: "We reserve the right to amend all of these rules as needed! Thank you for taking the time to read this! Please reach out to a staff member anytime if you have any more questions or would like some more clarification." Similarly on S59, a family-friendly server that closed, staff mention that their rules are authored by moderators. Another kid-/family-friendly server, S07, invites players to contact staff if the chat plugin inaccurately flags content (e.g., "It's so strong that at times it filters things it shouldn't filter. Having something you type filtered doesn't mean you're in trouble,

it just means that you triggered our filter. If you ever have questions about the chat filter you are welcome to email us. . . "). A limitation of this dataset is that we cannot ascertain whether or not youth participate in the creation of these rules.

Five topic codes reveal aspects of governance defined in Section 4.2 are Player-Staff Ban Appeal, Player-Staff Interactions, Social Governance, Technological Governance, and Socio-Technical Governance. Of these, the largest number of rules that reveal aspects of governance comes from kid-/family friendly servers – 269 governance topic out of 475 total in kid-/family-friendly (57%); 282 out of 707 total in the general-family-friendly (40%); and 199 out of 738 in the general category (27%). The following examples illustrate some similarities and differences among the server genres. One Peace, for example, coded as a general-family-friendly (self-described as a mature friendly) includes rules that convey moderators' goals and how players might reach out to them. (e.g., "We want to make sure you are safe on our server.- Players are welcome to share info such as name, age, general location,... if they choose to do so. - We do request that more personal information such as a personal address, etc. are kept private or party chats."). This is an example where staff express their goal for keeping players safe. Four general-family-friendly and two general servers include rules of this type. One Peace server also includes a rule that prohibits impersonating staff – a rule common across 24 servers in total, three of which are in kid-/family-friendly servers.

Similarities and Differences

The findings reveal that in kid-/family-friendly servers, rules coded as a governance topic guide players on how to report any problems including non-compliant behaviors that are against the server rules. For example, OhanaCraft, coded as a kid-/family-friendly server, includes three rules to guide players on how they might report misbehaviors:

1 Reporting behavior and rules violations.

2 Report any rules being broken to the staff immediately. Use /msg to any of the staff to report it. If no staff are online, you may use /report and a staff will get to it as soon as possible.

3 If you have a problem with a staff member, report it to a Paladin or Co-owner using /mail.

Autcraft and Cubeville, also coded as kid-/family-friendly, include similar rules on how players can contact moderators. These rules are phrased to convey players' rights in kid-/family- friendly servers like Autcraft, Cubeville, and OhanaCraft. For example, "You have the right to report poor behavior and rules violations of any player or staff." (OhanaCraft, a kid-/family-friendly server). Similarly, S45, coded a general-family-friendly server specifies – "Staff reserve the right to use their own discretion regardless of the any rules listed, if you think it is unfair please let us know by directly messaging another staff member. Failure to abide by these rules may result in a mute or ban from the Discord and/or Server. If you witness another player breaking rules, report them to the staff." Although this second example centers around staff rights, it offers players a way to contact staff with any concerns. The analysis shows that such rules, characteristic of kid-/family-friendly and general-family-friendly servers, inform players how they might actively voice any concerns about improper actions on the server including those by staff. As a point of contrast, the analysis shows that servers in the general genre phrase their rules in terms of staff rights. For example, a rule on S50. unspecified self-label and coded as general category of servers, states, "... Staff reserves the right to remove any player deemed unruly. staff reserves the right to perform ANY administrative action on offenders if deemed necessary. Staff claims no responsibility for any damages financial, emotional, or mental in nature." This quality is worth noting as rules in kid-/family-friendly servers and general-family-friendly servers are expressed to inform players of their rights to report inappropriate action. While the evidence is inadequate to form a sound conclusion, the ways in which these rules are phrased suggest that kid-/family-friendly and general-family-friendly servers offer a feedback channel and invite players to use

it on their respective servers.

3.5.4 Self-Narratives of Kid-/family-friendly Servers (RQ 3)

Self-narratives in kid-/family-friendly servers function as kinds of mission statements for a server, communicating both the purpose of the server and the means for accomplishing that purpose. For example, the self-narratives include information about who the staff or moderators are on the servers (e.g., former educators, parents who co-play with youth). In this sense, self-narratives and rules can be considered as metadata that signal important information for parents (e.g., OhanaCraft as a server that does not tolerate bullying or trolling behaviors; S22 and S23 where staff work with parents to understand youth needs). I use five servers from the study data as examples to show metadata can be similar and different across the servers, particularly kid-/family-friendly servers. Excerpts from the five servers' metadata illustrate the variances across kid-/family-friendly servers and servers that self-describe differently (e.g., friendly or general).

Indiesquish, Noobscraft, and The Sandlot servers each state on their website that they are family-friendly servers. The server origin information readily reveals that Noobscraft and The Sandlot servers were established in 2011. Servers like Indiesquish may not always post this information, but it gives prospective players an idea about when the community on the server was formed. From other metadata (e.g., discussion and blog posts dated back until 2019), we know that Indiesquish was formerly known as Minesquish. The mission statements of these three servers are published on their home pages and secondary web pages, albeit of varying styles. As illustrated in Figure 3.1, Indiesquish provides a detailed overview of the server and player community with rich visuals of the virtual world and links to other parts of the server ecosystem (i.e., a Discord server, a discussion forum, an online blog) on the main web page. The Sandlot server has similar information distributed between its

home page and other parts on the website (e.g., an "About Us" page). Indiesquish and The Sandlot servers explicitly mention that their staff (i.e., moderators and administrators) are present to help young players and are available for addressing concerns that parents of youth on their servers might have. The metadata in kid-/family-friendly servers also reveal background information about who the staff and players are. For example, staff may include parents and former educators (e.g., The Sandlot server) or adult gamers who volunteer as administrators on the server (e.g., Indiesquish). Similarly, players may include neurodivergent youth, children and families, or people from the LGBTQ community (e.g., Indiesquish, The Sandlot). The two quotes below from Indiesquish and The Sandlot servers' homepages exemplify how the metadata reveals nuances about the mission of the server.

> *"We work closely with our players to ensure everyone has a relaxing, fun experience, and will happily make arrangements with parents to minimise the impacts of change for example, when we need to change server maps) on our autistic miners" – mission statement from Indiesquish' home page.*
>
> *"The Sandlot aims to provide a family-friendly environment for younger players, free from swearing, abusive language, and mature content that is often found on many Minecraft servers (and the internet in general)." - mission statement on The Sandlot's main and "About Us" web pages.*

The remaining two server examples are LucidDreams and Mineplex. Neither of these servers ascribes any specific label as part of explicit mission statements or origin stories. However, they include some level of such information as part of their server rules. LucidDreams has a forum post for its server rules within which the creator provides more nuanced information about the server goals and staff. "We also aim in building a safe environment where parents are at ease knowing their child can play in peace, without fear of being bullied, argued with or griefed by. Our main aim is to also help establish friendship between other players - you can consider us as a family!." This metadata suggests that LucidDreams as a server

may be aligned with servers like Indiesquish and The Sandlot for example even though it does not explicitly self-describe as kid-/family-friendly. Mineplex, one of the larger player communities, states their goals as a preamble to their rules "We want to offer everybody a safe environment where they are able to have fun, meet new people, share their opinions, and be respected on the network. The focus of our rules is to ensure a positive and accepting environment for all our users." All these five servers share one salient metadata – server rules. This appears to be a more consistent feature in nearly all moderated Minecraft servers. In other words, moderated servers without other metadata can still include rules. Some of these servers include multiple Minecraft servers within the same ecosystem, (e.g., OhanaCraft has three servers and Cubeville has multiple servers within their respective server ecosystems).

In summary, kid-/family-friendly servers:

- Include adult moderators who are always present on the server. A subset of servers reveal that the adults are parents, educators (present/former), professionals. Although the metadata in the dataset does not explicitly reveal this info, I note from the stories of Elbereth, KTango, and Chimit, that some servers include youth moderators.
  - Kid-/family-friendly servers also include roles such as helpers, volunteers, and junior moderators (e.g., The Sandlot, Cubeville, OhanaCraft).
- Some servers support additional social platforms like Discord and Mumble while others do not, although no specific reasons are provided (e.g., Famcraft uses Mumble while OhanaCraft, Cubeville, PonyLandMC, are examples of servers that also include Discord servers).
- Most servers publish the Minecraft IDs of moderators and staff, but this feature is common across three server genres
- At a higher level, metadata reveals the goals of such servers - which as the name

suggests is to establish friendly spaces for youth, but also emphasize online safety through the mission statements and origin stories when available.

- While it is more common in general servers to list banned players, one kid-/family-friendly server S15 also lists such players on their website. The dataset does not offer additional explanations, although we might speculate that servers keep track of players who are banned and some publish this in their metadata.

Taken together, self-narratives in the kid-/family-friendly genre inform the reader about the servers' goals of creating friendly and safe play-spaces. However, the findings suggest that self-narratives alone are inadequate to determine the rhetoric of kid-/family-friendly servers. In the next subsection, I report on how the server rules when juxtaposed with self-narratives enriches our understanding of the kid-/family-friendly rhetoric.

3.5.5 The Rhetoric of Kid-/family-friendly Servers vs. Rulesets (RQ 4)

The findings show that the rhetoric of kid-/family-friendliness corresponds to their rulesets, however that is not the case for general-family-friendly servers. The differentiating factor for the latter genre is that their rulesets differ from their metadata in the ways in which they allow mature content. The rhetoric of kid-/family-friendliness in Minecraft is reflected in meta-data such as self-descriptions of servers, server origin stories, mission statements, the presence or absence of safelisting, and descriptions of founders and server staff. By virtue of being tailored specifically as a particular type of server, the server characteristics in the meta-data can be expected to corroborate with those reflected in server rules, and in turn corroborate with the rhetoric of that specific genre. For example, the rhetoric of kid-friendliness should match its meta-data and rules, and resonate with the general rhetoric of kid-/family-friendly servers. In this subsection, I unpack how the meta-data correlates

with the rulesets for kid-/family-friendly servers.

The main premise of this work is that kid-/family-friendly servers correspond to a specific genre of servers that are tailored for kids and differ from other peer servers in the Minecraft network. Study I findings are consistent with the characteristics described in the introductory stories in Chapter 1. The frequency distribution (Table 3.5) offers preliminary evidence to suggest that server rules do coalesce into rulesets that exhibit characteristic patterns to further understand the types of servers and what attributes render a server genre unique. Although the number of rules in general servers is roughly more than that of kid-/family-friendly servers, the percentage of rules that mention prosocial outcomes in the general server category is half that of the latter. Roughly similar percentages of rules are restrictive in general-family-friendly and general categories (52.6% and 51.1 % respectively). A similar match exists for rules that mention consequences or next steps (12% in general-family-friendly and 13% in general). The percentage variation across the genres is highest for rules with the rationale attribute, (23% in kid-/family-friendly; 9.2% in general-family-friendly; and 3.1% in general). When applicable, this attribute relates to an underlying rationale for why a given rule exists. Rules in kid-/family-friendly servers make the largest contribution to the count of rules that mention a rationale (54% of 201 such rules) followed by general-family-friendly (32.3%) and general (11.4%) respectively. A qualitative analysis focused on how the rules are phrased helps distinguish the characteristics of each genre and reveals both similarities and differences between servers in the same genre and among the server genres.

Characteristics of kid-/family-friendly servers - Qualitative Similarities Differences Within

Overall, kid-/family-friendly servers have roughly the same amount of rulesets around etiquette for social play (and general social interactions online) and for Minecraft (in-game specific) suggesting an equal emphasis on social behaviors as much as playing Minecraft.

Starting with the first category of kid-/family-friendly servers, seven servers grouped as kid-/family-friendly based on the rulesets match the self-descriptions of kid-/family-friendly by the corresponding servers. That is to say, these servers self-describe as kid-/family-friendly and are also coded as kid-/family-friendly based on characteristic patterns in their rulesets. One server that did not self-describe as kid-/family-friendly or family-friendly along with 11 other servers that self-described as family-friendly are coded as kid-/family-friendly based on the patterns in their rulesets. These servers explicitly address kids as their main audience in their rules although their metadata does not. The restrictive rule count is higher than prescriptive in this genre. Don't-statement rules are not always about anti-griefing or in-game specific rules. Surprisingly, the don't statement rules are also about other social behaviors such as "don't harass or bully others, not advertising or spamming, not discussing mature topics." These rules suggest an intent to create a culture on the server where members are expected to not only play Minecraft in a fair manner but also treat each other well and refrain from inappropriate behaviors. 94 out of 246 (38% of antisocial behaviors are related to Minecraft etiquette).

Study I findings suggest the following characteristics drawn from the rules data, applicable to the kid-/family-friendly genre:

1 Playing and interacting with others socially is as important as, if not more than, playing Minecraft;

2 Rules suggest that staff want to be seen as approachable and helpful; rules mention the ways through which members can contact them within the given online server ecosystem;

3 Next steps are not limited to consequences for breaking rules, they include information on how people can get help or contact server staff;

4 When a reason for why a rule exists is provided, protecting kids or keeping kids safe online

ranks as the top reason and maintaining a friendly environment for everyone is another frequent explanation;

5 The list of desired and undesired behaviors derived from rules in this genre relate more to ways of being in a shared community than ways of playing the game. For example, rules in the kid-/family-friendly server genre emphasize on helpful actions to play, trade, and share resources with other players; to be welcoming and friendly to everyone on the server.

Characteristics of General-family-friendly servers - Qualitative Similarities Differences Within

Moving to the second category, servers grouped as general-family-friendly based on the rulesets include servers that self-describe themselves differently in the following ways:

1 self-describe as family-friendly but rules state that mature or Not Safe For Work (NSFW) content is accepted (5 servers);

2 self-descriptions and rulesets coalesce to form the general-family-friendly category where kids may play but are not the main audience (13 servers, one is youth-operated and corresponds to Chimit and Meem's server in Chapter 1); and

3 self-descriptions are unspecified but the servers are included based on the patterns of rulesets (4 servers)

The example of "6. No NSFW Content - We have kids that play on our server." vs. "11. Be Mature - If you are found to be annoying/childish you will be muted." within the same server (S09, which self-describes as a friendly server and was finally coded as a general-family-friendly server).

Finally, the last category includes 20 servers that self-describe themselves generally as large server networks and whose rulesets converge into the third category, viz., the general server genre. The patterns of rulesets based on the manual codes can be understood using a frequency table (Table 3.5), adapted from (Fiesler et al., 2018). While the sub-sample sizes (i.e. number of rules) varies across the three types of servers (475 rules: kid-/family-friendly; 707 rules: general-family-friendly; 738 rules: general; 12 rules: platform), the frequency distribution table (Table 3.5) and descriptive statistics that follow in this section support a richer description of the findings. All eight ruletypes and the seven attributes are presented as row data, while the columns represent the number of rules and frequency in %. This comprises from left to right, the total number of rules (60 servers and the platform) paired with the % based on the 15 codes, followed by similar pairs (number of rules, %) for the three server genres and the platform.

Qualitative Similarities Differences across the Three Server Genres

Playing and interacting with others socially is as important as, if not more than, playing Minecraft in all the three genres servers, as revealed in Table 3.5 (each genre contributes nearly the same proportion of rules in the Social etiquette category. This is not surprising however, as Minecraft is inherently a social game and the same characteristics are reflected in the rules defined at the platform level.

Five kid-/family-friendly servers and seven general-family-friendly servers include a rule that asks players "not to beg to be made staff". Only four general servers reference this phrase which may be explained by their metadata. Many servers in the general category include online applications where players can apply to become staff. Although the data limits our ability to understand why the other two server categories explicitly mention such a rule, the finding is interesting in and of itself. I discuss this aspect in the next section within this chapter.

The most salient difference is that the highest number of rules providing desired actions or outcomes (prosocial), consequences of inappropriate action, and an underlying rationale for why the rule exists, come from kid-/family-friendly servers (cf., Table 3.5). This is important because only 475 rules in the dataset come from kid-/family-friendly (19 servers), whereas 707 rules are from 21 general-family-friendly servers and 738 rules are from 20 general servers. In this sense, kid-/family-friendly servers extend the rules defined by the platform.

S14 (general), includes a rule against impersonating staff and another rule around using chat on the Discord platform. The reason mentioned in the rules read as, "... Some of our more inexperienced members could think the information you give them is official, and this could prove problematic for them and us. ..." and "... that's why we want to keep our member list and interactions in chat channels a safe place" respectively. These reasons suggest that server staff in the general category also consider the impact to newer members and the safety of the community overall. However, as the frequency distribution Table 3.5 shows, kid-/family-friendly servers contribute to the highest proportions of rules in the social governance and player-staff interaction topics (kid-/family-friendly servers have 10% and 19% for social governance and player-staff interaction codes, whereas general servers contribute to 3% and 10% respectively. The general-family-friendly servers resemble kid-/family-friendly servers in certain aspects (e.g., set of values included in the rules) but are like general servers where mature topics are concerned. One discrepancy that is observable in Table 3.5 is that general servers contribute to no rules under the tech-governance code. Two kid-/family-friendly servers (Autcraft and Famcraft) and one general-family-friendly server (Timezoomers) include rules under this code. The data is insufficient to explain why this may be the case, but a speculative reasoning, based purely on how rules in these two categories are phrased, would be that server staff in kid-/family-friendly and general-family-friendly servers express their practice to articulate more clearly to the players on their servers who include youth.

3.6 Summary of Study I Findings

Study I was designed to address a two-fold purpose. First, it examines the rhetoric of kid-/family-friendliness in the Minecraft server ecosystem through an empirical analysis of server rules. Second, it reports on how governance mechanisms are reflected in server rules, particularly the balance between social (e.g., human moderators) and technological approaches (e.g., chat filters, plugins, etc.) Findings from the study sample clarify the nuances between the rhetoric of kid-/family-friendly and family-friendly servers. Additionally the qualitative analysis of rules is used to contrast the similarities and dissimilarities within and across the server genres - particularly between kid-/family-friendly and family-friendly and the descriptive statistics enrich the qualitative descriptions. Next, I briefly discuss the implications, strengths and limitations of Study I. I return to these findings in Chapter 6 to situate these implications in the three core areas of adolescent development, youth in online gaming, and online moderation or governance approaches in HCI.

3.7 Study I Discussion

Study I findings reveal that rulesets in kid-/family-friendly servers (n=19) are viable tools to identify such servers as a genre (T1). Study I also show that rules are important analytic tools that can surface the specific ways in which kid-/family-friendly servers express their beliefs and approaches to governance. The striking resemblance across the kid-/family-friendly servers is that they include nearly as many positive actions as desired outcomes as they do the negative actions within the server ecosystem, and their rules are not mere duplicates of each other. Fiesler et al., (2018) examined this aspect in subreddit rules but did not find evidence that subreddits were copying rules from a standard template. Through the examples illustrated in the findings, here too, the results show that rules in kid-/family-

friendly servers are phrased unique to a given server. At a cursory glance, these rules appear to be similar to rules in servers that do not identify as kid-/family-friendly (In fact, a server pep.gg, excluded from Study I dataset even explicitly mentions the intended audience is older adults). It is only through the taxonomy that the nuanced differences start to become apparent. This finding is salient because youth may not always have supportive parents who can guide their journey into Minecraft that are designed for youth. Servers that self-describe as friendly, some of which mention that kids play, reveal through their rules that mature or "Not Safe for Work/ NSFW" content is permitted. KTango's story reveals that she tried out various servers before settling on The Sandlot server and Elbereth shared that her dad (pseudonym unavailable) helped locate the OhanaCraft server. In light of the findings from Study I, these stories suggest that individual kid-/family-friendly servers have their unique strengths (e.g., Harry Potter themed world on The Sandlot and fun role-plays on OhanaCraft. But the sum of their strengths highlighted in the Frequency table (Table 3.5) shows that these servers can be recognized based on characteristics of their rules.

The fact that these rules mention positive actions, consequences and reasons explicitly albeit to varying degrees of detail suggest that rules on kid/family-friendly servers are created with an intent to encourage positive behaviors, not only constrain inappropriate behaviors. For example, "Being mean to other players is not acceptable. Players come to Ohanacraft and are accepted for who they are and are treated as a friend" in OhanaCraft suggests the server goals are to provide inclusive and friendly spaces for players, whoever they may be.

Kid-/family-friendly rules reveal values and goals of kid-/family-friendly servers, similar to the mission statements. In servers that do not have mission statements such as S25, S37, and S42, rules are even more salient as markers of kid-/family-friendliness. In making rules explicit and clear, some of the kid-/family-friendly servers are consistent with what Ringland (2018) observed on Autcraft. Some kid-/family-friendly servers (S2, S23, S39, for example) have much shorter and fewer rules but the majority of rules in this genre are more elaborate.

HCI research suggests that norms should be made explicit and visible to members of a community, particularly to overcome the problems that online digital medium presents (e.g., trolling or harassing someone anonymously; Resnick and Kraut 2000). Grimes' (2010) view however, is that rules can constrain the freedom in children to play and be creative. Similarly, in a study of classroom rules, Boostrom (1991, 1999) explains that too many explicit rules might limit the opportunities for educators and learners to teach and learn respectively. Rules and social norms can help youth develop critical thinking skills needed for making responsible decisions (Boostrom 1999; Beals Bers 2009). While more work is necessary to understand rules from the perspectives of youth, Study I findings should be considered in light of the target audience that include parents and caregivers (e.g., S07, S17, S18, S22, S23, S25, S42, and S59). The emphasis on friendly and approachable staff (or moderators) on the servers signals to parents and caregivers that children can safely enjoy playing Minecraft with other people on kid-/family-friendly servers.

3.7.1 Strengths and Limitations of Study II

Study I findings help us understand the rhetoric of kid-/family-friendly servers based on the published self-narratives. This understanding is valuable as the self-narratives reveal how servers position themselves within the socio-cultural contexts of gaming in Minecraft. As Bourgonjon et al. 2017 explain, rhetorics can help us understand socially constructed meanings. "When studying the impact of video games, we therefore believe it is meaningful to map out the foundations of the debate by exploring the perspectives of players." (Bourgonjon et al., 2017; p. 1733). This perspective is relevant for the present study which seeks to understand the potential impact of kid-/family-friendly Minecraft servers. The same quality of Study I's strength contributes to its limitations. By design, the dataset is insufficient to explain the underlying rationale of why rules and metadata are presented in a certain manner. Yet, the results of this study are interesting as it motivates the need to understand

more (e.g., why does one kid-/family-friendly server publish their players' ban list? Or, if we take note from Elbereth's story in Chapter 1, how are youth invited to moderate on kid-/family-friendly servers? Observational data might offer more evidence, but if the goal is to deeply understand the lived experiences of moderators, the next step involves applying qualitative approaches to gather such perspectives. A curiosity to understand how server staff, moderators in particular, describe their practice and regulate social norms on kid/family-friendly servers led me to Study II which I present in the next chapter.

Chapter 4

Study II: Interview Study to Understand the Lived Experiences of Minecraft Moderators on Kid-/family-friendly Servers

4.1 Chapter Abstract

HCI research has a long-standing focus on community moderation, but much of the work has been focused on content moderation. Drawing from prior HCI studies on Minecraft and theories of play, Study II builds on Study I presented in the previous chapter to understand the described motivation, practice, and approach that moderators bring to bear in kid-/family-friendly Minecraft servers. Based on an interview study with 30 participants (22 adults and 8 youth), I report five salient themes that reveal moderators' practices for reinforcing social support and opportunities for youth on their servers. This work established empirical

evidence for kid-/family-friendly servers as instantiations of play-based affinity networks.

4.2 Study II Background

Given what we learned in the previous chapter about the rhetoric of kid-/family-friendliness in Minecraft, Study II asks, how are the self-narratives enacted on kid-/family-friendly servers? How are the rules enforced on the servers? Through an analysis of server metadata across 60 in-the-wild servers, Study I found that the rules in 19 kid-/family-friendly servers present a set of constraints and encourage positive outcomes at the individual and community-level. However, the metadata also reveals that some of the server ecosystems have rich socio-technical infrastructure including Discord servers, discussion forums, in-game chats, and multiple game-modes on their servers. Given that play is emergent in nature (Salen and Zimmerman 2008) and player actions cannot be predetermined or unlike content, be checked against a set of keywords, Study II in this chapter posits that moderators in Minecraft are tasked with more responsibility in managing their servers. Study I findings also suggest that the server staff have a specific role and purpose in these servers and their corresponding ecosystems (i.e. online spaces such as Discord, discussion forums that may be affiliated with the server). While the self-narrative on a server is produced to convey expectations to stakeholders including players, parents of youth, and other third-party entities, it is the server staff who, in various capacities as server owners, administrators, moderators who operationalize the server rules and self-narratives. Study I motivates the need to know how self-narratives are enacted by moderators. As discussed in Chapter 2, these virtual worlds may include artificially invented realities, but research shows that the social meanings are reflected back in the real world (Lastowa et al., 2004; Atkins 2014). Understanding moderators' practices may help us understand how the prosocial rules and the kid-/family-friendly rhetoric are translated into practice (Slovak et al., 2018).

Potential differences in moderator styles may influence player experiences on the server, given the role played by moderators within the overall governance structure of a server. Further, insight into what influences moderators to take up certain kinds of moderation practices might help us better understand the role moderation plays on servers designed for youth.

Study II contributes to a better understanding of moderation across seven kid-friendly servers. Interviews from youth suggest that these spaces promote opportunities for youth to explore their interests and develop interpersonal and leadership skills. The chapter concludes with a discussion on implications for developmental needs of young adolescents in spaces that reflect mainly adults' conceptions of online spaces for youth and the opportunities for how youth can participate. In the following, I outline the research questions, and describe the chosen methodological approach and findings. Then, I present a brief study-related discussion within the context of moderating play-based spaces. I explain how the described socio-technical practices in kid-/family-friendly servers match the features of affinity spaces (Gee 2003) as a way of establishing T1 and T2.

4.2.1 Study II Research Questions

By understanding moderator attitudes and beliefs about the purpose of the servers for youth, we might understand the impact, in principle, that kid-/family-friendly servers could make on youth. Study II asks,

RQ5 How do server staff, moderators in particular, describe their motivation for moderating on kid-/family-friendly servers?

RQ6 How do moderators describe their practice in regulating rules related to social norms on their servers?

RQ7 How might we characterize their approach (i.e. style) to moderating on the server?

Study II posits that moderators in Minecraft are in charge of managing more than content within their server ecosystems. To describe how moderators in Minecraft approach play-based moderation, I draw from interviews with 30 moderators (22 adults, 8 youth: 10-17 years). The findings reinforce Study I results and contribute a set of social and technological practices, that when contrasted with Gee's affinity rubric (11 original features) show that kid-/family-friendly servers are a set of online-play-based affinity networks. I note the ways in which seven features of socio-technical moderation in kid-friendly servers strongly align with and one feature differs from Gee's rubric. Of the three remaining features in Gee's rubric – two features cannot be verified based on Study II dataset and one feature on tacit knowledge requires observational data, which is out of the scope of this study. Even so, as per Gee's theory, the features are not an "all-or-nothing" checklist (Gee 2003; p. 228). Given that socio-technical mechanisms strongly satisfy the theoretical rubric, kid-/family-friendly servers can be said to be instantiations of online play-based affinity networks.

In the following sections I describe the research approach, participant profiles, recruitment strategy, chosen methodological approach, and empirical results. Following, I demonstrate how the socio-technological features of kid-/family-friendly servers meet the criteria of affinity networks. I conclude this chapter with short discussion and connect back to the implications in the broader core areas of adolescent development, youth in online gaming, and server governance in Chapter 6.

4.3 Study II: Research Setting & Chosen Methodology

In this section, I describe the recruitment strategies, participants, data collection, ethics and data analysis processes.

4.3.1 Recruitment Process

Following the formal approval from the Institutional Review Board, I began my outreach efforts for recruiting participants beginning March 2020. My primary goal was to interview 50 moderators from kid-/family-friendly servers but I also invited moderators from a subset of servers in the general-family-friendly genre to understand their perspectives and surface opportunities and challenges in moderation practices (Table 4.1).

I used a brief survey questionnaire as a way to screen participants for the interview study to help ensure that I could enroll diverse participants in terms of ages 18 years and above, all genders and ethnic backgrounds, and with varying levels of experience (minimum of 6 months). Participants who completed the interviews shared my study information with colleagues on their servers and kindly made introductions that led to eight additional participants who were interested to contribute to the study. I waived off the screener survey for six participants (18 years and above) and only presented the study information sheet to obtain their informed consent. I obtained informed parental consent and assent from the two minor participants, who were anyway waived off the screener survey. As the interviews were ongoing, I modified my recruitment procedures to invite youth (ages 8-17) to opt-in to participate in the interviews. I followed standard Ethics and IRB protocol to obtain parental permission and youth assent. Youth under 18 did not complete the screener survey because the adult moderators posted my interview recruitment materials on their servers.

I invited moderators to complete a brief screener survey and indicate their willingness to participate in an interview study. Considering the-then circumstances due to the global pandemic, I offered to be available at times that were convenient for participants in my outreach and recruitment efforts. While this is normal practice to respect the contributions and time that participants offer to research, I also adjusted my follow-up procedures and checked-in with participants and reiterated my goals at various intervals during the inter-

views. Two participants could not appear for their interviews for personal and health reasons. I sustained my recruitment effort for a longer period to factor the possibility of recruiting more participants with time. This strategy was useful as I heard back from moderators in Cubeville in Spring of 2021 and was able to include three adults and two youth moderators from this server. Similarly, KTango and two additional moderators who had been recently appointed but had prior experience also signed up for the interview study.

4.3.2 Interview Participants

A total of 30 participants (22 adults and eight youth of which two are minors) across seven kid-/family-friendly and four general-family-friendly servers completed the interview study. Of these, one kid-/family-friendly server is co-owned by youth and one general-family-friendly server is run by a youth. Except Chimit, all participants confirmed that they actively moderated on their servers at the time of the study but a subset of participants fulfilled additional roles as system administrators, co-founders. One youth shared that they identified as neurodivergent and preferred to complete the interview through Discord chat. I describe a proven technique related to this mode of conducting interviews in the next subsection. Two youth were unable to complete the interviews as they reported feeling especially overwhelmed with responsibilities at school. Though brief, their interviews reveal interesting findings which I report later on in this chapter.

#	Server Name/Server Pseudocode	Pref'd Pseudonym/ Participant Code	Gender	Pref'd pronouns	Adult/ Youth	Interview Mode	# Interview sessions	Interview Duration (in hours)	Role
1	OhanaCraft	Nite	female	she/hers	Adult	Virtual Zoom and Discord chat	7	7	co-founder, moderator
2	OhanaCraft	Nerdy	female	she/hers	Adult	Virtual Zoom	2	2	co-founder, moderator
3	OhanaCraft	Akitty	female	she/hers	Youth	Discord chat	2	2	moderator
4	OhanaCraft	Elbereth	female	she/hers	Minor**	Discord chat	1	1	moderator
5	Server1	Mod021	male	he/him	Adult	Virtual Zoom	1	0.5	moderator
6	Server1	Fauxx	male	he/him	Adult	Virtual Zoom	1	1	moderator
7	The Sandlot	LL	female	she/hers	Adult	Virtual Zoom and Online chat	5	5	moderator
8	The Sandlot	Jungle-Troll	male	he/him	Adult	Virtual Zoom	2	2	moderator
9	The Sandlot	KTango	female	she/hers	Adult	Online chat	2	2	moderator
10	The Sandlot	waseric	male	he/him	Adult	Virtual Zoom and Online chat	2	2	moderator
11	The Sandlot	mickey-heart	female	she/hers	Youth	Online chat	3	3	moderator (newly promoted)
12	Cubeville	Fredi	male	he/him	Adult	Virtual Zoom	5	5	sys admin, moderator
13	Cubeville	Mod081	male	he/him	Adult	Discord chat	1	0.5	sys admin, moderator

#	Server Name/Server Pseudocode	Pref'd Pseudonym/ Participant Code	Gender	Pref'd pronouns	Adult/ Youth	Interview Mode	# Interview sessions	Interview Duration (in hours)	Role
14	Cubeville	LLaine	female	she/hers	Adult	Virtual Zoom and Discord chat	3	2.5	admin, moderator
15	Cubeville	Mod071	female	she/hers	Youth	Discord chat	2	2	moderator
16	Cubeville	wahvie	female	she/hers	Minor**	Discord chat	1	1	moderator
17	Server 2	Mod021	female	she/hers	Adult	Virtual Zoom	2	2	moderator
18	Server 2	Mod022	male	he/him	Youth	Virtual Zoom	2	2	moderator
19	Server 2	Mod023	female	she/hers	Youth	Virtual Zoom	2	2	moderator
20	Server 2	Mod024	male	he/him	Adult	Virtual Zoom	2	2	moderator
21	Server 2	Mod025	male	he/him	Adult	Virtual Zoom	1	1	moderator
22	FamaLlama	Sparkle-Twinnie	female	she/hers	Adult	Discord chat	1	0.5	sponsor, moderator
23	FamaLlama	Daisy-Boo	female	she/hers	Youth	Discord chat	1	1	co-founder, moderator
24	Server 3		male	he/him	Adult	Discord text chat and audio	1	1	co-founder, moderator
25	Server 4	Mod041	male	he/him	Adult	Virtual Zoom	1	1.5	co-founder, moderator
26	Server 5	Mod051	male	he/him	Adult	Virtual Zoom	1	1	moderator
27	Server 5	Mod052	male	he/him	Adult	Virtual Zoom	1	0.5	moderator
28	FoxCraft	chimit	male	he/him	Adult	Virtual Zoom and Discord chat	2	2	sponsor, server management
29	Server 6	aegis	male	he/him	Adult	Discord chat	1	1	co-founder, moderator

#	**Server Name/Server Pseudocode**	**Pref'd Pseudonym/ Participant Code**	**Gender**	**Pref'd pronouns**	**Adult/ Youth**	**Interview Mode**	**# Interview sessions**	**Interview Duration (in hours)**	**Role**
30	Server 6	nargle	female	she/hers	Adult	Virtual Zoom	1	1	moderator
***	Server 5	Mod053	–	–	Adult	dropped out for personal reasons irl	0	0	moderator
***	Server 5	Mod054	–	–	Adult	dropped out for health reasons	0	0	moderator
TOTAL							59 rounds	57 hours	30 participants

Table 4.1: Summary of Interview Participants by Pseudonym, duration, number of rounds and mode of interview; Highlighted colors for server count

4.3.3 Data Collection Process

For Study II (Table 4.2), I deployed a screener survey and then used synchronous virtual semi-structured interviews over Zoom and epistolary semi-structured interviews (text-based interviews; (Debenham, 2007)). The screener survey was intended to prevent recruiting only those moderators who responded that Minecraft was good for kids in two open-ended questions.

Servers reached (recruitment outreach: kid-/family-friendly and select general-family-friendly)	20
# Total Respondents (Screener Questionnaire)	38
# Participants signed up for interview	29
# Participants who completed the interview (Adults)	22
# Youth Participants who completed the interview study	8
Total Participants (Interviews: Study II)	**30**
# Kid-/Family-friendly Servers participated	7
# General-family-friendly participated	4
Total Servers	**11**

Table 4.2: Summary of Recruitment & Data Collection Process

I launched the online questionnaire (14 items, Appendix B) for the duration of the study between late Feb 2020 - June 2021 as a way to understand which servers respondents came from, their years of experience in Minecraft, and the typical tasks they performed in their role as a moderator. In a similar study on Ravelry, as an affinity space, Pisa (2000) explored members' initial views using a survey questionnaire. Drawing from this approach, the questionnaire in Study II provided information about the research including the interview study and reminded respondents to take their time to review the information before providing in-

formed consent. I also posted the same study information along with the recruitment poster on Enjin and server websites from Study I dataset so prospective participants could reach out to me by email if they had any questions or concerns about the research.

In the screener survey, I gathered inputs about server names, whether or not their servers were safelisted, a high level list of roles and tasks they performed and included three open-ended questions to ask about why they chose to be moderators, and their views on Minecraft for kids/children. Although the questionnaire was used as a screener before the Interview study, I report the responses in the findings as a way to provide a brief overview based on what moderators from non-kid-/family-friendly servers shared. Respondents were prompted to opt-in for the main interview study at the end of the questionnaire or reach out to the lead researcher's email address (i.e. mine) at a later time. Out of 38 adult participants who consented online before completing a brief questionnaire, 29 of those participants opted in to participate in the interview study. Finally 22 among those completed the interviews. Additionally, eight participants (4 teens, 2 minors, 2 adults) participated in the interview study resulting in a total of 30 participants in the interview study. I also invited moderators from select general-family-friendly servers to complete the brief survey and potentially the interviews. These servers did not allow mature content per their rules and metadata. Five moderators from three servers in the general-family-friendly category participated in the interview study.

As Bailey (2007) explains, semi-structured interviews grant the researcher some flexibility in using the interview protocol as a guide, but not necessarily pose the questions in the same order. Bailey offers several reasons such as participants' inclination to emphasize one topic or aspect over another or provide answers before a question is asked. As is customary to schedule semi-structured interviews ahead of time (Bailey 2007), I conveyed the expectations of time and potential follow-up interviews that were not to exceed 90 minutes. With five adult staff across three servers however, the interviews became more conversational and

led to multiple rounds of in-depth interviews (summarized in Table 4.1). These subset of participants expressed an interest and generously contributed to richer insights through these additional sessions.

Ten participants completed their interviews through Discord or server forum chat messaging, 14 participants over Zoom, and six participants participated in both modes. This was the preferred method for interviewing minors who gave consent and whose parents consented. These forms of interviews are known as epistolary interviews (Debenham, 2007). Although first established as a technique for interviewing participants via email, in essence epistolary interviewing uses text-form instead of other in-person or online virtual modes of interviewing.

Other than the mode of interviewing, the interview protocol remained the same. Participants answered the same set of questions and in one instance in the text interview, a participant decided to skip a question. In synchronous virtual interviews over Zoom, I spent the initial segment to greet and remind participants about my study. I transcribed five interviews, following which I was able to use the Zoom auto-transcription feature – although not accurate, provided a means to look for keywords based on the time-stamps (e.g.,. "00:00:07.680 –¿ 00:00:09.269 Krithika Jagannath [she/her(s)]: Always things to do." as an example of how the Zoom auto transcription works) However, out of habitual practice, I always took notes on paper during all virtual interviews. These dated, hand-written notes were important quotes or points that participants shared and helped me get acquainted with the data as I contrasted my field notes and replayed the audio recordings. The remaining 15 were auto-transcribed by the Zoom feature and ten interviews over text chat were already transcribed during the process. Participants consented to the use of their preferred pseudonyms or pseudo codes (e.g., Mod0xy).

4.3.4 Ethical Considerations

As Debenham explains, the benefit is that participants can take as much time as they need and provide thoughtful responses. Another advantage he specifies is that these interviews are already in text form and transcribed. However, epistolary interviews also bring the dilemma of burdening participants as they have to take the time to type their responses (while the researcher is spared the additional task of transcribing the interview). As Bailey (2007) and others (Holtz Swanson 2015; Creswell 2014) reiterate, researchers must be mindful of the demands placed by such techniques on participants. For example, Bailey (2007) cogently explains that participants deserve all the courtesy and respect for contributing their insights and for their time (p. 105). While participants chose this format, it was important for me to acknowledge their effort and remind them that they can take as long as they need. This method enables people to reflect and respond (Debenham 2007). As participant aegis shared, "I would prefer the discord chat method. I have enough video/zoom calls for my "day job" and I think it lets me give more thoughtful responses." This is an important consideration given that participants, already volunteer moderators who had one or more roles in life (parent, professional, student, etc.), may have been experiencing fatigue as a result of the COVID-19 global pandemic.

Since the textual interviews spanned over time for each participant, I regularly posted reminders in my follow-up responses that participants could skip questions/take as much time as they needed to answer etc. One of my minors in the study reported that they were busy with a school musical but remembered to return and respond to questions without any follow-up from my side. Another youth moderator explained she was busy with schoolwork and unable to complete the interview. I have not revealed their pseudonyms as the number of youth in the sample is small as a way to protect their identity. The findings, which I report in the next section, reveal that adult moderators recognize that youth may be more vulnerable to exhaustion and they encourage youth moderators and players to take breaks

away from Minecraft.

4.3.5 Data Analysis Process

The findings in the following section mainly draw from interviews with participants (Bailey 2007; Swanson Holtz 2015; Siedman, Debenham 2007). I analyzed the open-ended responses from the questionnaire using thematic coding and consolidated other data (e.g., age, server name, role) in preparation for follow-up interviews (See Table 4.1). For the interview data, I referred back to my notes throughout the study and wrote research memos and reflective memos regularly. I applied the inductive thematic analysis approach to begin with, but as I interviewed more participants and contrasted themes using the constant comparison technique (Swanson Holtz 2015; Cresswell 2013), I also noted how the findings corresponded to the theoretic concepts of affinity spaces. In that sense, as I discussed in Chapter 3, Swanson and Holtz (2015) like others clarify that as the themes and codes are generated, an inductive and deductive approach helps to ascertain how the themes hold against new data. Although my research questions are aimed at understanding three key concepts (i.e. practice, motivation, and styles), I avoided coding the data based on the questions following the guidelines suggested by Braun and Clarke (2012).

Lewis (2009) describes the ways in which qualitative researchers can account for validity. The first relates to "descriptive validity". I transcribed the initial set of five interviews and thereafter used the automated transcription feature of zoom for the virtual interviews. The chat-based interviews generated text during the interview in real-time. The second relates to interpretation validity which I designed through open-ended questions (Refer Appendix F) and following what participants emphasized. Thus while broadly all participants answered questions around their motivation, practice, and style, the interviews also produced specific understandings based on participants' accounts (this could be because of experience). The

youth participants answered most questions. Three of them chose to skip a question or two. Unlike quantitative approaches where outliers are removed during the data-prep/clean-up phase, Lewis explains that theory validity, which is that researchers report all findings, including those that do not support their overall findings. The last way is to engage in peer-debriefing/feedback, which I did through presenting findings to mentors and peers, and during research lab meetings regularly.

In the next section, I outline five salient themes that I generated through my analysis of the interview data as a way to describe moderators' described motivations, practices, and styles.

4.4 Study II Findings

The main goal of Study II was to understand moderators' lived experiences and their use of social and technological mechanisms in their practices as moderators in a select set of kid-/family-friendly servers. What are their goals and motivations for moderating in servers designed for youth? How do they describe their practice and style as a moderator on such servers? What qualities do they ascribe to "good" moderation or "bad" moderation practices? Why do they think moderation matters? What social and technological mechanisms do they use in their practice as moderators? The interview findings help to also illuminate how moderators strive to support youth on their servers by encouraging younger adolescents to lead their own creative role-plays and mentoring youth who moderate on the server.

In the sections below I include a brief summary of the survey questionnaire responses from the subset of participants who completed the interview study, as a way to supplement the thick descriptions drawn from the interview findings. In some instances, quotes from participants have been paraphrased or shortened, but the modifications serve to make the quotes more readable without altering what the quotes mean.

4.4.1 Overview: Summary from the Screener Questionnaire

Here, I summarize the thematic findings from the screener questionnaire as a way to share what moderators expressed as their main motivations and views on kid-friendly servers in brief responses to open-ended questions. These findings support the five main themes that follow in this section.

> *"I joined the Server1 community back in 2010, as a regular player and for the most part, haven't played minecraft anywhere else. After a few months I was made a moderator, and helped develop our server into a safe space for families to play together since then. My goal is to provide the kids with not only a space to build and have fun, but to also provide a place where younger kids can learn to communicate with each other, problem solve together, and just generally enjoy their time." - Fauxx from Server1*

Probing for Views on Minecraft for Kids

The above text is what Fauxx, one of the participants, provided in response to an open-ended question on what comes to their mind when they think of Minecraft for young children. This single quote captures the essence of other respondents' answers to the same question. The preliminary findings elaborated below suggest that some adults may view Minecraft as purely recreational (e.g., Aegis, Nargle) and some others view it as a way to teach kids social skills (e..g, Fauxx, LLaine, Nite, LL, Kreeper).

Unsurprisingly, the answers show that Minecraft embodies a space for fun, friendships, and socializing with friends and others for the eight youth moderators (including two minors). All youth wrote that they enjoyed helping others in Minecraft and three youth (from different servers) added that they enjoyed *"giving back to the community"* (e.g., Mickeyheart from

The Sandlot; aKitty from OhanaCraft; and Wahvie from Cubeville). The most salient response from the adults' perspectives (68%; 15 out of 22 adults, including Mod012, from nine servers) to the same question on motivation included the term "safe" with reference to making Minecraft more appropriate for young children (e.g., *"[most multiplayer servers] have very foul language, horrible behavior, possible predators, etc. I think most parents don't understand how bad it is. Kids need a safer place to play, and Minecraft should do more to help this problem"* - JungleTroll from The Sandlot server). This mindset need not be limited to adults who moderate on kid-friendly servers as the screener responses from moderators on other genres of servers suggest. Aegis, a founder and moderator on the MCL server that self-describes as friendly (characterized in Study I as general) for example, stated in both the brief survey and the interview that Minecraft for young children "should require parental supervision". He explained that many teens on the server began playing as younger children seven years ago and added that, *" their experience is generally far better if they join a community with a parent, or at least older siblings, than when young children are just set off on their own."*

These findings are not surprising in that online safety for children and youth is one of the main concerns that adults have (Holtz and Appel 2011; boyd and Harigatti 2013; Livingstone et al., 2009; Hasebrink 2011), while the desire for fun and social play is a priority for youth (Reich et al., 2014; Adachi et al., 2013; Prensky 2003). They are worth noting, nevertheless, because these perspectives surface different goals among various stakeholders (e.g., adults, parents, youth, the platform) which I discuss in Chapter 6. Another prominent observation based on the responses to the brief survey is that adult moderators see Minecraft as a space to teach kids a set of values around being respectful (e.g., Kreeper on AZCraft), fair, friendly, and cooperative with others (e.g., Nerdy on OhanaCraft). Eight moderators across five kid-/family-friendly servers explicitly stated this idea in their own words to the same open-ended prompt. LLaine, a moderator on the Cubeville server for instance, wrote, "An online server can be a great way to teach children how to respect others, follow rules, and work together

towards a goal." This finding lends preliminary support to my initial hypothesis that adult moderators in kid-/family-friendly servers want to help kids learn and practice values through social play in Minecraft. It also helps explain why server rules in such servers emphasize interpersonal values as much as they do on how to play in a fair manner (Study I findings). As reported earlier in this chapter, the reported responses above reflect inputs gathered from those 30 participants who completed the interview study (i.e. 22 interview participants took the online screener survey while the remaining eight, recruited through snow-ball sampling (Creswell 2013; Swanson Holtz 2014) answered the same questions during their interviews). These findings further motivate the questions posed in Study II.

Are the self-described styles of moderators consistent across the kid-/family-friendly genre of servers? Within a server? Do they see themselves as educators? Where does their goal for teaching kids emanate from? How do adult moderators invite youth to moderate in Minecraft? How do youth know how to moderate on their servers?

4.4.2 Using Play as a Way to Meet Youth Where They Are

Consistent with the preliminary survey responses described above, the interviews revealed that motivations for moderating on kid-friendly Minecraft servers differ between adults ($n_1 = 22$) and youth ($n_2 = 8$; ages 8–18). Additionally, the interview data offers nuanced understandings about moderators' prior influential experiences and their future goals for their servers.

Motivations for Adult Moderators

For parents like Chimit, Kreeper, and SparkleTwinnie who founded/co-founded their respective servers for/with their children, the primary motivation was to support their children's

interest in Minecraft and establish a close-knit community on the server. As revealed in Elbereth's story in Chapter 1, moderators like Nite and Nerdy co-founded the OhanaCraft server, with five other colleagues, to ensure that youth who had previously established friendships on an older server could continue to experience that same sense of community with familiar staff. Some adult moderators like Fauxx, Fredi, LL, Waseric, Wallydonkey, Mod011, Mod041, Mod051, and Mod052 described their early experiences playing video games or board games before they began to play Minecraft. They had started out on the server as regular players (i.e. playing with friends, family, or with the community) and found ways to help other people either through their expertise in the game or socially or both. Eventually, just like KTango and LLaine who started off as parents co-playing Minecraft with their respective children, they too got invited to become official moderators on their servers. These findings resonate with the stories of KTango and Chimit in Chapter 1 as caring adults who support youth, including their own children. SparkleTwinnie, for example, co-founded the FamaLlama server to support her children's interest in Minecraft.

Motivation for Youth Moderators

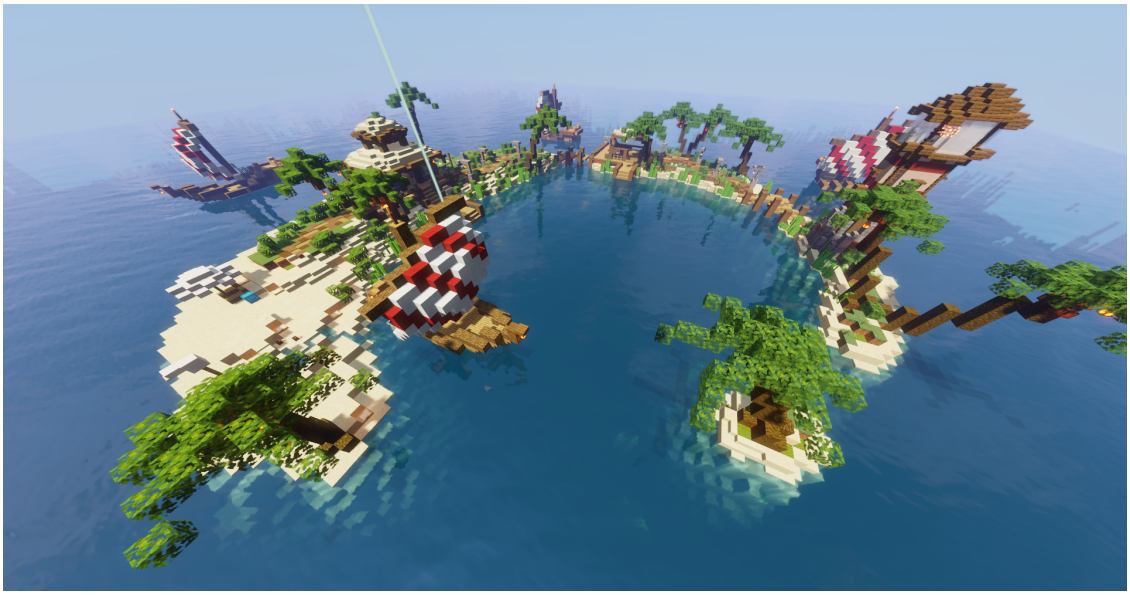
Younger moderators (Mod022, Mod023, Mod024, and Mod025) recalled playing Minecraft in their adolescent years on friendly servers, where they felt like they belonged. They all talked about various leadership and volunteering roles they took on at school and within their communities. Two of them ran gaming clubs including Minecraft interest-clubs. Their motivation for serving as paid or unpaid moderators on their respective servers was two-fold. First, they wanted to continue playing a game that they had grown up with and lend their Minecraft expertise to the server. Second, they expressed a desire to create welcoming and friendly experiences for younger adolescents on the server, similar to their own early experiences. For example, Mod023 contrasted experiences as an 11 year old on two or three family-friendly servers with that on another server as a teenager. She explained that

friendships underscored her experiences on all those servers, although the one as a teenager was less moderated and had more *"cliques"*. Although the other younger moderators were not as vocal as Mod023 about competitive servers (e.g., *"the most highlighting point of all of them as if they were so welcoming growing up I hated going on any kind of like faction servers, which is where pits players against each other a PvP"* - Mod023), their responses reflected similar sentiments about the value of friendships they could build on moderated friendly servers.

AKitty shared that she enjoyed creating builds for the server both independently and with other players on the server. Similarly, Mod071 from Cubeville and Mickeyheart from The Sandlot shared images of the worlds they built on their respective servers. Figures 4.1a and 4.1b, 4.2, and 4.3 respectively illustrate what these youth created on their servers. Mickeyheart added that another player had actually created the lobby structure in Figure 4.3, but she maintained it for the server (*"I redecorate it each month to keep it fresh. I get occasional help from other players and Moderators."*– Mickeyheart, The Sandlot server.)

Youth build these structures independently or with their friends, that takes expertise, time, and focus to follow-through. These data suggest that youth moderators across these three kid-/family-friendly servers have similar experiences and scaffolds on their servers (e.g., opportunities to build with friends; maintain and tend to common spaces in the server that anyone can create and anyone else can modify independently or with the help of others).

Some of these participants, including Mod023, described themselves as *"rather shy"* in real life and that they did not always have many friends at school. Servers designed to be welcoming to youth with adult and near-peer supervision provided opportunities for them to develop new friendships around shared interests during their formative years. These aspects of helping peers and making friends resonated with what the youth moderators expressed. Akitty, a moderator on OhanaCraft, for example, disclosed that she had initial challenges making friends and fitting into a group. Even though she overcame that and made many new



(a) A view of AKitty's co-created structure on one of the OhanaCraft servers. She shared that this took her 8 hours to build this structure with her friends in a staff contest.

Alt Text: An illustration from Minecraft. 3 dimensional perspective from the top showing a large body of water with a horseshoe-like island that has a boat docked in the far left, many green trees, sand, and temple or tower-like structures.

(b) One of AKitty's favorite creations that she built independently in about 18 hours.

Alt Text: An illustration from Minecraft. Three-dimensional perspective from the top showing a large green elevation on which there are snow-capped-like mountains and forests, a lake. One of the mountains has a cave in it and there are two streams of water from two mountains.

Figure 4.1

Figure 4.2: Mod071, a youth moderator on Cubeville, shared this illustration as an example of something she built on the server.

Alt Text: A multi-level house-like structure with balconies and layered rooftops surrounded by a landscape of trees and flowers, a lamppost and pathway around the building and other block-like buildings

Figure 4.3: In her own words, Mickeyheart, youth mod explained this image: "Here is the current Sandlot lobby! As you can see, it is filled with vibrant colors and decorated for the autumn season."

Alt Text: A lobby area with natural landscaping in the background with rocky mountains and streams, trees. The lobby itself is decorated for the autumn season and has signs that read "Welcome to the Sandlot" and portals for choosing gameplay modes : Easy, Creative, Survival, and PvP.

friends on the server, she remembered what feeling left-out felt like. That motivates Akitty to "host events, play games, and build with the players" on the server. Two youth moderators offered examples of interpersonal challenges in their friendships, which I present in findings for RQ7, but they were able to work through such dynamics. The youth moderators also said that their friendships with other players did not change after they were appointed as helper staff or moderators. Elbereth, Daisyboo, Mod023, and Wahvie also shared that they played on other servers from time to time. However, they explained that they always returned to their respective servers to play with friends, to give back to the communities as youth staff, and in one instance for a dislike towards experiences on competitive or "faction" servers (e.g., Mod023). Adult moderators like Fredi and Nite acknowledged the possibility that their players might play on other servers. Although Study II data does not explain how youth play across servers (e.g., from a smaller kid-/family-friendly server to a larger multiplayer network like Hypixel), the findings suggest that youth might begin playing Minecraft on a server they consider as their "home", but venture to play on other servers as they gain more experience.

For the eight youth moderators (ages 8–21 years), the motivation was expressed more in terms of their desire to help their friends and earn a way to be looked up to by peers and others on the server. Connecting to the developmental principles reviewed in Chapter 2, these opportunities to produce creations and share experiences with peers and others is critical to help youth give and get feedback and potentiate their learning through such social experiences (Dahl et al., 2018). Wahvie, a youth moderator from Cubeville said, *"The best way I can describe the feeling is someone you looked up to as a kid, almost as if they were a celebrity or a teacher or something suddenly treating you as an equal and even wanting to be your friend."* Similarly, Mickeyheart, a youth moderator on The Sandlot said, *"I felt uplifted by my peers, and it was truly a special moment. I have definitely noticed a rise in in-game messaging, but I don't mind [being messaged so much]."* These examples show how youth seek opportunities to contribute, to earn recognition by peers and adults. This suggests that

kid-/family-friendly servers offer opportunities aligned with intrinsic motivations in youth.

With the exception of five moderators on two servers, all participants moderate on their servers as unpaid volunteers. At the same time, eight participants said that they hoped their experience would help them find a paid moderator position. Unpaid youth moderators expressed a strong interest in continuing in their roles for the foreseeable future, despite juggling busy schedules at school, part-time-jobs, home/family etc. For instance, Mickeyheart on The Sandlot server shared her plans for continuing to moderate on the server for a long time. Akitty similarly sees herself continuing in her current position (with nearly four years of experience as a moderator) on the OhanaCraft server. This quote by Mod023 (19 years, Server2) exemplifies the notion of personal satisfaction that all participants touched upon. *"You're always going to have your bad days, especially moderation, you're always going to have those rough shifts. But at the end of the day we do it for the kids and moments like those are the ones that outshine any dark moment."*

Participants from six out of the 11 servers described wanting to create more inclusive communities with neurodivergent and neurotypical youth. Some of these moderators are parents or close family members of children who are neurodivergent and therefore personally motivated to support neurodivergent children on the server. SparkleTwinnie and DaisyBoo shared that their server, FamaLLama, is a dedicated space for children and youth who are neurodivergent. Similarly, Nite explained that the OhanaCraft server includes many players and staff who are neurodivergent. Taken together, these findings show that moderators are motivated by a desire to give back to the community, to create a place for younger players to make friends, build status and reputation, and as a training ground for moderator experiences in Minecraft.

4.4.3 Diverse Styles as an Asset within a Server

Across all the servers studied, moderators reflected that their practice varied within their servers. However, despite those differences, adult moderators opined that it was beneficial to have moderators who could bring in different perspectives to discussions around activities on their servers. The two quotes below from two adult moderators exemplify the ways in which moderators described their styles. In the first example, Waseric from The Sandlot server explains that moderating on the server is similar to watching over kids in real-world playgrounds (as parents, caregivers, or teachers do). It involves lurking and watching from a distance while kids play on the server and also involves watching over children who are not their own. Just like in the physical playgrounds, the adult need not be the parent, but is available to step in as the responsible adult if a situation necessitates it.

> *" I really take the name of 'The Sandlot' to heart, you think of it as a real life sandlot where you have parents coming together with their kids. You know kids will go to play, but there is adult supervision there. So, that is the vision, I have in my head of Sandlot.. it's an online analog to the Community Park, if you will. . . . The important and critical thing is [that] so many kids today... their first formative years are in the online park instead of at the real life park." - Waseric, moderator and system admin from The Sandlot*

The second example shows how moderators like Kreeper, also founder of the AZCraft server, might watch more closely who they let into their online playgrounds (i.e. servers) as a way to prioritize fostering a closer-knit community. The server has youth moderators who are mostly 14 -16 years who are mature for their age. But through specific examples, the data suggests that regardless of their styles, moderators tailor their approach to give youth space and opportunities to troubleshoot problems independently before they intervene on their servers.

Other examples of varying styles within a server can be found in the stories of moderators on Cubeville. For example, Fredi shared that one of his colleagues, also a sysadmin and a moderator on the server used humor and kindness "even with the trolls." Fredi explained that his colleague always looked for the "human behind the computer screen." Fredi explained that these players would troll the server by spamming messages on chat or use banned hacks and plugins to gain an advantage over others while playing Minecraft. Fredi acknowledged that although he always reasoned with players, he was relatively more stern with players who engaged in trolling behaviors. LLaine another moderator and admin on the Cubeville server described her style as letting *"kids play the game"*; which resonates with the Sandlot metaphor that Waseric used. LLaine, whose 11 year old daughter also plays on the server explained that although she played on the server, she always made her position as an adult and a moderator clear to the players. As a daycare educator, LLaine explained that she erred on the side of caution when chatting with others on the server as "text chat could get misconstrued" since the younger players may misspell words or not really mean to type in capital letters, for example. LLaine shared her strategy for allowing kids to first figure out how to settle an argument on their own, but stepping in when a player is being ignored or when one or more players complain about something or someone. Both Fredi and LLaine acknowledged that the player ban list was an old feature, but that *"players look at it sometimes to see if their friends are missing on the server because of a ban...otherwise people do not mention it"* – Llaine.

These findings are salient in that by accepting varying styles on their servers, kid-/family-friendly servers reflect similar diverse approaches that exist in the real world.

4.4.4 Strategies for Moderating: Social and Technical Challenges

Through describing their strategies for moderating and mentoring youth moderators, the adult moderators revealed a set of challenges that I include in this theme. Across the servers, adult moderators have their own systems to recruit and coach youth moderators.

Coordinating with Moderators within a Server

On The Sandlot, for example, moderators shared that they discuss amongst themselves and invite a new member including youth after reaching a consensus. The youth moderators are then coached by others and provided with resources (e.g., a handbook) Nite and Nerdy shared that they coordinate amongst the co-owners, and then work closely one-on-one with youth moderators. Nite also shared that some youth on the OhanaCraft server are kids who are neurodivergent, requiring personal coaching.

Dividing Responsibilities

Some participants revealed that they carry out the majority of server administration, plugin programming or updates, and backend technological tasks (e.g., Nerdy, Mod011, Waseric, Fredi, Wallydonkey, Mod051, Chimit, Nargle and aegis). However, they also talked about instances when they actively moderate on the server. On Cubeville, for example, Fredi explained that it was important for administrators to get involved with moderating on the server before taking on more technical roles so they could develop rapport and trust with the community.

> *" ...if you're not interested in the game in that way in the interactive and the cooperative aspect of the game, then you won't be a big help with other aspects*

of the running the server either that's our experience" - Fredi, a moderator and senior system administrator on Cubeville

This quote reflects the emphasis that moderators, regardless of their specific roles, place on the social aspects of the server as it enables them to harness the affordances of Minecraft (e.g., the feature that Fredi refers to as the interactive and cooperative aspect).

Learning New Skills to Develop Responsive Activities or Supports on the Servers

Similarly, moderators who oversee emergent behaviors in-game or the text chat among players also train themselves, with the help of their peers, on how to handle certain technical aspects. This enables them to develop ideas for new builds on their servers and regularly add features in the virtual world to support the player community. For example, LL described the elaborate process she undertook to design a new Skyblock server for players on The Sandlot. More insights from the analysis are shortly reported in the next theme, but the long and thorough process that LL shared reveals that moderators are constantly looking for ways to provide events and activities that might interest youth on the server. JungleTroll offered a similar example from the same server where he aimed at helping young people think more critically about design, STEM concepts. He explained that instead of building imposing structures everywhere on the Skyblock server, that players could start out in the opposite sense of building by using dirt blocks. He explained that the idea had to be abandoned as it became a concern for some people, but went on to share other games and ideas that he continued to push forward on.

To manage social challenges, all moderators mentioned that they discussed among peers using tools that vary by server (e.g., Discord, or Trello boards, internal forums, etc.). On at least five servers, moderators talked about how they deliberate on decisions about whether or not to ban or take a course of action when players break rules (Cubeville, OhanaCraft,

The Sandlot, Server1, and Server 2). Youth mods often returned to conversations and shared that they were busy with school activities, or in some instances exhausted (e.g., Mod071 : *"school is really getting to me"*. On checking in with youth moderators, they shared that the adult moderators remind the youth to take breaks and not have to do everything.

Recognizing that young adolescents are present on the server

According to the law COPPA (Children's Online Privacy Protection Rule) children over 13 years can provide their own information and in some cases, parents who play with their children younger than 13 mention that in the safelisting application. The adult moderators explained that they generally know how old their players are through optional information that the server applications (i.e. safelisting process) contain or can tell by experience when they observe how players type (or not) and behave on the server. This finding means that moderators believe that they know players' ages, but we cannot ascertain whether or not they actually know. The quote below represents how twelve adult moderators (55%, out of 22 adult moderators) explained this idea.

> *"generally, we have a fair idea and certainly after seeing interactions it's really not too difficult to ballpark the kids age play" - Waseric*

At the same time, two moderators cited instances when their guesstimates were inaccurate or impossible to ascertain for sure. LL, one of the most senior moderators in the study sample from The Sandlot for example, was skeptical about one of their players who according to the safelisting application is 13 years, but most likely is 8 or 9 years of age based on what they posted on the server forums. Similarly, Fredi mentioned one of their regular players was actually an older teen and not an adult as most moderators on the server had inferred based on the player's mature behavior. Neither voice nor text are reliable indicators' of a player's age.

" We have a girl on our server who has been playing there for five years. And she's always been the most patient kid.. you would have thought she was a grown up by her behavior. We only knew she's a kid because we actually were in voice chats with her and stuff. So you can always be completely wrong." - Fredi

This ability in moderators of acknowledging the possibility that they could be wrong helps keep them alert and wary of instances when things could go wrong on the server. Nite, the co-founder of OhanaCraft, articulated this concern shared by many moderators including Waseric and Fredi, that the converse is equally possible. Child predators could be pretending to be younger in order to interact with younger children. This finding has serious ramifications for why community moderation is paramount on servers where youth play and has serious implications at the platform and policy level, which I address in Chapter 6.

4.4.5 Using Technology for Designing Innovative Scaffolds in the Virtual World

Related to the finding around moderators' efforts to learn and suggest interesting activities for youth, moderators across four servers (Cubeville, OhanaCraft, The Sandlot, and Server 2) also shared remarkable designs they had developed on their servers to scaffold gameplay and social experiences for youth. This finding reinforces that moderators are attentive to the emergent nature of play and deploy social and technological mechanisms to address such opportunities or challenges.

For example, Fredi shared that he had developed a mechanism for trading that allowed players to agree mutually before they took or gave away a virtual asset from their inventory. Fredi explained that this mechanism was designed to prevent confusion or misunderstanding when a player potentially took away an item (presuming it was ready for trading) before the

owner had a chance to acknowledge it. Figure 4.4 illustrates this example.

As another example, LL, a senior moderator on The Sandlot described an elaborate structure that was designed in the PvP arena, which was an underwater world (Figure 4.5). LL explained that players could opt to engage in PvP battles on the server through mutual consent. Sometimes, players who were at the brink of losing their virtual lives or assets in the game in a PvP battle chose to escape before the PvP battle ended to escape further harm. However, their premature exit upset those players who were winning and invested in the PvP battle. LL explained that these situations are conditions for social conflict where one or more players are unhappy or frustrated when PvP opponents quit just before they are about to be defeated. So LL and the team of moderators designed a virtual dome enclosure that prevented any PvP player from escaping before the game concluded.

Other examples of such virtual structures from the data include: a *"Rules room"* (The Sandlot server) that displays server rules in the game; a calm room or a lobby for taking kids to a quiet place where moderators can help them when needed on the Cubeville and OhanaCraft servers; an island marked specifically to let kids break virtual builds on Server 2. One of the structures was a virtual space designated to display the server room, called the Rules Room (Figure 4.6). By making the rules accessible not only on the server webpage but also as a persistent visual feature in the virtual world, the moderator team on the server are able to remind players about the guidelines for playing together.

These illustrations exemplify the ways in which moderators embed the scaffolding structures within the social contexts of the game to facilitate better understanding (in the case of rules and trading) for players.

(a)

(b)

Figure 4.4: Safe trade mechanism that moderators built on the Cubeville to facilitate trading chest items among players

Alt Text: an enclosed room with a large chest enclosed within a glass case. A gift box and some signs are in the farther background. Text captions in the picture read "Accept Trade," "Cancel / Deny Trade"

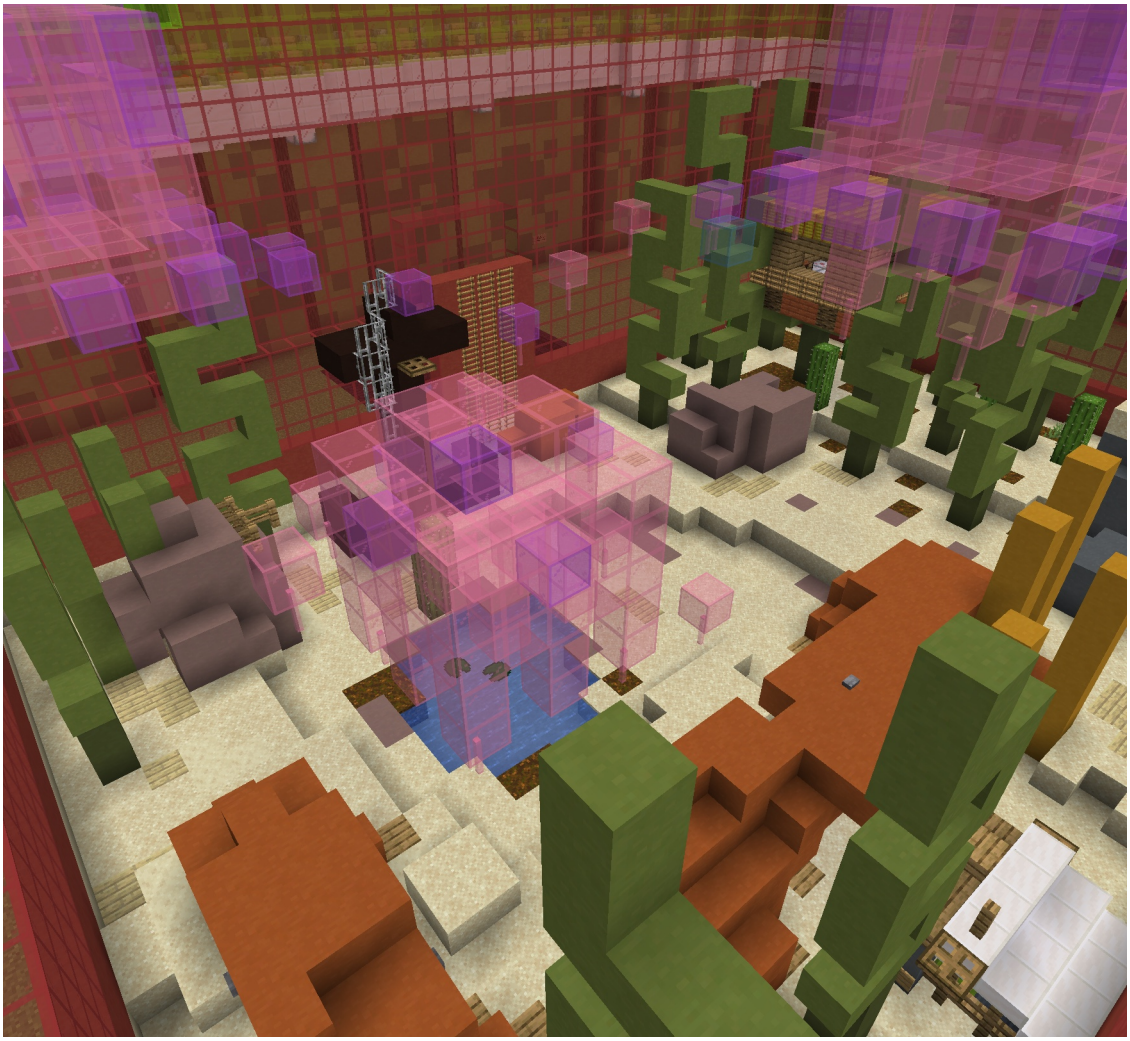


Figure 4.5: Structure in the PvP arena on The Sandlot with a dome constructed to prevent players from escaping. As LL explained: "Oyster Stadium picture, the 3 ladders you see are the legitimate way out of the stadium. Players who close their Minecraft game to avoid certain death are considered to be "cheating." This is called "combat logging."

Alt Text: Top view of a structure that has colored blocks shaped and colored differently. In the center is a pink translucent dome over a water body, and other blocks surround this structure.

Figure 4.6: A room that displays rules on The Sandlot

3-wall view of a room that appears to have a carpeted floor and signs posted on the 3 walls numbered 2, 3, 4. The text on the signs is unreadable, but they correspond to rules on The Sandlot

4.4.6 Desirable Characteristics of a Moderator in Kid-/family-friendly Servers

Adult and youth moderators reflected on their practice and shared their perspectives on what qualities were essential for a moderator in kid-/family-friendly servers. Their responses were synthesized into five main sub-themes as follows.

Consistency

Moderators explained in their own words that consistency was a key trait for any moderator on kid-/family-friendly servers. This quality had nuanced meanings based on participants' responses including consistency in decision making and being unbiased about responding to rules' violations. For example, Fredi explained that there were a few odd occasions when assistant admins on the Cubeville server got banned themselves. LLaine added that her 11 year old who plays consistently on the Cubeville server along with other "staff kids" are treated the same way as other players on the server. Similarly, moderators on The Sandlot explained that they regularly discuss and deliberate as a group and seek consensus before adding new rules. In this case, consistency relates to getting a consensus from all staff and stakeholders (e.g., server owner) before changes were made on the server. They explained an upcoming change on the servers through which youth could continue to share pictures of art, food or pets but not personal photographs. Although shared photographs are always protected within a secure and closed online forum for members only, moderators did not want personal pictures to pose any self-esteem related issues for youth (e.g., stereotype of what pretty should mean) or raise concerns since older adults were also present on the server.

Being empathetic and helpful

This quality is self-explanatory. Moderators concurred on the requirement of having to be patient and empathetic towards players on their servers as they recognized that they were *"dealing with kids"* (LL and many others). Youth moderators expressed being helpful was important, particularly towards newer members. It relates to showing empathy as the youth moderators reflected on their early experiences on servers (e.g., "I was able to give the kids [[help]] at the same age that I was when I first had my experiences with Minecraft." – Mod023 on Server 2)

Keep Calm and Carry on, but be OK with interruptions

Moderators explained that as much as they loved to play Minecraft, they often had to prioritize responsibilities on the server, especially being interrupted to respond to chat, to *"modrequests"* (real-time help requests), or questions from younger moderators, and so on. Another important quality entails the ability to remain calm, especially during stressful busy moments on the servers. For example, Nite explained that there were occasions when 10 or 12 players would login at the same time on the OhanaCraft server and create spam texts or troll players. Remaining alert to take note of what happened before and during such unanticipated trouble helps moderators determine what additional filters or security measures they should take. In other cases, moderators described that the ability to remain dispassionate was important to arbitrate any interpersonal challenges among players.

Following the rules and modeling behaviors

Related to Fredi's example of instances in which moderators were not exempt from bans even if they accidentally broke a rule, OhanaCraft has a rule through which youth can

report staff for any non-compliance (cf., Section 3.4.3.1 in Chapter 3). This is worth noting because within the server, moderators are usually seen as experts (e.g., *"kids look up to mods - because kids see mods/admins who know all the commands"* Mod023, a youth moderator on Server 2). Moderators can have different abilities based on their roles and responsibilities on their servers (e.g., being able to fly in the virtual world, or "vanish" (i.e. hide oneself from players and be invisible) that especially younger players might perceive as moderators having special powers. By subjecting themselves to rules and being consistent, moderators may serve as role models for youth on their servers.

Keeping perspective: It is a game

Moderators recognize that things can seem overwhelming from time to time to both players and moderators. On a subset of the four servers (Cubeville, OhanaCraft, Server 2, and The Sandlot), moderators described that they often reminded players to take breaks (from the screen or from activities within the virtual world). They also recognize that moderators need to take breaks. Youth moderators shared how they often took time off the server during busy activities at school and at times were reminded by adult moderators that they did not have to solve everything. Similarly, LLaine described that in 2020, the moderators took turns to give each other a break from the server. As Fredi put it, *"Minecraft is a complex game, running a server is like running a family, it can feel very real. But it's a game."* Moderators explained that Minecraft is a game in the context of their work on their servers.

In summary, adult moderators like JungleTroll, LL, Fredi, Nite, and many others shared that some youth declined the invitation to be moderators citing inability to take on such demanding responsibilities, which suggests that youth on such servers are also mature to know what they can and cannot take on. When on the lookout for youth moderators, the adult moderators described seeking youth who demonstrate potential for the above qualities.

4.5 Study II Discussion

The themes described above show that moderators' underlying motivations and socio-technical practices resonate across the kid-/family-friendly servers in the dataset. Furthermore, the analysis reveals that moderators practice various styles of moderation on their respective servers, ranging from being very involved in co-play with youth to being observers to; from carrying out more stringent approaches to being more lenient in regulating norms. Although these differences in moderation styles appear to be in conflict with each other, moderators nonetheless value those variations as an asset that can benefit youth on their servers. A deeper analysis of socio-technical mechanisms in a subset of five servers – Cubeville, OhanaCraft, The Sandlot, Server 1 and Server 2—shows, for example, the innovative supports that moderators create in the virtual world in response to various needs of youth on their servers. These include a calm room (Cubeville); a Rules room or tutorial to re-familiarize youth with server rules (The SandLot and Cubeville; Friendly lobby and helpful signs (OhanaCraft); an island designed to let youth break things (Server 2); safety measures in virtual chests and PvP arenas (Cubeville and The Sandlot). Similar to Study I, Study II findings show that moderators' socio-technical practices are characteristic within the genre of such servers tailored for youth. In the following, I unpack how Study II findings correspond to the theoretical features of affinity networks (Gee 2005; Gee Hayes 2012) as a way to ground my argument that kid-/family-friendly servers are online play-based affinity spaces the second thesis statement (cf., Section 1.1 in Chapter 1). Additionally, I briefly discuss how these findings contribute to the body of work in HCI on community moderation. I then briefly describe the strengths and limitations of Study II before I proceed to present the final study in the following chapter.

4.5.1 Kid-/family-friendly Servers as Online Play-Based Affinity Spaces

Study II results suggest that kid-/family-friendly servers mobilize the concept of online play-based affinity spaces. The findings show that kid-/family-friendly servers are spaces that foster intergenerational play among young adolescents, older teens, parents and other family members including grandparents, and adult moderators. Based on the interview data, eight servers include children as young as seven or eight years, although younger children are often accompanied by their parents. The other two servers, Shape the Cube and Minecraft Lovers, include older teens on their servers but also players from a wide range of ages. Moderators and players have varying levels of experiences, and these servers continue to grow as they enroll younger inexperienced players or promote youth as helpers and moderators.

KTango's story in Chapter 1 is an example of how younger players may join the server as they are still learning to play, but develop expertise over time by playing with peers and near-peers. Similar to KTango and Chimit, moderators like Nerdy and LLaine, who did not necessarily consider themselves as gamers, shared instances of how they learned many new things from the youth on their servers. Further, the innovative virtual world structures on Cubeville, OhanaCraft, Server 2, and The Sandlot (Illustrations in Section 4.3.5) are examples of how moderators deploy technological mechanisms to facilitate youth interests or as ways to regulate social norms. Similarly, moderators on all the kid-/family-friendly servers described how youth led creative role plays with peers and near-peers. Youth moderators like Elbereth, Akitty, Mod023, and Mod071 help make builds and suggest ideas for such activities while the other youth moderators like Mickeyheart, Wahvie, DaisyBoo, Mod022, and Mod023 shared how they help new players on the server, moderate chat or fulfill help requests and in general are focused on developing friendships with other players. The data shows that youth play kid-/family-friendly servers as very young adolescents of seven or eight years (e.g., Elbereth, Wahvie, Mod023) and see themselves as "growing up" on their

servers (e.g., Elbereth, AKitty, Mickeyheart, Mod022, Wahvie). The findings suggest that kid-/family-friendly servers can act as "training wheels" for young adolescents' entry into online social play and provide opportunities for youth to explore more about their interests in Minecraft and online gaming. Future work can help us understand how such youth might pursue their interests in social gaming across other servers they play on.

The stories that moderators shared show that youth can participate in various ways in kid-/family-friendly servers—from playing on the server, directing creative role-plays, organizing collaborative builds like AKitty did (Figure 4.1a), and/or help as volunteers or official moderators. Similarly, within the kid-/family-friendly server ecosystem, youth are encouraged to bring in ideas and knowledge from external sources. For example, youth moderators like Elbereth and Wahvie, described their process for learning to play Minecraft by reading books, playing with other people on smaller servers or with friends. The Hogwarts themed world that KTango described shows that moderators integrate such interest-driven themes from popular culture that many youth find appealing.

Study II findings do differ from one feature of affinity networks as described by Gee (2005). Unlike the nebulous quality of leadership, which is non-hierarchical and unconstrained by any rigid roles (Gee 2005, p. 228), adult and youth moderators are bound to a more definite structure and organization of roles on their kid-/family-friendly servers. That being said, the in-depth interviews with moderators from four such servers reveals that moderators carry out various responsibilities according to their roles but work together as a team to roll out changes on the server, decide whom to invite as staff, etc. I present Table 4.3 to contrast Study II findings with other empirical work on affinity spaces and compare with the theorized features posited by Gee (2005).

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Shared endeavors, interests, goals, and practices	Rather than connecting with each other by way of shared gender, race, age, and other such attributes, people in affinity spaces share common goals and interests. In other words, Gee asserts that identity in affinity spaces is established primarily by such shared interests.	Inherently, the kid-/family-friendly servers are spaces for playing Minecraft with other people	Yes
Not segregated by age or experience	As the title of this feature suggests, affinity spaces do not distinguish between young and old, experienced and new, etc.	Players and staff include young adolescents like Wahvie and Elbereth, older teens, youth, and adults including parents and grandparents	Yes
Various levels of expertise co-exist in the same space	Affinity spaces do not exert assumptions on how much people will engage. Instead, everyone in the space has the autonomy to pursue goals and learn from each other to the extent that individuals seek	Players and moderators have varying levels of expertise in Minecraft. KTango's story exemplifies that moderators also learn about Minecraft from youth on their servers; Figures 4.1–4.3 are also examples of this feature	Yes

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Affinity spaces promote participation and production (but not forced)	This feature relates to how the space is designed to enable everyone in the affinity space to engage with it. People can participate or spectate or do both	The moderators described that players create builds or participate in youth-led roleplays. The themes show how moderators actively produce events and supports for youth on the server. Mickeyheart explained that she took it on herself to keep the lobby updated on The Sandlot.	Yes
Content is transformed by interaction	The qualities and content within the affinity space are constantly shaped by social interactions. This idea of continuous transformation in affinity spaces is related to Lastowa et al.'s (2004) description of virtual worlds.	Although the rules and norms were described to be fairly unchanged, the data shows that the virtual worlds and infrastructure on the server are continuously evolving. The calm room, special island, & rules room are some examples of this principle; the creations by youth, scaffoldings by adults are examples of this feature.	Yes

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Intensive (highly specialized) and extensive (more general) knowledge are both encouraged	This feature refers to how the space is designed to support various levels of expertise on shared interests.	The evidence for this feature in Study II draws from moderators' descriptions of their expertise which varies from being highly specialized (e.g., building mods, technological infrastructure) to the broader expertise with facilitating social play, events	Yes (in the scope of moderators' knowledge)
Encourages individual and distributed knowledge	As the title of the feature suggests, affinity spaces are designed to support individual and collective growth. People can give and get feedback or share ideas to advance on their goals.	The creations that aKitty and Mod071 shared for example reflect individual knowledge (i.e., personal ideas) and creations such as the calm room, rules room, etc., which are examples of distributed knowledge that is formed based on moderators' shared ideas and observations of emergent play behaviors on their servers	Yes

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Encourages dispersed knowledge	This is to say that the design allows people to apply knowledge acquired within the affinity space to external sites. Likewise, people can bring in external knowledge into the affinity space		No strong evidence
Uses and honors tacit knowledge, encourages explicit knowledge	This feature explains that the affinity space is designed to support learning by trial and error or practice that may not be explicitly stated (in documents or guidelines, etc.)	In principle, based on what the moderators shared, these servers provide extended spaces in the ecosystem where players can chat or discuss their game-play experiences	Not in the scope of Study II (this evidence would come from observational data)

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Many forms and routes to participation	This principle or feature states that people in affinity spaces should be able to engage in a number of different ways and to whatever extent they choose to. The concept of "lurking" or peripheral participation is also addressed by Rogoff (1994).	Moderators shared that some players would announce their return to the server after a long time or that few players logged in only during the weekends, etc. Youth moderators explained their absence on the server when they were busy with schoolwork. These examples suggest the servers remain open for youth to choose their level of participation without feeling compelled to do so.	Yes
Many routes to status	Like the title of the feature suggests, this aspect is about social status and affinity spaces are designed to allow for people to take charge of their goals to earn status, or not.	n/a	Insufficient evidence

Features of Affinity networks (Gee 2005; Gee & Hayes 2013); discussed in Chapter 2	**Feature definition**	**Synthesis of Study II findings related to the corresponding feature (specific examples elaborated in the Findings)**	**Do the findings support the feature in the same way or reveal something different?**
Leadership is porous and leaders are resources	Affinity spaces are designed to allow for more flexible forms of leadership, where anyone can assume initiative. It lacks hierarchy or rigidity in how roles are designed in the affinity space.	Kid-/family-friendly servers have well-defined roles for moderators. While youth are provided opportunities to moderate, as described in the results they are not forced to accept those roles.	Different

Table 4.3: Contrasting Study II results with Gee's theory of Affinity Networks and Empirical Examples from Prior Work

Although the findings do not support every feature of an affinity space as defined by Gee, it is worth noting that Gee (2005) clarifies that this rubric is not intended to declare a space as an "all-or-nothing" affinity network (p.225). Rather, he suggests that the rubric helps us understand the extent to which a given online space is an affinity network or approximately representing the concept of an affinity space. On the servers in my study, moderators encourage youth to pursue their interests in playing Minecraft, develop friendships with peers and others on the server, and offer youth leadership roles as social or technical moderators on these kid-/family-friendly servers. Through this understanding of the lived experiences of moderators in Study II, the data strongly suggests that kid-/family-friendly servers are instantiations of online play-based affinity spaces for youth (T1).

4.5.2 Implications for HCI Research on Online Moderation

Community moderation in HCI research has been focused on content moderation (Chandrasekharan et al. 2018; Fielser et al. 2018); The detailed examples and illustrations that moderators shared in interviews help us understand how social and technological mechanisms are being deployed on their servers. These findings suggest that moderators of kid/family friendly servers manage more than content: they also moderate the social behaviors of players. Study II contributes empirical insights into moderation practices within spaces tailored for youth, which extends the moderation literature in HCI that has been focused primarily on content moderation.

This work shows that moderators in online play-based spaces designed for youth take responsibility for content and emergent behavioral moderation. Moderators develop innovative social scaffolds in their servers based on a deep knowledge about their players. This practice reveals the lack of automated tools that can support moderators in games like Minecraft. These are significant opportunities to note for HCI moderation research that has thus far

been focused mainly on content moderation.

4.5.3 Revised definition of kid-/family-friendly servers

Currently the rhetoric of kid-/family-friendly represents adults' conceptions of kid-/family-friendly. Nonetheless, they are conceptions in response to youth interests in online gaming. To that end, as the adult moderators described, their motivations began with and included the need to protect kids and keep them safe in online spaces. But as they revealed more about their practice, it is evident that their conceptions of kid-/family-friendly align with the theories about positive youth development originating in positive psychology, learning science, and developmental science. Moderators on three servers shared that they preferred the term family-friendly as it was more inclusive (i.e. families and kids playing together), but did not mind being referred to/self-describing as kid-friendly.

Moderators take on the role of caring adults or caring youth on the server reflected in their practice (e.g., building responsive scaffolds and encouraging youth-led role-plays). They describe their reasons for moderating as ways to protect youth; through their practice they even surveil youth on their servers. However, they reveal more nuance, drawing from their lived experiences as parents, professionals, educators, and learners. The findings reveal their described efforts and goals to support (and play) Minecraft with youth. LL, KTango, LLaine, Chimit, JungleTroll, Nerdy, Nite are examples of adults who were not gamers like Fredi, but have embraced Minecraft through the roles they play on their servers. For example, LL elaborated with great fervor the meticulous planning and work she undertook to build a new Skyblock server for The Sandlot server community.

Similarly, youth like Akitty, Elbereth, Mod071, and MickeyHeart share their Minecraft expertise with peers and encourage peers to be friendly with new members. These youth initially defined kid-/family-friendly similarly to how the adult moderators did; more as con-

scientious members, noting their responsibility for keeping the server safe and complying to norms. But through more examples, they revealed attributes that were less related to safety or server rules but more around helping others, building friendships, having fun, enjoying watching others play, learning to be calm during stress. These attributes are developmentally appropriate for youth. The latter set of qualities are still prosocial. They are similar to the agreements and goals that youth in a prior study expressed (Tekinbaş et al., 2021). More work is needed to ground our understanding of youth perspectives of kid-/family-friendliness.

4.5.4 Strengths & Limitations of Study II

The research design imposes a constraint in that Study II cannot provide observational data to further corroborate the characterization of kid-/family-friendly servers as affinity networks. However, this limitation is mitigated to the maximum possible extent in three ways. First, a subset of five different servers suggest that the features analyzed are not arbitrary. In fact the thick descriptions reinforce findings of common social and technical features across the study sample described. Second, three or more rounds of interviews with moderators from three different servers provided opportunities to understand any changes over time and gather deeper insights into the features of those servers. Third and finally, the empirical findings are firmly grounded in an established theory of affinity networks and compared with empirical findings from other real-world affinity spaces. Interviews with more youth from these servers and a consistent number of moderators from each given server would have been ideal. This was not possible for various reasons, including the COVID-19 pandemic, beyond my control and that of prospective participants. Epistolary interviews as a form of data collection constitutes a strength of this study as an alternative approach to consider participants' preferences or help any concerns they may have around virtual interviews. Another strength of the study lies in participants' diverse roles and experiences. Youth and adult participants provided thick descriptions with thorough examples and illustrative data where possible

to describe their practice. An understanding of the variety of roles, the similarities and differences in their responsibilities and practice make for a more holistic understanding of social practices and technological mechanisms in kid-/family-friendly servers. I revisit Study II findings in Chapter 6 to discuss the overall implications from the three studies in this work.

Chapter 5

Study III: Design Case-study of a Prosocial Discord Bot in OhanaCraft

5.1 Chapter Abstract

HCI research shows that online games can, with the right kinds of socio-technical features, be viable sites for youth to develop social and emotional competencies that can positively shape their behavior online. This potential, however, can be inhibited by governance mechanisms overly focused simply on stopping disruptive player behavior. These mechanisms include automated tools like bots, anti-spamming and anti-griefing plug-ins that both limit player actions and sometimes punish them. While these automated tools can help community moderators mitigate disruptive behaviors, the approach discounts the potential role these tools might play in helping to identify and support positive player behaviors. This is important to consider in light of the developmental needs of young adolescents, which centers around peers, identity development, and risk taking—a combination of variables that leave many youth vulnerable and ill-prepared for online play. How might a focus on positive, rather than

negative, behaviors change the role automated tools play in helping to moderate a server? How might they be designed to support moderator practices on servers for youth? Using HCI's Research through Design (RtD) approach, I situate these overarching questions in the context of Ohanacraft, one of the kid-friendly Minecraft communities studied in this work. A technology probe, defined in HCI as a low-fidelity tool used to reveal possibilities for future use and design, formed the chosen approach for the study. The probe, referred to as 'UCIProsocialBot', was designed as an AI chatbot on the Discord platform, drawing inspiration from principles in asset-based community interventions. UCIProsocialBot was deployed in OhanaCraft between February and April 2021. No definitive conclusions are possible owing to the scope and duration of the study. However, the probe elicited several interesting responses from the OhanaCraft community that are worth noting and may motivate future work for technology-led governance features in kid-friendly Minecraft servers. This work also helps move forward the emerging discourse around prosocial design for community moderation.

5.2 Study III Background

This dissertation is focused, in part, on expanding our understanding of how a certain genre of Minecraft server—those designed to be kid or family friendly—use rules and moderation as tools for social governance. Both rules and moderator practices shape player behavior on a server and as such, contribute to the overall server culture and climate. From a developmental point of view Beals and Ber (2009) suggest that rules are features that can help not only manage virtual social interactions, but also foster moral development in youth. Relatedly, Reich et al. (2014) note that despite restricted abilities to communicate in the virtual worlds, youth find ways to override such controls and manage to develop social ties with peers and others. In unrelated studies, Taylor (2007) and Grimes (2010) opine that governance

mechanisms suppress the emergent nature of play and diminish children's ability to explore through play respectively. These scholars agree on the social value of virtual world games. Minecraft is a contemporary virtual world game that shares some common affordances with the games reviewed in the aforementioned studies. However, it is also unique given that its users have integrated various other platforms including online discussion forums and multimedia communication platforms like Discord that have expanded the possibilities for players to communicate with each other within and outside the virtual worlds (i.e. server and in other parts of the server ecosystem respectively). HCI research has established the potential for Minecraft to support social competencies and shape positive online behaviors (Ringland et al. 2016; Tekinbaş et al., 2021). Salient literature on play explains that values, both positive and negative, and socio-cultural practices expressed through play are worth fostering and paying attention to (Salen Zimmerman 2008; Flanagan Nissenbaum 2014).

In this first section, I briefly discuss related work on the role of automated moderation tools, governance approaches, and the asset-based design paradigm. I then describe how Studies I and II motivate this third study and outline the research questions. In the second section of this chapter, I describe the target server ecosystem, OhanaCraft in this case, the chosen design approach and the design of the probe. As Boehner et al. (2007) advise, I articulate the design process and the design of the probe as part of my research approach. Then, I report on observations during the probe deployment (February - April 2021) and finally I present a brief speculative discussion. As Gaver et al. (2004) specify, and Boehner et al. (2007) reiterate, the purpose of the probe in Study III is not to solve a problem or evaluate the efficacy of the bot. The probe enables a way to speculate and imagine a new design space – in this case prosocial automated tools. In that sense, the discussion of Study III offers potential future directions in lieu of design implications.

5.2.1 Role of Automated Moderation Mechanisms: Current Potential

The adverse impacts of non-normative behaviors escalate multiple-fold in online settings as online communication can be easily misconstrued or worse, perpetrators can remain anonymous and leave the online setting (Kraut and Resnick 2012). Decades of HCI research on online communities strongly advocates for a balanced approach towards community governance as a way to foster equitable social norms (Kraut and Resnick 2012, pp. 143 - 150). Prevalent applications of technology in online governance are skewed towards negative social behaviors that disrupt online communities. For example, chat filters block inappropriate content, logging mechanisms track users' online footprints, systems are programmed to restrict users' online activities or even automate banning or kicking users in certain instances (Gorwa et al., 2020). Social platforms like Facebook, Reddit, Twitter (Fiesler et al., 2018; Matias 2019; Chandrasekharan et al. 2020; Jiang et al. 2019); streaming platforms like Twitch (Seering et al., 2019); and multiplayer games like Minecraft, Roblox, Fortnite, and most others, along with associated platforms like Discord (Ringland 2018; Tekinbaş et al., 2021, Jiang et al. 2020) rely on social and automated moderation mechanisms for managing or governing their communities. In Games research, some studies have leveraged user-interface design to suggest cooperative behaviors among gamers in multiplayer games (Targett et al. 2012; Wuertz et al., 2018). Technology has established its value as a form of online governance against negative behaviors, but arguably its potential for mediating positive social outcomes for online communities is not as well understood. How might technology be designed to help amplify positive social behaviors in online communities? How might technology be designed to address the current imbalance in automated moderation approaches? These are questions Study III sought to answer.

5.2.2 Balancing Norms in Minecraft Servers

I situate a design exploration of these overarching questions in the context of Minecraft server ecosystems tailored for youth (i.e., kid-/family-friendly) and draw inspiration from reflecting on the first two studies in this dissertation. In terms of inappropriate and appropriate social norms, server rules in kid-friendly servers reflect a symmetry that is particularly characteristic of their genre (Study I findings). The total number of rules on suggested positive or prosocial behaviors is nearly equal to those that specify negative or antisocial behaviors. Study II findings reveal that server staff or moderators in kid-friendly servers endeavor to promote friendships and helpful behaviors within their ecosystems, albeit through differing styles among such staff within and across kid-friendly servers. Moderators also described their reliance on and challenges with real-time chat logs that reveal potential signs of inappropriate behaviors or interpersonal difficulties among players. Taken collectively, these findings suggest that server staff of kid-friendly servers strive for a more equitable form of governance by way of authored server rules and developed practices that pay attention to negative and positive social interactions.

Study III takes on HCI's Research through Design (RtD) approach (Olson Kellog 2014) and aims to understand how a technological intervention might reflect a similar balance in online governance. Following a review of related prior work and the chosen design paradigm, the current chapter describes the design of a technology probe and its deployment in the kid-friendly OhanaCraft ecosystem between February and April 2021. The asset-based paradigm (Pinkett, 2000; Mathie and Cunningham, 2003, 2005; Ebersohn and Eloff, 2006); developed further in HCI by Wong-Villacres et al. 2020[1] inspired the design of the probe - an AI bot on the Discord platform. Given its exploratory nature and length, Study III does not offer any definitive conclusions. However, the probe revealed insights drawn from staff' and members' responses within the OhanaCraft community that are worth noting. Stepping back

[1]A CSCW workshop that I contributed to and participated in

to the initial premise of online communities in a broader sense, this work motivates future applications of technology-led tools that promote prosocial outcomes and build resilience in communities as a result.

5.2.3 Asset-based Approach as a Design Paradigm

The Asset-based model broadly refers to a community intervention approach that is focused on existing and potential resources and strengths as opposed to the deficits or shortcomings of a community (McKnight and Kretzmann 1993). Assets refers to the set of resources and strengths or capabilities of a given community and the term has been operationalized in prior work in terms of their functionality such as natural, physical, socio-cultural, political in (Mathie and Cunningham, 2003, 2005; Pan, 2005; Ebersohn and Eloff, 2006; May et al., 2009; Myende and Chikoko, 2014,?; Phillips and Pittman, 2009; Samuelson and Litzler, 2016) or more conceptually as tangible or intangible (Itami and Roehl, 1991). The asset-based approach has a rich history of practice within various community and organizational contexts and has been pioneered by several scholars and practitioners (Mathie and Cunningham, 2003, 2005; Ebersohn and Eloff, 2006; Wong-Villacres et al., 2020).

Drawing from their analysis, an asset-based approach can be defined as a problem-solving approach that mobilizes available assets and actualizes any potential assets. As Eloff and Ebersohn 2006 clarify, the asset-based paradigm is concerned about the needs and opportunities in a community context, but only from the perspective of how the solution might build on the existing and potential strengths of a community. The field of HCI is well-positioned for understanding how the asset-based paradigm might translate into online community contexts (Wong-Villacres et al. 2020).

5.2.4 Motivation: Tapping into the Prosocial Potential of Kid-friendly Minecraft Servers

Studies I and II, aimed primarily at identifying the social and technological features related to governance in kid-/family-friendly servers, reveal nuances in ways that rules are articulated and regulated on such servers. The analysis of rules (Study I) shows that kid-/family-friendly servers rely on technological approaches for preventing disruptive outcomes to their young players and their server ecosystems, much like any other moderated Minecraft server. However, the findings also point to a subtle yet striking characteristic of socio-technical governance in the kid-/family-friendly genre: the rules across 19 kid-friendly servers emphasize prosocial outcomes through an articulation of values. These include values such as kindness, politeness, being nice and helpful to the community. In certain instances, these values were expressed as independent rules (e.g., "Be kind to everyone") and in others, they were embedded with the don't-statements (e.g., "Do not steal ... but it is polite to offer to return them if you know who they belong to"). The kid-/family-friendly genre contributes the largest count of rules that explicitly mention desired social outcomes. In Study II, the interview data showed that moderators expressed values of helping and being friendly through social play in terms of the server goals and relied on technological tools and chat logs to mitigate disruptions on their servers.

More interestingly, moderators from five kid-friendly servers described innovative structures and mechanisms they developed in the virtual world to scaffold positive interactions among players (e.g., the calm room, rules room). At the same time, they described their challenges in keeping up with voluminous text chat logs for monitoring social interactions even when they were not necessarily playing on the server ("I try to keep an eye on the chat, but it's hard to follow" – quote from LLaine from Cubeville). Was there a way, I wondered, to help server staff stay focused on their prosocial goals for youth, rather than processing a continuous stream of chat in the logs and defaulting to tools designed to handle antisocial

behaviors? Through such an approach, how might I support their goals of reinforcing positive social interactions among their players, especially the youth? To answer these questions I developed a technology probe, or low-fidelity tool, which became the focus of Study III.

5.2.5 Study III Research Questions

In light of the above wonderings, Study III asks:

RQ8 How might a technological governance feature be designed to leverage the strengths or assets of the target community, a kid-/family-friendly server in this case?

RQ9 How might such a feature be designed to support moderators' current practices?

RQ10 How does the target community respond to such a feature that highlights positive social interactions?

Study III explores two aspects: i) the feasibility of translating a strengths-based paradigm into a technological feature and ii) the ways in which such a designed feature would not only support moderators in their practice, but also amplify positive social interactions among members through a technological design probe. Drawing from HCI's RtD and probes approaches, summarized above and elaborated in Chapter 2 (cf., Section 2.3.4) and inspired by prior work (Seering et al., 2020), I designed and developed a Discord bot. The nature of this work by design is to produce ideas and spark inspiration for prosocial tools in the future. Based on the probe deployment (February - April 2021), Study III offers promising initial evidence that establishes ways in which an asset-based design paradigm can be conceptualized using a socio-technical feature – the Discord Bot instantiated within OhanaCraft's server ecosystem invoked through social interactions among players and moderators.

In the following sections, I describe the OhanaCraft server ecosystem, the design of the

probe, UCIProsocial Bot, and results from the probe study. This chapter concludes with a brief synthesis of potential ideas to inspire future work on prosocial moderation tools for online kid-/family-friendly play-based settings.

5.3 Study III Research Approach

In this section, I describe OhanaCraft ,the kid-/family-friendly Minecraft community and then describe the design and development of the UCIProsocial bot (i.e the technology probe.)

5.3.1 OhanaCraft Server Ecosystem: Defining the Assets or Strengths of the Community

OhanaCraft identifies itself as a family-friendly community deriving its name from the Hawaiian word for family – Ohana. Based on the analysis of server rules in Study I, I grouped this server under the kid-friendly genre. Comprising various servers that support different gameplay modes including Creative, Survival, and Skyblock (See Section 2.2 in Chapter 2), OhanaCraft was co-created in 2018 by seven people who previously moderated together on a different kid-friendly server. Currently, the OhanaCraft community comprises around 230 members, 36 of whom are staff (8 adults, 28 youth) although the number of active staff at a given time may vary (e.g., taking some time off to complete other life obligations including professional or academic). During the probe deployment, there were 12 active staff.

The OhanaCraft Discord server integrates in-game text-chat from the Minecraft servers and is configured to include staff-only and co-owners-only channels that are accessible only by server staff and co-owners respectively (Figure 5.1). Their Discord server already integrated 15 bots for various purposes such as polls, entertainment, role-assignments, and so on (Bar-

rett, 2018). In general, Discord bots may react or ask members to react, launch polls, send direct messages to welcome or remind members about the community guidelines, and so on. This was an important criteria as the design approach adopts an asset-based model. Staff from OhanaCraft who had completed more interviews at the time of conceptualizing Study III also expressed an interest in exploring potential tools that could aid their practice.

5.3.2 Design of the Probe

In this section, I describe the chosen design approach, a background about the Discord platform, and the design and development of the technology probe.

Chosen Design Approach

The exploratory nature of research questions in Study III warrants a design-led approach that can be better understood in terms of how research through design (RtD) and accountability in design are explained in HCI scholarship (Olson Kellogg, 2014). As an approach that aims to generate plausible ideas, especially those unchartered applications that potentially "disrupt, complicate, or transform the current state of the world" (Olson Kellogg, 2014, p.169), RtD is well-suited for investigating underexplored uses of technology for online governance. In this sense, even though the inspiration for Study III draws from issues identified by the previous two studies (i.e., emphasis on prosocial in theory but antisocial in the tools and practice), the design endeavor was not to produce a specific solution or a novel prototype. Instead, Study III uncovers future possibilities for technology-led governance features in kid-friendly Minecraft servers and aims to understand the accountability of such features through design (Gaver et al., 1999; 2004). Specifically, Study III involves the use of a technology probe in the OhanaCraft ecosystem for addressing the research questions. Again as Gaver lucidly explains, here the role or responsibility of the probe lies in its ability to

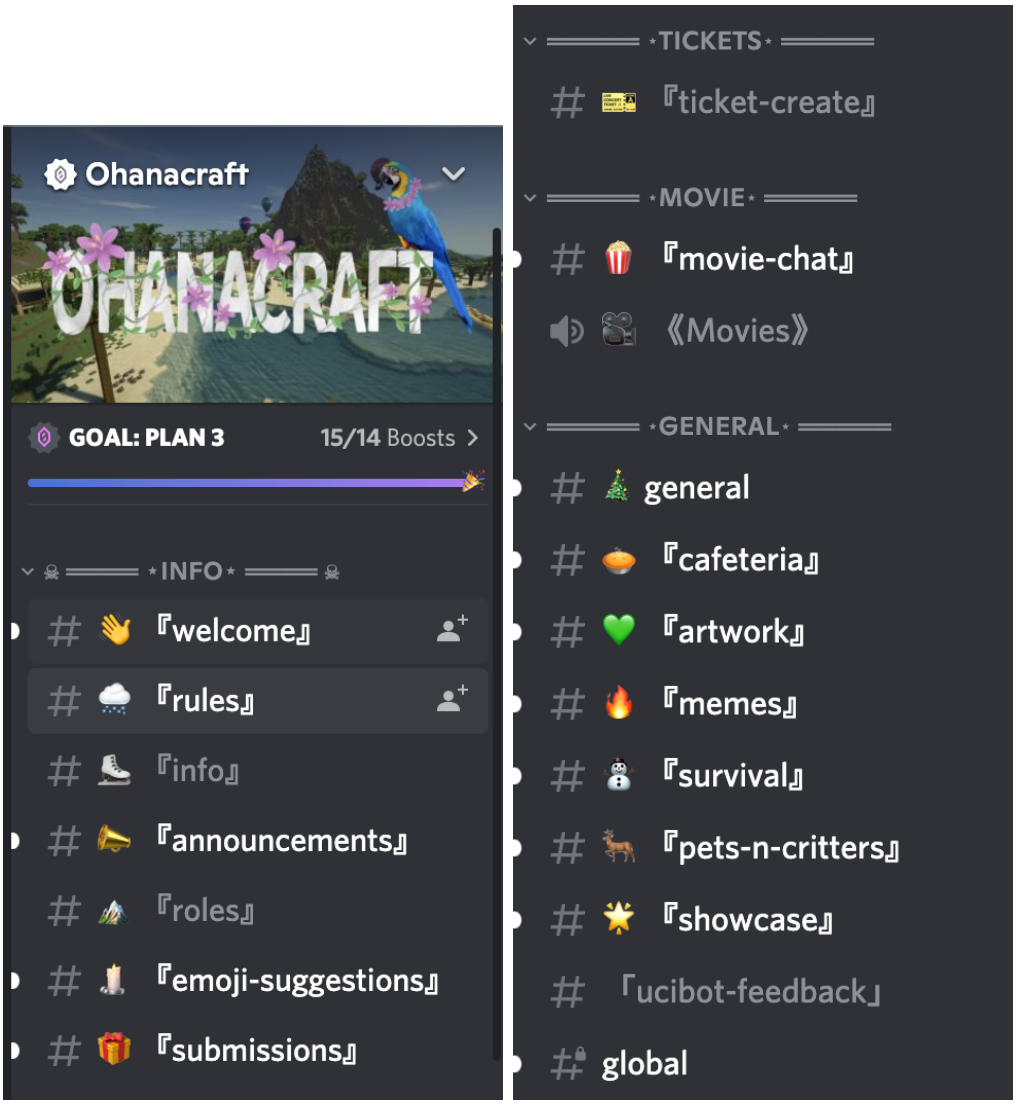


Figure 5.1: Screenshot of channels in OhanaCraft's Discord Server. Channels can include emojis in their titles, and their access can be configured based on roles that members get assigned. For example, #global is a channel that is not open for all members (lock sign following "#" symbol). Similarly, #welcome and #rule are public channels that anyone on the server can view.

reveal potential future directions or even a problem/opportunity space rather than solve a problem. This is especially true for technology probes in that they are designed to help identify new possibilities for future work through low-fi prototypes (Boehner et al. 2007). In this sense, Study III does not seek to evaluate the design or the efficacy of the bot or test its outcomes. The study aims to explore the design of a technological mechanism that mobilizes the assets or strengths of the target community (RQ 8) as a way to understand how such a design might support moderators' existing practices (RQ 9) and how the community might respond to such a mechanism (RQ 10) Drawing from the probe study, Study III proposes future potential socio-technical features for kid-friendly Minecraft communities. Reflecting more broadly, this work may help advance a wider range of HCI applications for technological approaches to promote social assets in other kinds of online communities.

Leveraging Discord as one of the socio-technical assets of OhanaCraft

Having joined the OhanaCraft Discord server during Summer 2020, I had already witnessed the ways in which members actively engaged in regular chat about Minecraft and other general topics. In applying the asset-based paradigm, it was important to select a technological mechanism that would align with the community's existing practices. Discord was the main platform that server staff used for monitoring chat in their ecosystem (in-game and on Discord) and they had integrated other tools they used for communicating (e.g., Trello) on their Discord server. The Discord server also showed that community members regularly posted messages on various channels on topics within and outside of their Minecraft gaming activities (Figure 5.1.)

Analogous to the platform affordances of Minecraft (i.e. end-users can develop game modifications and customize their servers through plugins and "mods"), the Discord platform also provides programmable interfaces for end-users to customize their servers. Users can create their own applications including AI chatbots that can be integrated with the Discord Server.

Weighing all these factors, Discord was a viable choice as the OhanaCraft community was active even when they were not playing Minecraft. Members posted messages everyday on the Discord server and at least 20 members were among those who posted and reacted to messages within various channels. In other words, Discord could be considered as one of the primary assets that members of the staff and player community used actively (i.e. daily basis). At the same time, I was leading a Discord-based research project in the Made With Play Lab in collaboration with youth organizations that prompted me to learn and explore ways to develop a Discord chatbot.

Design of UCIProsocial Bot

Inspired by the Baby bot study (Seering et al., 2020) I wanted to conceptualize, design, and deploy a bot that could reflect the characteristics of rules (i.e. emphasis on prosocial actions) and practices of moderators (i.e. to encourage and support youth). I started by mapping these design goals and met virtually with Nite, the co-owner of OhanaCraft, to think through some of these ideas during early Fall 2020. I also began to present some concepts during research lab meetings and to a few experts to get additional perspectives. Additionally, I wanted to explore the design of a moderation-based tool that could assist moderators in their practice in a manner that gave them autonomy over moderation-based decisions. Moderators had expressed that keeping up with text chat was a challenge while they also relied on text chat for cues on when to step in or when to let youth figure things out. In the initial stage, based on advice from design experts, I developed a set of user-stories. These are short and specific statements that mention goals for a given user type. For example: "As a moderator on OhanaCraft, I want to be able to ...."

The bot design evolved as follows. First, it was necessary to understand what messages moderators would find most useful to read from the text chat. Nite shared that there were fewer messages that reflected positive interactions on the OhanaCraft server in the-then-

recent times, possibly because of ongoing events in 2020 and expressed that it would be nice to have youth say nice things to show support to each other in the spirit of upcoming holidays. This prompted a discussion around developing a keyword list with positive and negative attributes and programming the bot to react to such words with Nite and in the context of my research lab meetings. The initial logic model was developed as follows

1 When anyone posts a chat message with at least one <positive keyword> on a pre-selected channel in Discord, the bot reacts with a thumbs-up emoji. The bot also creates a copy (or logs) the message in a private channel for staff to review

2 When a chat message contains a <negative keyword>, the bot logs the message in a private channel for staff to view.

The rationale was that messages with positive keywords should be accessible to all members but messages with negative keywords would not warrant a public reaction. Here, the strengths-based paradigm relates to not "shaming" anyone in public. Whereas logs were meant for staff-use as a way to provide a snapshot of positive and negative words in messages. Table 5.1 illustrates the finalized channels and bot features as viewable (Yes/No) by members and staff.

	Discord #general		#global (Minecraft Chat)		messages from #general and #global redirected into two private channels	
	keywords List A with a heart emoji	keywords List B with a thumbs up emoji	keywords List A with a heart emoji	keywords List B with a thumbs up emoji	keywords from List A and B (positive words)	keywords from List C (negative words)
can players view?	y	y	n	n	n	n
can staff view?	y	y	y	y	limited	limited
can UCI design & dev team view?	y	y	y	y	y	y

Table 5.1: A snapshot of UCIProsocial bot's actions and access based on roles (players, staff, and UCI Design and Development team

Development of the UCIProsocial Bot

Once the features of the bot were finalized with Nite, I worked with two undergraduate students to co-develop the bot program and test it out on a local Discord server. Following successful completion of the testing, I decided to host the UCIProsocial bot using Heroku, a secure cloud service platform that offered 1000 hours of free hosting per month, which proved more than sufficient for hosting it on OhanaCraft (1 bot $\times$ 24 hours/day $\times$ 31 days = 744 hours). Github was used for securely hosting the source code (shared with OhanaCraft) and

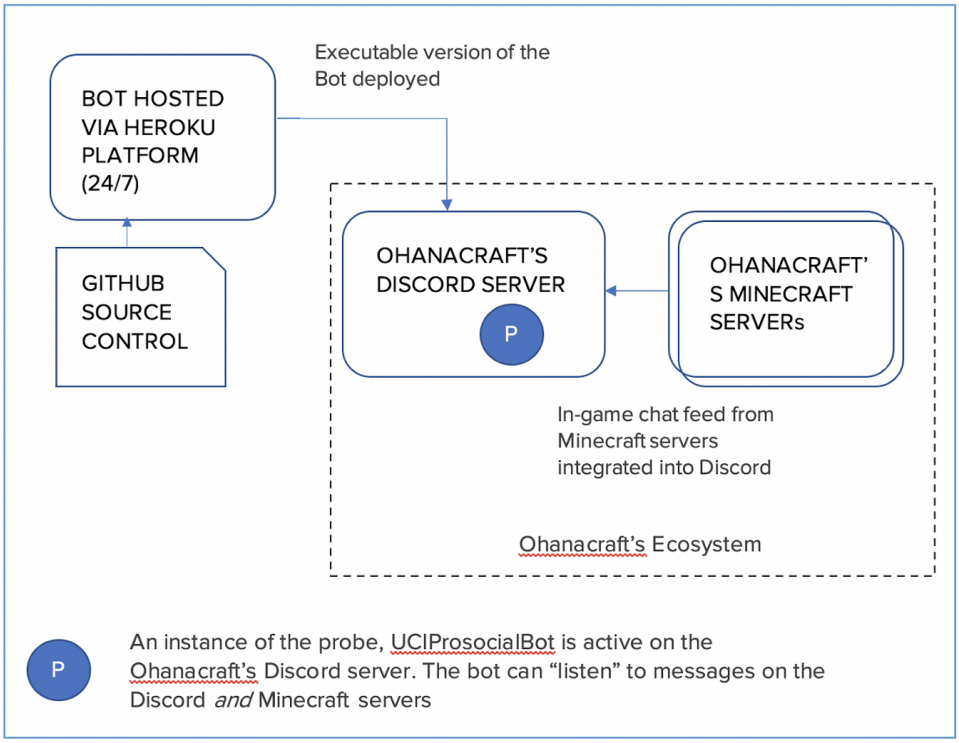


Figure 5.2: System Level Architecture of UCIProsocial Bot

for version control. Figure 5.2 illustrates the system level architecture of the bot.

The OhanaCraft Discord server already included at least five active and a total of 11 bots before the UCI Prosocial Bot was introduced. It is unclear how the pre-existing bots were configured on the OhanaCraft server.

5.4 Results of the Probe Study

The salient observations of Study III are three-fold: i) the UCIProsocial bot captured the attention of youth on the server nearly as soon as it was launched on the OhanaCraft (OC) server; ii) Youth and Staff on the OC server uncovered cases when the bot did not work and discussed their interpretations of the bot; and iii) Youth staff or moderators shared their feedback on how the bot's logging functionality could be improved. In this section, I present

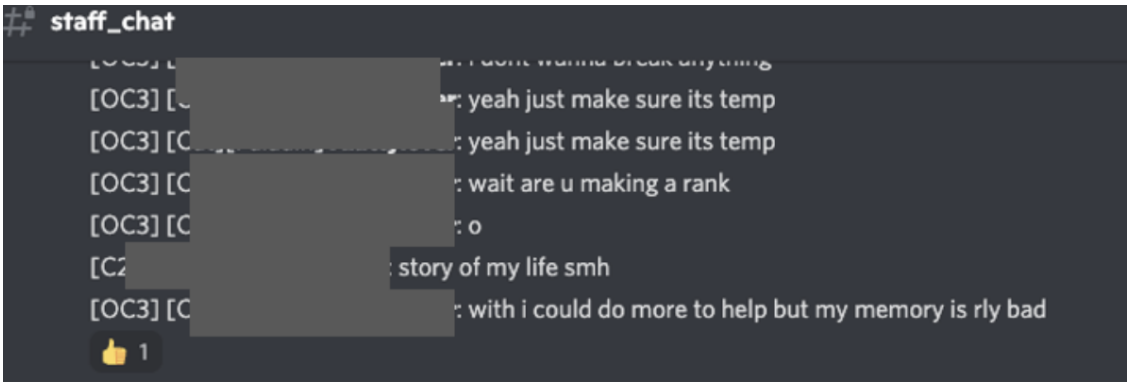


Figure 5.3: Illustration of bot logging a message in a private channel accessible only by OC staff and reacted with an emoji. In this example, the positive word "help" takes precedence.

the observations under the three salient themes with screenshot illustrations and quotes to support these interpretations.

During the first week of deployment, the bot was configured to generate audit logs in a channel that only staff could access. For the first few days, the bot was configured to listen to or read messages within the private staff chat channels. Two additional channels were included so the bot could react to and log chat messages in the public general channel (general) on Discord and the in-game Minecraft chats (#global). In the following week, the bot was configured to react with a thumbs-up emoji in the #general channel whenever messages contained at least one positive keyword (e.g., *cool*, *thank you*, *good*, *sorry*, to list a few examples). As explained in the design rationale (Section 5.2.2), the bot did not react with any emoji for messages that contained negative keyword(s) to avoid harsh judgment based on any negative keywords. Messages in both cases were added to a separate log channel that only staff could access (Figure 5.3).

5.4.1 Community Members' Responses: Making sense of the Bot

The following examples show that bots were not invisible technologies on the OC server -– members were aware of bots' presence and expressed their understanding as rules to

align the use of bots with the server norms. During Week 2, two members from the staff and general community (pseudonym prefix Mod and Mem respectively) noticed that a new bot had appeared and was reacting to some of their messages. The excerpt in Table 5.2, paraphrased slightly only to protect the anonymity of participants, shows what transpired within a day of configuring the bot on the general public channel. *Mem01* and *Mem02* went on to talk about stickers as they exchanged more messages and images until a third member, determined to figure it out, started to type some more words (*good*, *sorry*, *happy*, *forgive*, *love*) to which the bot reacted (Fig. 5.4).

Mem01:	"*who is* [referring to one of the undergrad research assistants who just joined the server] *why do they have the "positive bot" role i've never seen them here*
	"***Good***" (to which the bot added a thumbs up emoji)
	"Why did it react lol"
... [many messages later and in a different context]	
Mem02:	"*he* ***good***"
Mem01:	"*why did that bot react*"

Table 5.2: Excerpt from chat among members on Discord who first noticed the reactions

The other two members returned to the conversation and typed phrases that made the bot react again (e.g., *you're welcome*, *thanks*). At this point, the conversation shifted to how some component of the (Minecraft) server had crashed for some reason unrelated to the bot. Most members commented that the crash was *"not good"* or *"a bad thing"*. As programmed, the bot reacted to messages that contained the keyword *good* but did not react to the *bad* keyword and logged messages with both keywords. The chat traces show that the bot continued to react to messages over the next two days. Members *Mem02* and *Mem03* shared that two new roles called positive bot and architect had been added and were curious

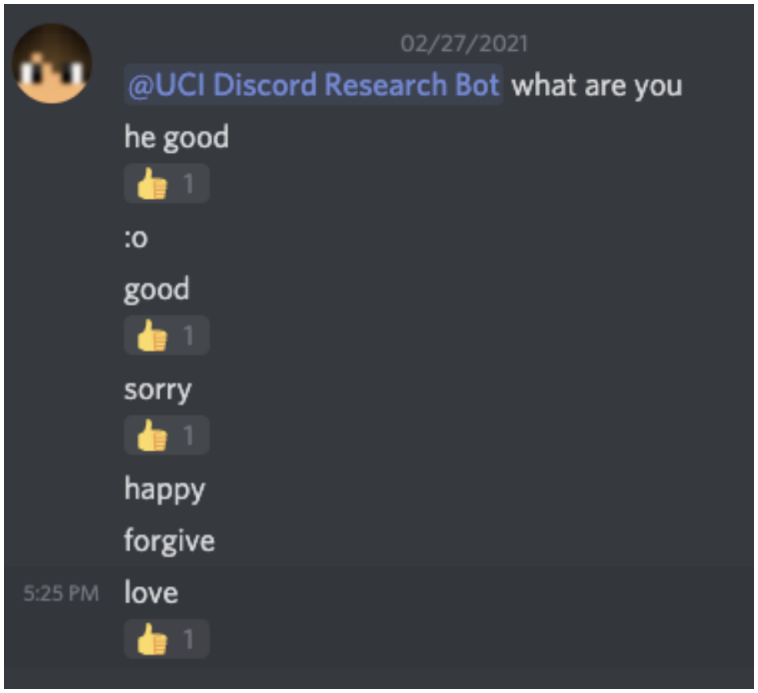


Figure 5.4: Another member, *Mem03* (virtual profile blurred for anonymity), trying to figure out what words make the bot react.

Alt Text: A screenshot from Discord chat showing a message from a member, *Mem03*, dated 2/27/2021. The member tagged UCI Discord Research Bot in a question that reads "what are you" followed by a series of words (Refer main text) to which a yellow thumbs-up sign is added as an emoji.

why ResearcherKrit (referring to my username on Discord) had been assigned these roles. More relevant, the next set of chat traces suggest that *Mem03* had figured out what made the bot react, although they probably did not know it at the time (*"hmm... can I get it? do I need to be positive? maybe i should add the word good to any sentence that doesn't otherwise have a positive word in it" —Mem03*).

Behind these scenes, Nite had suggested that the "lol" keyword be removed as it felt redundant in their assessment. The screenshot below shows further how *Mem03* kept reflecting on their interpretation of the bot while one of the staff members noticed that the bot had stopped reacting to "lol". They were perceptive to the keywords that elicited a reaction from the bot. Although they nearly figured out how the bot worked, they may not have known that the keywords were drawn from a static list that was programmed into the bot. In ongoing conversations the same day, *Mem03* wished they could *"...directly search for messages that the bot reacted with a thumbs up to"* and Mod07 who could not get the bot to react to positive words that were not in the pre-programmed keyword list (e.g, friend and the word positive itself) quipped that the positive bot did not like them. These responses suggest that the community was responsive to subtle changes in their server (e.g., addition of new roles) and tried to make sense of the bot and its features based on a few clues (the new roles added on their server and the emoji reactions added by the bot).

Chat traces in OhanaCraft reveal that the probe bot is not the first bot that sparked conversations among members. Even before the UCI Prosocial Bot was added in the OhanaCraft ecosystem, members noticed the other Discord bots on their Discord server. Although these bots are not directly relevant to the probe study, the kinds of interactions that various automated bots spark are worth contrasting. For example, in 2019, the traces show a few instances where a member mentioned that a bot was added or was offline. Two other instances show staff clarifying norms about Discord bots. One staff member reminded players not to impersonate bots and another reassured players to be safe although the platform would ban

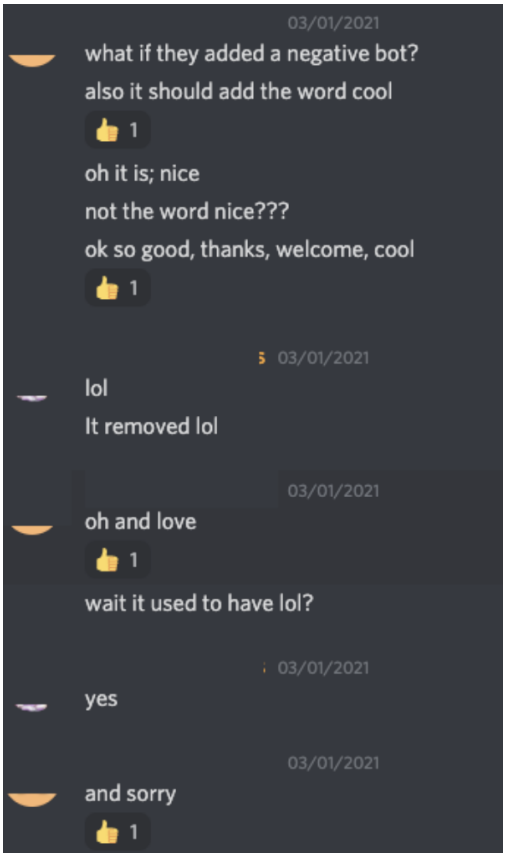


Figure 5.5: Screenshot illustrating staff and general members' response to the bot

Alt Text: A screenshot from Discord chat showing a conversation between a member, Mem03 and a staff Mod09, dated 3/01/2021. Mem03 wonders *"what if they added a negative bot?"* and asserts that *"it should add the word cool"* followed by more questions such as "not the word nice?? Mod09 types "lol" in reaction and then notices that the bot "removed lol". Mem03, who did not know that it used to react to lol before types more words "love" and "sorry". A yellow thumbs-up sign is added as an emoji to the words cool, thanks, good, love, and sorry.

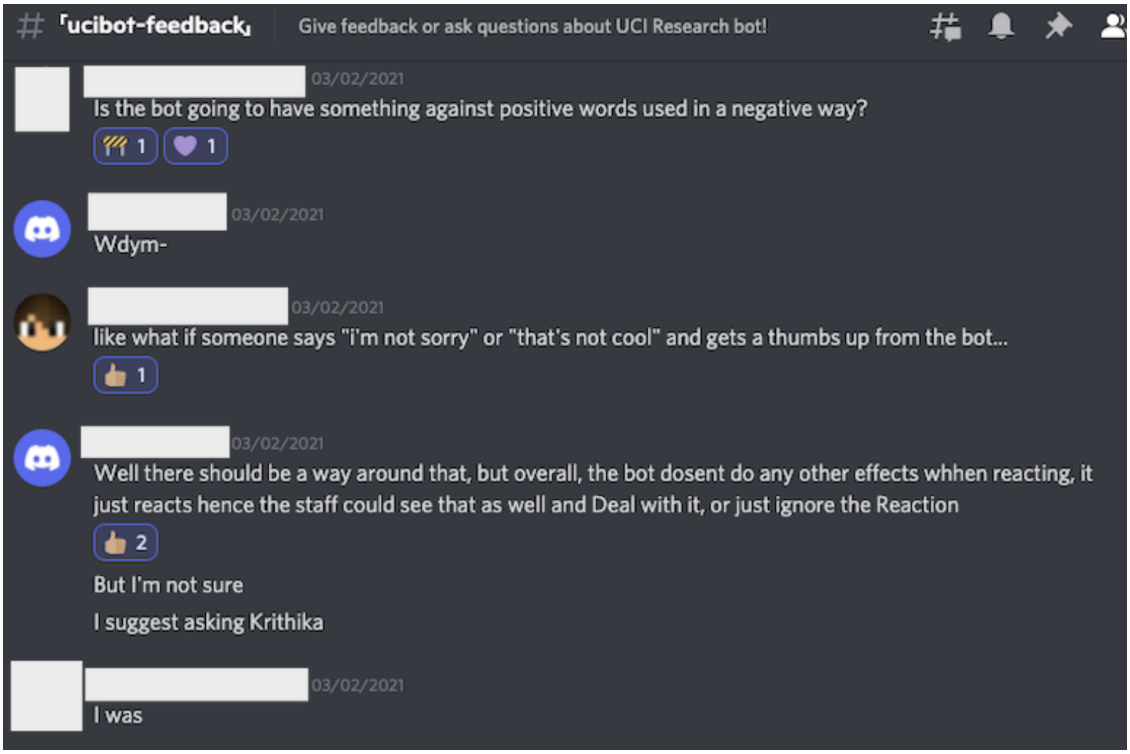
illegal bots.

5.4.2 False Alarms

The observations described in this theme reveal how the community members engaged with the AI bot to explore its purpose and limitations.

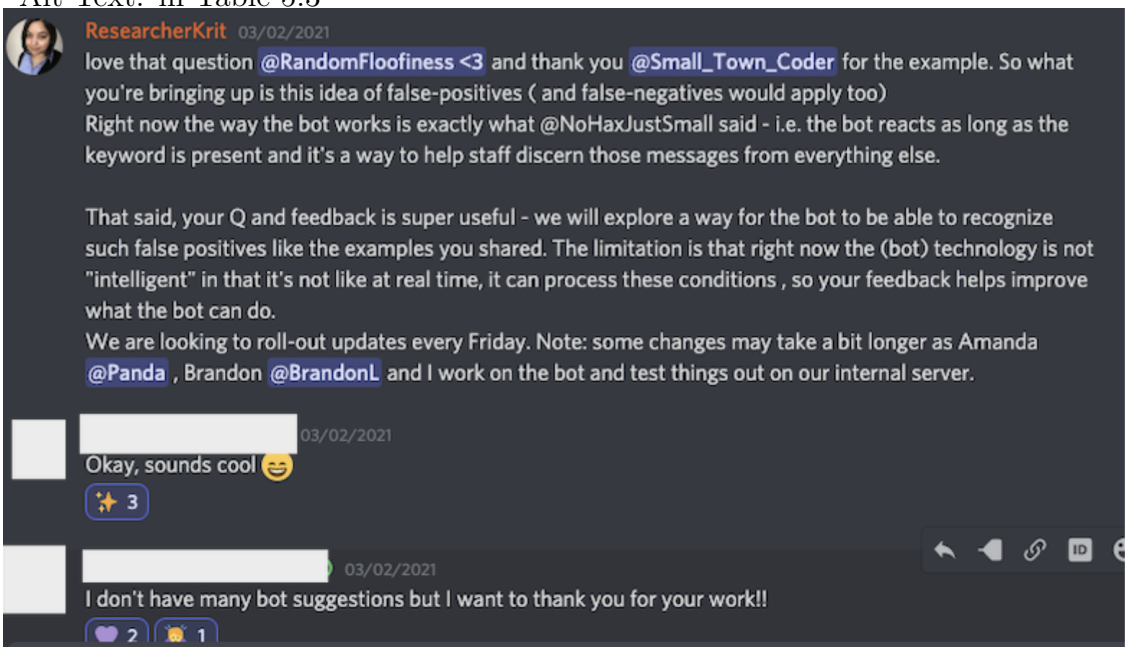
The probe study eventually surfaced a well-known issue in most applications of computational work – that of false-positives and false-negatives (Figures 5.7a and 5.7b) The flurry of conversations about the UCI Prosocial Bot among regular members and two direct messages (DMs) to me from two other members who were not as active in the general chat, suggested that some members and staff were curious to understand the bot and discuss their thoughts on the same. For example, Mem03 commented that the bot did not work if certain punctuation marks were used and wanted to know more about the bot. Mem03 wanted the bot *"to think i'm a good positive person"* when another staff member asked Mem03 why the latter was testing it (*"are we just playing with the bot or trying to find its limitations LOL"* - Mod06). Based on my weekly discussions with Nite, we agreed that a separate public discussion channel could potentially benefit those who were interested to follow and contribute to conversations around the bot. Thus the ucibot-feedback channel was created. At this point, Nite formally reintroduced me along with my collaborators to the OhanaCraft community followed by an invitation for anyone interested to share their comments in the feedback channel. Three other general and two staff members began to contribute to a new thread of conversations with those who had already been chatting about the bot in the more recent ucibot-feedback channel. This channel remained most active (with messages and reactions from members) until mid-April.

The Initial messages in the channel focused on members' questions or ideas about what the bot was doing on the server (Figures 5.4 and 5.5). Then the conversations became about



(a) Screenshot of messages from youth and staff identifying the issue of false positives

Alt Text: in Table 5.3



(b) Screenshot of my conversations with youth and staff identifying the issue of false positives

Alt Text: A screenshot of chat conversations (elaborated in findings) between ResearcherKrit and youth players and staff on the OC server.

Figure 5.6: False Positives and Feedback

what the bot did not do well and the OC community offered various inputs. Although they did not use the terms false-positives or false-negatives, their questions and examples represented in the excerpt at the end of this paragraph were about these errors. It all started with Mod09 asking, "Is the bot going to have something against positive words used in a negative way?" (Figure 5.6a). This cannot be assertively correlated, but it is possible that the staff member had noticed the thumbs-up emoji added to a few messages, including their own, in the general channel that did not reflect a positive idea but contained a keyword. Examples are *"It's not very good"* —Mod09; *"I'm good at being chaotic"* —Mem07; and *"no thats good for rel (real)"* —Mod08.

Mod09:	*"Is the bot going to have something against positive words used in a negative way?"*
Mem08:	*"Wdym"* [what do you mean?]
Mem03:	*"like what if someone says 'i'm not sorry' or 'that's not cool' and gets a thumbs up from the bot ...*
Mem08:	*"Well there should be a way around that, but overall, the bot doesn't do any other effects when reacting, it just reacts hence the staff could see that as well and Deal with it, or just ignore the Reaction. But I'm not sure. I suggest asking ResearcherKrit"*
Mod09:	*"I was"*

Table 5.3: Excerpt of a short discussion on 3/2/2021 about the bot flagging messages incorrectly

At this point, I acknowledged that this was a problem and thanked them for their questions and feedback. However, I quickly realized the solution was not straightforward. For example, if a member were to say, "hey! that's not a good thing to say to your friend!", the phrase not good in this case should ideally still get logged and flagged as a positive one. In this

hypothetical scenario, a youth could be telling another peer to be nice to their friend - which is in fact a good sign of standing up for someone else. Other kinds of inputs in the feedback channel included expressions towards the UCI team (e.g., *"I don't have many bot suggestions but I want to thank you for your work!!"* —Mem05) or questions about future work (e.g., *"Will and/or when will you update the bot to function in different channels? Ex. #*[cafeteria icon]*cafeteria"* —em06). One of the hoped outcomes from the co-owner's perspective was that the server staff might share feedback as potential users of the audit logs.

5.4.3 Feedback from OC Youth Staff

One goal of Study III was to begin to understand how the OC staff might respond to the bot and the subset of logs or audit logs that it filtered - in their use (or the lack of it). All 12 active staff reported to have viewed the audit logs that the bot generated in the Discord channels although their reported patterns of typical use varied. Half of these staff accessed the logs on a weekly basis (e.g., two staff said they accessed the logs 3 to 5 times in a week and three staff accessed it fewer times) and four among the other half reported to have checked the logs less often over a month. This revelation motivates the need to rethink potential needs of youth versus adult moderators in future work.

Staff were invited to share any inputs through the feedback channel during the probe's deployment. Nite, the co-owner set up a brief poll configured for staff to share opinions (anonymously) about the bot (including anything that they liked or disliked). Seven of them said they liked the idea of tagging positive words and that the bot *"is a good way to view what's going on in the server"* - Mod1. A couple of staff said that the bot could do more and offered their ideas on improving it (*"Perhaps working on making it AI based and running some tests would make it better tell the differences"* - Mod4.) Six of them noted the issue of false-positives referencing discussions in the feedback channel. One staff member

expressed their confusion when messages that had negative words in the logs were still added in the audit logs - *"don't understand why words like 'Noob', 'Annoying', 'Stop', 'Hate',... count as positives (Mod05)".* Speculatively, some of the confusion, at least in the quoted example from Mod5, may be because only one text channel had been created for the audit log. Now within the audit log channel that only staff can view, the bot is configured to react with a thumbs-up or heart emoji to "positive words" and a thumbs-down to the "negative words." These reactions were added to potentially catch their attention within the subset of audit logs but the probe study suggests that such emoji reactions may be less relevant when staff quickly scan text content in the log files. Redirecting messages into two separate audit log channels, named appropriately, may help circumvent the issue as far as being able to access logs based on the negative and positive keywords.

5.5 Study III Discussion: Future of Prosocial Bots in Kid-/family-friendly Play-based Spaces

This work set out by interrogating the widening gap in technological governance approaches for fostering positive social behaviors caused by a longstanding focus mainly on disruptive behaviors. Study III sought to understand how to unlock newer opportunities for technology-led community governance using an asset-based design approach. The premise of this work is that we could harness the mediating potential of technology to amplify and promote healthier social interactions in online communities. Using the context of kid-friendly servers in Minecraft that already demonstrate a balanced outlook towards antisocial and prosocial behaviors through their server rules, Study III explored how a technological intervention might mirror the balanced outlook through an AI bot designed as a technological probe. The probe surfaced and reinforced a set of characteristics seen also in Studies I and II. Study III theorizes the idea of a prosocial bots in kid-friendly online communities that can be

designed to reinforce the community assets or strengths.

Study III looked specifically at the use of a technological tool – an interactive bot, to make positive player behavior more visible to moderators. In doing so, the study posited that an increased focus on prosocial behavior would benefit moderators by reinforcing their desire to positively recognize youth contributions to the server. Additionally, the bot leverages user-interface (emojis in this case) - an approach commonly used by game developers (Targett et al., 2012; Wuertz et al., 2018; Charleer et al., 2018), to make positive qualities more visible to the community as a way of fostering prosocial behaviors. In the context of the probe study, Ohanacraft facilitated opportunities for youth players and moderators to participate (without being forced to) and served as an affinity space to explore newer technologies such as bots (T2).

The bot was designed as a probe to help advance discussion around where bot technologies could go next. Given the exploratory nature of the probe, new possibilities arose out of the study. Bots may be a promising direction to explore technologies that interest youth. The Discord platform affords features such as interactive polls, onboarding assistance for new members that can be harnessed as supportive tools to help moderators. This dissertation is part of a larger body of work on online games – Raising Good Gamers, focused on demonstrating the kinds of socio-technical features that can positively shape youth player behavior (Tekinbaş 2020). However, I note that these are not the only possibilities and future work might uncover newer applications for bots in kid-/family-friendly servers.

Chapter 6

General Discussion

This dissertation investigated a set of in-the-wild Minecraft servers, specifically designed for youth, as a way to understand the current rhetoric of kid-/family-friendly and the social and technological features of such servers. The current chapter summarizes findings from three studies I carried out on kid-/family-friendly Minecraft servers using mixed methods research. Findings from the three studies reveal that server rules, moderators' practices, and technological mechanisms including AI chatbots are tailored to provide specific kinds of social support for youth. These supports are intentional, responsive to the needs of young players, and embedded in the culture and climate of kid-/family-friendly servers. This chapter also discusses the implications of these findings in relation to a broader exploration of the features of developmentally appropriate online playgrounds for young adolescents. The implications are organized by three areas of focus: adolescent developmental needs, youth development in online gaming, and socio-technical forms of governance in digital playgrounds.

6.1 Situating the Research in Current and Emerging Contexts

Before delving into the summary and discussion, I step back to situate this work within current and emerging contexts in light of three timely considerations.

The first reason is related to emerging evidence around the mediating role that online digital environments play in the social and learning experiences of youth (Giovanelli et al., 2020; Magis-Weinberg et al., 2021b). Critically, evidence-based research has shown that changes in the body and brain during early adolescence are shaped by the quality of relationships and social interactions during this period (Crone and Dahl, 2012; McCartney et al., 2016; Immordino-Yang et al., 2018; Dahl et al., 2018). But recent studies show that the quality of social interactions can shape brain development in adolescents (Immordino-Yang et al., 2015; Dahl et al., 2018; Muriuki et al., 2021). Prior research shows that, with adequate support, virtual world games like Minecraft help youth develop social connections, technical expertise, and socio-emotional competencies (Beals and Bers, 2009; Bos et al., 2014; Reich et al., 2014; Ringland et al., 2016a; Ringland, 2018; Tekinbaş et al., 2021). With online games like Minecraft becoming an intrinsic feature of social life for many present-day youth, especially young adolescents (Granic et al., 2014; Salen Tekinbaş, 2020), the pressing question is how might such play-based spaces be developmentally more responsive to youth (Beals and Bers, 2009; Depping et al., 2018; Kidron and Rudkin, 2017; Du et al., 2021b; Cowan).

The second consideration is that despite the aforementioned research that highlights the promise of harnessing virtual world games for youth development, alarmist attitudes towards gaming as negative phenomena persist in popular discourse and in the literature (e.g., games are aggressive or addictive; (Choo et al., 2010; Prot et al., 2012; Kuss and Griffiths, 2012; Brunborg et al., 2013; Aarseth et al., 2017; Männikkö et al., 2020). These latter perspectives do not help us make sense of the ever-increasing popularity of Minecraft among

youth. In the wake of the COVID-19 pandemic, online games like Minecraft were one of the limited available ways through which youth could find social connections (Andrews et al., 2020). However, ongoing initiatives at the research-practice and policy levels are striving to restore the rights of youth (Digital 5Rights [1], Raising Good Gamers [2], Headstream [3]; FairPlay Alliance [4]) and advocate for a better understanding of features that can provide safe, developmentally appropriate, and equitable digital playgrounds for youth.

The third reason is that research in HCI on socio-technical governance approaches in online communities has been largely focused on content moderation (Grimmelmann, 2015; Chandrasekharan et al., 2018; Seering et al., 2020a) and automated approaches for mitigating harm and disruptive behaviors (Kwak et al., 2015b; Gorwa, 2019). Moderation in multiplayer games like Minecraft necessitate socio-technical mechanisms that need to address the emergent nature of social interactions inherent in play-based contexts that go beyond content moderation. A better understanding of moderators' motivations and practices in kid-/family-friendly Minecraft servers informs approaches for developing trust and supporting youth in online playgrounds that may also apply in other similar contexts. Relatedly, a handful of studies in Games research and HCI have explored the potential of technology to mediate positive social interactions (Targett et al., 2012; Wuertz et al., 2018; Seering et al., 2020a). This direction is much needed to shift conversations around technological governance approaches towards more prosocial mechanisms that can support the developmental needs of youth. The current research was motivated in part, by a need to understand the extent to which online social play communities like those instantiated by kid-/family-friendly Minecraft servers, took into account the developmental needs of young adolescents.

In this dissertation, I drew from Developmental Science, Game Studies, HCI, Learning Sci-

[1] https://digitalfuturescommission.org.uk/blog/the-childs-right-to-play-in-a-digital-world-what-does-this-mean-and-how-can-we-realise-it/

[2] raisinggoodgamers.com/

[3] https://www.headstreaminnovation.com/research

[4] https://fairplayalliance.org/framework/

ence, and Positive Psychology to investigate kid-/family-friendly servers in Minecraft. As described in Chapter 2, although the motivations may look different for these disciplines, I position them as allied fields that help us understand the significance of kid-/family-friendly Minecraft servers as interest-driven affinity spaces that include features for promoting adolescent development.

6.2 Five Key Findings

This section summarizes five key findings and discusses the broader implications of this work for research, design, and practice. The three studies I carried out using mixed methods research were: i) an empirical study of server rules and metadata, which I refer to as self-narratives, across 60 moderated servers (Study I, Chapter 3); ii) a study of moderators' lived experiences, motivations and practices across seven kid-/family-friendly and four general-family-friendly servers through interviews with 22 adults and eight youth (Study II, Chapter 4); and iii) a technology probe study of a Discord bot within OhanaCraft, a kid-/family-friendly server ecosystem using a design-led research approach for exploring the potential of AI chatbots as prosocial moderation tools in kid-/family-friendly play-based spaces (Study III, Chapter 5).

6.2.1 Rules are tools that can be used to characterize kid-/family-friendly servers as a distinct genre of server

Based on a taxonomy I developed using a grounded-theory approach to analyze rules based on topics and attributes (i.e. how they are phrased), server rules reveal nuanced aspects that are characteristic of kid-/family-friendly servers. The most striking feature is that rules in these servers not only specify inappropriate actions, but also explicitly state appropriate

actions in the form of prosocial values such as being polite, helping to keep the community friendly and safe, and enjoying Minecraft with everyone. Furthermore, server rules reflect moderators' goals of keeping the server safe and appropriate for young children. Rules mention how youth might report concerns to staff or interpret the technological features such as chat filters, (e.g., "It's so strong that at times it filters things it shouldn't filter. Having something you type filtered doesn't mean you're in trouble, it just means that you triggered our filter. If you ever have questions ...you are welcome to email us" – S07, a kid-/family-friendly server). On a subset of kid-/family-friendly servers, rules also provide an underlying rationale (e.g., "Do not grief... because other players should be able to leave and come back later without their work being destroyed – Cubeville). Rules play an additional role in that they signal a set of values and beliefs on the servers to parents and caregivers. Rules present moderators as the primary point of contact for ensuring that youth are safe on the servers. In summary, Study I results suggest that rules in kid-/family-friendly servers are tailored to provide specific support for youth and reveal insights into moderators' goals for the culture and climate of their servers.

6.2.2 Moderators in kid-/family-friendly servers sponsor and legitimize youth interests

The interview findings show that moderators provide opportunities for youth on their servers to cultivate friendships, creativity, leadership, and other prosocial behaviors. They moderate social interactions within their Minecraft server ecosystems, that include online discussion forums, in-game chats configured for various activities (e.g., chat for youth interested in role-plays, global chat for all players on the server, etc.), and extended play-spaces such as Discord. They also moderate emergent play behaviors on the Minecraft servers. Although moderators play with youth on their servers when they can, they encourage youth to follow their interests whether through creative youth-led play-acts or role-plays; developing tech-

nical expertise in Minecraft; or volunteering as youth moderators to build leadership and social skills; and so on. KTango's story in Chapter 1, for example, highlights this intergenerational aspect of servers where adults and youth coplay and moderate on kid-/family-friendly servers. Chimit, KTango and many other adults in Study II support and sponsor youth who are interested in online gaming. By appointing youth as moderators and mentoring them as youth staff, adult moderators legitimize youth interests and development on their servers. Adult and youth moderators volunteer their time and resources to provide the necessary social support (e.g., onboarding new players, helping youth understand the server rules) and environment (e.g., assisting youth with builds in the virtual world for their role-plays and gaming activities) so youth can enjoy playing Minecraft with their peers, near-peers, and family.

6.2.3 Moderators develop responsive socio-technical scaffolds for youth and use technology in innovative ways

The analysis of server rules revealed that moderators rely on various social and technological mechanisms for moderating play on their kid-/family-friendly servers. The interviews provided more depth and insight into moderators' practices on their servers. Moderators recognize that youth on their servers belong to diverse age groups and tailor their approaches accordingly. Adult moderators work closely with younger adolescents and their parents to provide additional support in understanding the server rules. Adult moderators create roles for youth interested in helping out on the server either as helpers and volunteers, or more formally as youth moderators. They offer support to youth moderators on a need-basis and model practices for youth on their servers. Youth and adult moderators suggest activities and ideas for players and help build the virtual world environments to carry out those play-based activities (e.g., hosting mini-games on holidays; hosting graduate parties; Skyblock server on The Sandlot). The most interesting finding relates to innovative scaffolds that modera-

tors developed as a way to reinforce prosocial actions within the virtual worlds. Moderators shared examples of supports they developed that reorients players with the server rules (e.g., rules' rooms or rules' tutorials); encourages fair play (e..g, the trading chest in Cubeville, the oyster dome in The Sandlot); and provide youth with private supportive spaces to take breaks from playing with others (e.g., calm room in Cubeville, special island on Server 2).

6.2.4 Bots have the potential to be used as prosocial supports for the community and moderators

The UCIProsocial bot was developed as a way to explore opportunities for reinforcing positive social behaviors (by reacting to text-chat with an emoji) within a kid-/family-friendly community, OhanaCraft in this case. The design of the bot as a technology probe (Gaver et al., 1999) on the Discord platform demonstrates a feasible design paradigm that leverages existing strengths or assets of OhanaCraft and HCI's Research Through Design or RtD approach (Olson Kellogg 2014). The preliminary observations from the probe deployment study suggests that youth are curious about Discord bots and experts of such social platforms and technologies in their own right (e.g., Mock et al., 2019). This was exemplified in the ways in which youth ingeniously made sense of the bot through trial and error and even identified special instances when the bot could not react to the same keywords (e.g., "good") or pointed out the case of false-positives and false-negatives (Gergle Tan in Olson Kellogg, 2014). The bot serves as an example for technological mechanisms that can assist moderators in their existing practices. The technology bot probe was developed to motivate future applications of automated prosocial tools that can support social moderation. But, as Gaver et al. explain in their pioneering work on cultural probes, the probe study also acts as a reminder that as designers, we ought to approach our participants' reactions, mainly that of youth in this case, "empathetically, not intellectually" (Gaver et al., 2004; pp 53-56).

6.2.5 Kid-/family-friendly servers are play-based affinity spaces

The lived experiences of adult and youth moderators reveal concrete examples for how the social and technological features of kid-/family-friendly servers correspond to the theoretical rubric or criteria of affinity spaces (Gee, 2005; Gee Hayes 2012). From very young adolescents (7 to 8 years -14) to older adolescents (14-18), the servers provide an array of options for youth to choose from. Youth and older adults with varying levels of experiences in Minecraft can be found playing together, interacting with each other within these server ecosystems. Adult moderators including Fredi, LL, LLaine, Nerdy, Nite, and Waseric develop an interest in Minecraft so they can support youth on their servers. For example, KTango, LL, Nerdy, Nite, and LLaine started playing Minecraft with the goal of supporting youth in their lives (e.g., their own kids, kids they babysat, kids in the extended family etc.) but eventually stayed on their servers to support youth in general, in some cases long after their own kids had stopped playing or moved on to other Minecraft servers. Similarly, Elbereth, Wahvie, AKitty, Mod071, Mod022, Mod023, and Mickeyheart are youth between ages 8 -18 who moderate and support peers and adults on their servers. Their stories reveal that they contribute to various aspects of moderation and to varying degrees. For example, younger adolescents like Elbereth and Wahvie help with builds and role-plays, while the older adolescents may contribute to technical aspects of server operations or social moderation, or both. Similarly, the findings show that youth players participate in or lead role-plays and other mini-games. These servers are characterized by their ability to offer youth opportunities to explore their interests with trusted peers and adults. These lived experiences illuminate the ways in which moderators actualize the social and technological features on their servers to promote youth development.

6.2.6 Connecting Key Findings to the Three Introductory Stories

In summary, kid-/family-friendly servers are affinity spaces where members across generations connect over a shared interest, online gaming in this case. These servers include explicit rules that convey expected social norms to youth such as Elbereth and also signal more information about the server values and the server staff to parents like KTango and Elbereth's father. Youth like Meem and SparkleTwinnie may operate their own servers, but the findings highlight the role that caring adults play in modeling prosocial behaviors and mentoring youth staff on their servers. Moderators consider diverse styles within their servers as an asset that aligns with their intergenerational audience that range from very young adolescents to older teens and even other adults. Moderators leverage the platform features to customize their servers to support virtual world themes or features of roleplay and develop innovative technological mechanisms to support youth. The findings reveal the need for better technological mechanisms that can reinforce prosocial behaviors in such kid-/family-friendly servers. The experiences described by KTango, Elbereth, and Chimit were possible because of the intentional socio-technical design and practices within their respective servers.

6.3 Implications for Online Kid-/family-friendly Playgrounds

I now look at the five core findings described above through the lens of three contexts: adolescent development, youth in online gaming, socio-technical governance systems. I do so as a way to draw attention to how the findings from this work might contribute to my allied fields, which include developmental science, learning science, and positive psychology; game studies; and HCI.

6.3.1 Implications for Adolescent Development

The findings from the three studies show that kid-/family-friendly servers provide social and technological features tailored for youth across diverse ages. The transition into adolescence constitutes a key window of opportunity which can set and reset developmental trajectories that can have a lasting impact through adulthood (Crone Dahl 2012; Immordino-Yang 2007, 2011). In other words, development during early adolescence (ages 8 -14) really matters. Development at this age centers around social experiences – with peers and other adults, that are now known to be factors that can impact brain development (Dahl et al., 2018; McCarthy et al., 2016; Muriuki et al., 2021). The theories of learning science (e.g., Gee 2003) and positive psychology (e.g., Lerner et al., 2005), help us understand the theoretical implications of socio-technical features in kid-/family-friendly servers (cf., Table 4.3 in Chapter 4). The findings show that kid-/family-friendly servers provide opportunities to youth for exploring their interests and identity through activities on the corresponding servers.

Youth earn their ability to moderate on their servers by helping others and demonstrating their potential for problem solving, especially under pressure. (e.g. Fauxx, now a moderator on Server 1, recollected a defining experience on the server when he managed to diffuse an interpersonal situation. As a then-14 year old, Fauxx had settled the problem by talking with another player who had destroyed (or griefed) Fauxx's build). Adult moderators revealed that some youth called attention to their helpful behaviors as a way to be selected as youth moderators. The science of adolescence helps us understand that adolescents might do this to gain social acceptance. Adult moderators on a subset of three servers also revealed that some youth declined an invitation to be a moderator as those youth were not ready to take on the responsibilities of being a moderator. These results reinforce Gee's concept of affinity networks as spaces that support multiple ways of participating without forcing anyone to contribute.

The findings suggest that the socio-technical features in kid-/family-friendly servers are designed to provide opportunities for identity exploration, building social support with peers and adults, making interest-driven contributions to the server (e.g., leading roleplays, volunteering to help on the server, and taking on moderation responsibilities) and earning recognition from peers and others (e.g., *"The best way I can describe the feeling is someone you looked up to as a kid, almost as if they were a celebrity or a teacher or something suddenly treating you as an equal and even wanting to be your friend."* - Wahvie on being made a youth moderator on Cubeville); and *"I felt uplifted by my peers, and it was truly a special moment. I have definitely noticed a rise in in-game messaging, but I don't mind."* - Mickeyheart, a youth moderator on The Sandlot). The described practices of moderation on kid-/family-friendly servers suggest that in principle, these servers can support positive risk-taking - which is where youth can recover from any mistakes and learn from such experiences. The findings show that moderators deploy various age-appropriate strategies (e.g., talking one-on-one with very young adolescents or inviting a parent or caregiver; or using humor with older adolescents) that render kid-/family-friendly servers as safe spaces for youth, as defined within the context of this study. As Dryfoos (1998) and many others (e.g., Larson 2000; Damon 2003, 2004) explain, youth need more interest-driven and challenging opportunities that they can explore with social support (e.g., peers and caring adults) in safe spaces. This work shows that moderators in kid-/family-friendly servers curate such safe spaces and alleviate the burden that otherwise would fall entirely on parents. A small set of findings show the promise of meeting their developmental needs around risk-taking. For example, Elbereth who once broke rules was invited to become moderator on Ohanacraft. Similarly youth players on Ohanacraft figured the UCIProsocial Bot on their own through trial and error. More work is needed to understand how the server features actualize positive risk-taking.

6.3.2 Implications for Youth in Gaming

Video games are an integral part of social life for many youth today (Granic et al., 2014; Reich et al., 2014; Ringland et al., 2018; Tekinbaş et al., 2021; Microsoft Fact Sheet 2021). In fact, video games are so integral to growing up these days that not playing video games tends to be an indicator that a child may be socially disconnected (Tekinbaş 2020). Online games are broken when it comes to supporting the needs of young adolescents or those between the ages of 8 and 12. Despite official reports that youth ages 9 -11 (Microsoft Fact Sheet 2021) and often much younger (e.g., as revealed by the lived experiences of youth in this work) play Minecraft, policies like COPPA and platform-specific clauses do not acknowledge that players under 13 play video games like Minecraft. Moderators take on the responsibility to provide safe and supportive social spaces within Minecraft for youth, but they cannot be left to shoulder such responsibilities on their own. This work has future implications for other stakeholders including policymakers and platform developers, which I present in the concluding chapter.

Research shows that social experimentation decreases as the amount of time spent with non-peers increases online (Headstream 2021). Playing online games with peers is critical to youth development. Given what we know about the developmental needs of youth and the increasing interest in online gaming among youth, the current work really matters. The findings produced by the three studies suggest a model for supportive online playgrounds – server rules, moderation practices, and technological mechanisms are designed to support youth interests and respond to their needs that arise through the emergent nature of play.

Consistent with findings from prior work (Ringland et al., 2016; Ringland 2018; Tekinbaş et al., 2021), server rules, moderators, and technological mechanisms shape the social experiences for youth on Minecraft servers dedicated to them. This work extends prior work by illuminating the ways in which rules are characteristic of the kid-/family-friendly genre and

the ways in which moderators develop innovative technological scaffolds to help youth on their servers. The findings also suggest that youth may play on more than one Minecraft server that may or may not be kid-/family-friendly as they gain more expertise in Minecraft (e.g., Elbereth, Mod023, Mickeyheart, and Wahvie). These youth consider their respective kid-/family-friendly servers as their home server (e.g., *"always return to Cubeville"*, Wahvie) but are motivated to give back to their servers as youth staff. More work is needed to understand the pathways and specific roles that kid-/family-friendly servers provide for fostering youth development and interests in online gaming.

While there is much to be learned about kid-/family-friendly servers from youth perspectives, this dissertation provides empirical evidence that the right kinds of social and technological features can shape the culture and climate of servers as supportive social play-based spaces. If we recall Elbereth's story in Chapter 1, we see a youth who learned by breaking the rules and was given the opportunity to help out on the server as a moderator. However, this is not the reality for many youth in gaming. We can understand this from the lived experiences of youth who now serve as moderators on kid-/family-friendly servers (e.g., *"I hated going on any kind of faction servers, which pits players against each other in a PvP... So I was naturally drawn to those friendlier servers. The second server. I got on... I had just turned 14 and it was with a bunch of kids that are almost my age, the owner was still pretty young... looking back on that. That's a perfect example of when cliques exist."* – Mod023, now a youth moderator on Server 2 reflected on early experiences in Minecraft). Social systems in virtual worlds may provide valuable insights for imagining possibilities in the real world (Lastowa et al., 2004). In that sense, this work argues that if kid-/family-friendly virtual world servers can be designed to support youth interests within the virtual worlds, it is high time that we legitimize their interests in online gaming in the real world. Furthermore, online gaming communities must be considered from the perspectives of young adolescents' abilities to meet their developmental goals. This will require synergistic efforts across my allied disciplines and some of the emerging initiatives mentioned in Section 6.1. I situate my

recommendations for future work within one such initiative – Raising Good Gamers in the next concluding chapter.

6.3.3 Implications for Socio-Technical Governance Systems

Thus far in HCI, moderation has been focused on content across communities in Facebook, Reddit, Wikipedia, etc. (Roberts, a; Chandrasekharan et al., 2018; Fiesler et al., 2018; Matias, 2019b; Seering et al., 2019). Building on prior HCI work on Minecraft (Ringland et al., 2016b; Ringland, 2018; Slovak et al., 2018; Jagannath et al., 2020; Tekinbaş et al., 2021), this dissertation contributes a more nuanced understanding of moderation in online play-based settings. Moderators on kid-/family-friendly servers manage content and emergent actions that are an inherent feature of play (Salen et al., 2004). While more recent work has sought to characterize moderation in terms of community size, platform, and infrastructure (Caplan 2018), even these perspectives do not consider the nuances of play-based moderation as an emergent practice within "in-the-wild" server ecosystems. This perspective matters in light of automated moderation tools being developed presuming that content is the (only) crux of moderation ((Gillespie, 2020). Context moderation (Caplan and Gillespie, 2020) and theories of care may be relevant concepts to build on in future work, but acknowledging that play-based moderation, especially for youth, would form the first step towards a more holistic view of community moderation. With video games already being positioned within the concept of the "metaverse" (e.g., Bronstein, 2021 [5]) and content-based platforms moving towards such emergent systems, there is a need to expand moderation research beyond content moderation. The contributions of this dissertation may inform and motivate newer theories of moderation including the notion of care (Yu et al., 2020).

Nevertheless, one argument from moderation research is worth unpacking in the context of the current findings. Chandrasekharan et al. 2017a contend that the Reddit platform did

[5]https://blog.roblox.com/2021/09/future-communication-metaverse/

not necessarily make the Internet safer through its norms and moderation practices. Instead they argue that the platform absolved itself by pushing banned users into "darker corners" (p. 18) of the web. A parallel version of their argument in Minecraft could potentially oppose or challenge the findings of this work. However, there are two perspectives I offer as counterarguments. First, the contexts of communities in Chandrasekaran et al.'s 2017a work (i.e. hate-speech communities) are not the same as online gaming communities for youth. Findings from Study II, some of which are referenced in the subsection above (6.3.2) suggest the opposite – faction-based (i.e. highly competitive) servers are not guaranteed to provide safe experiences for youth, which draws youth like Elbereth, Mod023, and their peers towards more friendly servers. Second,the Reddit platform closed or banned the hate-speech communities. This is not the same as moderators in kid-/family-friendly servers who temporarily may ban players in certain extreme cases. Overall, the contexts of the Reddit argument and this work are dissimilar. Adult moderators (18) shared that they always gave their players a second, third chance and so on. Additionally, moderators acknowledged that players who stay on the server are those who want to play by the rules and some other youth leave the server. The current research shows that a subset of servers (Cubeville, OhanaCraft, Server1, Server2, and The Sandlot) work closely with youth to explain the rules. This phenomena may be more nuanced than mere compliance to rules, and given that play is emergent - making the servers safe is not merely the responsibility of moderators. I suggest some ways in which future work might take on a more ecologically viable approach in the next chapter.

6.4 Summary

This work shows that kid friendly/family friendly servers are a genre that can be identified by their approach to governance, specifically by their server rules and socio-technical mecha-

nisms that include social moderation by caring adults and the use of innovative technological mechanisms that provide scaffolding support to youth in the virtual worlds. These findings provide a set of social and technological features that may substantiate a model for designing kid-/family-friendly online playgrounds. This work shows that kid-/family-friendly servers can actualize positive youth development when their self-narratives, social practices, and technological mechanisms are aligned with adolescent developmental needs.

Drawing from Lastowa et al. (2004)'s analysis of laws in virtual worlds, I argue that by understanding rules and how they are regulated in virtual world games that youth inhabit we can gather insights into social interactions that pervade realities for youth in the physical world. Contrasting the three main reasons the authors discussed, I unpack how the Study I and II findings support their arguments. First, survey studies indicate the rising popularity of Minecraft among youth. Study I and II findings show that adult and youth moderators value social interaction within their servers. The second reason that Lastowa et al., described was around the notion of assets that cannot be strictly categorized as virtual and real. Youth moderators spend hours creating builds and volunteering time and effort on their servers and adult moderators and administrators invest in the resources to maintain the social and technological features of their servers. This is what Lastowa et al. (2014) refer to as building assets that are perceived as worthwhile by peers and other people, players on the servers, in this case. The third and most important reason the authors provided is that the "parallel alternatives" (p. 11) in the virtual worlds may offer opportunities for reexamining alternative approaches in the real world. The examples of how the moderators created virtual world scaffolds on four corresponding kid-/family-friendly servers is an example of such "parallel alternative" to how youth can be supported in newer contexts. Value-inclusive rules (Study I), virtual world scaffolds and moderators' practices to encourage role-play (Study II), and the prosocial bot (Study III) suggest that although the rhetoric of kid-/family-friendly is currently adult-driven, a subset of servers where these self-narratives, moderator practices, and automated tools can align to meet youth where they are at developmentally

constitute a model of online playgrounds. This dissertation provides an understanding of the rhetoric of kid-/family-friendliness in Minecraft that primarily reflects adults' conceptions although the data includes some perspectives from youth moderators. Future work can reveal adolescents' conceptions of kid-/family-friendliness and how those might relate to our current understanding of the concept in online play-based spaces, which I briefly discuss in the next final chapter.

Chapter 7

Summary & Emerging Directions for Future Work

This dissertation investigated a specific genre of Minecraft servers explicitly designed for youth known as kid-/family-friendly servers to understand its socio-technical features through the lens of three contexts – adolescent development, youth in online gaming, and governance approaches in online play-based spaces. As sandbox-style or open virtual world games like Minecraft are becoming an increasingly important part of social life for many adolescents today (Microsoft Fact Sheet 2021; Reich et al., 2014; Ringland et al., 2019; Tekinbaş et al., 2021), situating my findings within these three contexts hold implications for future work around the design of digital playgrounds for youth. Based on an interdisciplinary theoretical framework and mixed methods research approach, empirical findings from a three-part study provide a nuanced understanding about the rhetoric and socio-technical features of kid-/family-friendly servers. methods research. As a foundational first step towards identifying features of digital playgrounds that can support the developmental needs of adolescents, this dissertation contributes a model comprised of three forms of governance – rules that shape social norms, social practice of moderation in Minecraft, and technological mecha-

nisms designed to support youth and assist moderators in their practice (Table 7.1; assumes kid-/family-friendly servers). In this brief concluding chapter, I summarize the contributions of this dissertation and suggest a set of directions for future work. In this brief concluding chapter, I summarize the contributions of this dissertation and offer a set of recommendations for future work that may help advance research agendas for the three core contexts mentioned above.

7.1 Summary of Contributions

This dissertation offers insights into how in-the-wild kid-/family-friendly Minecraft servers are designed for youth as play-based affinity spaces. The characteristic practices of server moderators (adults and youth) might serve as a model for the kinds of social and technological mechanisms used in governing such play-based spaces for youth. The model, presented in the previous chapter, draws from the three-part study data set that include self-narratives or metadata which refers to how kid-/family-friendly servers describe and present themselves online; the lived experiences of adult and youth moderators about their underlying motivations and practice on their servers; and an exploratory design-led probe study within OhanaCraft, one of the kid-/family-friendly servers. The findings from the three studies deepen our understanding of the social and technological forms of governance that are characteristic of such servers and theorize a strengths-based approach for exploring prosociality in automated moderation tools.

1 Rules are tools that can be used to characterize kid-/friendly servers as a distinct genre of server

Study I contributes a taxonomy for understanding server rules and an empirical characterization of three server genres – kid-/family-friendly (n1= 19); mature-family-friendly

(n2=20); and general (n3=20). The taxonomy was developed based on a dataset comprising 1920 rules drawn from 60 servers and 12 rules stipulated by the publisher (i.e. Microsoft) at the platform level using a grounded-theory approach. It includes eight codes for understanding the types of rules based on their topic and seven codes to understand the types of rules based on their attributes. The taxonomy was used to develop a nuanced understanding of the features of kid-/family-friendly servers based on their self-narratives. An analysis of rulesets (i.e. sets of rules) based on this taxonomy also revealed the social and technical features of servers reflected in their rules. Study I shows that rulesets can be a valuable analytical tool for understanding the features and the rhetoric of server genres in Minecraft. Rules also signal information about the values and goals (or mission statements) of kid-/family-friendly servers to parents and caregivers in search of safe and friendly Minecraft servers that their children can play on.

2 Moderators in Minecraft deploy responsive, socio-technical approaches that include, but go beyond, content moderation

Study II findings contribute to a more nuanced understanding of moderation practices in play-based community contexts that extend the ways in which moderation has traditionally been understood in HCI literature. Given the emergent nature of play in virtual worlds, moderators are tasked with monitoring both player behavior and content. The findings revealed the ways in which moderators created innovative technological features on their servers to help reinforce social norms among youth. Study II also revealed an apprenticeship model where adult moderators provide pathways for youth to take on moderator roles on kid-/family-friendly servers. Methodologically, this study establishes empirical evidence for epistolary chat-based interviewing (Debenham 2007) as a viable method as described in Chapter 4. Study II shows that moderators develop responsive strategies to support youth through their practice.

3 Bots have the potential to be used as prosocial supports for the community and moderators

A technology probe in the form of a Discord bot deployed within a chosen kid-/family-friendly community demonstrated the potential of chatbots as tools that can scaffold prosocial norms and assist moderators in managing content moderation aspects of their practice. Drawing from how probes have been used in HCI (Gaver et al., 1999; Boehner et al.,2007), the bot served as an experimental participatory probe. The probe provided participants opportunities to "interpret and explain" their perspectives on the bot. The exploratory nature of the probe may inspire and inform future designs of such automated interactive tools (Boehner et al., 2007; pp. 1079). Study III theorizes the notion of a prosocial AI chatbot designed to leverage a strengths-based paradigm for supporting kid-/family-friendly servers using a design-led research approach.

In summary, Study I findings show that rules in kid-/family-friendly servers are created to encourage positive social outcomes at the individual and community level (e.g., "Be polite and thoughtful towards all players." - S02; and "...Keep your builds respectful, as with the chat rules..." S18). Servers do this by articulating desirable outcomes/values with constraints/rules that prohibit bad player behavior and encourage positive play. Study II findings reveal that moderator practices in such servers reflect the same balance between discouraging disruptive behavior and encouraging positive behavior. While individual approaches/styles may range from being lenient to strict, my findings showed that moderators agreed that a mix of approaches are in fact helpful both to individual players and to the larger community. Study III sought to understand how technology could reflect a similar balance through an AI bot, which was designed to amplify positive interactions and support moderators. The probe study demonstrates that bots can be designed to make certain social interactions more visible to the youth community. It also suggests the feasibility of prosocial tools to support moderators in their practice. Taken together the three studies contribute

empirical, theoretical, and design results that have been described in the core chapters 3-5. Throughout the dissertation I situate these findings within HCI and allied disciplines, discussed in chapters 2 and 6, to also suggest that all these areas are focused on the core question from different perspectives, and that it might be beneficial to develop a synergistic agenda for research, design and practice. The findings in this dissertation together inform an emerging research agenda around the design of online playgrounds for youth. This agenda is informed by three principal contexts—adolescent development, youth in online gaming, and socio-technical governance in play-based spaces—which I discuss in more detail below. A vital aspect of realizing this research agenda involves translational work to help connect research, design, and practice and the broader ecosystem in online gaming. To that end, I situate my work within the Raising Good Gamers or the RGG initiative that is focused on shaping the future of online play spaces from ecological perspectives.

Governance mechanism:	**Applied approaches:**	**Guiding Questions**	**Empirical findings (strong/weak/none):**
Server Rules: a set of do-and-do-not statements that inform players about permitted and prohibited actions, potential consequences, and underlying rationale within the server ecosystem.	• Consider rules as a tool to support and scaffold youth learning • Invite youth into the rule design process • See rules as as space to articulate community values	• Do rules include examples of how to behave well? • Are rules written to be understood by youth rather than adults? • Are youth involved in the ongoing process of writing and rewriting server rules? • Are server values visible in the rules? • Do server rules reflect underlying rationale? • Do rules offer information on what next steps are? • Do rules tell players how to reach moderators?	Study I: (strong) kid-/family-friendly servers shows how values are incorporated in the rules. Study II: offers preliminary evidence for how moderators revise rules in response to youth activities *Future work should investigate how youth can participate in setting such explicit norms

Governance mechanism:	**Applied approaches:**	**Guiding Questions**	**Empirical findings (strong/weak/none):**
Social moderation in play: focused on social practices by adult and youth moderators to support activities, reinforce value-inclusive rules	• support rather surveill • provide opportunities for youth to become moderators and support them by coaching and mentoring • diversity of approaches valued as an asset	• Do youth get opportunities to figure things out on their own? • Do youth receive opportunities for mentorship? • Are moderators playing with youth?	Study II: Caring adults create technological supports for scaffolding play Youth take on various social (e.g., onboarding new members), technical (helping make builds), or socio-technical aspects of moderation on the server

Governance mechanism:	**Applied approaches:**	**Guiding Questions**	**Empirical findings (strong/weak/none):**
Automated prosocial tools: tools that leverage strengths-based approach and can support the community and moderators	• Leverage existing strengths and practices • User-interface changes can produce change • Recognize the limits of automated tools but design to fit into moderators' existing practices • Defer decisions to moderators • Technological scaffolds tailored to the virtual worlds on the server	• What are the assets (social and technological) of the kid-/family-friendly community? • Does the tool allow moderators to make decisions? • Do youth have an opportunity to shape the design of tools for their community?	Study III: through the exploratory study, the bot was developed based on an asset-based paradigm The bot elicited reactions from the youth. An empathetic rather than intellectual perspective (Gaver et al., 2004) motivates the need for investigating newer applications for Discord bots in Kid-/family-friendly servers The bot routed specific logs into private channels for staff to review;

Table 7.1: A model of governance features in kid-/family-friendly servers: Contributions by drawing from an interdisciplinary framework (cf. Fig. 1.1)

7.2 Emerging Directions for Future Work

The RGG initiative, guided by the broad question of "What kinds of experiences should young gamers (8-13 years old) be having in video games and online communities now and in the future?", envisions important outcomes that are necessary to better support youth in online play-based spaces. Below is a summary drawn from a workshop report based on an event produced by Games for Change, Connected Learning Lab, and the DQ Institute in association with the World Economic Forum, in which I was involved as a researcher.

The RGG initiative emphasizes youth as the primary agents for realizing the vision for more safe, inclusive, and supportive play-based spaces (p 4). Critically, this vision does not imply that youth ought to shoulder this responsibility on their own. Rather, this work calls for developing age-appropriate supportive ecosystems that mobilize offline (i.e., family and other social contexts in the real world, policy changes) and online resources (i.e. affinity spaces with peers, near-peers, moderators, etc.) to cultivate such prosocial communities. In this sense, the emerging future directions drawn from the current research and presented below are well-suited to be embedded within the RGG initiative.

7.2.1 Supporting Adolescent Development Through Play

- **Understanding adolescents' conceptions of kid-/family-friendliness, motivation, and goals**: When youth are in safe and supportive environments, their learning outcomes can be potentiated (e.g., Luckin 2008; Dahl et al., 2018; National Scientific Council on the Developing Child, 2018; Tekinbaş et al., 2021). To date, early adolescence has not received the attention it deserves in research, practice, and policy, in comparison to earlier childhood years and older adolescence (Blum et al. 2014). According to Blum et al. (2014), changes during early adolescence are not as observable as in the later stages, which is one plausible reason why the research is lacking.

Future empirical work can help us deeply understand how youth, young adolescents in particular, conceptualize kid-/family-friendly play spaces, their motivations and goals. The current research offers some perspectives based on inputs from 8 youth (Study II) and 5 youth (Study III), but more research can inform discussions in the fields brought together as allies by this work on adolescent development and help identify where any gaps in the current conceptions of kid-/family-friendliness may be. Prior work shows that play affords authentic social contexts that can be harnessed to better understand social behaviors in adolescents (Beals Bers 2009; Reich et al., 2014; Ringland et al., 2016; Jagannath et al., 2020; Tekinbaş et al., 2021). Situating research in play-based contexts might offer insight for developing interventions aimed at scaffolding socio-emotional development in youth.

- **Leveraging near-peer network for youth development**: Youth are experts in their own right and the evidence-based research explains that young adolescents are wired for intense and rapid learning (e.g., Dahl et al., 2018). Building on the promise of kid-/family-friendly servers where youth take on moderator roles, future work may help identify newer models of peer and near-peer mentorship that promote socio-emotional competencies. For example, servers might create programs for alum teen or youth players who grew up playing Minecraft on their servers to share their expertise or serve as positive role models to inspire younger adolescents.

- **Unlocking more scaffolded opportunities for positive risk-taking**: Adolescents need safe spaces for exploring new roles and experiences as a way to discover their strengths and limitations (Fulgini 2018). Most importantly, adolescents need supportive environments where they can recover from and reflect on any failures as part of preparing to take healthy social risks independently throughout life (Andrews et al., 2020; Blakemore 2018). This work shows that kid-/family-friendly servers lend themselves as safe training grounds with a strong potential for youth to develop these

skills. Future work can build on such social and technological mechanisms to identify ways to scaffold such learning experiences while also fostering autonomy in youth.

7.2.2 Supporting Youth in Online Gaming Spaces

- **Kid-/family-friendly Minecraft servers as a springboard for youth**:Kid-/family-friendly servers can be considered as "on-ramps" (Rawson 2002; Ito et al. 2018) for helping young adolescents develop expertise in interest-driven play-based activities including creative roleplays, collaborative social play, technical "modding" skills, etc. These servers can prepare adolescents with the necessary interpersonal and technical skills for playing Minecraft on other servers or other social games as they mature. Future work might identify ways in which access to kid-/family-friendly servers can be expanded to reach more youth from various socio-economic backgrounds by partnering with local public libraries and community centers. As discussed in Chapter 6, (cf., Section 6.3.3), future work should aim to understand what makes some youth leave a server and investigate ways that they might be supported in online playgrounds; without which a subset of youth may be misled and vulnerable to other toxic sites as prior work suggests (Chandrasekaran et al., 2015).

- **Increased opportunities for youth-led development**:The kid-/family-friendly servers studied in this work support youth-led creative roleplays and include youth as moderators. Prior work suggests that youth are fully capable of working together to develop shared practices (e.g., by creating their own social norms) that can benefit them at a collective level (Boostrom 1991; Tekinbaş et al., 2021;). Future research should explore ways to encourage youth to reflect on their experiences and actively drive their development in such play-based affinity spaces.

- **Tapping into platforms and technologies that youth are already using**:Findings from the current work suggest that youth are motivated to learn more and engage with

Discord bots, for example. They are expert users of platforms like Discord which they leverage to connect socially with peers and others on their servers. Future work might investigate other such technologies that can be integrated with the Minecraft ecosystem as a way to sustain learning and curiosity in adolescents.

7.2.3 Social and Technological Forms of Governance

- **Understanding how to support neurodivergent youth**: Moderators on four servers shared that they have youth who are neurodivergent on their servers and a fifth server is dedicated for such youth. As scholars have noted in HCI (e.g., Ringland; Spiel and Gerling 2021), more research focused on understanding the needs of neurodivergent youth can inform the design and development of friendlier and improved technological supports in games like Minecraft.

- **Social scaffolding Prosocial tools for assisting moderators**: Through design-research-practice partnerships with moderators, future work might develop a set of best practices for moderating on kid-/family-friendly servers. Other interventions might explore moderator-led strategies to amplify "teachable moments" (Woods Jeffrey, 1996) and other such social scaffolding techniques. The UCIProsocial bot probe (Study III) in this work illustrates the ways in which simple changes at the user interface level can be helpful in making certain behaviors more visible to the community, akin to prior work in games focused on individual players (Targett et al., 2012; Wuertz et al. 2018). The probe study also suggests that bots can be harnessed to support social onboarding for new members and scaffold social interactions among youth. Future design-based research might reveal the full potential and efficacy of such prosocial moderation tools that can support moderators with their current practice.

- **Platform-based policy**: Considerable work is needed to understand how legal (e.g.. COPPA) and platform-based policy impacts the goals for supporting youth in online

gaming. Likewise, future work must endeavor to understand how the design-research-practice of play-based affinity networks might inform policy changes.

- **Extending theories**: While dominant work in HCI has examined content moderation, this dissertation brings a different dimension of moderation in play-based spaces to light. The emergent nature of play necessitates moderators in games like Minecraft to not only focus on content, but also individual and social play behaviors. As a result, moderation research should investigate further the styles and approaches used in other play-based contexts as a way of deepening our understanding of moderation. Furthermore, this work offers the preliminary basis for exploring alternative theoretical paradigms for contexts involving youth in that moderation functions more as a social support or scaffold to aid learning. More research including observational studies, research-practice initiatives such as Designing Care-full online communities might help advance the theoretical underpinnings of existing theories around affinity-based mentoring and care (Gee 2005; Rhodes).

Bibliography

Espen Aarseth, Anthony M Bean, Huub Boonen, Michelle Colder Carras, Mark Coulson, Dimitri Das, Jory Deleuze, Elza Dunkels, Johan Edman, Christopher J Ferguson, and others. Scholars' open debate paper on the World Health Organization ICD-11 Gaming Disorder proposal. *Journal of behavioral addictions*, 6(3):267–270, 2017. Publisher: Akadémiai Kiadó Budapest.

Hind Almerekhi, Haewoon Kwak, Joni Salminen, and Bernard J. Jansen. Are These Comments Triggering? Predicting Triggers of Toxicity in Online Discussions. In *Proceedings of The Web Conference 2020*, WWW '20, pages 3033–3040, New York, NY, USA, 2020. Association for Computing Machinery. ISBN 978-1-4503-7023-3. doi: 10.1145/3366423.3380074. URL `https://doi.org/10.1145/3366423.3380074`. event-place: Taipei, Taiwan.

Morgan G. Ames and Jenna Burrell. 'Connected Learning' and the Equity Agenda: A Microsociology of Minecraft Play. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, CSCW '17, pages 446–457, New York, NY, USA, 2017. ACM. ISBN 978-1-4503-4335-0. doi: 10.1145/2998181.2998318. URL `http://doi.acm.org/10.1145/2998181.2998318`. event-place: Portland, Oregon, USA.

Diego Fernando Gutierrez Aponte and Deborah Richards. Managing cyber-bullying in online educational virtual worlds. In *Interactive Entertainment'13*, pages 1–9, New York, New York, USA, 2013a. ACM Press. ISBN 9781450322546. doi: 10.1145/2513002.2513006. URL `http://dl.acm.org/citation.cfm?doid=2513002.2513006`.

Diego Fernando Gutierrez Aponte and Deborah Richards. Managing Cyber-Bullying in Online Educational Virtual Worlds. In *Proceedings of The 9th Australasian Conference on Interactive Entertainment: Matters of Life and Death*, IE '13, New York, NY, USA, 2013b. Association for Computing Machinery. ISBN 978-1-4503-2254-6. doi: 10.1145/2513002.2513006. URL `https://doi.org/10.1145/2513002.2513006`. event-place: Melbourne, Australia.

Paul WB Atkins, David Sloan Wilson, and Steven C Hayes. *Prosocial: using evolutionary science to build productive, equitable, and collaborative groups*. New Harbinger Publications, 2019.

Flávio S. Azevedo. Lines of practice: A practice-centered theory of interest relationships. *Cognition and Instruction*, 29(2):147–184, 2011.

Flávio S. Azevedo. The tailored practice of hobbies and its implication for the design of interest-driven learning environments. *Journal of the Learning Sciences*, 22(3):462–510, 2013.

Roger Azevedo, Jennifer G. Cromley, Fielding I. Winters, Daniel C. Moos, and Jeffrey A. Greene. Adaptive human scaffolding facilitates adolescents' self-regulated learning with hypermedia. *Instructional science*, 33(5):381–412, 2005. Publisher: Springer.

Carol R Bailey and Carol A Bailey. *A guide to qualitative field research*. Sage Publications, 2017.

Tom Baranowski, Richard Buday, Debbe I. Thompson, and Janice Baranowski. Playing for real: video games and stories for health-related behavior change. *American journal of preventive medicine*, 34(1):74–82, 2008.

Tom Baranowski, Janice Baranowski, Debbe Thompson, and Richard Buday. *Behavioral science in video games for children's diet and physical activity change: key research needs*. SAGE Publications, 2011.

Jane E. Barker and Yuko Munakata. Developing self-directed executive functioning: Recent findings and future directions. *Mind, Brain, and Education*, 9(2):92–99, 2015.

Lynn A. Barnett. Developmental benefits of play for children. *Journal of leisure Research*, 22(2):138–153, 1990. Publisher: Taylor & Francis.

Oliy Barrett. Making a Basic Discord Bot with Java, June 2018. URL `https://medium.com/discord-bots/making-a-basic-discord-bot-with-java-834949008c2b`.

Richard A Bartle. Why governments aren't gods and gods aren't governments. *First Monday*, 7, 2006.

Laura Beals and Marina Umaschi Bers. A developmental lens for designing virtual worlds for children and youth. 2009. Publisher: MIT Press 238 Main St., Suite 500, Cambridge, MA 02142-1046, USA email ....

Vaughan Bell, Dorothy V M Bishop, and Andrew K Przybylski. The debate over digital technology and young people. *BMJ*, page h3064, August 2015. ISSN 1756-1833. doi: 10.1136/bmj.h3064. URL `http://www.bmj.com/lookup/doi/10.1136/bmj.h3064`.

Luciana Benotti, María Cecilia Martínez, and Fernando Schapachnik. Engaging high school students using chatbots. In *Proceedings of the 2014 conference on Innovation & technology in computer science education*, ITiCSE '14, pages 63–68, New York, NY, USA, June 2014. Association for Computing Machinery. ISBN 978-1-4503-2833-3. doi: 10.1145/2591708.2591728. URL `https://doi.org/10.1145/2591708.2591728`.

Max V. Birk, Benjamin Buttlar, Jason T. Bowey, Susanne Poeller, Shelby C. Thomson, Nicola Baumann, and Regan L. Mandryk. The effects of social exclusion on play experience and hostile cognitions in digital games. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pages 3007–3019. ACM, 2016.

Rebecca W Black and Constance Steinkuehler. Literacy in virtual worlds. *Handbook of adolescent literacy research*, pages 271–286, 2009.

Lindsay Blackwell, Jill Dimond, Sarita Schoenebeck, and Cliff Lampe. Classification and Its Consequences for Online Harassment: Design Insights from HeartMob. *Proc. ACM Hum.-Comput. Interact.*, 1(CSCW), December 2017. doi: 10.1145/3134659. URL `https://doi.org/10.1145/3134659`. Place: New York, NY, USA Publisher: Association for Computing Machinery.

S. Blakemore. The social brain of a teenager. *PSYCHOLOGIST-LEICESTER-*, 20(10):600, 2007.

Sarah-Jayne Blakemore and Suparna Choudhury. Development of the adolescent brain: implications for executive function and social cognition. *Journal of child psychology and psychiatry*, 47(3-4):296–312, 2006.

Sarah-Jayne Blakemore and Kathryn L. Mills. Is adolescence a sensitive period for sociocultural processing? *Annual review of psychology*, 65:187–207, 2014. Publisher: Annual Reviews.

Sarah-Jayne Blakemore, Hanneke den Ouden, Suparna Choudhury, and Chris Frith. Adolescent development of the neural circuitry for thinking about intentions. 2007.

Elaine A. Blechman, Ronald J. Prinz, and Jean E. Dumas. Coping, competence, and aggression prevention: Part 1. Developmental model. *Applied and Preventive Psychology*, 4 (4):211–232, 1995.

James H. Block and Robert B. Burns. Mastery Learning. *Review of Research in Education*, 4:3–49, 1976. ISSN 0091-732X. doi: 10.2307/1167112. URL `https://www.jstor.org/stable/1167112`. Publisher: [Sage Publications, Inc., American Educational Research Association].

Kirsten Boehner, Janet Vertesi, Phoebe Sengers, and Paul Dourish. How HCI interprets the probes. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 1077–1086, San Jose California USA, April 2007. ACM. ISBN 978-1-59593-593-9. doi: 10.1145/1240624.1240789. URL `https://dl.acm.org/doi/10.1145/1240624.1240789`.

Tom Boellstorff, Bonnie Nardi, Celia Pearce, and Tina L. Taylor. *Ethnography and virtual worlds: A handbook of method*. Princeton University Press, 2012.

Beth Bos, Lucy Wilder, Marcelina Cook, and Ryan O'Donnell. Learning mathematics through Minecraft. *Teaching Children Mathematics*, 21(1):56–59, 2014.

Jeroen Bourgonjon, Geert Vandermeersche, and Kris Rutten. Perspectives on Video Games as Art. *CLCWeb*, 19(4), December 2017. doi: 10.7771/1481-4374.3024. URL `https://search.proquest.com/docview/2272295566?accountid=14509`.

danah boyd. *It's complicated: the social lives of networked teens*. Yale University Press, New Haven, 2014. ISBN 978-0-300-16631-6.

Virginia Braun and Victoria Clarke. Thematic analysis. 2012.

David A. Bray and Benn R. Konsynski. Virtual worlds: multi-disciplinary research opportunities. *ACM SIGMIS Database: the DATABASE for Advances in Information Systems*, 38(4):17–25, 2007. Publisher: ACM New York, NY, USA.

Svend Brinkmann and Steinar Kvale. *Interviews: Learning the craft of qualitative research interviewing*, volume 3. Sage Thousand Oaks, CA, 2015.

B Bradford Brown and Mary J Lohr. Peer-group affiliation and adolescent self-esteem: an integration of ego-identity and symbolic-interaction theories. *Journal of personality and social psychology*, 52(1):47, 1987.

Jonathon D. Brown. Evaluations of Self and Others: Self-Enhancement Biases in Social Judgments. *Social Cognition*, 4(4):353–376, December 1986. ISSN 0278-016X. doi: 10.1521/soco.1986.4.4.353. URL `https://guilfordjournals.com/doi/abs/10.1521/soco.1986.4.4.353`. Publisher: Guilford Publications Inc.

Geir Scott Brunborg, Rune Aune Mentzoni, Ole Rogstad Melkevik, Torbjørn Torsheim, Oddrun Samdal, Jørn Hetland, Cecilie Schou Andreassen, and Ståle Palleson. Gaming addiction, gaming engagement, and psychological health complaints among Norwegian adolescents. *Media psychology*, 16(1):115–128, 2013. Publisher: Taylor & Francis.

David Buckingham. *Youth, identity, and digital media*. the MIT Press, 2007.

M. Bundick, M. Andrews, A. Jones, J. M. Mariano, K. C. Bronk, and W. Damon. Revised youth purpose survey. *Unpublished instrument, Stanford Center on Adolescence, Stanford, CA*, 2006.

Martin Camiré, Pierre Trudel, and Tanya Forneris. Examining how model youth sport coaches learn to facilitate positive youth development. *Physical Education and Sport Pedagogy*, 19(1):1–17, 2014.

Julie Ann Campbell, Cecilia Aragon, Katie Davis, Sarah Evans, Abigail Evans, and David P Randall. Thousands of Positive Reviews: Distributed Mentoring in Online Fan Communities. *CSCW '*, page 14, 2016.

Marilyn A Campbell. Cyber bullying: An old problem in a new guise? *Journal of Psychologists and Counsellors in Schools*, 15(1):68–76, 2005.

Robyn Caplan. Content or context moderation? Report, Data & Society Research Institute, November 2018. URL `https://apo.org.au/node/203666`. Journal Abbreviation: Artisanal, community-reliant, and industrial approaches.

Robyn Caplan and Tarleton Gillespie. Tiered Governance and Demonetization: The Shifting Terms of Labor and Compensation in the Platform Economy. *Social Media + Society*, 6 (2):2056305120936636, April 2020. ISSN 2056-3051. doi: 10.1177/2056305120936636. URL https://doi.org/10.1177/2056305120936636. Publisher: SAGE Publications Ltd.

Richard F. Catalano, M. Lisa Berglund, Jean AM Ryan, Heather S. Lonczak, and J. David Hawkins. Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *The annals of the American academy of political and social science*, 591(1):98–124, 2004.

Eshwar Chandrasekharan, Umashanthi Pavalanathan, Anirudh Srinivasan, Adam Glynn, Jacob Eisenstein, and Eric Gilbert. You can't stay here: The efficacy of reddit's 2015 ban examined through hate speech. *Proceedings of the ACM on Human-Computer Interaction*, 1(CSCW):1–22, 2017a. Publisher: ACM New York, NY, USA.

Eshwar Chandrasekharan, Mattia Samory, Anirudh Srinivasan, and Eric Gilbert. The Bag of Communities: Identifying Abusive Behavior Online with Preexisting Internet Data. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, CHI '17, pages 3175–3187, New York, NY, USA, 2017b. Association for Computing Machinery. ISBN 978-1-4503-4655-9. doi: 10.1145/3025453.3026018. URL https://doi.org/10.1145/3025453.3026018. event-place: Denver, Colorado, USA.

Eshwar Chandrasekharan, Mattia Samory, Shagun Jhaver, Hunter Charvat, Amy Bruckman, Cliff Lampe, Jacob Eisenstein, and Eric Gilbert. The Internet's Hidden Rules: An Empirical Study of Reddit Norm Violations at Micro, Meso, and Macro Scales. *Proc. ACM Hum.-Comput. Interact.*, 2(CSCW), November 2018. doi: 10.1145/3274301. URL https://doi.org/10.1145/3274301. Place: New York, NY, USA Publisher: Association for Computing Machinery.

Sven Charleer, Kathrin Gerling, Francisco Gutiérrez, Hans Cauwenbergh, Bram Luycx, and Katrien Verbert. Real-time dashboards to support esports spectating. In *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play*, pages 59–71, 2018.

Joohee Choi and Yla Tausczik. Will Too Many Editors Spoil The Tag? Conflicts and Alignment in Q&A Categorization. *Proc. ACM Hum.-Comput. Interact.*, 2(CSCW), November 2018. doi: 10.1145/3274307. URL https://doi.org/10.1145/3274307. Place: New York, NY, USA Publisher: Association for Computing Machinery.

Hyekyung Choo, Douglas Gentile, Timothy Sim, Dong Dong Li, Angeline Khoo, and Albert Liau. Pathological video-gaming among Singaporean youth. 2010.

Suparna Choudhury, Sarah-Jayne Blakemore, and Tony Charman. Social cognitive development during adolescence. *Social cognitive and affective neuroscience*, 1(3):165–174, 2006.

Michael G. Christel, Scott Stevens, Matt Champer, John Balash, Sean Brice, Bryan Maher, Danny Hausmann, Nora Bastida, Chandana Bhargava, and Weiwei Huo. Beanstalk: A unity game addressing balance principles, socio-emotional learning and scientific inquiry.

In *2013 IEEE International Games Innovation Conference (IGIC)*, pages 36–39. IEEE, 2013.

Robert B Cialdini and Noah J Goldstein. Social influence: Compliance and conformity. *Annu. Rev. Psychol.*, 55:591–621, 2004a.

Robert B Cialdini and Noah J Goldstein. Social influence: Compliance and conformity. *Annu. Rev. Psychol.*, 55:591–621, 2004b. Publisher: Annual Reviews.

Robert B Cialdini, Melanie R Trost, and Jason T Newsom. Preference for consistency: The development of a valid measure and the discovery of surprising behavioral implications. *Journal of personality and social psychology*, 69(2):318, 1995.

Maria Cipollone, Catherine C Schifter, and Rick A Moffat. Minecraft as a creative tool: A case study. *International Journal of Game-Based Learning (IJGBL)*, 4(2):1–14, 2014a.

Maria Cipollone, Catherine C. Schifter, and Rick A. Moffat. Minecraft as a Creative Tool: A Case Study. *International Journal of Game-Based Learning*, 4(2):1–14, April 2014b. ISSN 2155-6849, 2155-6857. doi: 10.4018/ijgbl.2014040101. URL `http://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/ijgbl.2014040101`.

Michelle Colder Carras, Antonius J. Van Rooij, Donna Spruijt-Metz, Joseph Kvedar, Mark D. Griffiths, Yorghos Carabas, and Alain Labrique. Commercial video games as therapy: A new research agenda to unlock the potential of a global pastime. *Frontiers in psychiatry*, 8:300, 2018.

Helena Cole and Mark D. Griffiths. Social interactions in massively multiplayer online role-playing gamers. *Cyberpsychology & behavior*, 10(4):575–583, 2007.

James S Coleman. Foundations of Social Theory. page 31.

James S Coleman. Commentary: Social institutions and social theory. *American Sociological Review*, 55(3):333–339, 1990.

James S Coleman. The emergence of norms. In *Social institutions*, pages 35–60. Routledge, 2018.

Margaret Coleman, Larry Wheeler, and Jo Webber. Research on interpersonal problem-solving training: A review. *Remedial and Special Education*, 14(2):25–37, 1993.

Ian Convery and Diane Cox. A review of research ethics in internet-based research. *Practitioner Research in Higher Education*, 6(1):50–57, 2012. Publisher: UniPress.

National Research Council. *Education for life and work: Developing transferable knowledge and skills in the 21st century*. National Academies Press, 2012.

National Research Council. Education for life and work: Developing transferable knowledge and skills in the 21st century, 2013.

Kate Cowan. A Panorama of Play - A Literature Review. page 39.

Andy Crabtree, Alan Chamberlain, Rebecca E. Grinter, Matt Jones, Tom Rodden, and Yvonne Rogers. Introduction to the special issue of "The Turn to The Wild", 2013.

Ashley B. Craig, Emily R. Brown, James Upright, and Melissa E. DeRosier. Enhancing children's social emotional functioning through virtual game-based delivery of social skills training. *Journal of Child and Family Studies*, 25(3):959–968, 2016.

John W. Creswell and Dana L. Miller. Determining Validity in Qualitative Inquiry. *Theory Into Practice*, 39(3):124–130, August 2000. ISSN 0040-5841, 1543-0421. doi: 10.1207/s15430421tip3903_2. URL `http://www.tandfonline.com/doi/abs/10.1207/s15430421tip3903_2`.

John W. Creswell and Cheryl N. Poth. *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications, 2016.

Eveline A. Crone and Ronald E. Dahl. Understanding adolescence as a period of social–affective engagement and goal flexibility. *Nature Reviews Neuroscience*, 13(9):636, 2012.

Kevin Crowley and Melanie Jacobs. Building islands of expertise in everyday family activity. *Learning conversations in museums*, 333356, 2002.

Jen Scott Curwood. " the hunger games": Literature, literacy, and online affinity spaces. *Language Arts*, 90(6):417–427, 2013.

Ronald E. Dahl, Nicholas B. Allen, Linda Wilbrecht, and Ahna Ballonoff Suleiman. Importance of investing in adolescence from a developmental science perspective. *Nature*, 554 (7693):441–450, February 2018. ISSN 0028-0836, 1476-4687. doi: 10.1038/nature25770. URL `http://www.nature.com/articles/nature25770`.

William Damon. Peer education: The untapped potential. *Journal of Applied Developmental Psychology*, 5(4):331–343, October 1984. ISSN 01933973. doi: 10.1016/0193-3973(84)90006-6. URL `https://linkinghub.elsevier.com/retrieve/pii/0193397384900066`.

William Damon. What is positive youth development? *The Annals of the American Academy of Political and Social Science*, 591(1):13–24, 2004.

William Damon, Jenni Menon, and Kendall Cotton Bronk. The development of purpose during adolescence. *Applied developmental science*, 7(3):119–128, 2003.

Margaret Debenham. Epistolary Interviews On-line: A Novel Addition to the Researcher's Palate. *TechDis Website Resource*, January 2007.

Ansgar E. Depping and Regan L. Mandryk. Cooperation and Interdependence: How Multiplayer Games Increase Social Closeness. In *Proceedings of the Annual Symposium on Computer-Human Interaction in Play*, pages 449–461, 2017.

Ansgar E. Depping, Colby Johanson, and Regan L. Mandryk. Designing for Friendship: Modeling Properties of Play, In-Game Social Capital, and Psychological Well-being. In *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play*, CHI PLAY '18, pages 87–100, New York, NY, USA, October 2018. Association for Computing Machinery. ISBN 978-1-4503-5624-4. doi: 10.1145/3242671.3242702. URL https://doi.org/10.1145/3242671.3242702.

Kathy T Do, João F Guassi Moreira, and Eva H Telzer. But is helping you worth the risk? defining prosocial risk taking in adolescence. *Developmental cognitive neuroscience*, 25: 260–271, 2017.

Matt Doyle. 11 Family-Friendly Minecraft Servers Where Your Kid Can Play Safely Online, June 2014. URL https://www.brightpips.com/11-family-friendly-minecraft-servers-where-your-kid-can-play-safely-online/. Library Catalog: www.brightpips.com Section: Minecraft.

Joy G Dryfoos. Safe passage: Making it through adolescence in a risky society. 1998. Publisher: ERIC.

Yao Du, Thomas D Grace, Krithika Jagannath, and Katie Salen-Tekinbas. Connected play in virtual worlds: Communication and control mechanisms in virtual worlds for children and adolescents. *Multimodal Technologies and Interaction*, 5(5):27, 2021a.

Yao Du, Thomas D Grace, Krithika Jagannath, and Katie Salen-Tekinbas. Connected Play in Virtual Worlds: Communication and Control Mechanisms in Virtual Worlds for Children and Adolescents. *Multimodal Technologies and Interaction*, 5(5):27, 2021b. Publisher: Multidisciplinary Digital Publishing Institute.

Nicolas Ducheneaut, Nicholas Yee, Eric Nickell, and Robert J. Moore. Alone together?: exploring the social dynamics of massively multiplayer online games. In *Proceedings of the SIGCHI conference on Human Factors in computing systems*, pages 407–416. ACM, 2006.

Caitlin Duncan, Tim Bell, and James Atlas. What Do the Teachers Think? Introducing Computational Thinking in the Primary School Curriculum. In *Proceedings of the Nineteenth Australasian Computing Education Conference*, ACE '17, pages 65–74, New York, NY, USA, 2017. Association for Computing Machinery. ISBN 978-1-4503-4823-2. doi: 10.1145/3013499.3013506. URL https://doi.org/10.1145/3013499.3013506. event-place: Geelong, VIC, Australia.

Sean C. Duncan. Gamers as designers: A framework for investigating design in gaming affinity spaces. *E-Learning and Digital Media*, 7(1):21–34, 2010.

Sean C. Duncan. Minecraft, beyond construction and survival. *Well Played: a journal on video games, value and meaning*, 1(1):1–22, 2011.

Brianna Dym, Cecilia Aragon, Julia Bullard, Ruby Davis, and Casey Fiesler. Online Fandom: Boldly Going Where Few CSCW Researchers Have Gone Before. In *Companion of the 2018 ACM Conference on Computer Supported Cooperative Work and Social Computing*, CSCW

'18, pages 121–124, New York, NY, USA, 2018. Association for Computing Machinery. ISBN 978-1-4503-6018-0. doi: 10.1145/3272973.3274542. URL https://doi.org/10.1145/3272973.3274542. event-place: Jersey City, NJ, USA.

Liesel Ebersohn and Irma Eloff. Identifying asset-based trends in sustainable programmes which support vulnerable children. *South African journal of education*, 26(3):457–467, 2006. Publisher: Education Association of South Africa (EASA).

Jacquelynne S. Eccles and Allan Wigfield. Young adolescent development. *INSTITUTION National Middle School Association, Columbus, OH. ISBN ISBN-1-56090-120-9*, page 28, 1997. Publisher: ERIC.

Jacquelynne S Eccles, Carol Midgley, Allan Wigfield, Christy Miller Buchanan, David Reuman, Constance Flanagan, and Douglas Mac Iver. Development during adolescence: The impact of stage–environment fit on young adolescents' experiences in schools and in families (1993). 1997. Publisher: American Psychological Association.

Tisha Lewis Ellison and Jessica N. Evans. " Minecraft," Teachers, Parents, and Learning: What They Need to Know and Understand. *School Community Journal*, 26(2):25–43, 2016.

Joshua AT Fairfield. Anti-social contracts: The contractual governance of virtual worlds. *McGill LJ*, 53:427, 2008. Publisher: HeinOnline.

Christopher J. Ferguson. Do angry birds make for angry children? A meta-analysis of video game influences on children's and adolescents' aggression, mental health, prosocial behavior, and academic performance. *Perspectives on psychological science*, 10(5):646–666, 2015.

Christopher J Ferguson and John Colwell. Understanding why scholars hold different views on the influences of video games on public health. *Journal of Communication*, 67(3): 305–327, 2017.

Andy Field, Jeremy Miles, and Zoë Field. *Discovering statistics using R*. Sage publications, 2012.

Casey Fiesler, Joshua McCann, Kyle Frye, and Jed R. Brubaker. Reddit rules! characterizing an ecosystem of governance. In *Twelfth International AAAI Conference on Web and Social Media*, 2018.

Abbie R. Finlinson. Cooperative games: promoting prosocial behaviors in children. 1997.

Mary Flanagan and Helen Nissenbaum. *Values at play in digital games*. MIT Press, 2014.

Mary Flanagan, Jonathan Belman, Helen Nissenbaum, and Jim Diamond. A Method For Discovering Values in Digital Games. In *DiGRA Conference*. Citeseer, 2007.

Mary Flanagan, Daniel C. Howe, and Helen Nissenbaum. Embodying values in technology: Theory and practice. *Information technology and moral philosophy*, 322, 2008. Publisher: Citeseer.

Chek Yang Foo and Elina MI Koivisto. Defining grief play in MMORPGs: player and developer perceptions. In *Proceedings of the 2004 ACM SIGCHI International Conference on Advances in computer entertainment technology*, pages 245–250. ACM, 2004.

Lucy Foulkes and Sarah-Jayne Blakemore. Is there heightened sensitivity to social reward in adolescence? *Current Opinion in Neurobiology*, 40:81–85, October 2016. ISSN 0959-4388. doi: 10.1016/j.conb.2016.06.016. URL `https://www.sciencedirect.com/science/article/pii/S0959438816300824`.

Andrew J Fuligni. The need to contribute during adolescence. *Perspectives on Psychological Science*, 14(3):331–343, 2019a.

Andrew J. Fuligni. The Need to Contribute During Adolescence. *Perspectives on Psychological Science*, 14(3):331–343, May 2019b. ISSN 1745-6916. doi: 10.1177/1745691618805437. URL `https://doi.org/10.1177/1745691618805437`. Publisher: SAGE Publications Inc.

Bill Gaver, Tony Dunne, and Elena Pacenti. Design: Cultural probes. *Interactions*, 6 (1):21–29, January 1999. ISSN 1072-5520. doi: 10.1145/291224.291235. URL `https://doi.org/10.1145/291224.291235`.

James Paul Gee. Affinity spaces. *Situated language and learning: A critique of traditional schooling*, pages 77–89, 2004.

James Paul Gee. Semiotic social spaces and affinity spaces. *Beyond communities of practice language power and social context*, 214232, 2005.

James Paul Gee. Are video games good for learning? *Nordic Journal of Digital Literacy*, 1 (03):172–183, 2006.

James Paul Gee. Learning and games. *The ecology of games: Connecting youth, games, and learning*, 3:21–40, 2008.

James Paul Gee. Affinity spaces: How young people live and learn on line and out of school. *Phi Delta Kappan*, 99(6):8–13, 2018.

James Paul Gee and Elisabeth Hayes. Nurturing affinity spaces and game-based learning. *Games, learning, and society: Learning and meaning in the digital age*, 123:1–40, 2012.

Steinunn Gestsdóttir and Richard M. Lerner. Intentional self-regulation and positive youth development in early adolescence: Findings from the 4-h study of positive youth development. *Developmental psychology*, 43(2):508, 2007.

James J Gibson. The concept of affordances. *Perceiving, acting, and knowing*, 1, 1977.

Tarleton Gillespie. *Custodians of the Internet: Platforms, content moderation, and the hidden decisions that shape social media*. Yale University Press, 2018.

Tarleton Gillespie. Content moderation, AI, and the question of scale. *Big Data & Society*, 7(2):205395172094323, July 2020. ISSN 2053-9517, 2053-9517. doi: 10.1177/2053951720943234. URL http://journals.sagepub.com/doi/10.1177/2053951720943234.

Alison Giovanelli, Elizabeth M. Ozer, and Ronald E. Dahl. Leveraging Technology to Improve Health in Adolescence: A Developmental Science Perspective. *Journal of Adolescent Health*, 67(2, Supplement):S7–S13, August 2020. ISSN 1054-139X. doi: 10.1016/j.jadohealth.2020.02.020. URL https://www.sciencedirect.com/science/article/pii/S1054139X2030094X.

Vittorio Girotto, Paul Light, and Christopher Colbourn. Pragmatic Schemas and Conditional Reasoning in Children. *The Quarterly Journal of Experimental Psychology Section A*, 40 (3):469–482, August 1988. ISSN 0272-4987, 1464-0740. doi: 10.1080/02724988843000023. URL http://journals.sagepub.com/doi/10.1080/02724988843000023.

Vinod Goel, Jordan Grafman, Norihiro Sadato, and Mark Hallett. Modeling other minds. *Neuroreport*, 6(13):1741–1746, September 1995. ISSN 0959-4965.

Dion H. Goh, Rebecca P. Ang, and Hui Chern Tan. Strategies for designing effective psychotherapeutic gaming interventions for children and adolescents. *Computers in Human Behavior*, 24(5):2217–2235, 2008. Publisher: Elsevier.

Shelley Goldman, Angela Booker, and Meghan McDermott. Mixing the digital, social, and cultural: Learning, identity, and agency in youth participation. *Youth, identity, and digital media*, 216, 2008.

Robert Gorwa. The platform governance triangle: conceptualising the informal regulation of online content. *Internet Policy Review*, 8(2), June 2019. ISSN 2197-6775. URL https://policyreview.info/articles/analysis/platform-governance-triangle-conceptualising-informal-regulation-online-content.

Robert Gorwa, Reuben Binns, and Christian Katzenbach. Algorithmic content moderation: Technical and political challenges in the automation of platform governance. *Big Data & Society*, 7(1):2053951719897945, January 2020. ISSN 2053-9517. doi: 10.1177/2053951719897945. URL https://doi.org/10.1177/2053951719897945. Publisher: SAGE Publications Ltd.

Isabela Granic, Adam Lobel, and Rutger CME Engels. The benefits of playing video games. *American psychologist*, 69(1):66, 2014.

S.M. Grimes. Configuring the Child Player. *Science Technology and Human Values*, 40(1):126–148, 2015a. ISSN 01622439. doi: 10.1177/0162243914550253. URL https://www.scopus.com/inward/record.uri?eid=2-s2.0-84912083854&doi=10.1177%2f0162243914550253&partnerID=40&md5=9da712fb7d035ef25f747a809fb92b2f. Publisher: SAGE Publications Inc.

S.M. Grimes. Playing by the market rules: Promotional priorities and commercialization in children's virtual worlds. *Journal of Consumer Culture*, 15 (1):110–134, 2015b. ISSN 14695405. doi: 10.1177/1469540513493209. URL https://www.scopus.com/inward/record.uri?eid=2-s2.0-84925246550&doi=10.1177%2f1469540513493209&partnerID=40&md5=6d58884ca5b03b11b71f290441d2099e. Publisher: SAGE Publications Ltd.

Christian Grimme, Mike Preuss, Lena Adam, and Heike Trautmann. Social Bots: Human-Like by Means of Human Control? *Big Data*, 5(4):279–293, December 2017. ISSN 2167-6461. doi: 10.1089/big.2017.0044. URL https://www.liebertpub.com/doi/10.1089/big.2017.0044. Publisher: Mary Ann Liebert, Inc., publishers.

James Grimmelmann. The virtues of moderation. *Yale JL & Tech.*, 17:42, 2015.

Nancy G. Guerra and Catherine P. Bradshaw. Linking the prevention of problem behaviors and positive youth development: Core competencies for positive youth development and risk prevention. *New directions for child and adolescent development*, 2008(122):1–17, 2008.

Robert Halpern. A different kind of child development institution: The history of after-school programs for low-income children. *Teachers College Record*, 104(2):178–211, 2002.

Lisa Harker, Sonja Jütte, Tom Murphy, Holly Bentley, Pam Miller, and Kate Fitch. How safe are our children. *London: National Society for the Prevention of Cruelty to Children*, 2013.

Uwe Hasebrink, Sonia Livingstone, Leslie Haddon, and Kjartan Olafsson. *Comparing children's online opportunities and risks across Europe: Cross-national comparisons for EU Kids Online*. EU Kids Online, 2009.

Uwe Hasebrink, Anke Görzig, Leslie Haddon, Veronika Kalmus, and Sonia Livingstone. Patterns of risk and safety online: In-depth analyses from the EU Kids Online survey of 9-to 16-year-olds and their parents in 25 European countries. 2011.

Peter Holtz and Markus Appel. Internet use and video gaming predict problem behavior in early adolescence. *Journal of Adolescence*, 34(1):49–58, February 2011. ISSN 0140-1971. doi: 10.1016/j.adolescence.2010.02.004. URL https://www.sciencedirect.com/science/article/pii/S0140197110000370.

Linda A. Hughes. ?But that's not really mean?: Competing in a cooperative mode. *Sex Roles*, 19(11-12):669–687, December 1988. ISSN 0360-0025, 1573-2762. doi: 10.1007/BF00288984. URL http://link.springer.com/10.1007/BF00288984.

Mary Helen Immordino-Yang and Rebecca Gotlieb. Embodied brains, social minds, cultural meaning: Integrating neuroscientific and educational research on social-affective development. *American Educational Research Journal*, 54(1_suppl):344S–367S, 2017.

Mary Helen Immordino-Yang, Andrea McColl, Hanna Damasio, and Antonio Damasio. Neural correlates of admiration and compassion. *Proceedings of the National Academy of Sciences*, 106(19):8021–8026, 2009.

Mary Helen Immordino-Yang, Joanna A. Christodoulou, and Vanessa Singh. Rest Is Not Idleness: Implications of the Brain's Default Mode for Human Development and Education. *Perspectives on Psychological Science*, 7(4):352–364, July 2012. ISSN 1745-6916. doi: 10.1177/1745691612447308. URL `https://doi.org/10.1177/1745691612447308`.

Mary Helen Immordino-Yang, Linda Darling-Hammond, and Christina Krone. The brain basis for integrated social, emotional, and academic development. *Washington, DC: National Commission on Social, Emotional, and Academic Development*, 2018.

Hiroyuki Itami and Thomas W. Roehl. *Mobilizing Invisible Assets*. Harvard University Press, 1991. ISBN 978-0-674-57771-8. Google-Books-ID: wEQ2QOaD0twC.

Mizuko Ito, Kris Gutiérrez, Sonia Livingstone, Bill Penuel, Jean Rhodes, Katie Salen, Juliet Schor, Julian Sefton-Green, and S. Craig Watkins. *Connected learning: An agenda for research and design*. Digital Media and Learning Research Hub, 2013.

Mizuko Ito, Crystle Martin, Rachel Cody Pfister, Matthew H. Rafalow, Katie Salen, and Amanda Wortman. *Affinity online: How connection and shared interest fuel learning*, volume 2. NYU Press, 2018.

Mizuko Itō, editor. *Hanging out, messing around, and geeking out: kids living and learning with new media*. The John D. and Catherine T. MacArthur Foundation series on digital media and learning. MIT Press, Cambridge, Mass, 2010. ISBN 978-0-262-01336-9. OCLC: ocn314840580.

Krithika Jagannath, Katie Salen, and Petr Slovàk. "(We) Can Talk It Out...": Designing for Promoting Conflict-Resolution Skills in Youth on a Moderated Minecraft Server. *Proceedings of the ACM on Human-Computer Interaction*, 4(CSCW1):1–26, May 2020. ISSN 2573-0142, 2573-0142. doi: 10.1145/3392855. URL `https://dl.acm.org/doi/10.1145/3392855`.

Yasmin B. Kafai. World of Whyville: An introduction to tween virtual life. *Games and Culture*, 5(1):3–22, 2010.

Joseph Kahne, Ellen Middaugh, Nam-Jin Lee, and Jessica T. Feezell. Youth online activity and exposure to diverse perspectives. *New media & society*, 14(3):492–512, 2012.

Mark E. Kann, Jeff Berry, Connor Grant, and Phil Zager. The Internet and youth political participation. *First Monday*, 12(8), 2007.

Patrick Van Kessel, Skye Toor, and Aaron Smith. 2. Children's content, content featuring children and video games were among the most-viewed video genres, July 2019. URL `https://www.pewresearch.org/internet/2019/07/25/`.

Katherine M. Keyes, Julie Maslowsky, Ava Hamilton, and John Schulenberg. The great sleep recession: changes in sleep duration among US adolescents, 1991–2012. *Pediatrics*, 135 (3):460–468, 2015. Publisher: Am Acad Pediatrics.

Baroness Beeban Kidron and Dr Angharad Rudkin. Addressing Childhood Development Milestones in the Digital Environment. page 28.

Beeban Kidron and Angharad Rudkin. Digital Childhood: Addressing childhood development milestones in the digital environment., December 2017. URL `http://5rightsframework.com/resources.html`. Publisher: 5Rights.

Sara Kiesler, Robert Kraut, Paul Resnick, and Aniket Kittur. Regulating behavior in online communities. *Building successful online communities: Evidence-based social design*, pages 125–178, 2012.

Douglas Kirby and Karin Coyle. School-based programs to reduce sexual risk-taking behavior. *Children and youth services review*, 19(5-6):415–436, 1997.

Lisa J Knoll, Lucía Magis-Weinberg, Maarten Speekenbrink, and Sarah-Jayne Blakemore. Social influence on risk perception during adolescence. *Psychological science*, 26(5):583–592, 2015.

Caroline Knorr. Parents' Ultimate Guide to Minecraft, May 2020. URL `https://www.commonsensemedia.org/blog/parents-ultimate-guide-to-minecraft`.

Yubo Kou and Bonnie A. Nardi. Governance in League of Legends: A hybrid system. In *FDG*, 2014.

Robert E Kraut and Paul Resnick. *Building successful online communities: Evidence-based social design*. Mit Press, 2012a.

Robert E. Kraut and Paul Resnick. *Building successful online communities: Evidence-based social design*. Mit Press, 2012b.

Daria Joanna Kuss and Mark D. Griffiths. Internet Gaming Addiction: A Systematic Review of Empirical Research. *International Journal of Mental Health and Addiction*, 10(2):278–296, April 2012. ISSN 1557-1882. doi: 10.1007/s11469-011-9318-5. URL `https://doi.org/10.1007/s11469-011-9318-5`.

Haewoon Kwak, Jeremy Blackburn, and Seungyeop Han. Exploring Cyberbullying and Other Toxic Behavior in Team Competition Online Games. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, pages 3739–3748, Seoul Republic of Korea, April 2015a. ACM. ISBN 978-1-4503-3145-6. doi: 10.1145/2702123.2702529. URL `https://dl.acm.org/doi/10.1145/2702123.2702529`.

Haewoon Kwak, Jeremy Blackburn, and Seungyeop Han. Exploring cyberbullying and other toxic behavior in team competition online games. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, pages 3739–3748. ACM, 2015b.

Kristin Hansen Lagattuta. When You Shouldn't Do What You Want to Do: Young Children's Understanding of Desires, Rules, and Emotions. *Child Development*, 76(3):713–733, 2005. ISSN 1467-8624. doi: 10.1111/j.1467-8624.2005.00873.x. URL https://srcd.onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8624.2005.00873.x. _eprint: https://srcd.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1467-8624.2005.00873.x.

H. Chad Lane, Sherry Yi, Brian Guerrero, and Neil F. Comins. Minecraft as a Sandbox for STEM Interest Development: Preliminary Results. In *25th International Conference on Computers in Education Proceedings*, 2017.

Reed W. Larson. Toward a psychology of positive youth development. *American psychologist*, 55(1):170, 2000.

F Gregory Lastowka and Dan Hunter. The laws of the virtual worlds. *Calif. L. Rev.*, 92:1, 2004.

Jean Lave. Situating learning in communities of practice. In *Perspectives on socially shared cognition*, pages 63–82. American Psychological Association, Washington, DC, US, 1991. ISBN 978-1-55798-121-9. doi: 10.1037/10096-003.

Daniel Lee, Gopi Krishnan Rajbahadur, Dayi Lin, Mohammed Sayagh, Cor-Paul Bezemer, and Ahmed E Hassan. An empirical study of the characteristics of popular minecraft mods. *Empirical Software Engineering*, 25(5):3396–3429, 2020.

Juhani E. Lehto, Petri Juujärvi, Libbe Kooistra, and Lea Pulkkinen. Dimensions of executive functioning: Evidence from children. *British Journal of Developmental Psychology*, 21 (1):59–80, 2003. ISSN 2044-835X. doi: 10.1348/026151003321164627. URL https://onlinelibrary.wiley.com/doi/abs/10.1348/026151003321164627.

Amanda Lenhart, Joseph Kahne, Ellen Middaugh, Alexandra Rankin Macgill, Chris Evans, and Jessica Vitak. *Teens, Video Games, and Civics: Teens' Gaming Experiences Are Diverse and Include Significant Social Interaction and Civic Engagement*. Pew Internet & American Life Project, September 2008. URL https://eric.ed.gov/?id=ED525058.

Amanda Lenhart, Kristen Purcell, Aaron Smith, and Kathryn Zickuhr. Social Media & Mobile Internet Use among Teens and Young Adults. Millennials. *Pew internet & American life project*, 2010.

Amanda Lenhart, Mary Madden, Aaron Smith, Kristen Purcell, Kathryn Zickuhr, and Lee Rainie. Teens, kindness and cruelty on social network sites: How american teens navigate the new world of" digital citizenship". *Pew Internet & American Life Project*, 2011.

Jacqueline V. Lerner, Erin Phelps, Yulika E. Forman, and Edmond P. Bowers. Positive youth development. *Handbook of adolescent psychology*, 1, 2009.

Richard M. Lerner, Cornelia Brentano, Elizabeth M. Dowling, and Pamela M. Anderson. Positive youth development: Thriving as the basis of personhood and civil society. *New directions for youth development*, 2002(95):11–34, 2002.

Richard M. Lerner, Jason B. Almerigi, Christina Theokas, and Jacqueline V. Lerner. Positive Youth Development A View of the Issues. *The Journal of Early Adolescence*, 25(1):10–16, February 2005. ISSN 0272-4316, 1552-5449. doi: 10.1177/0272431604273211. URL http://journals.sagepub.com/doi/10.1177/0272431604273211.

Richard M. Lerner, Jacqueline V. Lerner, Selva Lewin-Bizan, Edmond P. Bowers, Michelle J. Boyd, Megan Kiely Mueller, Kristina L. Schmid, and Christopher M. Napolitano. Positive youth development: Processes, programs, and problematics. *Journal of Youth Development*, 6(3):38–62, 2011.

Lawrence Lessig and Lawrence Lessig. *Code*. Basic Books, New York, version 2.0 edition, 2006. ISBN 978-0-465-03914-2. OCLC: ocm77638613.

Seth C. Lewis, Rodrigo Zamith, and Alfred Hermida. Content analysis in an era of big data: A hybrid approach to computational and manual methods. *Journal of broadcasting & electronic media*, 57(1):34–52, 2013. Publisher: Taylor & Francis.

Qing Li. Bullying in the new playground: Research into cyberbullying and cyber victimisation. *Australasian Journal of Educational Technology*, 23(4), 2007.

Ioana Literat and Neta Kligler-Vilenchik. Youth collective political expression on social media: The role of affordances and memetic dimensions for voicing political views. *New Media & Society*, 21(9):1988–2009, 2019.

Ian J. Livingston, Lennart E. Nacke, and Regan L. Mandryk. The Impact of Negative Game Reviews and User Comments on Player Experience. In *ACM SIGGRAPH 2011 Game Papers*, SIGGRAPH '11, New York, NY, USA, 2011. Association for Computing Machinery. ISBN 978-1-4503-0970-7. doi: 10.1145/2037692.2037697. URL https://doi.org/10.1145/2037692.2037697. event-place: Vancouver, British Columbia, Canada.

Sonia Livingstone. Online risk, harm and vulnerability: Reflections on the evidence base for child internet safety policy. *ZER: Journal of Communication Studies*, 18(35):13–28, 2013.

Rosemary Luckin. The learner centric ecology of resources: A framework for using technology to scaffold learning. *Computers & Education*, 50(2):449–462, February 2008. ISSN 0360-1315. doi: 10.1016/j.compedu.2007.09.018. URL https://www.sciencedirect.com/science/article/pii/S0360131507001091.

Mechthild Maczewski. Exploring identities through the Internet: Youth experiences online. In *Child and Youth Care Forum*, volume 31, pages 111–129. Springer, 2002.

Lucía Magis-Weinberg, Ahna Ballonoff Suleiman, and Ronald E. Dahl. Context, Development, and Digital Media: Implications for Very Young Adolescents in LMICs. *Frontiers in Psychology*, 12, 2021a. ISSN 1664-1078. doi: 10.3389/fpsyg.2021.632713. URL https://www.frontiersin.org/articles/10.3389/fpsyg.2021.632713/full?&utm_source=Email_to_ae_&utm_medium=Email&utm_content=T1_11.5e2_editor&utm_campaign=Email_publication&journalName=Frontiers_in_Psychology&id=632713. Publisher: Frontiers.

Lucía Magis-Weinberg, Christopher Gys, Estelle Berger, Sarah Domoff, and Ronald Dahl. Positive and Negative Online Experiences and Loneliness in Peruvian Adolescents During The COVID-19 Lockdown. Technical report, OSF Preprints, February 2021b. URL https://osf.io/mv8rw/. type: article.

Brendan Maher. Can a video game company tame toxic behaviour? *Nature News*, 531 (7596):568, 2016a.

Brendan Maher. Good gaming: scientists are helping to tame toxic behaviour in the worlds most popular online game. *Nature*, 531(7596):568–572, 2016b.

Jenni Menon Mariano and Julie Going. Youth purpose and positive youth development. In *Advances in child development and behavior*, volume 41, pages 39–68. Elsevier, 2011.

Samantha Marsh, Cliona Ni Mhurchu, and Ralph Maddison. The non-advertising effects of screen-based sedentary activities on acute eating behaviours in children, adolescents, and young adults. a systematic review. *Appetite*, 71:259–273, 2013.

Adrienne Massanari. # Gamergate and The Fappening: How Reddit's algorithm, governance, and culture support toxic technocultures. *New Media & Society*, 19(3):329–346, 2017. Publisher: Sage Publications Sage UK: London, England.

Alison Mathie and Gord Cunningham. From clients to citizens: Asset-based Community Development as a strategy for community-driven development. *Development in Practice*, 13(5):474–486, November 2003. ISSN 0961-4524. doi: 10.1080/0961452032000125857. URL https://doi.org/10.1080/0961452032000125857. Publisher: Routledge _eprint: https://doi.org/10.1080/0961452032000125857.

Alison Mathie and Gord Cunningham. Who is Driving Development? Reflections on the Transformative Potential of Asset-based Community Development. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, 26(1):175–186, January 2005. ISSN 0225-5189, 2158-9100. doi: 10.1080/02255189.2005.9669031. URL http://www.tandfonline.com/doi/abs/10.1080/02255189.2005.9669031.

J. Nathan Matias. The Civic Labor of Volunteer Moderators Online. *Social Media + Society*, 5(2):205630511983677, April 2019a. ISSN 2056-3051, 2056-3051. doi: 10.1177/2056305119836778. URL http://journals.sagepub.com/doi/10.1177/2056305119836778.

J. Nathan Matias. Preventing harassment and increasing group participation through social norms in 2,190 online science discussions. *Proceedings of the National Academy of Sciences*, 116(20):9785–9789, May 2019b. ISSN 0027-8424, 1091-6490. doi: 10.1073/pnas.1813486116. URL http://www.pnas.org/lookup/doi/10.1073/pnas.1813486116.

Jane Mavoa, Marcus Carter, and Martin Gibbs. Beyond addiction: positive and negative parent perceptions of minecraft play. In *Proceedings of the Annual Symposium on Computer-Human Interaction in Play*, pages 171–181, 2017.

Catherine May, Greg Brown, Niall Cooper, and Lucy Brill. The Sustainable Livelihoods Handbook: An asset based approach to poverty. 2009. Publisher: Oxfam GB.

Katharine McCarthy, Martha Brady, and Kelly Hallman. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. 2016.

Robert McCartney, Jonas Boustedt, Anna Eckerdal, Kate Sanders, Lynda Thomas, and Carol Zander. Why Computing Students Learn on Their Own: Motivation for Self-Directed Learning of Computing. *ACM Trans. Comput. Educ.*, 16(1), January 2016. doi: 10.1145/2747008. URL `https://doi.org/10.1145/2747008`. Place: New York, NY, USA Publisher: Association for Computing Machinery.

Janet E McDonagh, Anne-Emmanuelle Ambresin, Kirsten Arntz Boisen, Helena Fonseca, Pia Jakobsson Kruse, Anne Meynard, Susanne Stronski, Pierre-Andre Michaud, and Yusuke Leo Takeuchi. The age of adolescence... and young adulthood. *The Lancet Child & Adolescent Health*, 2(4):e6, 2018.

Lauren McInroy and Faye Mishna. Cyberbullying on Online Gaming Platforms for Children and Youth. *Child & Adolescent Social Work Journal*, 34(6):597–607, December 2017. ISSN 07380151. doi: 10.1007/s10560-017-0498-0. URL `http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=126169896&site=ehost-live&scope=site`. Publisher: Springer Nature.

Sally J. McMillan. The microscope and the moving target: The challenge of applying content analysis to the World Wide Web. *Journalism & Mass Communication Quarterly*, 77(1): 80–98, 2000. Publisher: SAGE Publications Sage CA: Los Angeles, CA.

Ariella Meltzer, Kristy Muir, and Lyn Craig. The role of trusted adults in young people's social and economic lives. *Youth & Society*, 50(5):575–592, 2018. Publisher: Sage Publications Sage CA: Los Angeles, CA.

Microsoft. Minecraft Franchise Fact Sheet Xbox.com. Technical report, April 2021.

Ryan M Milner. Working for the text: Fan labor and the New Organization. *International Journal of Cultural Studies*, 12(5):491–508, 2009. Publisher: Sage Publications Sage UK: London, England.

Elliot G. Mishler. *Research Interviewing: Context and Narrative*. Harvard University Press, April 1991. ISBN 978-0-674-76461-3. Google-Books-ID: avqyg4NcCoAC.

Faye Mishna, Charlene Cook, Tahany Gadalla, Joanne Daciuk, and Steven Solomon. Cyber bullying behaviors among middle and high school students. *American journal of orthopsychiatry*, 80(3):362–374, 2010. Publisher: Wiley Online Library.

Jennifer L Mnookin. Virtual (ly) law: The emergence of law in LambdaMoo: Mnookin. *Journal of Computer-Mediated Communication*, 2(1):JCMC214, 1996. Publisher: Oxford University Press Oxford, UK.

Kathryn C. Montgomery, Jennifer Earl, Kirsten A. Foot, and Michael Xenos. *Civic life online: Learning how digital media can engage youth*. Mit Press, 2008.

Christiane Moser, Verena Fuchsberger, and Manfred Tscheligi. Using Probes to Create Child Personas for Games. In *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology*, ACE '11, New York, NY, USA, 2011. Association for Computing Machinery. ISBN 978-1-4503-0827-4. doi: 10.1145/2071423.2071472. URL `https://doi.org/10.1145/2071423.2071472`. event-place: Lisbon, Portugal.

Phumlani Myende and Vitallis Chikoko. School-university partnership in a South African rural context: Possibilities for an asset-based approach. *Journal of Human Ecology*, 46(3): 249–259, 2014. Publisher: Taylor & Francis.

Niko Männikkö, Heidi Ruotsalainen, Jouko Miettunen, Halley M Pontes, and Maria Kääriäinen. Problematic gaming behaviour and health-related outcomes: A systematic review and meta-analysis. *Journal of Health Psychology*, 25(1):67–81, 2020. Publisher: Sage Publications Sage UK: London, England.

Bonnie Nardi. Collaborative Play in World of Warcraft. In *2006 Fourth Latin American Web Congress*, pages 3–3, Cholulu, Puebla, Mexico, 2006. IEEE. ISBN 978-0-7695-2693-5. doi: 10.1109/LA-WEB.2006.8. URL `http://ieeexplore.ieee.org/document/4022084/`.

National Research Council (US) Panel to Review the Status of Basic Research on School-Age Children. *Development During Middle Childhood: The Years From Six to Twelve*. National Academies Press (US), Washington (DC), 1984. ISBN 978-0-309-03478-4. URL `http://www.ncbi.nlm.nih.gov/books/NBK216778/`.

Steve Nebel, Sascha Schneider, and Günter Daniel Rey. Mining learning and crafting scientific experiments: A literature review on the use of Minecraft in education and research. *Journal of Educational Technology & Society*, 19(2):355–366, 2016.

Katherine Nelson. *Young minds in social worlds: Experience, meaning, and memory*. Harvard University Press, 2009.

Dodie J Niemeyer and Hannah R Gerber. Maker culture and minecraft: Implications for the future of learning. *Educational Media International*, 52(3):216–226, 2015.

Judith S. Olson and Wendy Kellogg, editors. *Ways of knowing in HCI*. Springer, New York, 2014. ISBN 978-1-4939-0377-1. OCLC: ocn879418401.

Elinor Ostrom and Vincent Ostrom. *Choice, Rules and Collective Action: The Ostrom's on the Study of Institutions and Governance*. ECPR Press, May 2014. ISBN 978-1-910259-13-9. Google-Books-ID: EJWoAwAAQBAJ.

Elizabeth Levy Paluck and Hana Shepherd. The salience of social referents: A field experiment on collective norms and harassment behavior in a school social network. *Journal of personality and social psychology*, 103(6):899, 2012.

R. J. Pan. Building Healthier Communities for Children and Families: Applying Asset-Based Community Development to Community Pediatrics. *PEDIATRICS*, 115(4):1185–1187, April 2005. ISSN 0031-4005, 1098-4275. doi: 10.1542/peds.2004-2825Q. URL http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2004-2825Q.

Frank W Paulus, Susanne Ohmann, Alexander Von Gontard, and Christian Popow. Internet gaming disorder in children and adolescents: a systematic review. *Developmental Medicine & Child Neurology*, 60(7):645–659, 2018.

H Wesley Perkins. Social norms and the prevention of alcohol misuse in collegiate contexts. *Journal of Studies on Alcohol, Supplement*, (s14):164–172, March 2002. ISSN 0363-468X, 1946-6005. doi: 10.15288/jsas.2002.s14.164. URL http://www.jsad.com/doi/10.15288/jsas.2002.s14.164.

Jennifer H. Pfeifer and Elliot T. Berkman. The Development of Self and Identity in Adolescence: Neural Evidence and Implications for a Value-Based Choice Perspective on Motivated Behavior. *Child Development Perspectives*, 12(3):158–164, 2018. ISSN 1750-8606. doi: 10.1111/cdep.12279. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/cdep.12279. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/cdep.12279.

Rhonda Phillips and Robert H. Pittman, editors. *An introduction to community development*. Routledge, London ; New York, 2009. ISBN 978-0-415-77384-3 978-0-415-77385-0 978-0-203-88693-9. OCLC: ocn231834341.

Elena Pilipets and Susanna Paasonen. Nipples, memes, and algorithmic failure: NSFW critique of Tumblr censorship. *New Media & Society*, page 146144482097928, December 2020. ISSN 1461-4448, 1461-7315. doi: 10.1177/1461444820979280. URL http://journals.sagepub.com/doi/10.1177/1461444820979280.

Trevor J Pinch and Wiebe E Bijker. The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social studies of science*, 14(3):399–441, 1984.

Randal D. Pinkett. Bridging the digital divide: Sociocultural constructionism and an asset-based approach to community technology and community building. In *81st Annual Meeting of the American Educational Research Association (AERA), New Orleans, LA*, pages 24–28, 2000.

Karen J Pittman, Wanda E Fleming, Academy for Educational Development, United States, Congress, House, and Youth Select Committee on Children, and Families. *A new vision: promoting youth development : testimony of Karen J. Pittman before the House Select Committee on Children, Youth and Families*. Academy for Educational Development, Washington, DC, 1991a. OCLC: 48090428.

Karen J. Pittman, Marlene Wright, and Joan Wynn. *Bridging the gap: A rationale for enhancing the role of community organizations in promoting youth development*. Center for Youth Development and Policy Research, Academy for Educational . . . , 1991b.

Karen Johnson Pittman, Merita Irby, Joel Tolman, Nicole Yohalem, and Thaddeus Ferber. Preventing problems, promoting development, encouraging engagement. In *Washington, DC: Forum for Youth Investment*, 2011.

Marc Prensky. Digital game-based learning. *Computers in Entertainment (CIE)*, 1(1):21–21, 2003.

Marc Prensky. *Don't bother me, Mom, I'm learning! How computer and video games are preparing your kids for 21st century success and how.* 2006.

Sara Prot, Katelyn A. McDonald, Craig A. Anderson, and Douglas A. Gentile. Video Games:: Good, Bad, or Other? *Pediatric Clinics*, 59(3):647–658, 2012. Publisher: Elsevier.

Andrew K. Przybylski. Electronic gaming and psychosocial adjustment. *Pediatrics*, 134(3): e716–e722, 2014.

Andrew K. Przybylski, Richard M. Ryan, and C. Scott Rigby. The motivating role of violence in video games. *Personality and Social Psychology Bulletin*, 35(2):243–259, 2009.

Andrew K. Przybylski, C. Scott Rigby, and Richard M. Ryan. A motivational model of video game engagement. *Review of general psychology*, 14(2):154–166, 2010.

Stephanie M. Reich, Rebecca W. Black, and Ksenia Korobkova. Connections and communities in virtual worlds designed for children. *Journal of Community Psychology*, 42(3): 255–267, 2014. Publisher: Wiley Online Library.

Paul Resnick. Beyond bowling together: Sociotechnical capital. *HCI in the New Millennium*, 77:247–272, 2001.

Eugenia Ha Rim Rho, Oliver L. Haimson, Nazanin Andalibi, Melissa Mazmanian, and Gillian R. Hayes. Class confessions: Restorative properties in online experiences of socioeconomic stigma. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pages 3377–3389. ACM, 2017.

Jean E Rhodes. Older and wiser: Mentoring relationships in childhood and adolescence. *Journal of primary prevention*, 14(3):187–196, 1994a.

Jean E. Rhodes. Older and wiser: Mentoring relationships in childhood and adolescence. *Journal of primary prevention*, 14(3):187–196, 1994b. Publisher: Springer.

Jean E. Rhodes. Improving Youth Mentoring Interventions Through Research-based Practice. *American Journal of Community Psychology*, 41(1-2):35–42, 2008. ISSN 1573-2770. doi: 10.1007/s10464-007-9153-9. URL `https://onlinelibrary.wiley.com/doi/abs/10.1007/s10464-007-9153-9`. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1007/s10464-007-9153-9.

Rajiv N Rimal and Maria K Lapinski. A re-explication of social norms, ten years later. *Communication Theory*, 25(4):393–409, 2015. Publisher: Oxford University Press.

Kathryn E. Ringland, Christine T. Wolf, LouAnne E. Boyd, Mark S. Baldwin, and Gillian R. Hayes. Would you be mine: Appropriating minecraft as an assistive technology for youth with autism. In *Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility*, pages 33–41, 2016a.

Kathryn E. Ringland, Christine T. Wolf, Heather Faucett, Lynn Dombrowski, and Gillian R. Hayes. "Will I always be not social?": Re-Conceptualizing Sociality in the Context of a Minecraft Community for Autism. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, pages 1256–1269, Santa Clara, California, USA, 2016b. ACM Press. ISBN 978-1-4503-3362-7. doi: 10.1145/2858036.2858038. URL `http://dl.acm.org/citation.cfm?doid=2858036.2858038`.

Kathryn E. Ringland, LouAnne Boyd, Heather Faucett, Amanda L.L. Cullen, and Gillian R. Hayes. Making in Minecraft: A Means of Self-Expression for Youth with Autism. In *Proceedings of the 2017 Conference on Interaction Design and Children*, IDC '17, pages 340–345, New York, NY, USA, 2017. ACM. ISBN 978-1-4503-4921-5. doi: 10.1145/3078072.3079749. URL `http://doi.acm.org/10.1145/3078072.3079749`. event-place: Stanford, California, USA.

Kathryn Elizabeth Ringland. *Playful Places in Online Playgrounds: An Ethnography of a Minecraft Virtual World for Children with Autism*. Ph.D., University of California, Irvine, United States – California, 2018. URL `https://search.proquest.com/pqdtglobal/docview/2099224285/abstract/7C555118B9844D34PQ/1`.

Sarah T Roberts. BEHIND THE SCREEN: THE HIDDEN DIGITAL LABOR OF COMMERCIAL CONTENT MODERATION. page 195, a.

Sarah T Roberts. Commercial Content Moderation: Digital Laborers' Dirty Work. *Dirty Work*, page 12, b.

Yvonne Rogers and Paul Marshall. Research in the Wild. *Synthesis Lectures on Human-Centered Informatics*, 10(3):i–97, 2017. Publisher: Morgan & Claypool Publishers.

Barbara Rogoff. Developing understanding of the idea of communities of learners. *Mind, culture, and activity*, 1(4):209–229, 1994.

Barbara Rogoff, Jacqueline Baker-Sennett, Pilar Lacasa, and Denise Goldsmith. Development through participation in sociocultural activity. *New Directions for Child and Adolescent Development*, 1995(67):45–65, 1995.

Barbara Ed Rogoff and Jean Ed Lave. *Everyday cognition: Its development in social context.* Harvard University Press, 1984.

Stephen P Safran. Using the effective behavior supports survey to guide development of schoolwide positive behavior support. *Journal of Positive Behavior Interventions*, 8(1): 3–9, 2006.

Katie Salen. 10 Best Minecraft Servers for Kids and Why, January 2017. URL https://blog.connectedcamps.com/10-best-kid-friendly-minecraft-servers/. Library Catalog: blog.connectedcamps.com Section: Parenting.

Katie Salen and Katie Salen Tekinbaş. *The ecology of games: Connecting youth, games, and learning*. MIT press, 2008.

Katie Salen, Katie Salen Tekinbaş, and Eric Zimmerman. *Rules of play: Game design fundamentals*. MIT press, 2004.

Katie Salen Tekinbaş. Raising Good Gamers: Envisioning an Agenda for Diversity, Inclusion, and Fair Play. Technical report, Connected Learning Alliance. Irvine, CA, Irvine, CA: Connected Learning Alliance., September 2020. URL https://drive.google.com/file/d/1JZNvvNObfEW0cQnwiogwO-1VwiAc8BIf/view?usp=embed_facebook.

Cate C Samuelson and Elizabeth Litzler. Community cultural wealth: An assets-based approach to persistence of engineering students of color. *Journal of Engineering Education*, 105(1):93–117, 2016.

Susan M Sawyer, Rima A Afifi, Linda H Bearinger, Sarah-Jayne Blakemore, Bruce Dick, Alex C Ezeh, and George C Patton. Adolescence: a foundation for future health. *The Lancet*, 379(9826):1630–1640, April 2012. ISSN 01406736. doi: 10.1016/S0140-6736(12)60072-5. URL https://linkinghub.elsevier.com/retrieve/pii/S0140673612600725.

Susan M Sawyer, Peter S Azzopardi, Dakshitha Wickremarathne, and George C Patton. The age of adolescence. *The Lancet Child & Adolescent Health*, 2(3):223–228, March 2018. ISSN 23524642. doi: 10.1016/S2352-4642(18)30022-1. URL https://linkinghub.elsevier.com/retrieve/pii/S2352464218300221.

Catherine Schifter and Maria Cipollone. Minecraft as a teaching tool: One case study. In *Society for Information Technology & Teacher Education International Conference*, pages 2951–2955. Association for the Advancement of Computing in Education (AACE), 2013.

Seth J. Schwartz and Mariya Petrova. Fostering healthy identity development in adolescence. *Nature Human Behaviour*, 2(2):110–111, February 2018. ISSN 2397-3374. doi: 10.1038/s41562-017-0283-2. URL https://www.nature.com/articles/s41562-017-0283-2. Bandiera_abtest: a Cg_type: Nature Research Journals Number: 2 Primary_atype: Comments & Opinion Publisher: Nature Publishing Group Subject_term: Human behaviour;Public health Subject_term_id: human-behaviour;public-health.

Joseph Seering, Robert Kraut, and Laura Dabbish. Shaping Pro and Anti-Social Behavior on Twitch Through Moderation and Example-Setting. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing - CSCW '17*, pages 111–125, Portland, Oregon, USA, 2017a. ACM Press. ISBN 978-1-4503-4335-0. doi: 10.1145/2998181.2998277. URL http://dl.acm.org/citation.cfm?doid=2998181.2998277.

Joseph Seering, Saiph Savage, Michael Eagle, Joshua Churchin, Rachel Moeller, Jeffrey P. Bigham, and Jessica Hammer. Audience Participation Games: Blurring the Line Between Player and Spectator. In *Proceedings of the 2017 Conference on Designing Interactive Systems - DIS '17*, pages 429–440, Edinburgh, United Kingdom, 2017b. ACM Press. ISBN 978-1-4503-4922-2. doi: 10.1145/3064663.3064732. URL `http://dl.acm.org/citation.cfm?doid=3064663.3064732`.

Joseph Seering, Tianmi Fang, Luca Damasco, Mianhong 'Cherie' Chen, Likang Sun, and Geoff Kaufman. Designing User Interface Elements to Improve the Quality and Civility of Discourse in Online Commenting Behaviors. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems - CHI '19*, pages 1–14, Glasgow, Scotland Uk, 2019. ACM Press. ISBN 978-1-4503-5970-2. doi: 10.1145/3290605.3300836. URL `http://dl.acm.org/citation.cfm?doid=3290605.3300836`.

Joseph Seering, Geoff Kaufman, and Stevie Chancellor. Metaphors in moderation. *New Media & Society*, page 1461444820964968, October 2020a. ISSN 1461-4448. doi: 10.1177/1461444820964968. URL `https://doi.org/10.1177/1461444820964968`. Publisher: SAGE Publications.

Joseph Seering, Michal Luria, Connie Ye, Geoff Kaufman, and Jessica Hammer. It takes a village: Integrating an adaptive chatbot into an online gaming community. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pages 1–13, 2020b.

Elena Márquez Segura, Laia Turmo Vidal, Luis Parrilla Bel, and Annika Waern. Using Training Technology Probes in Bodystorming for Physical Training. In *Proceedings of the 6th International Conference on Movement and Computing*, MOCO '19, New York, NY, USA, 2019. Association for Computing Machinery. ISBN 978-1-4503-7654-9. doi: 10.1145/3347122.3347132. URL `https://doi.org/10.1145/3347122.3347132`. event-place: Tempe, AZ, USA.

Irving Seidman. *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. Teachers college press, 2006.

Martin EP Seligman. Positive psychology, positive prevention, and positive therapy. *Handbook of positive psychology*, 2(2002):3–12, 2002.

Lauren A Spies Shapiro and Gayla Margolin. Growing up wired: Social networking sites and adolescent psychosocial development. *Clinical child and family psychology review*, 17(1): 1–18, 2014.

Daniel Short. Teaching scientific concepts using a virtual world—Minecraft. *Teaching Science-the Journal of the Australian Science Teachers Association*, 58(3):55, 2012.

Myrna B. Shure. *I can problem solve: Intermediate elementary grades*, volume 3. Research Press, 2000.

Petr Slovak, Katie Salen, Stephanie Ta, and Geraldine Fitzpatrick. Mediating Conflicts in Minecraft: Empowering Learning in Online Multiplayer Games. In *Proceedings of the*

2018 CHI Conference on Human Factors in Computing Systems, CHI '18, pages 595:1–595:13, New York, NY, USA, 2018. ACM. ISBN 978-1-4503-5620-6. doi: 10.1145/3173574.3174169. URL http://doi.acm.org/10.1145/3173574.3174169. event-place: Montreal QC, Canada.

Petr Slovák, Nikki Theofanopoulou, Alessia Cecchet, Peter Cottrell, Ferran Altarriba Bertran, Ella Dagan, Julian Childs, and Katherine Isbister. I just let him cry...: Designing Socio-Technical Interventions in Families to Prevent Mental Health Disorders. *Proceedings of the ACM on Human-Computer Interaction*, 2(CSCW):160, 2018.

Jonas Heide Smith. Playing dirty – understanding conflicts in multiplayer games. *The Association of Internet Researchers*, (September):19–22, 2004.

Kurt Squire. Video Games and Learning: Teaching and Participatory Culture in the Digital Age. *Alberta Journal of Educational Research*, 59(1):129–132, 2013.

Rose-Marie Stambe. Natasha Whiteman, Undoing Ethics: Rethinking Practice in Online Research. *Qualitative Research in Psychology*, 12(3):342–345, July 2015. ISSN 1478-0887. doi: 10.1080/14780887.2015.1008913. URL https://doi.org/10.1080/14780887.2015.1008913. Publisher: Routledge _eprint: https://doi.org/10.1080/14780887.2015.1008913.

Laurence Steinberg and Amanda Sheffield Morris. Adolescent development. *Annual Review of Psychology*, 52:83–110, 2001. ISSN 0066-4308. doi: http://dx.doi.org/10.1146/annurev.psych.52.1.83. URL https://www.proquest.com/docview/619576614/7DBF12A46EF84542PQ/3. Num Pages: 83-110 Publisher: Annual Reviews (US).

Constance A. Steinkuehler. Learning in massively multiplayer online games. In *Proceedings of the 6th international conference on Learning sciences*, pages 521–528. International Society of the Learning Sciences, 2004.

Janet Sternberg. *Misbehavior in cyber places: The regulation of online conduct in virtual communities on the Internet*. Rowman & Littlefield, 2012.

Richard A Swanson and Elwood F Holton. *Research in organizations: Foundations and methods in inquiry*. Berrett-Koehler Publishers, 2005.

Sean Targett, Victoria Verlysdonk, Howard J. Hamilton, and Daryl Hepting. A study of user interface modifications in World of Warcraft. *Game Studies*, 12(2), 2012.

Mark Tarrant. Adolescent peer groups and social identity. *Social Development*, 11(1):110–123, 2002.

T. L. Taylor. Beyond Management: Considering Participatory Design and Governance in Player Culture. *First Monday*, September 2006. ISSN 1396-0466. doi: 10.5210/fm.v0i0.1611. URL https://journals.uic.edu/ojs/index.php/fm/article/view/1611.

Katie Salen Tekinbaş, Krithika Jagannath, Ulrik Lyngs, and Petr Slovák. Designing for Youth-Centered Moderation and Community Governance in Minecraft. *ACM Transactions on Computer-Human Interaction*, 28(4):1–41, July 2021. ISSN 1073-0516, 1557-7325. doi: 10.1145/3450290. URL https://dl.acm.org/doi/10.1145/3450290.

Clive Thompson. The Minecraft Generation. *The New York Times*, April 2016. ISSN 0362-4331. URL https://www.nytimes.com/2016/04/17/magazine/the-minecraft-generation.html.

Robert Thornberg. A categorisation of school rules. *Educational Studies*, 34 (1):25–33, February 2008. ISSN 0305-5698. doi: 10.1080/03055690701785244. URL https://doi.org/10.1080/03055690701785244. Publisher: Routledge _eprint: https://doi.org/10.1080/03055690701785244.

Data Source Triangulation. The use of triangulation in qualitative research. In *Oncol Nurs Forum*, volume 41, pages 545–7, 2014.

Ömer Uçur and Yunus Emre Dönmez. Problematic internet gaming in adolescents, and its relationship with emotional regulation and perceived social support. *Psychiatry Research*, 296:113678, February 2021. ISSN 0165-1781. doi: 10.1016/j.psychres.2020.113678. URL https://www.sciencedirect.com/science/article/pii/S0165178120333394.

John A. Velez. Extending the theory of Bounded Generalized Reciprocity: An explanation of the social benefits of cooperative video game play. *Computers in Human Behavior*, 48: 481–491, 2015.

John A. Velez and David R. Ewoldsen. Helping behaviors during video game play. *Journal of Media Psychology*, 2013.

Russell M. Viner, Elizabeth M. Ozer, Simon Denny, Michael Marmot, Michael Resnick, Adesegun Fatusi, and Candace Currie. Adolescence and the social determinants of health. *The lancet*, 379(9826):1641–1652, 2012.

Jayne Wallace, John McCarthy, Peter C. Wright, and Patrick Olivier. Making Design Probes Work. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '13, pages 3441–3450, New York, NY, USA, 2013. Association for Computing Machinery. ISBN 978-1-4503-1899-0. doi: 10.1145/2470654.2466473. URL https://doi.org/10.1145/2470654.2466473. event-place: Paris, France.

Chih-Chien Wang and Chia-Hsin Wang. Helping others in online games: Prosocial behavior in cyberspace. *CyberPsychology & Behavior*, 11(3):344–346, 2008.

Etienne Wenger. Communities of practice: Learning as a social system. *Systems thinker*, 9 (5):2–3, 1998.

Etienne Wenger. Communities of practice: A brief introduction. 2011.

Marisol Wong-Villacres, Aakash Gautam, Wendy Roldan, Lucy Pei, Jessa Dickinson, Azra Ismail, Betsy DiSalvo, Neha Kumar, Tammy Clegg, Sheena Erete, Emily Roden, Nithya Sambasivan, and Jason Yip. From Needs to Strengths: Operationalizing an Assets-Based Design of Technology. In *Conference Companion Publication of the 2020 on Computer Supported Cooperative Work and Social Computing*, pages 527–535, Virtual Event USA, October 2020. ACM. ISBN 978-1-4503-8059-1. doi: 10.1145/3406865.3418594. URL https://dl.acm.org/doi/10.1145/3406865.3418594.

David Wood, Jerome S Bruner, and Gail Ross. The role of tutoring in problem solving. *Journal of child psychology and psychiatry*, 17(2):89–100, 1976a.

David Wood, Jerome S. Bruner, and Gail Ross. The role of tutoring in problem solving. *Journal of child psychology and psychiatry*, 17(2):89–100, 1976b. Publisher: Wiley Online Library.

Michelle F Wright and Yan Li. The associations between young adults' face-to-face prosocial behaviors and their online prosocial behaviors. *Computers in Human Behavior*, 27(5): 1959–1962, 2011.

Jason Wuertz, Sultan A. Alharthi, William A. Hamilton, Scott Bateman, Carl Gutwin, Anthony Tang, Zachary Toups, and Jessica Hammer. A design framework for awareness cues in distributed multiplayer games. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, pages 1–14, 2018.

David S Yeager, Ronald E Dahl, and Carol S Dweck. Why interventions to influence adolescent behavior often fail but could succeed. *Perspectives on Psychological Science*, 13(1): 101–122, 2018.

Nick Yee. Motivations for play in online games. *CyberPsychology & behavior*, 9(6):772–775, 2006.

Bingjie Yu, Joseph Seering, Katta Spiel, and Leon Watts. " taking care of a fruit tree": Nurturing as a layer of concern in online community moderation. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, pages 1–9, 2020.

Amy X. Zhang. Building Systems to Improve Online Discussion. In *Companion of the 2018 ACM Conference on Computer Supported Cooperative Work and Social Computing*, CSCW '18, pages 65–68, New York, NY, USA, 2018. Association for Computing Machinery. ISBN 978-1-4503-6018-0. doi: 10.1145/3272973.3272975. URL `https://doi.org/10.1145/3272973.3272975`. event-place: Jersey City, NJ, USA.

Min Zhang, Arosha K. Bandara, Blaine Price, Graham Pike, Zoe Walkington, Camilla Elphick, Lara Frumkin, Richard Philpot, Mark Levine, Avelie Stuart, and Bashar Nuseibeh. Designing Technologies for Community Policing. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, CHI EA '20, pages 1–9, New York, NY, USA, 2020. Association for Computing Machinery. ISBN 978-1-4503-6819-3. doi: 10.1145/3334480.3383021. URL `https://doi.org/10.1145/3334480.3383021`. event-place: Honolulu, HI, USA.

Appendix A

Brief Reflection Statement

Regardless of whether or not a researcher is familiar with the research setting and participants, Bailey (2007) advocates building relationships with prospective participants. Bailey also explains that such relationships facilitate the ways in which a researcher makes sense of the setting. Through my own practices and by training (e.g., academic advisor, research labs I am a part of, courses I completed in the program), reflecting on these relationships are a fundamental way in which I make sense not only of research but also my reflective practice. Through this work, I am reminded of many caring adults (family, teachers, mentors, coaches) in my formative years who have shaped me and enriched my perspectives in different ways. As a high-schooler, I enjoyed playing PC games, only they were nothing like Minecraft and virtual world games that youth have today. Nevertheless, playing those games turned out to be one of the reasons I took the available Computer Science (CS) courses in high school and eventually completed my undergraduate studies in CS (probably a good thing I am not a kid in the Minecraft era, I have no doubt I would have gotten very little work done at school). As many youth in this research study, and in previous projects have demonstrated, a little encouragement from peers and others goes a long way-—only reinforcing everything that research already tells us about supporting young people. With my current and ongoing

research and the promise of prosocial bots and tools, it truly feels like things are coming to a full circle—I get to mix CS and Play.

Appendix B

IRB Documents

Approval Letter 2-18-20 (Revised Per MOD 27963)

Informed Consent Forms (Adult Screener Questionnaire)

Youth Assent form

Sample Recruitment Flyer (Parental permission)

July 15, 2020

KRITHIKA JAGANNATH
INFORMATICS

RE: UCI IRB HS# 2019-5527 *Investigating Youth-centric Online Communities to Inform Theory, Design, & Practice in Human-Computer Interaction (HCI)*

The above-referenced human-subjects research project has been approved by the University of California, Irvine Institutional Review Board (UCI IRB). This approval is limited to the activities described in the approved Protocol Narrative, and extends to the performance of these activities at each respective site identified in the Application for IRB Review. In accordance with this approval, the specific conditions for the conduct of this research are listed below, and informed consent from subjects must be obtained unless otherwise indicated below. Additional conditions for the general conduct of human-subjects research are detailed on the attached sheet.

NOTE: Approval by the Institutional Review Board does not, in and of itself, constitute approval for the implementation of this research. Other institutional clearances and approvals may be required (e.g., EH&S, Radiation Safety, School Dean, other institutional IRBs). Research undertaken in conjunction with outside entities, such as drug or device companies, are typically contractual in nature and require an agreement between the University and the entity. Such agreements must be executed by an institutional official in Sponsored Projects, a division in the UCI Office of Research. The University is not obligated to legally defend or indemnify an employee who individually enters into these agreements and investigators are personally liable for contracts they sign. **Accordingly, the project should not begin until all required approvals have been obtained.**

Questions concerning the approval of this research project may be directed to the Office of Research, 141 Innovation Drive, Suite 250, Irvine, CA 92697-7600; 949-824-6068, 949-824-2125, or 949-824-0665 (biomedical committee) or 949-824-6662 (social-behavioral committee).

Expedited Review: Categories 6 & 7

Melissa Camarena,
Alternate Member, Institutional Review Board

Approval Issued: 2/18/2020
Expiration Date: 2/17/2023
UCI (FWA) 00004071, Approved: January 31, 2003

Important Reminder: UCI is in Research Phase 2 as of June 8, 2020. UCI's research activities will increase over time in parallel with the stages in California's Pandemic Roadmap and other public health and higher education guidance. Refer to the Office of Research webpage on Research Continuity for more details.

IRB Determinations as Conditions of Approval:

Minors:

1. 45 CFR 46.404: One Parent / Guardian Permission Required – Waiver of Signature Granted[1]

Informed Consent Determinations:

2. Signed Informed Consent Required

[1] ***Because the study involves procedures that are no greater than minimal risk**, the IRB determined that the study should be classified under Subpart D as 45 CFR 46.404. The IRB agreed that the permission of one parent is sufficient.*

3. Waiver of Signed Consent Granted
    a. Study Information Sheet Required – Adult Participants & Parental Permission of Child Participants
4. Waiver of Signed Assent Granted
    b. Assent Script Required – Ages 8 Through 12 & Ages 13 Through 17

APPROVAL CONDITIONS FOR ALL UCI HUMAN RESEARCH PROTOCOLS

POST-APPROVAL INVESTIGATOR RESPONSIBILITIES (PAIR):
In accordance with Federal regulations and HRP policies, there are Investigator responsibilities during the conduct, as well as after completion, of your research. Use the PAIR Worksheet to ensure adherence with your post-approval regulatory responsibilities.

UCI RESEARCH POLICIES:
All individuals engaged in human-subjects research are responsible for compliance with all applicable UCI Research Policies. The Lead Researcher (and Faculty Sponsor, if applicable) of the study is ultimately responsible for assuring all study team members adhere to applicable policies for the conduct of human-subjects research.

LEAD RESEARCHER (LR) RECORDKEEPING RESPONSIBILITIES:
LRs are responsible for the retention of protocol–related records. The following web pages should be reviewed for more information about the LR's recordkeeping responsibilities for the preparation and maintenance of research files: Lead Researcher Recordkeeping Responsibilities and Preparation and Maintenance of a Research Audit File.

APPROVED VERSIONS OF CONSENT DOCUMENTS, INCLUDING STUDY INFORMATION SHEETS:
Unless a waiver of informed consent is granted by the IRB, the consent documents (consent form; study information sheet) with the UCI IRB approval stamp must be used for consenting all human subjects enrolled in this study. Only the current approved version of the consent documents may be used to consent subjects. **Approved consent documents are not to be used beyond the expiration date provided on the IRB approval letter.** Current consent documents are available on the IRB Document Depot.

PROTOCOL EXPIRATION:
The UCI IRB approval letter references the protocol expiration date under the IRB Chair's signature authorization. A courtesy email will be sent approximately 60 to 90 days prior to expiration reminding the Lead Researcher to apply for continuing review. **It is the LR's responsibility to apply for continuing review to ensure continuing approval throughout the conduct of the study.** Lapses in approval must be avoided to protect the safety and welfare of enrolled subjects.

MODIFICATIONS & AMENDMENTS:
Per federal regulations, once a human research study has received IRB approval, any subsequent changes to the study must be reviewed and approved by the IRB prior to implementation *except when necessary to avoid an immediate, apparent hazard to a subject.* **Accordingly, no changes are permissible (*unless to avoid an immediate, apparent hazard to a subject*) to the approved protocol or the approved, stamped consent form without the prior review and approval of the UCI IRB**. All changes (e.g., a change in procedure, number of subjects, personnel, study locations, new recruitment materials, study instruments, etc.) must be prospectively reviewed and approved by the IRB before they are implemented.

CHANGES IN FINANCIAL INTEREST:
Any changes in the financial relationship between the study sponsor and any of the investigators on the study and/or any new potential conflicts of interest must be reported immediately to the UCI Conflict of Interest Oversight Committee (COIOC). If these changes affect the conduct of the study or result in a change in the text of the currently-approved informed consent document, these changes must also be reported to the UCI IRB via a modification request.

GRANT CONGRUENCE REVIEWS:
If this human subject research is funded or supported by a Federal Agency, it is the LR's responsibility to submit modifications, as necessary, to assure that the IRB protocol continues to be identical in principle and congruent with the scope of work outlined in the proposal application.

UNANTICIPATED PROBLEMS REPORTING:
In accordance with Federal regulations and HRP policies, only internal (where UCI serves as the IRB of record), Unanticipated Problems must be reported to the UCI IRB. Unanticipated Problems should also be reported to the UCI IRB when UCI is relying

on an external IRB, and the incident occurred at UCI or the incident occurred at an offsite location on a study conducted by a UCI LR. Unanticipated Problems must be submitted to the IRB via the Unanticipated Problems (UP) Report within 5 business days upon the LR's knowledge of the event. For additional information visit the updated HPR webpage on Unanticipated Problems.

POSTING OF THE INFORMED CONSENT DOCUMENT:
Clinical trials initially approved by the IRB on or after January 21, 2019, must post one (1) IRB-approved clinical trial consent form at a publicly available federal website. The consent form must be posted after recruitment closes, and no later than 60 days after the last study visit. For additional guidance, refer to the OHRP FAQs on Informed Consent.

CLOSING REPORT:
A closing report should be filed with the UCI IRB when the research concludes. Visit the HRP webpage Closing a Protocol for complete details.

Study Title: Investigating Youth-centric Online Communities to Inform Theory, Design, & Practice in Human-Computer Interaction (HCI) for Adult Participants

Lead Researcher: Krithika Jagannath, PhD Candidate, Informatics, UC Irinve kjaganna@uci.edu
Faculty Sponsor: Professor Katie Salen Tekinbas, ksalen@uci.edu

UCI IRB: 949.824.7295

Welcome to the research study!

We are interested in understanding moderation practices in youth- and/or family-friendly Minecraft Servers. The study information is below at the end of which you will be presented with two options:

- I consent, begin the study
- I do not consent, I do not wish to participate.

Participation in this study is strictly voluntary. You should not take the survey until you have read all the information about the study. Please email the lead researcher, Krithika Jagannath, kjaganna@uci.edu, if you have any questions about the study or the survey. Should you consent to participate, please be assured that your responses will be kept completely confidential.

About the Research:

My research is focused on understanding moderators' practices in Minecraft communities, particularly those that identify themselves as child and/or family-friendly Minecraft communities. I am conducting this research for my doctoral study, supervised by Professor. Katie Salen, who is my advisor at the University of California, Irvine. The anonymized results of this research will be used for scholarly purposes only (doctoral dissertation, journal articles, presentations at technical conferences).

About this Survey:
This survey is meant for moderators in youth- and/or family-friendly Minecraft Servers. You are eligible to participate if you are 18 years or above, are a moderator of a Minecraft community for youth (ages 6-15 years), and are fluent in English. This survey includes questions about what kinds of activities you (as a moderator) perform within your Minecraft community/communities, how you coordinate with other moderators and Minecraft server owner(s), how you organize those activities, and how you coordinate in general with other members in your Minecraft community.

The online survey will take about 10-15 minutes to complete and although it can be taken on a mobile device, the survey is best displayed on a desktop computer or laptop. Please be assured that your survey responses will be kept confidential. I do ask for your Minecraft Username to validate the survey responses, but will delete this information within three weeks of your survey completion. Survey responses will not be associated with your Minecraft Username. I will not collect identifying information such as your name, email address, or IP address unless you provide contact information (Last optional question in this survey) for a follow-up interview study. Participation in this study is strictly voluntary (i.e. you do not need to participate if you don't wish to). The survey will take about 10-15 minutes to complete and if you consent to participate in a follow up virtual interview, the interview procedures can take approximately 60 – 90 minutes of your time. These virtual interviews may be scheduled as a series of shorter durations (e.g., two 45 min, blocks of 30 min, etc.) at your preferred time.

What data will I collect in this survey study?
- Your survey responses
- Your Minecraft server names and/or websites and your Minecraft IDs (will be used to validate that responses are from Minecraft moderators. This is done to ensure data accuracy (i.e. views are those of real moderators' and not someone pretending to be a moderator). Your Minecraft Username will not be associated with your survey responses.
- (Optional) Preferred email address: which will not be associated with your survey responses but used to contact you if you consent to participating in a follow-up interview.

There are no alternative procedures available. The only alternative is not to participate in this study.

Confidentiality:
All information you provide will be kept confidential. The data will be stored in a password protected electronic format on a private computer that will be accessible only by me, the lead researcher (Krithika Jagannath) and the faculty sponsor, Prof. Katie Salen. Once the survey responses have been validated against your minecraft ID (within three weeks after the survey period has ended), the survey responses will be detached from any information that can personally identify you. The results of this study will be used for scholarly purposes only.

- The research team, authorized UCI personnel, and regulatory entities, may have access to your study records to protect your safety and welfare.

While the research team will make every effort to keep your personal information confidential, it is possible that an unauthorized person might see it. We cannot guarantee total privacy.

- Researchers will use your information to conduct this study. Once the study is done, we may share the de-identified information with other researchers so they can use them for other studies in the future. We will not share your name or any other private identifiable information that would let the researchers know who you are. We will not ask you for additional permission to share this de-identified information.

- The researchers intend to keep the research data until the research is published and/or presented.

Risks and Benefits:
The only foreseeable risk / discomfort associated with this study is the imposition of your time and a breach of confidentiality if contact information is provided for the interview. All research data collected will be stored securely and confidentially. While the research team will make every effort to keep your personal information confidential, it is possible that an unauthorized person might see it. We cannot guarantee total privacy.

Your participation is voluntary and you may decline to participate or opt-out at any point in the study. By completing the survey, you are agreeing to participate in the research. If you wish to opt-out after completing the survey, please let me know immediately (Send email to Krithika Jagannath, kjganna@uci.edu). Your anonymized survey responses may still be used unless you let us know within a week of your participation.

There is no direct benefit to participants. However, your participation will enable an invaluable contribution towards research on moderators' practices in youth-centric online communities. Your inputs can help future designers, researchers, and practitioners in better understanding the needs and challenges in moderation within online play-based communities, like Minecraft. A summary of the aggregated final results will be made available to you, so there may be a potential benefit to the Minecraft moderator community in that they gain an understanding of how moderators work, what kinds of activities they perform and manage, and what they consider important in carrying out their roles and responsibilities.

You will not be compensated for your participation in this research study.
Contact:
If you have any concerns or questions at any time about the study or procedures that are being used, you can contact me, Krithika Jagannath, via email at kjaganna@uci.edu or through Minecraft (Researcher_Krit). My doctoral advisor, Prof. Katie Salen, can be reached at katie.salen@uci.edu .

Please contact the UCI Institutional Review Board by phone, (949) 824-6662, by e-mail at IRB@research.uci.edu or at 141 Innovation Drive, Suite 250, Irvine, CA 92697 if you are unable to reach the researchers listed at the top of the form and have general questions;

have concerns or complaints about the research; have questions about your rights as a research subject; or have general comments or suggestions.

What is an IRB? An Institutional Review Board (IRB) is a committee made up of scientists and non-scientists. The IRB's role is to protect the rights and welfare of human subjects involved in research. The IRB also assures that the research complies with applicable regulations, laws, and institutional policies.

By clicking on the "I consent, begin the study" button below, you are indicating that

- you have read and understood the study information sheet;
- you are at least 18 years of age (18 or above); and
- you voluntarily agree to participate in the study.

Thank you for your attention and interest,

- I consent, begin the study
- I do not consent, I do not wish to participate.

A STUDY ABOUT MINECRAFT SERVERS

My name is Krithika Jagannath. I am a Minecraft enthusiast and a PhD student studying in Human-Computer Interaction or HCI. I work with Professor Katie Salen in the Connected Learning Lab at the Donald Bren School of Information & Computer Science in the University of California, Irvine. I am conducting a research study about **moderators/admins/volunteers in Minecraft servers** for my doctoral dissertation.

Fig.1 My ID (Researcher_krit) & appearance in Minecraft

If you are the parent of a child who is a junior moderator/helper/volunteer in a Minecraft community, aged between 8 and 18 years, and can read/write/speak in English, your child is eligible to participate in an online interview study. Participation is voluntary. **I'd like to interview your child to hear their inputs and experiences as a moderator/helper/volunteer in Minecraft.** Your child's inputs can help researchers like me understand how to design better tools to make your experiences in Minecraft even better! You are welcome to attend this virtual interview with your child, if you wish to do so. Your presence during the interview is welcome, though not mandatory for your child's participation.

Your child's responses will be kept confidential to protect their identity. The interview responses will NOT be attached to any identifiable information such as your/your child's names, Minecraft ID, the name of the server they moderate on, etc.

The total time required for your child's participation will not exceed 2 hours. Interviews will be conducted through remote conferencing tools such as Zoom or Microsoft Teams and will be scheduled when convenient for you and/or your child. Interviews typically take an hour, but the researcher may request another day/time, if needed, for a follow-up interview.

This research study has been approved by UCI's ethics committee. Please take your time to read the study information document(s) attached with this message. You can email me, Krithika

Jagannath, at **kjaganna@uci.edu** with any questions that you or your child may have about my research study. If you wish to enroll your child as a participant, please follow the instructions in the Study Information Sheet and send me an email.

Thank you!

Best,
Krithika Jagannath
kjaganna@uci.edu
PhD Candidate in Informatics,
Donald Bren School of Information & Computer Science,
University of California, Irvine.

UNIVERSITY OF CALIFORNIA, IRVINE
ASSENT TO BE IN A HUMAN RESEARCH STUDY

Study Title: Understanding how people moderate Minecraft Servers
Research: Investigating Youth-centric Online Communities to Inform Theory, Design, & Practice in Human-Computer Interaction (HCI)

Participating in this study is totally voluntary. Please read about the study below. Feel free to ask questions about anything that you do not understand before deciding if you want to be in the study. A researcher listed below will be around to answer your questions.

RESEARCH TEAM
Lead Researcher:
Krithika Jagannath
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WHY ARE YOU HERE?
Researchers from the University of California, Irvine want to tell you about a research study looking at how people moderate players in Minecraft servers. They want to see if you would like to be in this study.

WHY ARE THEY DOING THIS STUDY?
Ms. Krithika Jagannath and Prof. Katie Salen are doing this study to learn more about the design of future technologies that can better support moderators in Minecraft.

WHAT WILL HAPPEN TO YOU?
These things will happen if you want to be in the study:

1. The study procedures involve a virtual/an online interview that will last approximately 60-90 minutes at a time convenient for you. The interview will comprise of three parts: an entry, the main, and an exit interview. Ms. Jagannath, whose Minecraft ID is researcher_krit, will ask you questions about your experience playing in the Minecraft server, and the kinds of activities you do as a helper/volunteer/moderator/staff in Minecraft. The researcher will ask you to give your feedback about the interview during the exit interview.

2. At the start of the interview, the lead researcher will read the study information sheet. You will be prompted for consent to audio recording of the interview. Your verbal consent (Yes, I agree to the interview being audio-recorded) will be used to record the interview to aid analysis. If you deny consent (No, I do not consent audio-recording of the interview), the lead researcher will take hand-written notes during the interview.

- Yes, I agree to the interview being audio-recorded
- No, I do not consent audio-recording of the interview

3. Ms.Krithika Jagannath will also play in the same Minecraft server after obtaining permissions from the adult moderators. It is possible that you may be present on the server at the same time and you may spot her (researcher_krit) on the Minecraft or Discord servers before or after you participate in this interview study.
4. However, she will NOT be interviewing or interacting with you in Minecraft.

ARE THERE RISKS TO THE STUDY?
You are not required to answer every question that is asked. Your participation in the study is strictly voluntary. The only foreseeable risks associated with this study are:
a. boredom for the time required and
b. the potential breach of confidentiality for the collection of identifiable information (i.e. your parent's email).
You can tell the researcher to stop the interview if you are feeling tired, bored, or stressed.

ARE THERE BENEFITS TO THE STUDY?
There are no direct benefits from participation in the study. However, your inputs will help researchers understand moderators' practices better and inform future designs on how technologies can help their practice. Your participation will contribute to our knowledge on what makes strong online Minecraft Communities that are kid-friendly.

WHAT IF YOU HAVE ANY QUESTIONS?
You can ask questions any time. You can ask now or you can ask later. You can talk to the researchers listed above, your mom and dad, or you can talk to someone else.

DO YOU HAVE TO BE IN THE STUDY?
You do not have to be in the study. No one will be mad at you if you don't want to do this. If you don't want to be in this study, you just have to tell Ms. Krithika Jagannath. If you want to be in the study, you just have to tell them. You can say yes now and change your mind later. It is up to you to decide.

If you have no further questions and are ready to consent to the study please let Ms.Krithika Jagannath know that you agree to participate in the study.

- Yes, I agree to the interview being audio-recorded
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If you have no further questions and are ready to consent to the study please let Ms.Krithika Jagannath know that you agree to participate in the study.

Appendix C

Server list (Study I)

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
1	S01	A Whole New World	84	16.96	4	48	family and friends	general-family-friendly
2	S02	AddStar	7	6.71	4	11	family-friendly, kid-friendly	kid-/family-friendly
3	S03	Applecraft	110	13.22	1	71	unspecified	general-family-friendly
4	S04	AutCraft	35	40.23	7	129	family-friendly	kid-/family-friendly
5	S05	AzCraft	3	92.33	40	131	family-friendly	kid-/family-friendly
6	S06	BizzCraft	18	13.22	3	31	unspecified	general

#	Server Pseu-do-nym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
7	S07	BlockIndia	16	99.19	4	562	kid-friendly	kid-/family-friendly
8	S08	Capecraft	14	79.36	20	254	listed as family-friendly but more friendly; also server closed now	general-family-friendly
9	S09	CasualCraft	23	12.26	10	17	friendly server	general-family-friendly
10	S10	Coder kids	3	15.7	8	25	kid-friendly	kid-/family-friendly
11	S11	CookieDo	16	44.44	7	74	friendly	general-family-friendly
12	S12	crazypig	10	6.2	2	9	family-friendly	kid-/family-friendly
13	S13	CreepersLab	19	16.3	5	40	friendly	general-family-friendly

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
14	S14	CubeCraft	74	34.15	7	97	one of the largest Minecraft Networks	general
15	S15	cubeville	21	63.62	7	196	family-friendly	kid-/family-friendly
16	S16	EOSCraft	49	29.88	4	135	unspecified	general
17	S17	Famallama	11	66.73	15	157	family-friendly	kid-/family-friendly
18	S18	famcraft	76	50.11	9	136	family-friendly	kid-/family-friendly
19	S19	FamilyMC	49	16.4	4	48	family-friendly	general-family-friendly
20	S20	Foxcraft	6	43	26	70	family-friendly, youth-operated	general-family-friendly
21	S21	Hypixel	20	81.05	18	303	largest server network	general

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
22	S22	indiequish	29	38.6	2	166	child-friendly, family-friendly	kid-/family-friendly
23	S23	KidClub	12	23.42	2	45	kid-friendly	kid-/family-friendly
24	S24	Lord of the Craft	66	21.5	4	57	largest RPG/ MMORPG	general
25	S25	lucid dreams	19	107.79	18	424	family-friendly	kid-/family-friendly
26	S26	Maximum Red	27	21.44	4	60	unspecified	general
27	S27	Minecraft 4 Nerds	48	18.8	2	82	unspecified	general
28	S28	Minecraft lovers	6	8.67	3	16	friendly	general
29	S29	Minefaire	11	19.23	3	37	family-friendly	general-family-friendly
30	S30	Mineplex	20	22.95	4	55	unspecified	general-family-friendly
31	S31	MineSuperior	86	21.8	9	62	unspecified	general

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
32	PLATFORM	Mojang	12	41	12	112	platform	platform
33	S32	Nameless Craft	42	26.6	4	92	family friendly	general-family-friendly
34	S33	Noobscraft	10	51.4	12	83	family-friendly	general-family-friendly
35	S34	OhanaCraft	25	38.12	4	102	family-friendly	kid-/family-friendly
36	S35	OnePeace	25	27.04	6	101	mature friendly	general-family-friendly
37	ADULTS	pep	18	16	3	40	middle-age +adults	older adults
38	S36	PickaxeMania	37	35.12	4	162	unspecified	general-family-friendly
39	S37	pigcnomony	37	32.2	7	98	Unspecified (economy-based)	kid-/family-friendly
40	S38	Pixelballers	20	19.8	3	65	friendly	general-family-friendly
41	S39	Ponyland MC	14	5.97	3	10	kid-friendly	kid-/family-friendly
42	S40	PrimeMC	76	26.63	9	72	unspecified	general

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
43	S41	Project Eden	52	15	2	113	Friendly	general
44	S42	ProsperCraft	18	33.7	4	133	family-friendly	kid-/family-friendly
45	S43	PuttlesCraft	15	16.9	7	33	unspecified	general
46	S44	Shape The Cube	39	28.6	3	94	family-friendly	general-family-friendly
47	S45	SHFT	24	19.38	4	61	fun family friendly server	general-family-friendly
48	S46	Simple Survival	50	15.1	2	51	unspecified	general
49	S47	Snapcraft	43	51.01	14	319	unspecified	general-family-friendly
50	S48	Soar	7	12.14	6	38	friendly	general
51	S49	TetraBear	8	58.13	14	103	friendly	general
52	S50	The Cake	8	58.5	14	153	unspecified	general
53	S51	The Sandlot	6	117.7	80	197	kid-friendly	kid-/family-friendly
54	S52	The Wooden Spoon	41	22.7	3	80	mature server	general

#	Server Pseudonym	Server Name	# Num of Rules	Avg Word Count	Min Words	Max words	Self-describe as	Final Code
55	S53	Timezoomers	21	20.05	8	47	family-friendly	general-family-friendly
56	S54	Towncraft	74	25.5	2	161	friendly	general-family-friendly
57	S55	vanillaTyme	32	24	2	95	unspecified	general
58	S56	Wierdos	5	79.6	34	150	family-friendly	general
59	S57	Wize	20	25.8	2	103	friendly	general-family-friendly
60	S58	Wynncraft	50	43.56	13	109	largest RPG/ MMORPG	general
61	S59	YAMS	125	26.9	5	70	family-friendly	kid-/family-friendly
62	S60	intercraften	8	48.4	14	74	family-friendly	kid-/family-friendly

Appendix D

Taxonomy for Rulesets

Ruleset Code	**Description of the ruleset type**	**Salient Example(s)**
Social Play Etiquette	Rules of this type describe how one is expected to play and interact with other people on the server, also applied to how one should generally behave on the server. Rules of this type are applicable universally (within and outside the gameplay) (Tekinbaş et al., 2021)	*"We ask our players to 'be a good nugget'... treat others as friends, and encourage positive behavior. Don't take away from another's ability to express themselves through fair play."* (S01) *"Don't post someone's personal information without permission."* (S45)

Ruleset Code	**Description of the ruleset type**	**Salient Example(s)**
Minecraft/ In-game Etiquette	How one is expected to play Minecraft with other people on the server. Rules of this type are applicable within the gameplay specific to Minecraft (Tekinbaş et al., 2021)	*"Be respectful to all players, their belongings, and their builds. Griefing and stealing will be dealt with accordingly."* (S49) *"No PvP unless both parties consent"* (S32 and S55)
Player Safety & Account	Related to what every individual is expected to do with respect to their personal information and account on the server, rules on how to protect oneself within the server ecosystem	*"Be safe. Do not share or ask for any personal information about you or real life: Real names (first name is OK) . . . "* (S51) *"Sharing account information in chat or private messaging is not allowed."* (S03)

Ruleset Code	**Description of the ruleset type**	**Salient Example(s)**
Player-ban-appeals	Conveying what players may expect from various staff/what staff do on the server (e.g., admins, moderators, helpers, etc.);	*"You can appeal any ban on the forums, whether guilty or not. Be polite, apologize when appropriate and you might be allowed back on our server."* (S15) *"No ban evasion. If you believe you've been unjustly banned, you can appeal on the forums"* (S13)
Player-Staff Interactions	Rules that mention how staff and players may contact each other, when players may contact staff and how they might do so within the given server ecosystem	*"Please talk to a member of staff if another player is bullying, trolling or using hate speech towards you. You or staff may request a private support chat room on discord to further discuss and investigate incidents."* (S08) *"Persistent hassling of Staff members for anything is not allowed. This includes world-editing, protections,... among other things."* (S18)

Ruleset Code	**Description of the ruleset type**	**Salient Example(s)**
Social Governance	Explicit rules about staff managing the server; Conveying what players may expect from various staff, what staff do on the server (admins, moderators, helpers, etc.);	*"The staff is here to help. We volunteer ourselves to this community out of love and a desire to see it succeed. If you have issues with any of us please contact that member's respective Management or Administrator."* (S24) *"Staff are expected to show only the highest possible level of maturity, but between general members we allow a more relaxed atmosphere"* (S27)
Tech Governance	Related to what players may expect from technological controls on the server; or conveying the purpose of tech controls used for moderation (e.g., chat filters, software to detect cheating, etc.)	*"No swearing or trying to bypass the filter."* (stated slightly differently S4, S18, S53)

Ruleset Code	**Description of the ruleset type**	**Salient Example(s)**
Socio-tech Governance	Rules that convey how staff use technological controls to manage the server, activities on the server. The difference between tech governance and socio-tech governance is that the latter includes some aspect that is handled by server staff and the use of tech is often implied (e.g., banned immediately)	*"We reserve the right to change our rules at any time, the moderation team may issue bans or mutes at their own discretion."* (S14) *"Harsh swear words will get you banned immediately. Admins reserve the right to decide what is considered harsh."* (S22)

Rules attribute	**Definition of Code**	**Salient examples**
Prosocial (Desired/ permissible)	Rules that mention desired outcomes for the group/community for a given server	*"Respect others/be Respectful to all"* (e.g., S01, S02, S07, S09, S12, S23, S34, S38) An example of permissible behavior in one server but prohibited in many others is: *"Swearing is allowed, but offensive remarks and spam are discouraged."* (S49)
Anti-social (undesired/ disallowed)	Rules that mention undesired behaviors, considered as breaking rules, or behaviors that will be punished	*"No cursing or profanity."* (S54) *"Do not use client side mods, a hacked client, or circumvent server plugins in a way that gives an unfair advantage."* (S43)

Rules attribute	**Definition of Code**	**Salient examples**
Next Steps (consequence, how to proceed)	Rules that mention next steps in a situation that can correspond to a. consequences or "punishments" for breaking rules; or b. guidelines or instructions on how to proceed	*"...Not following the rules may result in a kick, mute, jail, temporary ban, permanent ban, or permanent IP ban. ... With exceptions, staff will always warn players before resorting to these punishments."* (S37) *"...Any skins that can cause offence or upset will be monitored by admins and you will be asked to change them."* (S17)
Rationale	Rules that provide a reasoning or explanation for why the rule exists or a perspective from server staff	*"...wearing inappropriate or grown-up Minecraft skins such as those depicting Herobrine, nudity, gore, or are scary to young children."* (S07) *"Do not grief. ...When a player builds something, they should be able to leave and come back later without their work being destroyed."* (S15)

Rules attribute	**Definition of Code**	**Salient examples**
Descriptive	Rules that explain or describe something or provide examples of something (Note: some rules include elaborate examples even though the main rule may be restrictive &/or prescriptive)	*"Spam includes, but is not limited to, repeating sentences and/or splitting short sentences into several lines unnecessarily. Very occasional use of CAPS is fine (for example, in using abbreviations like LOL or slipping the OCCASIONAL word into a sentence), but repeated and large-scale use of CAPS is not. ... This is to ensure that server chat, which can get very busy at times, is kept as clean and readable as possible."* (S22) The above code of Rationale provided also applies in this example

Rules attribute	**Definition of Code**	**Salient examples**
Prescriptive	Rules written as "Do something" (Fiesler et al., 2018)	*"Avoid spam in the server chat (max. 4 lines at a time)."* (S32) *"Please only use English in public chats. We're unable to moderate other languages . . . you will be asked to take it to a private channel."* (S36)
Restrictive	Rules written as "Don't do something. . . ," "No. . . ," ". . . not allowed" (Fiesler et al., 2018)	*"Do not bully anyone in the server"* (S19) *"No excessive swearing, spamming or overusing caps, or bypassing the censor"* (S41)

Appendix E

Additional Frequency Distribution by Restrictive (do-not) vs. Prescriptive (do) [R vs P]

Restrictive ONLY ($R = 1$, $P = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Social Play/Etiquette	94	123	130	1
Minecraft/in-game etiquette	88	127	149	0
Player safety & privacy	19	19	33	1
Player-ban-appeals	1	2	3	0
Player-Staff interactions	23	30	27	0
Social governance	24	7	3	0
Tech governance	1	1	0	0

Restrictive ONLY ($R = 1$, $P = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Socio-tech governance	28	30	30	0
Desired/permissible (prosocial)	25	11	7	1
Undesired/disallowed (antisocial)	190	171	229	1
Next steps (consequence, help)	24	24	36	0
Rationale provided	43	16	6	0
Descriptive	115	112	182	0
Prescriptive	0	0	0	0
Restrictive	205	289	323	2
TOTAL RULES CODED	475	707	738	12

Prescriptive ONLY ($P = 1$, $R = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Social Play/Etiquette	48	78	89	3
Minecraft/in-game etiquette	55	64	57	1
Player safety & privacy	19	18	25	1
Player-ban-appeals	4	2	3	0
Player-Staff interactions	42	39	26	0
Social governance	12	18	8	0
Tech governance	0	0	0	0

Prescriptive ONLY ($P = 1$, $R = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Socio-tech governance	48	33	19	0
Desired/permissible (prosocial)	121	93	89	4
Undesired/disallowed (antisocial)	20	24	62	1
Next steps (consequence, help)	33	22	30	0
Rationale provided	27	18	7	3
Descriptive	58	108	101	1
Prescriptive	146	196	186	4
Restrictive	0	0	0	0
TOTAL RULES CODED	475	707	738	12

Restrictive and prescriptive ($R = 1$, $P = 1$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Social Play/Etiquette	42	35	25	3
Minecraft/in-game etiquette	43	34	22	0
Player safety & privacy	16	8	4	1
Player-ban-appeals	0	2	2	0
Player-Staff interactions	23	20	13	1
Social governance	7	5	2	0
Tech governance	1	0	0	0

Restrictive and prescriptive ($R = 1$, $P = 1$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Socio-tech governance	32	18	6	1
Desired/permissible (prosocial)	73	49	21	3
Undesired/disallowed (antisocial)	79	53	34	2
Next steps (consequence, help)	23	20	5	1
Rationale provided	35	17	4	0
Descriptive	65	47	34	0
Prescriptive	90	80	54	3
Restrictive	90	80	54	3
TOTAL RULES CODED	475	707	738	12

Neither restrictive nor prescriptive ($R = 0$, $P = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Social Play/Etiquette	1	17	41	1
Minecraft/in-game etiquette	13	52	55	1
Player safety & privacy	1	11	10	0
Player-ban-appeals	0	3	4	0
Player-Staff interactions	2	8	14	0
Social governance	6	5	8	0
Tech governance	0	0	0	0

Neither restrictive nor prescriptive ($R = 0$, $P = 0$)				
code	**kid-friendly**	**general-family-friendly**	**general**	**platform**
Socio-tech governance	15	59	31	0
Desired/permissible (prosocial)	8	9	5	2
Undesired/disallowed (antisocial)	4	22	85	1
Next steps (consequence, help)	4	20	25	0
Rationale provided	4	14	6	1
Descriptive	29	151	174	3
Prescriptive	0	0	0	0
Restrictive	0	0	0	0
TOTAL RULES CODED	475	707	738	12

Appendix F

Sample Questions (Study II)

How long have you been playing Minecraft?

What kinds of roles do you perform on the server?

What are some things you did to prepare to be in that role?

Before, On the job

Could you describe an overview of what the community is like?

E.g., Moderators, Players (age range), Server/technical infrastructure, Community (culture, climate)

How did you get involved—how old were you when you started? How old are you now?

What are you on the lookout for on the server?

Can you tell me a time on the server when you had to step in? What did you do?

Have you had to go to another (mod) for help?

What's the hardest thing about being a moderator? What are some challenges you run into?

[Questions on whether they have other roles in life, e.g., babysitter, coach]

What would Minecraft without moderators look like ?

What's your style as a moderator?

Is that similar to others? Different?

Why do you like that style? (motivations)

Appendix G

Glossary of Select Terms

Affordances Affordances can be defined as the most prominent features of an entity or environment (Gibson, 1979)

Affinity A social space that has distinct features (Gee, 2003; cf. Table 2.1)

Autonomy Drawing from Dworkin (1998); it can be understood as respecting someone's right to do/choose something; having equal respect (e.g., See Ch 2, Ch 5)

Positive risks; social risks In Developmental Science, used to refer to risks where if things fail, the individual has an opportunity to recover, and learn by reflecting on the experience (Blakemore et al., 2018, 2019; Dahl et al., 2018; Muriuki et al., 2021); in social settings

Scaffolding Adapted from Wood (1976), an approach where an individual or an entity (e.g., a bot) supports an individual carry on with their activities and is ready to intervene when the individual is unable to make further progress or needs more input to accomplish additional goals

Mini-modding Also known as backseat moderation[1]. When someone who is not an official

[1] `https://hypixel.net/threads/about-mini-modding.1689960/`

moderator or administrator attempts to tell another player what to do (or threatens to punish, etc.); a way of impersonating staff

Modding Refers to modifying the original game binary, a widely practiced activity across gaming by not just developers but users/players, but also one of the main reasons Minecraft is hugely popular (Gupta and Gupta 2015; Lee et al., 2020)