Counterspace Games for Refuge, Ritual, and Reclamation

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Abstract

Games have long functioned as *places*, or meaningful spaces, for players. Via play, from analog games to immersive reality games, players occupy special places; not just rich fictional worlds, but also environments holding different cultures, values, and potentials. These latter places go beyond entertainment alone–in them, players can enjoy belonging, connection and so much more. However, the places created and sustained by games have historically been designed and developed *without* marginalized people in mind. The archetypal white, cisgender, straight male is centered as the "normal" player, and so the places within games have been for *their* enjoyment, belonging, connection, etc. As a result, players that diverge from the assumed norm often feel unsafe, excluded, and even attacked in those same places while playing games where they should be able to at least have fun.

The space of games is not unique in othering marginalized people, and many approaches to combating oppression have been explored and developed across generations. One is to create counterspaces, which combat oppressive dominant culture. Counterspaces have centered marginalized people's joy, rest, and healing across contexts, generating places where they can enjoy belonging, connection, and even career support. Such counterspaces generate experiences that marginalized people should be able to enjoy in games too. With this in mind, I have been researching how games can be designed to be counterspaces for marginalized people. Drawing from game design research on uplifting marginalized people, counterspace research, and research on creating public places for community well-being, I develop the concept of *counterspace games*.

I present three roles for counterspace games in the lives of marginalized players: refuge, ritual, and reclamation. First, I conceptualize a single-player counterspace game as an uplifting refuge through the lens of autoethnographic play analysis. Counterspaces, however, are typically not solitary experiences. By examining existing counterspace practices of BIWOC+ in STEM, I learned that counterspaces can be generated by uplifting rituals. This insight then informed my research on multiplayer counterspace games, exemplified by my prototype *Mentorship Garden* and it's embedded rituals. Creating a "magic circle" - a separate and protected space for play - proved effective for refuge and ritual design. However, counterspaces are needed wherever oppression festers – in the real-world environments where marginalized people spend their time. As a result, I seek to extend my work to creating playful counterspaces that can be used in real-world contexts to reclaim the spaces that marginalized players encounter every day.

To accomplish this goal, I draw from my work in mobile AR, which shows how physical environments can be reshaped as places for uplifting marginalized communities. I contribute a playful research-as-counterspace method for co-storytelling about how marginalized communities might use mobile AR for their well-being. I also contribute insights on how mobile AR and play can transform and reclaim unwelcoming environments towards supporting BIWOC+ in STEM. With this, my dissertation provides actionable methods and strategies for playful counterspace creation, as well as identifies opportunities for further research - such as counterspace games for resistance, radicalization, and revolution.

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Chapter 1
Introduction

1.1 Playing Games to Go Places

Games have long functioned as *places*, or meaningful spaces, for players. Via play, from analog games to immersive reality games, players occupy special places; not just rich fictional worlds, but also environments holding different cultures, values, and potentials. These latter places go beyond entertainment alone–in them, players can enjoy belonging, connection and so much more. For example, players can have experiences in which they feel immersed in a game, even without the use of immersive technologies, and this can make playing a game feel like going to a place outside of real life [87]. In multiplayer games, people can enjoy social support, mutual care, and resource-sharing as part of a community of players [229].

However, the places created and sustained by games have historically been designed and developed *without* marginalized people in mind. The archetypal white, cisgender, straight male is centered as the "normal" player, and so the places within games have been for *their* enjoyment, belonging, connection, etc. As a result, players that diverge from the assumed norm often feel unsafe, excluded, and are even attacked in those same places while playing games where they should be able to at least have fun. Work like research on harassment of marginalized individuals in the multiplayer game *Call of Duty 4* have shown this stark contrast, as well as synthesized much needed design principles for fostering inclusion in and around games to support these players [265]. Similar work has also synthesized recommendations for games to include designs that at least have consequences for mistreating marginalized players in and around games [260], further highlighting just how different a place games can be for people who are considered the other. The body of work highlighting this reality has only grown, adding to our understanding of how play that excludes people can perpetuate oppression - and how marginalized players have already been combating this in and around games [40, 94, 120, 121, 123, 124, 310].

1.2 Playing Games to Go to Counterspaces

The space of games is not unique in othering marginalized people, and many approaches to combating oppression have been explored and developed across generations. One is to create counterspaces, or spaces which combat oppressive dominant culture [184, 232]. Counterspaces have centered marginalized people's joy, rest, and healing across contexts, generating places where they can enjoy belonging, connection, and even career support [51, 53, 86, 181, 232, 243, 336]. Drawing from game design research focused on uplifting marginalized people [56, 177, 310] and research on counterspaces created outside of games like those above, I develop the concept of *counterspace games* [250, 251]. In parallel I draw from work on physical shared spaces meant to support communities' needs, values, and well-being, (similar to counterspaces), which have been successfully co-designed using Placemaking [95, 96, 97, 98, 253, 254]. Thus,

in this dissertation I explore how digital games can be designed to function as counterspaces for marginalized players, specifically by critically applying placemaking to games as places, with special attention to uplifting marginalized individuals.

1.3 Conceptualizing Counterspace Game Design

This work presents my conceptualization of counterspace game design as complementary to counterplay, in which marginalized players combat oppression while they play games. I begin by detailing my autoethnographic play analysis of counterspace game elements to approach thinking about games as places that can support the joy, rest, and healing of a marginalized player. By analyzing game design elements of *Stardew Valley* in my personal play experiences, I describe how a game can support a person's joyful belonging, rest from exhausting marginalizing experiences, and healing hope in the faces of entrenched systems of oppression, thus functioning as a counterspace got me. This conceptualization also highlights how the game was able to function as counterspace by providing a place for meaningful experiences I could not access outside of play. Serving as an entry point to understanding counterspace game design, this work informs my other counterspace game design research.

1.4 Counterspace Games for Refuge & Ritual

Informed by the above conceptualization and my early counterspace game explorations for supporting BIWOC+ in STEM and BIPOC game designers, I apply my co-design methods and counterspace game design principles to create a counterspace game, *Mentorship Garden*. This counterspace game is a playful virtual environment embedded in the workplace for effectively mentoring historically marginalized employees. My collaborators and I designed interactions as "rituals" for mentorship pairs to play through during their sessions, which supported communication about commitments, goals, progress, and well-being. We also designed Mentorship Garden to support mentorship pairs getting to know each other better in playful ways as well as facilitate relationship persistence between mentorship sessions by recording a playful visual history of the pairs' mentorship experiences together. Deployed in a large global company, participants experienced Mentorship Garden as a relaxing counterspace for supporting historically marginalized individuals in the workplace. As an exemplar of effective counterspace game design and work that reveals further opportunities for counterspace game design across contexts, Mentorship Garden demonstrates my works' shift from conceptualizing to designing.

1.5 Translating Placemaking for Counterspace Game Design

Finally, drawing from my prior work and critical placemaking, or the community-centric process of designing public spaces in the physical world, I iterate on what I learned from Mentorship Garden and two additional counterspace game research projects to strategies for Critically Placemaking Play as Counterspace Game Design. This adapts critical placemaking for the counterspace game design process, citing related research and the counterspace game design methods

I have previously used in research to support BIWOC+ in STEM and marginalized artists in Pittsburgh. In this chapter I highlight how approaching counterspace game design as shaping a shared place *with* a marginalized community reveals novel methods for co-designing games that center the joy, rest, and healing of players. This work goes on to inform the methods I will use in my proposed research.

1.6 Proposed Work: Exploring Playful Mobile AR Counterspace for Reclamation & Expected Contributions

My proposed work draws from my prior research to develop a playful method for co-envisioning using mobile AR playfully with BIWOC+ to reclaim physical STEM environments that other them. Motivated by enabling playful counterspace in-context in the physical world, this research will contribute not only the collaborative method but also insights about how playful AR content can transform physical environments such that BIWOC+ are more supported and at the very least, welcome. Furthermore, this dissertation aims to complement existing work that uplifts marginalized communities, towards better understanding the powerful potential of games as places for combating oppression through joy, rest, and healing.

Chapter 2
Literature Review

Abstract

This literature review will focus on the concepts and prior work that contributed to conceptualizing and exploring counterspace games for the joy, rest, and healing of marginalized players. To start, this chapter develops an understanding of games as places of significance for players. This review presents prior work on how games can and have been places that marginalize different players, followed by how those same players have been able to combat oppression in games. Building from the above, I argue that games can be sites of pleasure for marginalized players instead and introduce the concept of counterspace games. I define counterspace games by presenting prior research on counterspaces (including those dedicated to supporting marginalized people and play-related counterspaces) and discussing how games that function as counterspaces can work towards the same goals. I then pair this with prior work on games that uplift marginalized players by design to demonstrate the potential power of a game that supports marginalized people by becoming a counterspace. Finally, this chapter scopes my exploration of counterspace games by presenting three roles that counterspace games can play in the lives of marginalized players: refuge, ritual, and reclamation.

2.1 Games Can Be Places

For many people, playing a game feels like going to a different world. One way to think about this experience is informed by prior work on the "magic circle". Salen and Zimmerman define the magic circle as a "special place in time and space created by a game" [271]. Within this definition, the terms "place" and "space" have useful distinction. Yi-Fu Tuan differentiates between the two: space is a location that has not been imbued with meaning from experiences; place is a location that *has* been imbued with meaning from experiences [322]. Aligning with this, Harrison and Dourish describe places as social products that are layered on spaces [134]. In other words, a place is a social and cultural interpretation of the space that is its setting, informed by experiential qualities rather than only spatial. Taking this distinction back to the magic circle, we can think of it like so: playing a game creates experiences and thus social and cultural interpretations of the space it occupies, imbuing it with meaning that goes beyond the environment alone. In this sense, through play, a game can become a meaningful place informed by players' experiences within it and their resulting perspectives of it. For example, Etchells discusses the game *Blake Stone* and his experiences in and perspectives of it as a place he could get lost in as a child, including as a way to step away from the pervasive fear of nuclear attack during that time [87].

2.1.1 Games Can Be Places that Marginalize Players

Games are places for different kinds of fun – whether that's saving a kingdom or running a demon-hunting business with friends. Beyond fun, games also become places for connection, belonging, and other beneficial experiences that are social products of play [229]. The reality for marginalized players is that games can become places where oppression is perpetuated. Such games can be significantly less fun places for marginalized players and can create experiences and perspectives of the game from harmful interactions. Because of this, these players are being marginalized in places where they should be able to have fun. This marginalization can come from patterns of oppression embedded in a game, e.g. *Grand Theft Auto III* perpetuating aspects of white supremacy [186]. It can similarly come from microaggressions from fellow players, e.g. harassment of players when recognized as members of marginalized communities in social VR spaces [13, 28, 37, 196, 207]. Intentionally or not, games can become places that harm different players by design.

2.1.2 Games Can Be Sites of Resistance for Marginalized Players

Like in all other arenas of injustice, marginalized people have been challenging oppression in games and creating places for their fun and pleasure. These challenges in play make games, as Gray argues, sites of resistance [120, 121, 122, 123, 124]. Challenging oppression in games comes in many forms. One example is the playful resistance practice of counterplay, which are player tactics for subverting the original intended way of playing the game [154]. Through counterplay, marginalized players have been able to disrupt marginalizing cultures and practices in games, e.g. resisting capitalism in *Minecraft* [154]. Another strategy has been inclusive modding, in which players have been able to change components of games [278] to challenge oppression, e.g. incorporating more diverse characters in *Stardew Valley* [3]. An additional way marginalized players challenge oppression in games is by centering themselves and their communities during game design and development, e.g. [40].

2.1.3 Games Can Be Sites of Pleasure for Marginalized Players

All of the above are necessary, admirable strategies for combating oppression in games. They also all require labor from marginalized people in contexts where they should be able to enjoy play without justification. With this in mind, my research proposes a complementary line of work on games as places for pleasure and play for marginalized players, where they don't need to continue to fight oppression and can instead simply have fun. In the same way that games can and have been sites of resistance for marginalized players, games can be sites of pleasure, fun, joy, rest, healing, etc. that center them by design. My research explores this kind of game as counterspace games.

2.2 Counterspace Games Can Center Marginalized Players

Counterspace games have the potential to uplift marginalized players, and they aim to support the overall well-being for all who challenge oppression in games (and beyond) as described above (these battles are long, and cultivating holistic well-being is important for long-term resistance against oppression [255]). To illustrate how counterspace games can do this, below I describe what contributes to the potential power of counterspace games and what counterspace games can do uniquely when compared to its parts alone.

2.2.1 Drawing from Counterspaces

Originally coined by Lefebvre, "counter-space" is "the space of a counter-culture" [184] (i.e. for practices and systems that oppose dominant culture, e.g. [130]). Building on this, Hershkovitz defined counter-space as the process of people temporarily creating social environments in which to discuss and practice oppositional politics [141]. The key defining factor of counterspace over time has been that it is an environment for challenging oppression. This has carried into a more recent way to define counterspace as a place where marginalized people are supported by combating dominant oppressive culture [232]. In the same way that a game can be a place for players, a counterspace game can be a place that supports marginalized people by combating oppression [251].

2.2.2 Counterspaces for Uplifting Marginalized Communities

Counterspaces dedicated to uplifting marginalized communities have done so in various ways, in turn providing them a range of benefits. In counterspaces, marginalized people can express and celebrate their identities [51], form interdependent communities of belonging [306], and challenge stereotypes about underrepresented groups while enjoying validation and community [297]. Counterspaces are also places for mutual emotional support and resource-sharing [232] and can strengthen senses of shared identity and thus belonging in "chilly" environments like STEM [305]. Additional work shows that counterspaces are also sites of empowering counter-storytelling to combat dominant, oppressive narratives [336] as well as narrative identity work and fostering empathy as a community [53].

2.2.3 Playful Counterspaces

While counterspaces are not inherently games, many have been playful, and marginalized communities have long used play to support their own well-being and pleasure. Some examples include the Theatre of the Oppressed [239] and humor and laughter as nonviolent strategies of oppression in revolutionary movements [298]. Playful counterspaces created by and for supporting marginalized people include Black Twitter [235] and instagram accounts dedicated to empowering women of South Asian descent [243]. These more recent examples are just a few in a wealth of playful counterspaces that marginalized communities create and enjoy together..

2.2.4 Games for Uplifting Marginalized Players

Like counterspaces, some games have also uplifted marginalized communities by design. Exemplars include *Butterfly Soup*[185], *Kisima Ingitchuna* [111], and *My PWI* [40]. In all three of these games, designed for BIPOC and by BIPOC, game designers and developers engaged in centering their "own voices" as BIPOC, which is part of transgressive game design as a way to challenge normative game narratives [273]. Other games like *Kai Unearthed* become sites of speculative liberatory futures for marginalized people, in which combat against oppression has had lasting successes [59]. Inspired by and aiming to build upon these games, counterspace games can be designed as sites for counterculture that centers the well-being of marginalized people.

2.3 Strategies for Centering Marginalized People

As previewed by the ways marginalized people have been uplifted in this literature review, there are a plethora of approaches to designing games as counterspaces for marginalized players. Below, I describe three strategies on which my work currently focuses, chosen for the potentials for games to effectively support them and for their utility in supporting marginalized communities.

2.3.1 Refuge: Centering the Marginalized

Refuge is something providing shelter – in my work, I discuss refuge specifically as shelter, even if only temporary, from oppression. In counterspaces, can be in the form of being able to express one's identity without being harassed and attacked. In games, this can be playing through narratives of justice and equity as a respite from the world outside of play. A counterspace game could become a place of refuge for marginalized players in the same ways. My dissertation explores counterspace game as refuge in Chapter 4.

2.3.2 Ritual: Centering Uplifting Practices

Ritual is a set of actions performed according to a prescribed order, typically as part of religious ceremony. In my research, I discuss ritual as actions that can support marginalized people (without rooting it in religious rites). More specifically, my work is concerned with how counterspaces and games can become places where rituals for supporting marginalized people are developed, fostered, and centered. In counterspaces, rituals would be found in the counterculture practiced there. For example, in a Pittsburgh counterspace for women and trans folk to learn and enjoy skateboarding, a common practice is offering informal help and advice as a ritual of interdependence among attendees. In games, uplifting rituals can even be embedded in game mechanics; for example, writing and sending letters of validation and support to strangers who are struggling, as done in *Kind Words*. Similarly, a counterspace game could be a place that centers uplifting rituals for supporting marginalized people. I explore this in Chapter 6 of this work.

2.3.3 Reclamation: Centering Marginalized People In-Context

Reclamation is claiming something back or reasserting a right. In my work, I discuss reclamation as a process of taking back public places in which oppression is embedded and perpetuated, towards reshaping it to support the well-being of all communities, especially those who are marginalized. Counterspaces can be generated through the act of reclamation. For example, because many public spaces in Pittsburgh are sites of violence on marginalized people, when neighbors display signs in front of their homes affirming that Black Lives Matter and that people of different religions, identities, sexualities, ethnicities, etc. are welcome in Pittsburgh, they reshape their streets into counterspaces. In games, reclamation can be a literal part of a game mechanic. For example, in *Tonight We Riot*, players fight oppressors to reclaim places in their city one by one [249]. Likewise, a counterspace game can become a place for reclamation as a method for uplifting marginalized people. In Chapter 8 of this work, I propose research that will explore designing a counterspace game for reclamation in-context of marginalized players' everyday lives.

Chapter 3
Counterspaces for Escape

Given counterspace games' goal to uplift marginalized people, I felt it was important that I explored this *with* and not *for* them. For me, this meant starting with the assets-based approach. By understanding and building upon a marginalized communities' strengths, I aimed to resist doing research that assumed deficit in my collaborators. Below, I designed focus groups as counterspaces for Black, Indigenous, and Women of Color as well as non-binary People of Color (BIWOC+) in STEM, towards understanding how they already support their well-being within a notoriously "chilly" social environment. In the context of my dissertation, the work in this chapter defines how my counterspace game research aims to uplift marginalized people.

The following is adapted from my paper:

Erica Principe Cruz, Nalyn Sriwattanakomen, Jessica Hammer, and Geoff Kaufman. 2021. Counterspace Games for BIWOC+ STEM Students. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), May 8–13, 2021, Yokohama, Japan.* ACM, New York, NY, USA, 6 pages. https://doi.org/10.1145/3411763.3451811

Abstract

Black, Indigenous, and other Women of Color (BIWOC+) studying STEM are underrepresented in STEM and subject to its "chilly" climate; it is unsurprising that BIWOC+ STEM students report weaker senses of belonging and higher rates of attrition. Counterspaces, or spaces for mutual support for BIWOC+ at the margins of STEM, have long combated dominant STEM culture to support BIWOC+ to thrive and persist in STEM. Digital game design and playful interactions to counter oppression can be leveraged to create digital games that function as counterspaces for BIWOC+ STEM students to playfully cultivate their belonging and persistence. Our exploratory game design research aims to co-design counterspaces games with BIWOC+ STEM students, and here we present our initial focus group designs centered on exploring existing BIWOC+ counterspace practices, preliminary data and insights, and promising directions for developing game design strategies to support BIWOC+ belonging and persistence in STEM.

3.1 Introduction

Black, Indigenous, and other Women of Color (BIWOC+) continue to be significantly underrepresented in most STEM academic contexts [295]. Moreover, BIWOC+ students in STEM are often subjected to an unwelcoming, "chilly" climate, exacerbated by frequent experiences with microaggressions and other manifestations of implicit and explicit biases and a lack of formal support mechanisms to challenge these cultural dynamics [232, 335]. It is thus not surprising that BIWOC+ students in STEM report weaker senses of belonging [158], lower levels of sat-

isfaction, and ultimately, higher rates of attrition in STEM majors and programs [231]. This complex problem, perpetuated by both unjust, historically-rooted institutional inequities and occurrences of interpersonal racism and sexism, requires large-scale social and institutional reform.

Such sweeping changes are, predictably, slow to occur, necessitating the creation of more immediate interventions to address experiences of isolation and promote greater psycho-social well-being for BIWOC+ students. One particularly impactful intervention is the creation of *counterspaces*, safe spaces that support marginalized individuals at the periphery of a dominant culture, which research has found support BIWOC+ to thrive and persist in STEM [232]. Counterspaces provide a context for members of marginalized groups to celebrate and express their identities [51], to develop bonds of interdependence that reinforce a sense of belonging [306], and to challenge dominant narratives that perpetuate stereotypes about underrepresented groups [297].

In our work, we are using participatory design and focus group methodologies to co-create digital games that can function as counterspaces for BIWOC+ students in STEM. These counterspace games aim to fulfill the goals of existing counterspaces — to increase a sense of identity affirmation, belongingness, and resistance — while additionally leveraging the affordances of games and play to cultivate a sense of psychological safety, interdependence, and collective joy.

In this paper, we describe the first phase of our exploratory game design research approach and introduce a novel protocol for conducting remote co-design focus groups with BIWOC+ participants to explore how digital games can be created to function as playful counterspaces. We also present preliminary insights from our initial focus groups that are yielding promising directions for the next phase of our co-design of counterspace games. We close by discussing our next steps to further develop and evaluate our game co-design strategies, and to produce and playtest digital prototypes of counterspace games for BIWOC+ STEM students.

3.2 Literature Review

3.2.1 Supporting Belonging and Persistence via Counterspaces

Counterspaces are created to challenge unwelcoming STEM culture and often exist at the margins of STEM, comprised of marginalized group members (and often their allies) [232]. They often center on interdependent practices, which reinforce mutual emotional support and resource-sharing [232], and serve to strengthen a sense of shared identity and belonging [305]. Counterspaces exist in many forms, such as campus-affiliated affinity or interest groups, and sometimes even entire STEM departments [232]. Prior research has shown that counterspaces provide a safe space for validation, recovery, and community[297]. Our work aims to pair these capabilities of counterspaces with playful interactions to design digital games that function as playful counterspaces to support BIWOC+ belonging and persistence in STEM.

3.2.2 Social Support via Game Design

Prior research in HCI has investigated how digital games can engender and cultivate social support and belonging in genres such as massively multiplayer online games (MMOG) such as *World of Warcraft*. This work has shown that MMOG players often report experiencing a culture of mutual care and resource-sharing with others within their MMOG-based communities [229]. Conversely, research on occurrences of harassment experienced by players from minority groups while playing online multiplayer games like *Call of Duty 4* has included the development of design principles for fostering equity and inclusion across axes of gender and ethnicity. These efforts have included new frameworks for designing inclusive social (outside-of-game) networks around games to mitigate players' vulnerability to negative experiences through practices like strict moderation against harassment [265]. Also, research on the positive gameplay experiences of Black women in college has generated insights for creating a more inclusive gaming subculture, including recommendations that multiplayer online game designers create environments in which negative social interactions are reportable, blockable, and have clear, concrete consequences [260]. Our research works to build from these insights to design playful counterspace games with the main function of cultivating BIWOC+ belonging and persistence in STEM by cultivating positive, interdependent interactions to counter negative aspects of dominant STEM culture.

3.2.3 Playful Counterspace Potentials

We aim to design digital games that can function as playful counterspaces to which BIWOC+ STEM students can turn whenever they need them. We take inspiration from elements of playfulness that already exist in some traditional counterspaces. These practices include the interactive traditions and methods cultivated by the Theatre of the Oppressed, which combines social issues with theatrical characters in scenes where spectators can interrupt and change the narrative, making it "just theatre" (e.g. a spectator can stop an actor from beating his "wife" and shape the narrative by getting on stage and beating him with a broom instead) [239]. Additionally, using humor and laughter as nonviolent strategies against oppression has been integral to various revolutionary movements [298]. More recently, humorous practices on Black Twitter for coping with injustices and the COVID-19 pandemic have also exemplified playful practices that counter damaging, dominant culture [235]. Our research aims to leverage these potential powers of play in combination with the positive effects of counterspaces to meaningfully support BIWOC+ STEM students' sense of belonging and persistence through digital gameplay.

3.2.4 Assets-Based Game Co-Design

We aim to co-design [277] digital games that function as counterspaces centered on interdependence, joy, and play using an assets-based approach [173] that builds upon existing practices for resilience and persistence in STEM. This approach runs counter to a deficits-based approach, which attempts to improve sense of belonging by trying to "fix" how students experience central STEM spaces [305]. This can be demoralizing to the people the work is supposed to be for [26]. A hypothetical example of a deficits-based approach to addressing weak senses of belonging

and their predictably negative consequences for persistence among BIWOC+ in STEM would be a game-based intervention that encourages BIWOC+ players to mentally reframe microaggressions as learning experiences from which they can improve. An assets-based approach instead recognizes no "fixing" is needed (unless it is directed at broken systems that perpetuate inequities and injustices) and instead focuses on strengths of the target population [26]. Adopting an assets-based approach means recognizing that BIWOC+ are already incredibly resourceful and resilient [119]. Building from these strengths, we aim to explore the practices BIWOC+ already employ to cultivate their own senses of belonging and persistence and support (and perhaps augment) such practices with digital game design.

3.2.5 Facilitating Exploration of Existing Practices of BIWOC

As a first step in co-designing games with our BIWOC+ participant collaborators that leverage existing counterspace practices, we first needed to explore these practices, acknowledging that our collaborators' experiences are likely to be personal and/or private. In devising our research methodology, we were guided by prior work by Rankin and Han (2019), who investigated the plurality of Black college women's play experiences. Specifically, Rankin described her decision to be transparent about her intersectional identities (i.e., as a Black woman who plays video games but does not label herself as a gamer) and the purpose of her research while conducting this work in order to build rapport with her participants over the course of several campus game nights. In doing so, she minimized the power imbalance between researcher and participant and invited them to share their personal narratives and expressions with her [260].

In our work, we faced the additional challenge of building rapport with BIWOC+ participants within a limited amount of time and in a single session, as we were constrained by limited funds with which to compensate participants. To this end, we drew from the Fast Friends procedure in prior research by Page-Gould and colleagues [238]. This procedure, which involves having participants respond to sets of rapport-building questions that entail increasing levels of self-disclosure, has been shown to reduce anxiety and increase comfort and rapport in interpersonal and intergroup contexts [238]. To further facilitate our participants' comfort with discussing personal and potentially private practices with strangers some degree of comfort, we drew from an element of Psychologically Embedded Game Design: psychological distancing, which creates a buffer between players and uncomfortable themes explored in a game [161]. Specifically, we use collaborative fictional storytelling in our focus groups to create this distancing for our BIWOC+ participants. Our work adapts these methods to explore existing counterspace practices of BIWOC+ in STEM by rapidly facilitating our participants' comfort with sharing their personal practices with us in our single, 1 hour remote focus groups.

3.3 Remote Game Co-Design Focus Groups

We initiated our game design process with recently-completed focus groups that aimed to identify which game elements and practices for mutual support are most valuable and desired by BIWOC+ as they continue to work to cultivate their own sense of belonging in STEM. We

conducted 2 virtual 1-hour focus groups [302] with a total of 6 STEM student BIWOC+ participant collaborators from our university to learn more about their current counterspace-related practices, with the intent to later translate these insights into game design strategies. 2 were graduate students, 4 were undergraduate students; 1 identified as Black, 1 as Nigerian-American, 1 as Black/Afro-Caribbean, 1 as Latina, 1 as Asian/South-Asian/Indian, and 1 as Asian/Chinese and Filipino. 4 of the participants identified as Female, 1 participant idenified as Demifemale, and 1 participant identified as Femme Non Binary. 2 indicated that they study Human-Computer Interaction, 1 studies Information Security Policy, 1 studies Dramaturgy with plans to pursue STEM-related graduate education, 1 studies Electrical and Computer Engineering, and 1 studies Information Systems.

3.3.1 Creating Counterspaces Within the Focus Groups

For all study activities, we employed Zoom video conferencing software. Zoom was chosen for its ease of use, ubiquity, and ability to record video and audio footage to the cloud for later retrieval and analysis. To make the focus groups function as counterspaces in which our collaborators could feel comfortable exploring counterspace practices, we played lo-fi hip hop beats softly via Zoom audio sharing, and ensured that facilitators exhibited genuine warmth, from greeting collaborators as they entered to encouraging their input on the Miro board (a web-based visual collaboration platform) and thanking them for their time and energy during goodbyes. Although all collaborators had previously consented to being audio- and video-recorded during the focus group, we also encouraged them to turn their cameras and/or microphones if and when they wanted/needed. In the same spirit, we encouraged all collaborators to participate however they preferred, even if that was solely via the Zoom public chat or even private chats to facilitators (which Zoom does not record). Furthermore, all collaborators were required to sign consent forms in which they agreed to not share anything they saw or heard during the focus groups.

Scaffolding Self-Disclosure

During the first 5 minutes of the remote focus groups, those of us facilitating introduced ourselves and the basics of the collaborative storyboarding activity. We disclosed our BIWOC+ and STEM student identities and the purpose of the research project to encourage comfort and sharing [260]. We conducted a brief ice breaker and then created space for collaborators to introduce themselves for another 5 minutes. Our brief ice breakers questions were adapted from the Fast Friends procedure [238] (i.e., 3 levels of ice breaker questions of increasing self-disclosure) to further ease collaborators into discussing their counterspace practices with strangers. Introductions and ice breaker components were framed as response-optional and answerable via any method (i.e., chat or voice).

3.3.2 Facilitating Exploration of Counterspace Practices

Outreach for our focus group recruitment highlighted that no prior game design (including storyboarding) experience was required to participate, so we designed our focus groups to facilitate our collaborators' counterspace activity exploration efficiently. Once we had rapidly established comfort, we moved onto the main collaborative storyboarding activity. As our medium for

remote co-design, we used the online collaboration platform Miro. In Miro, we created a custom mini tutorial to quickly acclimate our participants to Miro's layout and tools before our focus groups. Within a few minutes prior to our designated focus group sessions, they learned how to navigate within the digital design environment, add text and media, and operate in Miro without exiting our focus group Zoom room. We also created a custom collaborative storyboarding board on which our BIWOC+ participant collaborators inputted facts about a fictional BIWOC+ STEM student character, her possible emotional responses to negative narrative scenarios, and what she could do to support her own joy, rest, and healing (i.e., possible counterspace practices she could use). To preserve collaborator privacy, our Zoom rooms and Miro boards could be accessed only via the private passwords we provided to them, and the PI hid and locked storyboards once they were completed.

We recognized that counterspace practices are personal, potentially private matters and not comfortable to discuss with strangers, even when sharing BIWOC+ identity, so we adapted psychologically embedded distancing [161] to serve as a buffer in the form of a narrative about a fictional BIWOC+ character on whom collaborators could focus their discussion of counterspace practices.

Storyboarding: Facts about Her!

At the start of storyboarding, we prompted them to generate facts about a fictional BIWOC+ STEM student character on a collaborative Miro board for about 2 minutes. Supporting this buffer was the BIWOC+ Character Facts Generator, a program that one of our BIWOC+ undergraduate research assistants built specifically for the focus groups. The program generated playful example traits such as "One of her main hobbies is stamp collecting" and "She secretly loves reality TV shows like Love Island and The Bachelor." Although we had intentionally designed these facts to be lighthearted and non-specific to any one BIWOC+ identity, we encouraged collaborators to add semi-autobiographical facts. Our aim was to encourage them to identify with the fictional BIWOC+ character, albeit from a safe distance.

Storyboarding: How Do You Think She Feels?

Following this, we introduced one narrative scenario. We asked them to answer "How do you think she feels after this?" in response to the narrative scenario on the Miro board for 3 minutes. As they worked on editing the Miro board, including at any time we asked them to respond to a prompt on Miro, facilitators reminded them that their contributions did not have to be confined to a single bubble or section on the board, and that we in fact encouraged them to cross lines and collaboratively generate responses in shared bubbles. The key details of narrative scenarios of each storyboard, listed below, were modeled after fairly common experiences that BIWOC+ endure in STEM spaces, such as being told she "must" need help to pass a computing class or coping with performative emails from university leadership that do nothing to address poor campus climate. We did this so that BIWOC+ would readily share counterspace practices they may have enacted in response to similar negative experiences.

Scenario 1

Our fictional BIWOC+ STEM Student is sitting in the foundational introduction course for

her STEM major...when the lecture ends, one of her classmates approaches her and without introducing himself, asks if she needs help...he clarifies that he is offering to help her so she can pass the class because she "must be having a lot of trouble".

Scenario 2

Our fictional BIWOC+ STEM Student is on her way to her STEM class...as she passes through, she notices more than one person watching her, as if tracking her until she leaves the space, and it doesn't look or feel friendly. She notices one person protectively pull their bag closer to them as she passes. She quickly leaves the space.

Scenario 3

Our fictional BIWOC+ STEM Student is in a group project meeting with her classmates...one member presents an idea which the rest of the team enthusiastically supports...she reflects on the fact that this idea is very similar to (if not the same as) an idea she presented at the last meeting which the team quickly rejected. When she brings this up, her team minimizes what happened and ends the meeting.

Scenario 4

Our fictional BIWOC+ STEM Student checks her email and sees one from the University President with the subject line "Responding to Student Concerns". ..the President acknowledges that another prominent university official regularly demeans marginalized groups and that this "negatively impacts some students"...[the email ends] with statements regarding academic freedom and plans to form a committee...

Storyboarding: What Could She Do?

Once they were done, we asked them to answer "What can she do to address and/or counter these feelings? What can she do for her own rest, healing, and/or joy?" on the Miro board for 10 minutes. Again, we encouraged our collaborators to not be bound by single bubbles or sections and instead let them know they were welcome to list their counterspace practices wherever they saw fit, especially if they were building upon or were related to what their fellow collaborators had contributed. Furthermore, all cues for steps and helpful nudges for exploration were visible for each part of collaborative storyboarding. These cues included reminders to list things she could do if she had "time, energy, and resources", along with an unobtrusive timer to help everyone stay on track.

Storyboarding: Reflections

Collaborators then spent 5 minutes sharing their reflections on their input aloud, after which we repeated this collaborative storyboarding process once more for the second narrative scenario. While collaborators talked about their own and each others' contributions and facilitators encouraged open conversation around the presented counterspace practices, a dedicated facilitator took notes about the reflections as part of our focus group data. Throughout every part of the collaborative storyboarding activities, facilitators worked together to make sure all prompts were communicated aloud, via chat, and brought up again via nudges to help collaborators along. Genuine warmth was especially helpful in encouraging collaborators in real-time as they contributed

to the Miro board and shared their reflections with the group.

3.3.3 Leaving the Virtual Counterspace

To close the focus groups, we created space for a 2 minute cool-down of their choice and used the last 3 minutes to sort out payment logistics, thank them all, and say goodbye. Facilitator friendliness and warmth were constant throughout focus groups, and we closed the virtual counterspace gently through our cool-down period to enable collaborators to come down from our discussion of personal counterspace practices before getting on to the rest of their days. As our collaborators left, they kindly shared with us that they had fun and were interested to see how the research would develop.

3.4 Insights from Preliminary Focus Group Data Analysis

Co-creating storyboards about fictional BIWOC+ STEM Students by having collaborators describe "Facts About Her", "How Do You Think She Feels?", and "What Could She Do?" after her negative experiences in the narrative scenarios enabled us to explore the counterspace practices of our collaborators in our remote co-design focus groups. We feel our efforts to facilitate the storyboarding process and to make the focus groups counterspaces contributed to the quality of conversations that emerged during the focus groups, which we have yet to parse from our Zoom recordings and observational notes. The benefits of our focus group design can be seen in the insights we gleaned from preliminary data and analysis conducted on our Miro boards, which function as counterspace narrative design artifacts of our remote focus groups.

This preliminary analysis entailed the first two authors making two passes coding the responses to the "What Could She Do?" prompt. In the first pass, we independently coded up to 5 characteristics of each shared counterspace practice, such as "venting," "socializing," "ignoring," and "building positives." In the second pass, we discussed our characteristic codes to cluster responses into themes and reached consensus on theme definitions and the counterspace practice responses assigned to them. For example, the codes "venting" and "socializing" were combined into the theme "Seeking Solidarity & Validation." Counterspace practice responses that fell into more than one theme were included in each theme's frequency total.

3.4.1 Seeking Solidarity & Validation

Fourteen collaborator responses involved counterspace practices centered on seeking solidarity and/or validation by turning to external sources like communities. Collaborators referenced both real communities (e.g. a school club meeting) and imaginary ones. In the latter case, in response to *Scenario 1*, one collaborator suggested watching shows on Netflix that cover similar microaggressions because "it's reassuring to see the situation play out reasonably." This is a potentially fruitful path of further exploration as we work towards translating this insight into game design strategies: one possible example is designing counterspace games that create an in-

dividual BIWOC's ideal community that they could turn to for solidarity and validation, drawing inspiration from both real and fictional communities important to their lived experiences.

3.4.2 Self-Care & Small Joys

Thirty-one collaborator responses involved counterspace practices that were directed more inwardly by taking part in small joys to boost their overall feelings of well-being. Often, these responses were associated with the BIWOC+ character treating herself to good food and/or drink, such as when a collaborator listed "treat herself to some boba!" in response to *Scenario 1*. Practices also included feel-good habits like "take a nice long shower or bubble bath" in response to *Scenario 3*. These insights have the potential to be translated to especially joyful game design strategies: One possible example is designing games around enjoying small pleasures, such as hiking through a beautiful environment, hanging out with a virtual dog, or even making boba at home to cultivate self-care and small joys in the hopes of mitigating the harms of dominant, exclusive cultures like that of STEM.

3.4.3 Distraction & Escape from Dominant Culture

Twenty-seven collaborator responses purposely shifted counterspace practices away from negative aspects of dominant STEM culture, often with clear intent to ignore, forget, or simply get away from negative experiences. Some counterspace practices that served as distractions or escapes seemed to be total. For example, one collaborator wrote "dimension hop to somewhere interesting where people are nicer" in response to *Scenario 4*. Forgetting or ignoring the negative experience leaned more towards "focus[ing] on her own learning and grades/don't pay attention to classmates like that" in response to *Scenario 1*. Distraction and escape as broader counterspace practices also have exciting potential for game design strategy development: one possible example is designing counterspace games focused on visiting other worlds that counter dominant STEM culture, perhaps even as practices to model outside of gameplay.

3.4.4 Seeking Justice

Twenty collaborator responses were forms of direct action, engaging with authorities related to the fictional scenarios, and modified forms of activism as counterspace practices. First and foremost, while we joked with collaborators during focus groups about possibilities for petty revenge, neither the conversation nor shared counterspace practices involved violence or destructive actions to cope with marginalizing experiences. Our preliminary analysis understands them to be practices seeking some form of justice. In response to *Scenario 2*, one collaborator listed "sit in that place next time, with her friends" to reclaim that unwelcoming space. In response to *Scenario 2*, a collaborator listed "assuming she has a high grade, sabotage the entire project so everyone gets an F on it and it doesn't even affect her grade that badly" to address due credit for work not being given. While seeking justice is often be a heavy subject, especially for BIWOC+, and is typically a path taken when relevant authorities cannot or will not address problems nor hold wrong-doers accountable, possible game design strategies derived from this insight have the potential to bring healing. One way is through counterspace game design centered on practicing

scripts for necessary confrontations to normalize accountability, even within relationships with power imbalances in dominant STEM culture.

3.5 Conclusion

Thanks to our participant collaborators' storytelling, we can begin to understand how BIWOC+ in STEM already support their well-being while experiencing oppressive dominant culture. Following the assets-based approach, our counterspace games research will build upon this marginalized communities' strengths and strategies. From these preliminary insights, we have identified four promising directions for translating our collaborators' counterspace practices into game design strategies. These counterspace game design directions also present what roles a counterspace game could play in the lives of marginalized individuals in order to be effectively supportive of their well-being. Moving forward from this work, we can turn to prior research on how players can experiencing solidarity and validation, self-care and small joys, distraction and escape, and seeking justice in a game. These phenomena among players are explored and well-documented; however, prior work typically has not centered marginalized players, and games that offer such experiences are not designed with them in mind. Here, we can recognize that marginalized communities are having to generate such experiences for themselves to support their well-being, while privileged players enjoy this in existing games without labor. Because of this, counterspace games aim to challenge the status quo by designing games that do not require additional labor from already vulnerable people in order for them to enjoy playing a game without being othered.

3.5.1 Escape as Counterspace Practice

While all four of these preliminary insights highlight interesting opportunities for further research, this dissertation begins by focusing on distraction and escape from dominant culture. Escape as counterspace practice is especially interesting, as it implies going beyond distraction (e.g. generated by entertainment) to purposefully leave behind oppressive norms. Removing themselves from environments that perpetuate harm against them and their communities is *going elsewhere*. Actually escaping such environments and oppressive cultures is not always (or even commonly) possible – personal circumstances and oppressive patterns in society can make going elsewhere difficult for a marginalized individual. Also, even if escape is practiced to support their well-being, it requires additional labor from them, and the oppressive culture they leave behind will likely still be waiting for them when they return. Later in this dissertation, I propose research that focuses on the latter reality. Part of building up to that includes exploring how a game could strengthen marginalized people's practices of escape to support their well-being.

3.5.2 Counterspace Games as Playful Escape

In this study, we asked our participant collaborators to imagine without limitations because we aim to design counterspace games that can circumnavigate restrictions of physical environments – essentially enabling uplifting experiences marginalized players might not be able to

enjoy anywhere outside of the game. Looking at our participant collaborators' storytelling, we can recognize that the "magic circle" of a game, or separate space generated by play, could support marginalized players by *being* that escape. While games have long taken players to different worlds and realities, many times oppressive patterns follow them. With the above in mind, the following chapter explores how a game has the potential to be an escape, or a haven purposely different and apart from oppressive environments and culture.

Acknowledgments

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Chapter 4
A Counterspace Game as Refuge

Building upon the prior chapter about how BIWOC+ in STEM already create counterspaces for themselves, this chapter shows how a single player game can similarly support escaping places dominated by oppression. Below, I use autoethnographic analysis to show that although this game was not originally designed to be a counterspace, in the context of my intersectional identities, playing it became my refuge. This chapter demonstrates how a player can indeed experience a game as counterspace, highlighting further what might be possible when a game *is* designed to be a counterspace from the start.

This chapter was adapted from my paper:

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Abstract

Single player digital games can be safe environments for players; e.g. *Lost in a Good Game* discusses *Blake Stone* (1993) [143] as a safe place that satisfied intrinsic needs and offered respite from external troubles [87]. However, research on games like *Grand Theft Auto III* (2001) [110] discusses them as environments that perpetuate stereotypes and justify white supremacy [186]. As a pansexual Pilipina American player, I turned to single player digital games as safe environments for my personal joy, rest, and healing. Too many times, they became unsafe places where I felt sad, angry, tired, and hurt. *Counterplay*, or player tactics for subverting game developers' original intentions, like resisting capitalism and colonialism [154] in *Minecraft* (2011) [5], is one admirable form of recourse. Complementary to counterplay, I propose digital games can be counterspaces, or safe spaces (often at the periphery though they can be at the center of a dominant culture) for supporting marginalized individuals [232]. I offer a preliminary set of counterspace game design principles by analyzing elements of *Stardew Valley* (2016) [8] through an autoethnographic play lens. I synthesize key aspects that support this pansexual Pilipina American player's joy, rest, and healing. Specifically, I focus on single player game elements that enable joyful belonging of my intersectional identities, offer restful alternatives to othering realities, and provide healing narratives of hope and strength in the face of entrenched systems of oppression. While this work is centered on my own play of a single player game in relation to my lived experiences, it aims to spur more work around games that uplift marginalized individuals by centering their joy, rest, and healing.

4.1 Introduction

Digital games can offer players a fantastical experience, pull them into a magic circle, and provide a low-risk setting to take on new identities [87]. However, it's important to think about who gets to enjoy digital gameplay in this way. Typically, the imagined player is a white, straight, cisgender man, and this imagined archetype of a player is often enforced by the design of digital games and even by exclusionary communities that form around games [121]. This creates dissonance for players who do not fit into such a narrow mold. For example, digital games are not fantastical experiences in magic circles of low-risk when a player who has identities that are targeted by white supremacy is playing a game that has elements that perpetuate white supremacy [186], like *Grand Theft Auto III* (2001) [110]. There are games like *Animal Crossing: New Horizons* (2020) [1] (and many games before it that players classify as "cozy" games) which notably break from this exclusionary player archetype, providing play experiences that many find relaxing and comforting. Similarly, games like *Undertale* (2015) [101] notably disrupt norms for "winning" and NPC design and interaction in play. Single player games like these illuminate the valuable broadening and diversifying play experiences that are possible. Still, it is rare for games to center marginalized players at all. Key exceptions include *Kisima Ingitchuna (Never Alone)* (2014) [6], which embodies Iñupiat cultural values and uplifts Iñupiat players via self-representation, decolonization of their youth's education, and facilitating community in and around the game [338]. Similar games further highlight how single player games can become counterspace for marginalized players—but the reality is that most games perpetuate the exclusion of marginalized players.

One admirable strategy to address this is *counterplay*, or player tactics for subverting game developers' original intentions, like resisting capitalism and colonialism [154] in *Minecraft* (2011) [5] and the disruptive griefing practices of women of color gamers [120] in games like *Call of Duty: Modern Warfare 2* (2009) [2] Counterplay is a great way for marginalized players to reclaim space in games that were essentially not made for their enjoyment because of their difference from the imagined archetype of a player–and any player can choose to engage in counterplay in any game to do so. Related to this is another strategy of advocating for broader representation in games, not only in terms of character design but also in terms of the creators behind the games and the imagined player: e.g. designing digital games as Black, Indigenous, and People of Color where the imagined player is also a BIPOC and studying at a predominantly white higher education institution [40]. Compared to counterplay, this asks game designers and developers to operate more inclusively as opposed to making the work required for a better play experience rely only on a player who is already marginalized.

In this chapter, I propose a complementary approach: designing games to function as counterspaces, where a counterspace is a safe space at the periphery (with the potential to be at the center) of a dominant culture for supporting marginalized individuals [232]. This approach shifts the labor of making play more inclusive from the marginalized players themselves to game designers and developers who can proactively design games with marginalized players as the imagined player archetype while attending especially to how the game could support them. Beyond character and avatar diversity, a counterspace game would entail designing play to center the joy, rest, and healing of marginalized players. In this paper, I build from autoethnography of my own

intersectional identities as a pansexual Pilipina American player to explore how elements of a single player game can support the joy, rest, and healing of a marginalized player. I do this to illuminate the possibilities for games to uplift marginalized players by functioning as counterspaces by design (instead of solely by players like me reinscribing their own personal meaning in elements of a game or by players engaging in counterplay). From my play autoethnography, I synthesize early insights to inform single player counterspace game design towards approaching games as spaces in which marginalized players can be uplifted by centering their joy, rest, and healing at its core.

4.1.1 Queer Filipino American Oppression

Queer Filipino Americans are often invisible within communities of people of color, Asian Americans, and LGBTQIA+ folk, even when they face compounded oppression because of their intersectional identities. As queer people who are also Filipino Americans, they are often swept under too-broad labels that erase their unique experiences within aggregated data that ultimately does not represent their lived realities, with just one example being a dearth of data on how Filipino Americans have been disproportionately affected by COVID-19 [58]. Similarly, as Filipino Americans who are also queer people, even within LGBTQIA+ and Asian American communities, their experiences are ignored and/or invisible [221]. And as queer people within Filipino and Filipino American communities that experience layers of stigma around queerness, the intersectional identities of LGBTQIA+ Filipino Americans are further complicated because they must "manage" their sexual orientations and/or transgender identities in many ways, functioning with a "hyperconscious monitoring of gender presentation, behaviors and mannerisms, voice inflections, clothing choices, cultural tastes and even friendship networks [227]. This leaves queer Filipino Americans coping with and enduring oppression while existing as forgotten parts of communities that are already marginalized. For queer Filipino Americans who are also bisexual, pansexual, or asexual, there is an additional layer of invisibility, in that many people who identify as any of these are typically met with invalidation from various sources of society and with negative effects on their well-being [136].

The lack of disaggregated data aside, Filipino Americans are also deeply affected by colonial mentality as a result of colonization. The Philippines endured nearly five centuries of colonization at the hands of Spain and the United States of America [67, 102]. Beginning in 1521, Spanish colonization destroyed many aspects of the indigenous peoples' cultures, including imposing new gender role norms and Catholicism [222]. American colonialism in the Philippines began in 1899 (as Filipino sovereignty was not recognized in the Treaty of Paris) and brought about a culture of seeing Filipinos as inferior children compared to Americans [67]. So much violence was inflicted upon the indigenous peoples of the Philippines, and that violence bleeds across generations as result of centuries of oppression under two colonizing forces. This includes colonial mentality: "a specific form of internalized oppression wherein individuals regard anything of their heritage as inferior to anything of their colonizers or oppressors" [67], the negative effects of which many Filipinos and Filipino Americans experience in their everyday lives.

Because of the above, queer Filipino Americans endure invisibility, cope with colonial men-

tality, and must manage the expression of their intersectional racial and sexual/gender identities for their safety and well-being. This research aims to explore how queer Filipino Americans could be uplifted via play by centering their joy, rest, and healing in single player digital game design. In doing so, this work aims to combat these issues by beginning to make queer Filipino American experiences more visible by choosing to proudly share my own authentic experience as a pansexual Pilipina American.

4.1.2 Autoethnographic Play Case Study

I am a pansexual Pilipina American game designer, developer, and researcher, and throughout my life I have turned to single player digital games for joy, rest, and healing. Over the years, I came to think of many video games like those in the *Legend of Zelda* (1986-2021) [9] and *Kirby* (1992-2022) [4] series and younger games like *Undertale* (2015) [101] and *Stardew Valley* (2016) as spaces safer than those I occupied in my life outside of play–spaces in which I felt safe enough to reinscribe parts of myself that I could not express, enjoy, or practice elsewhere. Most recently, the game Stardew Valley has been my preferred safer space when I seek to playfully resist the oppression of my intersectional identities. I use an autoethnographic approach to examine how elements of this game helped me conceptualize it as a safer space that supports my personal joy, rest, and healing. I focus on elements of Stardew Valley in single player mode that contribute to my experiencing and interpreting the game as counterspace without having to practice counterplay. Through focused narratives and analyses of my own experiences as a pansexual Pilipina American playing this game, I synthesize preliminary design principles for creating single player digital games that function as counterspaces for marginalized players by attending to the joy, rest, and healing that is necessary to resist oppression outside of play.

4.2 This Pansexual Pilipina American Player

I am a second generation Pilipina American, proudly and joyfully. My earliest memories reveal that as a pre-schooler, my sense of identity was uncomplicated and certain – I remember thinking I'm Pilipina American and that's magical. However, once I started school, my proud and joyful sense of identity as a Pilipina American was steadily chipped away at, and that uncomplicated certainty about who I am, where I belong, and what I value became muddled and distressing. It started when I was six years old with "Why does your lunch look like worms? That's so gross!" from my classmates who critically eyed the (delicious) pancit I brought before shoving it off the table to spill on the floor. It continued with "Scram!" followed by a slur used against Chinese people when I was seven years old and merely standing in a room. It dragged on into "You're so dark and ugly" and "Your accent is so funny" and variations of all of these over and over again, both within my Filipino community and outside of it. By the time I was eleven, my internalized cheat sheet for getting through a day in the world without being attacked for being Pilipina American was to stay out of people's way in general, never bring home-cooked food to school, mask my accent as best as I could, and do my best to not look like me.

Complicating my sense of identity, belonging, and safety even more, that same year I finally understood I was attracted to men and women. My crushes included Sean Connery *and* all the women in the *James Bond* movie series and my love of *Star Wars* was actually just my love for Han Solo *and* Princess Leia. From there, I let heteronormative compulsivity swallow me up, specifically because I was raised Roman Catholic and I was convinced I was a sinner destined for hell. Then, when I was nineteen, I met a nonbinary researcher at a writing tutoring conference and it felt like I would be heartbroken forever because there was no way I could actually date them (let alone muster up the courage to ask them out). So I stuck with my long-time quiet resolution to be very quiet about anything that made me different, referring back to my eleven year-old cheat sheet for survival. Of course, doing all of this to survive and assimilate ultimately meant hurting myself daily–but I did it because I thought that all those terrible people were right, that I was inferior because I was Pilipina American and that I was a deviant sinner for loving regardless of gender.

They're wrong of course, but it's taken me years to do a lot of internal identity development work cultivating and reclaiming my intersectional identities (some through playing video games!), and it's an ongoing process I expect will last my entire life. Still, my experiences with oppression as a pansexual Pilipina American have left lasting damage. Three forms of hurt manifest as resurgent aches tied to my intersectional identities as a pansexual Pilipina American: 1) sadness born from feeling like I don't belong anywhere, 2) exhaustion fed by attacks and extraction, and 3) scarring rising from hopelessness in the face of entrenched systems of oppression. All of these pains manifest in my life in different ways, but single player digital games like Stardew Valley have counterspace elements that support my pansexual Pilipina American joy, rest, and healing.

4.3 Stardew Valley & my Joy, Rest, & Healing

Stardew Valley is an open-ended farming life role playing game. Players start out by inheriting their in-game character's grandfather's farm in Stardew Valley, and they leave their joy-sucking Joja Corporation job and life in the city to start fresh on their new farm. Players build up their lives by tending to their farm, building platonic and romantic bonds with the villagers in the nearby Pelican Town, and exploring surrounding areas to gather resources (see 4.1). But Joja Corporation tries to sink its teeth into Stardew Valley all the while, and the player's actions can determine what becomes of their new home and community.

This game is beloved by many, and since its initial release, its creator Eric Barone (also known as ConcernedApe) has rolled out updates that have expanded and improved play. On top of this, Stardew Valley can be enjoyed across many platforms and features a multiplayer mode. The game also has a vibrant mod community, and many mods of varying nature and purpose are available for even more play. In the context of this paper, I discuss playing Stardew Valley as a single player on the Nintendo Switch and from hindsight after playing the game for a few years (2019 onward). It's important to note that in the game, I created my avatar to be a tiny, pixelated reflection of myself (see 4.2): not just physically but also in terms of my intersectional identities.



Figure 4.1: (A map of Stardew Valley, including all the areas players get to explore. Image from stardewvalley.fandom.com. *Stardew Valley* © ConcernedApe.



Figure 4.2: My Stardew Valley avatar and dog, created to match real-life counterparts. *Stardew Valley* © ConcernedApe.

Like me, my avatar is pansexual and Pilipina American, and her tiny pixelated dog even looks a lot like my dog. I did this when I first created my file because my intention was to play the game to enjoy calm and relaxation which I was unable to access in other parts of my life. Over the past few years, I have completed many in-game years (as time does not pass mimetically in the game in the way that it does in other games like Animal Crossing: New Horizons (2020) [1]) and have had the time and resources to grow my farm into what I consider a pixel representation of my avatar's safest space (see 4.3). But Stardew Valley does so much more than give a tiny pixel me a safe pixel place to live.

4.3.1 Living with Sadness but Reinscribing Joyful Belonging through Play

In hindsight, the constantly building terror, shame, and self-hatred I felt for myself even as a child (fueled by the homophobic homilies, rants, and gossip in my former Roman Catholic parish and in my Filipino and Filipino American communities at the time) was unacceptable. But I felt all of that and was sure that if I revealed my sin, which was actually just my love, members of my communities would cast me out. These days, I still feel this fear sometimes, but with far less shame and self-hatred. Coming out is not always the best action for every queer person, and for me personally, I am not at all ready to know how the Filipinos and Filipino Americans who are still part of my life would react to me saying "hey y'all, all genders do it for me". Because I was and still often am afraid, because it's less risky for me to be quiet about being pansexual than to make myself extremely vulnerable among the different people in my life (many of whom have deep roots in conservative Catholicism), it's difficult to feel like I belong anywhere at all as a pansexual Pilipina American. So growing up and even now, it's like the warmth of my communities never truly reaches me. This reality feeds the quiet sadness of knowing that I don't feel safe enough to share about who and how I love with all the Filipinos and Filipino Americans in my life, that they don't know about a huge part of my life: my happiness, heartbreaks, and relationships. I'm extremely fortunate to have "found family" with whom I can share these parts of my life with, but I feel a heavy sadness in keeping quiet as a tradeoff for not risking losing my relationships with my fellow Filipinos and Filipino Americans.

At the same time, I have received signals from many sources that I can't be comfortable as



Figure 4.3: My Stardew Valley farm after several in-game years. *Stardew Valley* © ConcernedApe.

a Pilipina American in all Filipino spaces and that I won't be received as a Pilipina in American spaces (and from people who don't even know I'm pansexual). Elders in my family and those I would meet out in the world scold me because I don't speak Tagalog fluently (I'm working on it) or laugh at my "white girl accent" when I try (again, I'm working on it). Scrolling through internet forums presents many young Filipinos berating Filipino Americans for not "truly" being Filipino because we "do not live Filipino values in our daily lives". From these instances in my life, the space I can occupy as a Pilipina American is shrunk down to those in which I won't be essentially tested for "true" Filipino-ness as defined by people who grew up in the Philippines. This means I don't actually have space where I can exist without having to prove anything. Similarly, when I want to talk about the Philippines, Filipinos, or my lived experience as a Pilipina American among American people, I'm met with invalidation (as a byproduct of buy-in to the model minority myth) or clear disinterest in the form of being cut off with requests for "insider information" about how to visit the Philippines as a tourist (while I myself have been unable to return there since I was an infant). Sometimes, American people will interrupt what I'm trying to share about Filipino culture to tell me they "already know" all about it because they have a girlfriend or daughter/sister in law who is Filipino ("and you look just like her") or they know how to cook chicken adobo and actually "improved" the recipe (I don't even want to unpack the audacity).

Due to these experiences, the capacity in which I feel like I belong as a pansexual Pilipina American is reduced to whether or not people will react kindly to knowing I'm pansexual and whatever parts of Filipino-ness Americans deem valuable enough to consume. All of the above generates a great sadness in me, feeling uncertain about where I belong – about who I can feel connected to and whether the connection I need to feel can or will be reciprocated. As a result, I often try to cultivate kapwa, which is the core Filipino cultural value of all individuals feeling connected to each other, of sharing a sense of togetherness (which can be between a Filipino and other Filipinos or a Filipino and others) regardless of blood relation, societal status, and other identity factors [220]. Kapwa is not easy to feed, especially because currently to my knowledge I am the only Pilipina American in my PhD program, and while I've since cultivated kapwa with close ties who are not Filipinos, this was especially challenging during the period of the pandemic when I needed to stay home and work remotely. Thankfully, Stardew Valley makes joyful belonging possible for me as a pansexual Pilipina American in the form of playing through narratives of wholesome queer love without fear of complicating my existing relationships and cultivating kapwa with relatable characters.

I'll admit that I spent the first few in-game years as a hermit, spending my in-game days working hard to develop my farm while ignoring all game prompts and incentives to interact with NPCs in the valley beyond buying seeds and crafting tools locally. But developing my farm meant I eventually needed to visit the local carpenter, and it's there that I met the two characters I would love in turn. I trekked out there midday in the summer after watering my melons and tomatoes, determined to acquire a chicken coop (I wanted eggs for many reasons), foraging fiddlehead fern and common mushrooms along the way. Entering the shop and commissioning the chicken coop was unremarkable, but when I turned to leave I realized someone was in the lab across the hall, and I decided to snoop. It was Maru, and she was cute as hell (see 4.4).



Figure 4.4: Maru, the first NPC in Stardew Valley with whom I was able to cultivate kapwa and play through a joyful, wholesome queer love narrative. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

Even though I was a stranger in the valley at that point, I remember Maru greeted me warmly, saying she had been looking forward to meeting me. While other villagers I had interacted with were also warm at first meeting, this interaction with Maru meant a bit more, and not just because I thought she was cute. She was also the only other woman of color in Stardew aside from my character, and even if her first meeting line was scripted, it still felt like a small but effective affirmation of my presence as a woman of color in the valley–it felt like kapwa. I left that first meeting knowing I definitely wanted to try being Maru's friend, already thinking about how I could cultivate our friendship through gift giving. It turns out she loves cauliflower, pepper poppers, and rhubarb pie. She sees much of the world as exciting and grand, and her birthday is the tenth day of summer. Through gift giving I was able to trigger cutscenes as milestones of our deepening relationship, and I got to hang out with her and her dad, Demetrius (the only man of color in the game), in their science lab. I learned I can relate to her in that she likes to go on walks to clear her head. I got to stargaze with her using her huge telescope. On top of being a nurse at the local clinic and helping her dad out in the lab, Maru likes to craft and tinker (see 4.5) – another key way I felt like I could relate to her.

While Maru is not Filipino, like many of the people who I interact with on a daily basis outside of play, interacting with her still helped nurture my sense of connection, togetherness, and belonging with others (even if they were NPCs) that helped counter the sadness I often feel as a pansexual Pilipina American who can't seem to fit in cleanly among any community. Hanging out with Maru and getting excited about science, stumbling upon her stargazing and marveling at space, and being the one that she confided in all felt like I was cultivating kapwa through play when I couldn't feel it elsewhere. Maru made not fitting in cleanly with one community or another feel less terrible, and my connection with her affirmed that I could cultivate kapwa with people with whom I could be my whole self, and without having to prove anything or provide something they could consume to feel that sense of togetherness and belonging. In this way, NPCs like Maru made Stardew Valley a space in which I could nurture my kapwa and feel like I



Figure 4.5: Maru tinkering with a gadget. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.



Figure 4.6: A bouquet, "a gift that shows your romantic interest", which I used to ask Maru to be my girlfriend. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

belong in a community just as I am.

We continued to grow closer, and then she accidentally shocked me while showing me part of a machine she made. While she apologized and applied burn cream to my little pixelated hand, I knew I wanted to ask her to be my girlfriend. In-game, this translated to giving her enough gifts and triggering friendship cutscenes until our relationship representation reached eight hearts (and since I had been spending so much time with her, we were there already), at which point I bought a special bouquet to offer her as a formal way of asking her to be my girlfriend (see 4.6). When Maru accepted and officially became my girlfriend in-game (so official that her social status was updated to "girlfriend" in my file), I was happy not only because she's probably the coolest NPC in the game, but also because this marked the first time I didn't feel like I needed to be quiet and careful about having a romantic relationship with a woman (even if it was only in-game). Perhaps because of the predictability of the game and its NPCs, I knew that being in a relationship with Maru would not complicate any of my existing relationships with other NPCs (except maybe her dad, but he had always kind of not liked me–but that seemed more about dating his daughter and less about being a woman and dating his daughter).

Stardew Valley treated my romantic relationship with Maru as an update that meant more time and care with Maru and nothing else, a stark contrast with what a romantic relationship with a woman outside of play would be: a point of tension that could mean alienating my Filipino and Filipino American communities. Even if Maru and I didn't end up together in the end,

being able to play through a queer love narrative with her was one of the best expressions of pansexual Pilipina American love and belonging I've had. As a space for cultivating kapwa and safely playing through queer love narratives, Stardew Valley facilitates my joyful belonging as a pansexual Pilipina American.

4.3.2 Living with Exhaustion but Reinscribing Restful Alternatives to Attacks and Extraction in Play

I've been mostly lucky in that my exhaustion is due less to people becoming belligerent or violent in reaction to me disclosing my pansexual Pilipina American identity, but I've been mostly disgusted in that many people have reacted to my disclosure with fetishization, sexual harassment, or invalidation. Somewhere in the mix of variations of "Oh you mean you're bi, babe? So we can have threesomes?" and the "You just haven't been with a real man. I can show you if you let me–" or the "You're just saying that to make guys like you" or the "You look straight though" and "You're not gay enough" or even the critical interrogations which aimed to prove to me I was "chasing a trend" (this isn't the curiosity that comes out of genuine warmth and care, but rather a critical line of inquiry with the goal of somehow proving that I'm confused or faking), I figured out pretty quickly that people have no shortage of terrible things to say in response to me sharing about my whole self, which feels like being trampled on after I've made myself vulnerable in good faith. I have dated heterosexual men and had friends who are heterosexual women who didn't react this way (thanks, y'all!), but keeping my pansexual identity less visible is still more feasible than risking repeats of the above and enduring what I consider to be incredibly tiring. But even if I manage that, it's not as easy to avoid other exhausting and extractive aspects of living as a Pilipina American.

There is a lot about Filipino culture that I feel I have missed out on because of needing to assimilate as a form of survival. I've been very belatedly learning about the history of the Philippines and only recently have been able to articulate certain aspects of Filipino culture that have played large roles in my lived experience. And in being able to name them, I've been able to better understand what I need during my ongoing personal process of decolonization. The exemplar of this is how I came to understand the presence and reach in my life of utang na loob, or the norm of reciprocity in which generosity to others is accompanied by the implied expectation of the favor being returned [220], and how that revealed my need for a lot more bayanihan, or the practice of aiding others without expectation of reciprocity [67]. Recognizing this stems from looking back on how I've tried to live my life as a dutiful daughter to my Filipino parents. Utang na loob manifests often as children feeling the need to not only respect their parents but also care for them and put their needs before their own in gratitude for raising and nurturing them [220]. I find nothing wrong with respecting and caring for my parents, but utang na loob extends into the exhausting experience of feeling bound and obligated to make my parents happy at the cost of my own well-being. Just one example of when utang na loob made me deprioritize my own needs is the several years in which I wanted to leave the Roman Catholic church (for many reasons but primarily because I wasn't coping well with being told queer people were going to hell) but stayed anyway. I continuously put myself in spaces in which it was not safe to be queer because I didn't

want to bring hiya, or shame [220], on my parents who are not only devout Roman Catholics as many Filipinos are but were also both working for the local parish at that time. For seven years, my thoughts centered on the debt I owed my parents for caring for me as their child, and I felt the least I could do was not ruin their reputations at church by leaving (and of course coming out as pansexual was out of the question entirely), even if it meant I was exhausted and miserable.

I've since left and my family has since survived the ensuing drama, but I still have a strong aversion to transactional care that I personally understand to characterize utang na loob and find myself looking for opportunities for bayanihan–for communal care without expectation. These various attacks and extractions that I've experienced as a pansexual Pilipina American (and all the ways I try to avoid them) are exhausting, and for me it's taxing mentally, emotionally, and even physically. But Stardew Valley offers a space in which fetishization, sexual harassment, invalidation, and extractive expectations do not automatically arise when I express and act upon my pansexual Pilipina American intersectional identity through play. The game provides restful alternatives to my prior experiences in the form of never needing to defend or explain how my queerness manifests and facilitating practicing bayanihan.

As previously described, Stardew Valley made it possible for me to play through wholesome queer love narratives with men and women. It started with gorgeous genius Maru, but I eventually dated and married another NPC, Sebastian. Being able to date both of these NPCs made Stardew Valley a space in which I could play through my pansexual love without needing to explain or defend why I chose to date and marry a man against attacks on the validity of my identity, which was so restful. On top of that, dating different people in the game also made it possible for me to experiment with how I wanted to practice bayanihan as a form of my pansexual Pilipina American affection, providing additional rest from extractive utang na loob that typically dominates my experiences of care. Beyond that, not having to give in to heterosexual compulsivity to date only men meant a lot to me. Being able to choose to be with a man as opposed to needing to default to heterosexuality and being fully able to date women and other folks is not something I am able to experience outside of gameplay, and Stardew Valley made that possible through my still queer love narrative with Sebastian, with whom I developed my personal practice of bayanihan.

On an evening of the same in-game summer when I met Maru, I emerged from the mines of the mountains, planning to use the rest of the evening to fish for carp in the lake close by (before returning to my bed and my dog). Heading down to the lake to fish, I was startled to see Sebastian standing there in the dark by the water, actually smoking a little pixelated cigarette. After I had a little laugh about that, I figured it was finally my chance to snoop into Maru's mysterious half-brother, and approached him. Starting a conversation with him also meant seeing his character portrait for the first time (see 4.7).

First of all, I immediately thought he's got great emo hair. Then he very casually acknowledged I was new in the area. Then he very casually implied that Pelican Town sucks and that I suck for actually choosing to move there. Since this was coming from some guy smoking a cigarette in the dark and I was actually having the time of my life on my farm, I walked away



Figure 4.7: Sebastian, the NPC in Stardew Valley with whom I was able to play through a restful, wholesome queer love narrative and practice bayanihan. I eventually married this man. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.



Figure 4.8: A Void Egg, "a jet-black egg with red flecks. It's warm to the touch", which Sebastian loves to receive as a gift (even though it is inedible, though he probably likes that it's edgy). Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

from this figuring he was just one of those folks who needed a little warming up to. From there my interactions with Sebastian were a bit easier, aided by the fact that if I saw him while visiting Maru or while he was out of the house, I would recklessly test gifts on him as an early exploration of practicing bayanihan, giving him whatever interesting thing I had in my backpack simply because he was part of my valley community. He really loved the obsidian and frozen tears I found in the mines, and I laughed out loud when he told me he loved the Void Egg (see 4.8) that I got from my funky little Void Chicken as my farm grew.

As a byproduct of my exploratory bayanihan practice with Sebastian, I got to learn more about him and triggered friendship cutscenes. He's a freelance programmer, his birthday is on the tenth day of winter, and he plays the keyboard in a band with his friends Abigail and Sam. As time passed, I decided to end my relationship officially with Maru, and I figured given how close we'd gotten, I'd ask him to dance with me at the annual Flower Festival. Unfortunately, while reckless gift giving tests did help us get closer, I had given him enough things that he hated (which bafflingly included regular eggs, omelets, and any and all kinds of fruit jelly I ever made) to the point where it significantly reduced our relationship hearts–so he awkwardly rejected me on the spot. I like to think I took that rejection like a champ, but I did start being less reckless with my gift giving, and from there I learned he has a cool motorcycle (see 4.9) and enjoys pool and tabletop roleplaying games. That last bit made me sure I wanted to ask him to be my official boyfriend by giving him a bouquet, and after a romantic conversation in the rain under a shared



Figure 4.9: Sebastian working on his super cool motorcycle. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

umbrella on the docks, we finally started going steady.

The queer love narrative I played through with Sebastian (where it is queer because I am queer, and that is not erased simply because Sebastian is a man) which grew from my practicing bayanihan offered rest from my past othering experiences as a pansexual Pilipina American. The fact that I was able to play through a romance narrative with Sebastian after I had done the same with Maru without needing to explain or defend my choices and that I was able to practice bayanihan felt so different and so much better than what I've had to deal with outside of Stardew Valley. In hindsight, I'm not surprised at all that I ended up choosing Sebastian over everyone else: my in-game relationship with him was built on my being able to exist as a pansexual Pilipina American in peace, and our affection was built upon bayanihan, community care without implied obligation. Due to this, Stardew Valley became a space to which I returned for rest from exhausting experiences as a pansexual Pilipina American in the form of restful love and affection without debt.

4.3.3 Living with Scars but Reinscribing Healing Hope in the Face of Entrenched Oppression through Play

Intergenerational trauma as a result of colonization manifests in the form of colonial mentality, a pervasive presence in my own lived experience. Countering these far-reaching effects that stem from extensive systems of oppression can feel insurmountable most days, and I am often left with a sense of hopelessness and feeling scarred. The more I learn about Filipino culture, the more I realize how much was lost and how deeply ingrained the influences of Spanish and

American colonization have become. To see how colonial mentality was adopted and passed down under the guise of Filipino culture over the span of generations can make me feel like I can never do enough to change what has been passed down. This is further complicated by my pansexual identity and its intersection with my Pilipina American identity, because anti-queerness, as adopted values of the oppressor, has also made frequent appearances in my experiences of colonial mentality. As part of my personal decolonization journey, I have been using most of my free time to learn about what parts of my current understanding of my pansexual Pilipina American identity came from where, so I can recognize where intergenerational trauma and colonial mentality takes root and sprouts in my life so that I can better understand it towards resisting and combating it. This is certainly an ongoing process and I have so much to learn, but early on I began to feel like even my name is not my own. When Spain colonized the Philippines they also gave the indigenous people Spanish last names as a means of erasure and dominance [242]. My first name, middle name (which is also my mother's maiden name) and my last name are all Spanish, and most days this feels like the core of who I am has been deeply scarred by colonization that began centuries ago. This is because many times, people have told me they didn't know I was Filipino because of my name, instead thinking I was Latina (which I do not find offensive–in fact there is much Latinx have in common with Filipinos, thanks to a common colonizer [228] – but it still hurts to not be recognized as who I am). When something so central to my identity as my name feels like it belongs more to colonization than to me, it makes me feel wounded, powerless, and hopeless in the face of centuries-old systems of oppression.

Because that is not the only thing that has made me feel scarred and hopeless in the face of systems of oppression and I've needed to survive somehow, I have strategies for cultivating my own hope and resolve as a part of my personal healing and decolonization as a pansexual Pilipina American. Here, "healing" refers to my own processes of reclaiming power and strength in my intersectional identities that oppression and colonization seeks to cut from me . The hope and resolve that I draw strength from can be understood as lakas ng loob, or inner strength and courage amidst strife and uncertainty [220]. Throughout my life, I've been able to cultivate my lakas ng loob by playing single player digital games like Stardew Valley that include healing narratives of hope and love in the face of entrenched systems of oppression. Stardew Valley does not include a system of oppression so deeply rooted and far-reaching as centuries of colonization, but it does feature a corporate evil called Joja Corporation, a name which is literally littered across the landscape of the valley – on Joja Cola cans tossed into the rivers, lakes, and ocean, on the Joja Mart that is threatening to push out the local store, and on the shirts of the overworked and underpaid Joja employees. Joja's logo and look is of particular interest, as it's easy to see early on what Stardew Valley's creator ConcernedApe is referencing (see 4.10).

Putting a face to the abstract system of evil that is Joja Corporation results in the NPC Morris (see 4.11), who is JojaMart's store manager and the bane of my Stardew Valley avatar's existence. Even during my early hermit years in which my interaction with the wholesome NPCs of Pelican Town were rather limited, it became very clear very quickly that Joja Corporation's presence may have brought goods at cheaper prices and perhaps employment for a few young adults in the area, it was also slowly crushing the village and its inhabitants. This was evident in Pierre, the local general store owner and operator, worrying over the competitive prices he



Figure 4.10: Joja Corporation's branding on the JojaMart storefront in Pelican Town. Take a look at the faint Joja logo just above the door, which likely looks a lot like another massive corporation's logo that you may be very familiar with... The entity's slogans are "Life's better with Joja." and "Join Us. Thrive." Joja Corporation is positioned early on in the game narrative as the oppressor. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.



Figure 4.11: JojaMart's store manager and essentially the face of the Joja Corporation in Stardew Valley, Morris played the role of the villain in the way I played Stardew Valley's narrative. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.



Figure 4.12: Sam, an NPC who worked part time at JojaMart and always seemed miserable there. Image via Whiskey_Sandwich/Reddit. *Stardew Valley* © ConcernedApe.

couldn't match while enduring Morris's thinly veiled threats on his livelihood and the well-being of his family. It was frustratingly visible in the Joja trash I had to constantly pull from the rivers on my farm. It was in the exhausted face of NPCs like Sam and Shane (see 4.12 and 4.13, respectively), who worked long hours for little pay at the JojaMart (and were always miserable). And it was starkly present in Morris's attempts to convince the villagers, including my avatar, to agree to demolishing the town's old Community Center in order to replace it with a Joja Warehouse. In many ways, it seemed like my avatar had barely escaped permanent burnout while working for Joja Corporation in the city (see 4.14) only to find it sinking its claws into the valley. In that sense it felt like it might be too late; that there might be too many things already set in motion or already adopted by the villagers to really resist the entity.

Still, I tried to do what was within my power to combat Joja's encroaching grasp on my new home and community. I shopped exclusively at Pierre's general store despite JojaMart's slightly lower prices (this is of course, much easier to do in-game than to replicate outside of play with actual money), only ever entering the sterile looking clone box interior of the store to see how Sam and Shane were holding up (they were not doing well) and to try to give them pick-me-up gifts. I also recycled and repurposed all the trash I pulled from the rivers, lakes, and ocean in the valley, and in these ways I was able to support community members that I cared about albeit in small doses. But the biggest form of resistance I was able to enact was to avert the destruction of the Community Center by refusing a Joja membership and ignoring requests for support of the planned Joja warehouse, instead doing a little snooping around the abandoned hub myself. This led to meeting magical creatures indigenous to the area, the Junimo (see 4.15).

Working with these tiny keepers of the forest, through community care in the form of fulfilling long-standing requests of my neighbors presented by the Junimo and their restorative magic, I was able to play through a hopeful narrative of driving back oppressive forces by reviving the Community Center before it could be turned into a Joja warehouse. The Community Center's



Figure 4.13: Shane, seen in the upper left side wearing a blue Joja uniform hat, an NPC who worked part time at JojaMart and always seemed miserable there. Image via lostnoob.com. *Stardew Valley* © ConcernedApe.

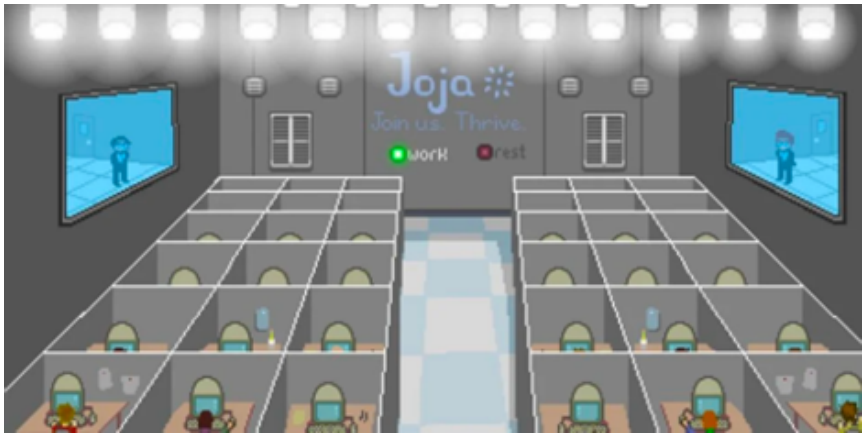


Figure 4.14: Stardew Valley's playable character's former workplace introduced in the opening narrative scenes of the game. In this setting, the player is saved from deep burnout by the option to take over their grandfather's farm in Stardew Valley. Image via screenrant.com. *Stardew Valley* © ConcernedApe.



Figure 4.15: A Junimo, one of the magical keepers of the forest that live in the dilapidated Community Center and my allies in resisting Joja Corporation. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

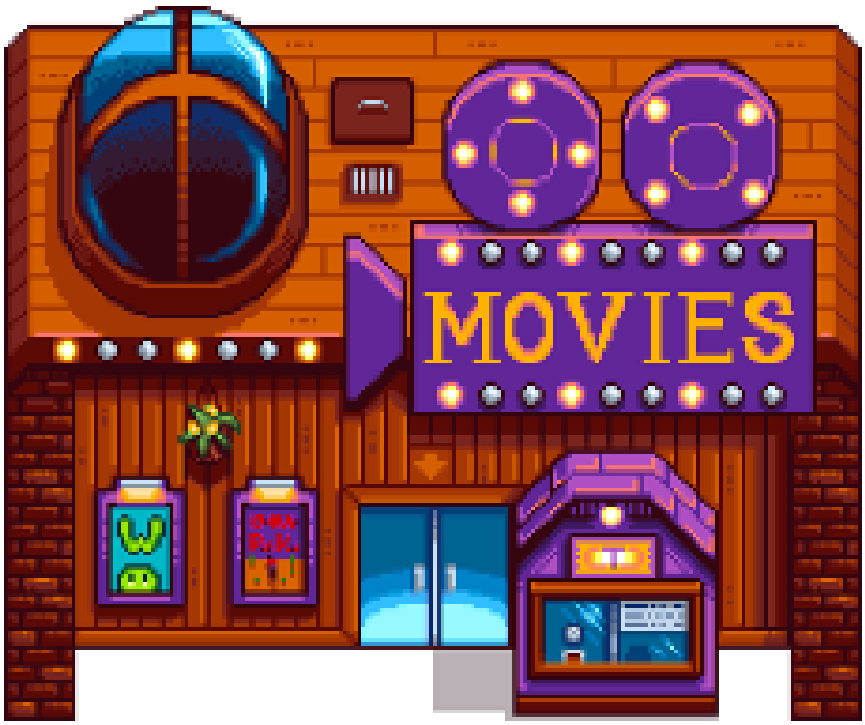


Figure 4.16: The Pelican Town Movie Theater, which the Junimo can build magically overnight after the community of Stardew Valley drives Morris and Joja Corporation out of town. Image from stardewvalleywiki.com. *Stardew Valley* © ConcernedApe.

reopening and the return of the community to its rooms was a culmination of everyone's individual efforts to resist Joja Corporation's invasion of the valley, and it also turned out to be the final collective action that drove Morris and Joja out of town. Even beyond that, the Junimo make it possible (with an additional community care sidequest) to convert the abandoned JojaMart into a cinema (see 4.16) that unlocks even more ways to express affection and build friendship with the people of Stardew Valley.

Playing through this narrative of strength and hope in which collective and individual action eventually made a difference in resisting what seemed to be a too-powerful oppressor felt like healing; it fed into the hope and resolve of my lakas ng loob. And my lakas ng loob easily bled beyond play: it made the battles I fight everyday seem worth it, and even fueled some revisiting of my personal strategies of resistance based on what worked for Pelican Town. Even if better values prevailed only in a game, it was still valuable to play that out as a part of how I heal from the hurt I feel often living as a pansexual Pilipina American.

4.4 Harvesting from Stardew Valley & Learning from this Pansexual Pilipina American's Play

Played as a single player game, Stardew Valley has given me one of the safest playful spaces I have ever had as a pansexual Pilipina American player. The game's relationship system allowed

me to date NPCs regardless of gender, and some of its characters' designs supported my joyful belonging. That the relationship system didn't demand justification or punish me for the way I played out my avatars' personal life and the game's gift giving mechanics supported my restful existence and exploration of practices of care. Its playable narrative steeped in hope despite overpowered oppression supported my personal healing. The ways in which Stardew Valley supports my joy, rest, and healing are undoubtedly inextricable from my personal lived experience of sadness, exhaustion, and scarring as a pansexual Pilipina American. However, as previous sections have highlighted, a single player digital game like Stardew Valley has key elements that have made my play joyful, restful, and healing. It's these key elements that have the potential to support similar joy, rest, and healing for other marginalized individuals who are similarly sad, exhausted, and scarred. After all, queer Filipino Americans like me are certainly not the only individuals who struggle with feeling like they don't belong, enduring attacks and invalidations of who they are, and feeling powerless and hopeless in the face of deeply ingrained systems of oppression. There are so many players who would benefit from their joy, rest, and healing being centered in single player digital games. My autoethnographic analysis of game elements that illuminate what can be possible if games are designed as counterspaces outright, and my hope is that the following can facilitate exploring how that can come to be.

4.4.1 Seeds from the Valley for Planting Joyful Belonging

Stardew Valley's relationship system allows players to date all NPCs regardless of gender, and some of its characters' design supported my joyful belonging as a pansexual Pilipina American. This is in stark contrast to single player games I have played before that locked me and my player character into heterosexual compulsivity by design. In regards to character design, I was able to relate to Maru best, but she is indeed the only woman of color in the cast of villagers of Pelican Town, and there is a distinct absence of nonbinary folk and people of other gender identities. The vibrant modding community of Stardew Valley players has long recognized the limited diversity of NPCs in the game, and there are mods available that can provide a more inclusive play experience, such as the Diverse Stardew Valley mod which adds ethnic, cultural, and gender identity as well as body type diversity to the NPCs players can interact with in the game [3]. But casting off restrictive relationship systems in single player games can do away with trapping players in heteronormative narratives of love, and designing diverse casts of NPCs as a standard can broaden who feels joyful belonging during play. It's true that even though I've yet to see a Filipino character in any games that I've played (and definitely no pansexual Pilipina American characters), I've still been able to experience a joyful sense of belonging in single player play – but it would still be incredible to see one (and soon). That isn't to say having token NPC characters is a plugin for diverse players to feel like they belong–rather, our thinking around single player (and other) games should include questions like: What identities and cultural values are being centered in game character design (including NPCs, avatar customization, player characters, etc.), intentionally or unintentionally? What identities and cultural values are marginalized or completely erased as a result? What design decisions can be made so that the range of identities and cultural values represented in the game's narrative, NPCs, and player character design options is more inclusive? What design decision checks can be implemented to assure marginalized identities do not become props of design to perform diversity instead of fostering positive

experiences for diverse players? All of these questions can support approaching making and understanding games as intentionally inclusive, because when games uplift marginalized players, they can become counterspace for joyful belonging.

4.4.2 Seeds from the Valley for Planting Restful Alternatives

Stardew Valley's elements of a relationship system that doesn't demand players' justification or punish them for the way they play out their avatars' personal lives and its gift giving mechanics supported my restful existence and exploration of practices of care as a pansexual Pilipina American. However, it's important to note that I had a great experience as a monogamous pansexual in Stardew Valley, but players who have pursued polyamorous love narratives are actually punished by the same relationship system that I enjoy, and there are aspects of relationship cutscenes that don't allow NPCs themselves to be bisexual, their narratives instead adapting to be straight, gay, or lesbian only depending on the gender of the player courting them [325]. Single player (and other) games are not just worlds or environments in which players play – they are places in which things can be different, can be better, so a relationship system that is less focused on punishing perceived deviance is not only inclusive, but also invaluable and radical . This isn't to say relationship systems in games should be free of consequences. Instead, our thinking around single player (and other) games should include asking: When a system in my game reacts to a character's play/choice/input in a certain way, what does the game communicate to the players? What values does it explicitly or implicitly elevate? What values does it explicitly or implicitly condemn? In doing so, what kinds of players are welcomed into the space of the game? Similarly, what kinds of players are excluded and/or alienated as a result of certain design decisions? These lines of inquiry can support understanding how some game design decisions might result in attacks on players while others might result in cultivating their restful enjoyment of the game as marginalized players. This understanding can facilitate approaching single player (and other) games as counterspaces that can offer restful alternatives to othering realities for marginalized players.

4.4.3 Seeds from the Valley for Planting Healing

Stardew Valley's elements of a playable narrative steeped in hope despite overpowered oppression and its mechanics for practicing non-obligatory communal care supported my healing as a pansexual Pilipina American. Like superficially diverse NPCs, having a narrative of good prevailing over evil is not a panacea that can support positive experiences (including those akin to healing) among marginalized players. In fact, there are plenty of single player (and other) games with classic hero-slays-the-dragon type narratives that technically are filled with hope in the face of very powerful opposing forces, but much of the time, those narratives are inundated with explicit and implicit signals of who is "good" and who is "evil" that marginalize many players. As just one example, let's look at one of my all-time favorite video games series ever, *Legend of Zelda* (1986-2021) [9]. First and foremost, the games in this series are all amazing to play and very close to my heart (in fact playing *Ocarina of Time* (1998) [7] was the first time I derived hope in the face of oppression via play), but that doesn't mean that I don't recognize that Link is blonde and blue-eyed in every game, and that when Ganon features as the big baddie

he is always dark skinned and has a large nose. These problematic signals tangled poorly with colonial mentality in my own lived experience growing up, so I feel it's important that single player (and other) games are critically examined by asking: Who gets to be "good" in the game narrative, and who is forced to be "evil"? What signals do the designs of these entities send to players? What identities and values are championed by the game, and what identities and values are villainized in it? What strategies and tools are available in the game narrative for players to use to combat and resist the oppressive force? Are these limited to things one would use to slay a dragon? Why? Must the dragon be slayed? Is the problem really the dragon? Questions like this can support understanding how single player (and other) games can do harm to already marginalized players in order to better approach games as counterspaces that can support marginalized players' personal journeys of healing.

All of these questions are meant to acknowledge that it is not enough to simply have similar game elements like those that supported my joy, rest, and healing as a pansexual Pilipina American in Stardew Valley. What matters more is creating counterspace that is central in single player (and other) games for marginalized players' joy, rest, and healing through communicating key values and welcoming diverse identities in a game. Without intentionally centering counterspace, seemingly diverse NPCs might turn out to be walking, talking stereotype perpetuation machines, a queer inclusive relationship system might still exclude players who want to play through polyamory, and a slay the dragon narrative might tell a story of eradicating the other and "saving" those deemed inferior. Because game designers and developers (including me) are human, part of approaching games as counterspaces that can uplift marginalized players will be getting things wrong despite our best intentions. An equally important part of this will be acknowledging mistakes and addressing them with grace, listening to our most vulnerable players to continue to center their joy, rest, and healing—particularly by doing this work with and not "for" them. An additionally important part of this includes players and people who enjoy, think about, study, etc. single player (and other) games critically examining games and the way they do or do not uplift marginalized players towards collectively calling for norms in games that at minimum do not perpetuate oppressive aspects of dominant culture.

4.5 Centering the Joy, Rest, & Healing of Marginalized Players: Preliminary Design Principles

The following are early insights to support game designers and developers in approaching single player (and other) games as counterspaces that can uplift marginalized players. Beyond this, these preliminary principles are standards by which players, scholars, etc. can critically examine game elements and to which they can hold game creators accountable towards normalizing games that at the very least disrupt patterns of oppression outside of play.

- **Game designers cannot center the joy, rest, and healing of marginalized players without first understanding their lived and play experiences.** Working with marginalized players as collaborators and acknowledging them as experts in how they want and need

their joy, rest, and healing to look, feel, and play like is required.

- **Games can function as spaces that combat negative aspects of dominant culture, so game designers should aim to create game spaces that bleed.** In centering the joy, rest, and healing of marginalized players within the magic circle of a game, attention to how that semipermeable barrier could facilitate the best parts of the game carrying over into the player's lived experiences outside of play is essential.

- **Small things are impactful (where small is not the same as superficial).** The spaces generated by games communicate a lot to players, and even small design decisions can impact how players might experience joy, rest, and healing in the game. Superficial (limited to surface engagement with a value and/or identity as opposed to thoughtful engagement) game elements are insufficient. E.g. superficial engagement with Filipino culture would be adding Filipino flags to different areas in the game, which has an impact that pales in comparison to the small game element of dialogue with a Filipino NPC who shares how they like to practice bayanihan by cooking for their friends.

- **The spaces generated by games should have room for the variation and fluidity of player identities and values.** Games can be low-risk spaces in which players explore practices related to their identities and values, so a game space shouldn't confine how a person plays by punishing them for changes in their play styles, priorities, and progress.

- **Also, make room for feelings like sadness, exhaustion, and pain.** Centering the joy, rest, and healing of marginalized players does not mean disallowing or trying to design away negative emotions in the game space. Make space for a spectrum of players' feelings and attend to how a game might support players as they experience them.

- **Aim for safer space, not a perfect space created by a perfect game.** No space is perfect and completely safe from the effects of oppression, including those generated by games. Working towards centering joy, rest, and healing of marginalized players means creating a space that does a lot better than the spaces they have to inhabit outside of play.

- **Design game spaces as gardens players can return to.** This isn't to say the design goal is for players to continue playing consistently as long as possible over time, but rather that the design goal is to create a space that players can cultivate as they wish and return to when they feel the need, without being punished for extended gaps in play.

4.6 Call for Counterspace Games

I have turned to counterspace elements of single player games for my own joy, rest, and healing, and I have presented this autoethnographic case study unpacking how playing Stardew Valley supports this pansexual Pilipina American player through joyful belonging, restful existence and exploration of practices of care, and healing hope in the face of oppression. I did this work in the hopes that my fellow game designers and developers will explore how not just counterspace elements but entire counterspace games could be designed to uplift marginalized players, starting with and iteratively improving upon the preliminary design principles for centering their joy, rest, and healing generated here. Counterspace games would serve as a safe space that is central in play instead of only generated from counterplay or reinscribing meaningful experiences in play alone. Counterspace games could uplift marginalized players by playing different roles in their lives. As a safer space that centers the joy, rest, and healing of marginalized players, counterspace games could become refuge from the oppressive aspects of dominant culture. Counterspace games could cultivate rituals and cultures that marginalized players might not be able to experience and practice outside of play. Through my work here, my research seeks to fuel the creation, study, and appreciation of counterspace games as spaces for personal playful resistance against oppression. By understanding how single player (and other) games can become magic shields and magic gardens for marginalized players, we can begin to approach games as sites of playful resistance that uplift players through joy, rest, and healing.

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Chapter 5
Placemaking for Communities

Due to the nature of counterspaces, which are interdependent and communal, my research shifted next to understand how to create a counterspace game that uplifts multiple marginalized players. Below, I translate and adapt the process, philosophy, and approach of placemaking, which has been used for decades to create physical public spaces that support community well-being. By synthesizing strategies at the intersections of game design and placemaking, this chapter presents how I approach counterspace games as shared *places* defined by community. As part of my dissertation, this chapter shows my initial work towards articulating a framework for counterspace game design.

This chapter draws from my ongoing work on approaching counterspace game design as critically placemaking play.

Abstract

Players sometimes describe getting "lost" in a good game, in which the norms of reality may not apply and a sense of psychological safety can pervade. Because games can become spaces of significance for players, they can be intentionally designed to be *counterspaces*, or places that combat oppressive aspects of a dominant culture. In doing so, *counterspace games* can center the joy, rest, and healing of marginalized people. Designing games that function as counterspace requires centering marginalized players as collaborators in their design while intentionally approaching the game as a *place*. We therefore propose that translating strategies of *placemaking* as *critical placemaking* for *counterspace game design* can support these counterspace game goals. We contribute strategies for approaching counterspace game design similarly to placemaking, informed by methods we designed and applied in two prior research studies. Building from this preliminary adaptation, we can create games that cultivate marginalized players' playful methods of resisting oppression through joy, rest, and healing in play.

5.1 Introduction

Counterspace games have the potential to be *places* in which marginalized players are uplifted by centering their joy, rest, and healing in game design [40, 250, 251]. Game design studies that uplift marginalized communities include LaPensée's SPEAR framework for Indigenous cultural games and encouraging self-determination among Indigenous game creators [177]. This contrasts with what marginalized players typically face when playing games, including stereotyping, harassing, and enacting other forms of violence on marginalized players like Black gamers and other gamers of color [56, 94] including Black women gamers in massively multiplayer games and online gaming communities [121, 122, 310]. In the wake of that, often

marginalized players engage in counterplay, or player tactics for subverting game developers' original intentions, like Black women gamers playfully resisting oppression in massively multiplayer games and online gaming communities [120, 121, 123]. Such research on games and ways of gaming that uplifts marginalized players has led the way and fuels this current work; as complementary to counterplay, we propose creating counterspace games, which explicitly shifts the labor of making play enjoyable for marginalized communities from the players themselves to game creators [250]. In this chapter, we investigate how counterspace games can be designed to uplift marginalized communities with key focus on centering their joy, rest, and healing, creating digital places in which they can playfully thrive. To explore this, we synthesize a theoretical counterspace game design framework from research on game design, counterspaces, and placemaking We highlight their intersections and translate strategies of placemaking to synthesize our approach of counterspace game design as critically placemaking play. Throughout, we support the synthesized process and strategies of our theorized framework with descriptions of study activities we designed and applied in two prior research projects: Counterspace Game Design for BIWOC+ in STEM [251] and Art across Realities at the Andy Warhol Pop District.

5.1.1 Positionality Statement

This work theorizes how game designers can uplift marginalized communities by co-creating counterspace games that center their joy, rest, and healing. The authors of this paper are positioned at differing intersections of marginalization and privilege. Collectively, the authors are Pilipina American, Jewish, queer, first-generation (in the higher education context), second-generation immigrant, chronically ill, women, and men. Collectively, the authors also have the privilege of researching and/or creating games for a living. Even as members of diverse marginalized communities, the authors cannot represent all members of associated marginalized communities. First and foremost, this work seeks to uplift *all* marginalized communities, including and beyond those to which the authors belong.

5.1.2 Space, Place, and Counterspace

The definitions of *space* and *place* may overlap, with important distinctions. Yi-Fu Tuan defines *space* as a location that does not yet have meaning, while *place* is a location that does have meaning, attributed by experiences [322]. Harrison and Dourish similarly define *place* as a meaningful social product, layered on *space*. Our framework draws from these definitions to conceptualize *place* as an environment that has been imbued with meaning by the people that occupy it and how they interact with each other.

Lefebvre, who coined the term *counter-space*, defined it as "the space of a counter-culture" [184], and Hershkovitz details "counter-space describes a process whereby groups create temporary and partial milieus to communicate and enact oppositional politics", where *milieus* refers to a person's social environment [141]. By these definitions and the more current conceptualization of counterspaces as spaces (often at the periphery, with the potential to be central) that support marginalized individuals by combating dominant culture [232], counterspace aligns with how we

define *place*; it is a location in which meaning and value are created via the people and experiences in that space. Drawing from these definitions, we define *counterspace* as a *place* dedicated to the well-being of marginalized individuals, characterized by a culture that challenges oppression.

5.2 Related Work

5.2.1 Counterspaces: Places of Powerful Practice

Our theorized counterspace game design framework also stems from an understanding of counterspaces as places where marginalized communities can cultivate and maintain uplifting cultures. Ong et al.'s research conceptualizes counterspaces as spaces that support individuals who are marginalized by a dominant culture, often at the periphery but also able to exist more centrally [232]. In the context of higher education, counterspaces have supported Black, Indigenous, and Women of Color to persist in STEM [232]. For example, Wilkins-Yel et al.'s research highlights how a multigenerational counterspace that included counter-storytelling promoted women of color's persistence and well-being in STEM [336]. Counterspaces facilitate identity celebration and expression for marginalized communities [51], cultivation of interdependence and belonging [306], and combat oppressive aspects of dominant culture like stereotypes about marginalized groups [297]. Beyond the higher education context, counterspaces remain sites that combat oppressive aspects of dominant culture. Places like "activist bookstores" provide space for gathering, organizing, and exploring radical ideas [164]. Western women of South Asian descent combat oppressive stereotypes and pressuring cultural expectations by using Instagram as a counterspace for creating and sharing gendered ethnic identity expressions and promote their well-being [243]. As alternative social spaces, counterspaces combat oppression and support the psychological well-being of marginalized communities, particularly through narrative identity work, acts of resistance, and direct relational transactions like fostering empathy via a sense of community [53]. Across contexts, counterspaces function as places of powerful practice that uplift marginalized communities as they navigate dominant cultures that are structured to exclude them. Our work seeks to leverage counterspaces to similarly uplift marginalized communities in play, creating magic circles that combat oppression in its many forms.

5.2.2 Game Design: Magic Circles and Who Gets to Enjoy Them

Our framework additionally draws from prior work on creating meaningful environments, particularly in the form of magic circles in games. Stenros describes the magic circle as how gameplay is bounded by *game space*, intertwined with yet distinct from the playful mindset and social contract also generated while playing games [304]. Huizinga describes the places generated by and in which play happens as "temporary worlds within ordinary world, dedicated to the performance of an act apart" [151]. In other words, a game's magic circle is formed in play and imbues the game space with meaning, creating a place that players can inhabit and enjoy, distinct from the space outside of the game. During development of this framework, we recognized parallels between magic circles and counterspaces as places. Thus, our research seeks to build upon

that play-generated place of the magic circle to design games that intentionally generate magic circles for uplifting marginalized communities. This aim breaks from how many marginalized players currently experience the magic circle: Fletcher presents the magic circle as formed by hetero white male gaming culture, as "the magic circle of whiteness" in which Black gamers have been attacked and pushed out in many ways for white pleasure, including spaces in external media connected to games like online forums [94].

To counter the magic circle of whiteness, our research proposes designing magic circles in games to function as counterspaces, cultivating marginalized players' thriving towards shifting a magic circle to a place that includes them by design. Like the magic circle as defined above, counterspaces are places which Hershkovitz describes as temporary social environments where people "communicate and enact oppositional politics" [141], where such temporary places are sites of actions atypical of dominant culture in both contexts. Counterspace games would center uplifting marginalized communities towards cultivating magic circles as counterspaces that combat the oppressive dynamics of the magic circle of whiteness. Our theorized counterspace game design framework aims to support marginalized players as gamers who belong in magic circles of play by designing games that cultivate their joy, rest, and healing to counter the dominant culture of "whiteness as default" [94]. As an approach, our work is complementary to counterplay, another strategy for resisting whiteness as default in the magic circle, in which players playfully resist oppressive aspects of gameplay. Key examples include Fletcher's research on *Black Girl Gamers* as the *Black Spoil Sport* [94] and Gray's research on women gamers' collective griefing practices as resistance in Xbox Live communities [120]. Many marginalized players already know how to adapt and adopt methods of play in games to resist oppressive dominant culture. So, our theorized counterspace game design framework focuses on guiding game designers to cultivate counterspace games so that the labor of making play enjoyable can shift away from already marginalized players.

5.2.3 Placemaking: Co-Creating Meaning and Transforming Spaces

Our theorized counterspace game design framework extends from the concept of placemaking as a philosophy, approach, and process that facilitates community-led meaning-making to transform spaces into places. Placemaking is the multifaceted approach and collaborative process of planning, designing, and managing public spaces; it is centered on a community's assets, aspirations, and identities, with communities shaping the public realm to promote their well-being and towards maximized shared value [95]. Placemaking has benefits including fostering a sense of belonging, perpetuation of the community's integrity and values, increased social inclusion, more cultural exposure and interaction, drawing a diverse population, greater ethnic and cultural pluralism, and community creativity [98]. Research on placemaking has generated evidence-based guidance and recommendations for health care institutions to better serve the communities they are situated in [97], strategies for implementing farmers markets in low-income communities to improve food access [96], and considerations about how placemaking could help prevent sexual harassment in public spaces [224]. Our work intends to build upon placemaking processes that center communities and their power and joy in shaping shared places, and our theorized framework adapts placemaking strategies to support communities shaping their own magic

circles to combat oppression in counterspace games.

5.3 Intersections Informing Our Approach

5.3.1 Counterspace and Placemaking Overlap: Critical Placemaking

Placemaking is not immune to perpetuating oppression in its many forms, as racism, classism, etc. are embedded and reproduced in places. Critical placemaking acknowledges that placemaking can offer benefits such as promoting social inclusion [312] and making invisible marginalized histories visible [25, 135], but it equally acknowledges that placemaking initiatives have sometimes been exclusionary, elitist, superficial, and contributed to covert gentrification [30, 82, 183, 197]. Toolis theorizes critical placemaking as disrupting systems of inequity to and create more inclusive and participatory communities by reclaiming public space for public use [318]. Elgobashi and Elsemary's research treats critical placemaking as a framework for supporting public spaces of rich heritage for their preservation, transformation of community narratives, and increased inclusivity of public spaces [85]. Allen and Queen's framework for critical placemaking also explicitly draws from participatory design methods to empower community collaborators as co-creators of places in which they can thrive [18]. Attending to this, our work builds from our understanding of the overlap of placemaking and counterspace: critical placemaking.

Critical placemaking has been applied to create counterspaces for marginalized communities. Hunter, Pattillo, Robinson and Taylor's research on Black placemaking in Chicago illuminates how Black residents in Chicago create places that are sustaining, affirming and pleasurable [153]. Tichavakunda's research extends this and argues that Black placemaking as a sociological framework can also be used to better understand Black student experiences and how they create and sustain communities at historically White institutions without ignoring oppression [314]. Mejia and Taniguchi's research explores placemaking counterspaces of art and heart as Women of Color at a predominantly White institution, particularly as counter to existing diversity regimes in academia that superficially address systemic oppression [206]. Exemplified in such work, critically placemaking counterspaces can reclaim places from dominant oppressive cultures to uplift marginalized communities. Our work intends to follow such works' lead by centering marginalized communities' joy, rest, and healing when critically placemaking counterspaces. Our translations begin with the established, actionable strategies and processes of placemaking while centering considerations put forth by more recent critical placemaking research in order to synthesize a counterspace game design framework that acknowledges how marginalization can and has been perpetuated in places and games.

5.3.2 Placemaking and Game Design Overlap: Games as Places

Games can be meaningful places for players. Piercy's ethnographic research in *World of Warcraft* illuminates how players receive and interpret layers of communication from virtual worlds (e.g. audio-visual content, known game narrative or player behavior history of a location in

the game, etc.) to construct their sense of place in games, and how game developers placemake through such layers of communication in the game [246]. Quiring's autoethnographic and related media analysis of *Minecraft* highlights how humans placemake consistently across physical and digital environments, by their identities interacting with place, through change and alteration of spaces, and via how they socially construct meaning in a location [256]. World building in games that became places for players is decades old, and there are digital game place ruins that illustrate this; remnants of Massively Multiplayer Online Games that predate *WoW* and *Minecraft* are testament to this–unsettling ghost worlds like the "proto-MMORPG" *Active Worlds* continue to exist as places [247], abandoned but still meaningful due to their histories of play.

Also, Álvarez and Duarte argue that while video games have drawn from some spatial design and placemaking knowledge, spatial designers and placemakers likewise could learn from video games as they have evolved over time in regards to spatial legibility, place specific narrative design, and interactions afforded by NPCs and participatory and flexible design [21]. Hjorth and Richardson discuss *Pokémon Go* as a game that transforms the immediate environment or spaces of players into a game resource, thus making places with meaning because of the presence of digital AR game objects [146]. This builds upon MacIntyre et al.'s research on how Mixed Reality technologies can leverage and/or increase the"aura" or cultural and/or personal significance of a place [198].

Creators have also designed games as places for prosocial engagement: Silva et al. highlighted how one location-based walkable AR game created an AR landscape ravaged by global warming to facilitate embodied interaction with how climate change disproportionately affects vulnerable communities. Some games become places in which players can engage with values that are important to them or a community, even making space for players to act out such values in play that they might not be able to outside of the game, becoming playful counterspaces. *Tonight We Riot* is one very concrete example: in the beat-em up game, players can act on socialist anti-capitalist ideals and liberate a society oppressed by a few wealthy capitalists place by place [249]. *Kai Unearthed* is another game that functions as a place in which players can practice and enjoy values they currently cannot outside of play: the game is set in a world free from police and prisons [128]. Games like *Kai Unearthed* demonstrate how games can be places where players can imagine and enjoy new practices and liberatory futures [59].

5.3.3 Counterspace and Game Design Overlap: Counterspace Game Design

There are many parts of existing games that can uplift marginalized players, which we refer to as counterspace game *elements*, where they are disparate pieces of play and not entire counterspace game systems. The first author's prior work explores how counterspace game elements in "cozy" games like *Stardew Valley* can support a marginalized player's joy, rest, and healing [250]. From this, they synthesize preliminary strategies for counterspace game design, including strategies for facilitating joyful belonging, restful alternatives to oppressive realities, and healing practices. Some games already go beyond disparate elements to uplift marginalized

communities. *Kisima Ingitchuna* or "Never Alone" embodies Iñupiat wisdom, values, and stories and celebrates and extends Iñupiat culture through play in the atmospheric platformer [324], combating harmful stereotypical representations of Iñupiaq people in other media and supporting the decolonization of Iñupiat youth's education and representation [338].

Beyond this, the first author's research explores designing games that could function as counterspaces for Black, Indigenous, and Women of Color in STEM to support their belonging and persistence [251]. Closely related, Brooks et al.'s work on the game *myPWI* examines the experience of designing and working through tensions and opportunities of creating a counterspace game that centers Black, Indigenous, and People of Color students at a predominantly White institution [40]. Our work builds upon this research to further explore how games can be designed *with and not for* marginalized players to function as counterspaces that facilitate their playful resistance against oppression.

5.4 Theorizing Counterspace Game Design as Critically Placemaking Play

We propose a game design research approach in the intersection of game design, counterspaces, and placemaking, as discussed above. Placemaking makes places that are produced by community-led processes, and they can perpetuate desirable community values [98] – which aligns with the quality of counterspaces combating dominant culture by uplifting marginalized communities in a meaningful social environment [232]. At the same time, games can function as places of significance to players per the nature of the magic circle [151], and in turn games have the potential to function as a place that specifically uplifts marginalized communities–a counterspace [251, 324, 338]. Furthermore, placemaking has helped create counterspaces outside play and games [153, 206]. Adapting placemaking with a critical lens on play could help create counterspaces that *are* games. Thus, we propose that critically placemaking play can generate counterspace games for marginalized players' joy, rest, and healing.

5.4.0.1 Translating and Adapting Critical Placemaking for Play

As part of our translation, we distinguish the roles of game designers, developers, and community participants throughout the process of counterspace game design approached as critically placemaking play. We refer to the community members a counterspace game intends to uplift as *community collaborators*. We refer to game designers, developers, researchers etc. as *critical playful placemakers*. When described as a combined team united in critically placemaking play in counterspace game design, they are *counterspace game creators*.

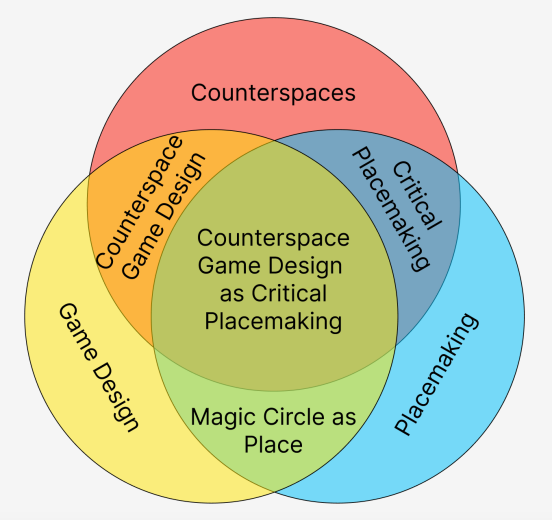


Figure 5.1: The above venn diagram reflects how we conceptualize counterspace game design as critical placemaking, as described in the related work section.

5.5 Adapting Placemaking for Counterspace Game Design as Critically Placemaking Play

While all the placemaking steps and strategies put forth by the Project for Public Spaces have much to offer [253, 254], we focus on what can be uniquely useful for and/or aligns with methods we have previously used to effectively support counterspace game design. Specifically, we detail our translations of "Define place", "Have a Place Vision, Not a Design", "Ongoing Re-evaluation", and "You are Never Finished". At the same time, we attend to critical placemaking's assertion that unchecked implicit biases can perpetuate oppression of marginalized communities, including during placemaking [318] and game design. This can begin by recognizing and resisting dark patterns in research and academia [130] which can inform ethical collaboration with vulnerable communities and support reflexivity as a professional practice.

In tandem, positionality statements or self-disclosure by researchers can make research goals and intent transparent to the community from the start [259]. For example, we designed a focus group activity begin with researcher self-disclosure [251]. This included each research team member sharing their identities, goals, and hopes in relation to the research project. In doing so, the research team fostered vulnerability and exploration among a group of strangers to co-create multiple game narratives and characters that involved sensitive situations and heavy emotions that their communities often faced. This strategy was successful, as demonstrated in the rich game narrative and character brainstorming that community members generated as collaborator game creators [251].

Like the example above, we accompany translations with related work and/or descriptions of our early research methods that eventually led to this theorized framework. These methods come from two prior research projects. In Counterspace Games for BIWOC+ in STEM [251], we

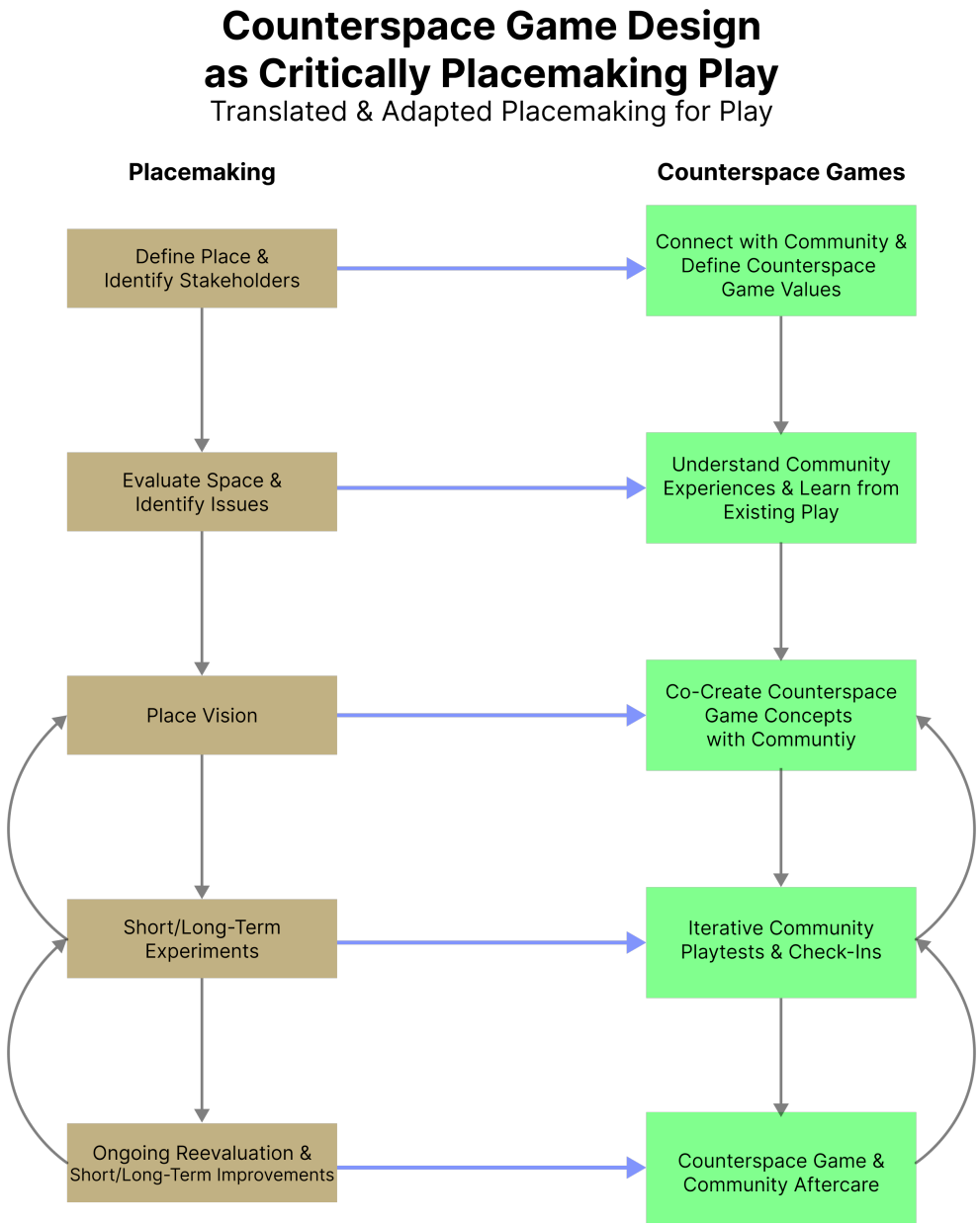


Figure 5.2: A high-level view of how we translated placemaking as a process.

designed and used methods for understanding the experiences of marginalized communities and supporting participants to envision counterspaces dedicated to their communities' well-being. In Art across Realities at the Andy Warhol Pop District, we designed and used methods for engaging participants at every iterative design and development stage of a prototype throughout the research process. Furthermore, Art across Realities informs our discussion of what place maintenance might look like when the place is a counterspace game.

5.5.1 Defining Place as Understanding Games as Places for Community Values

We adapt placemaking's "Define Place" step as helping community collaborators conceptualize counterspace games as meaningful environments for their collective well-being and shared values. We first draw from game design research to position community collaborators as game designers that can define, understand, and discuss games as places for their own values. Wanick et al.'s work explores game co-design with community stakeholders (including youth) and interdisciplinary researchers that involves imagining plausible futures of the real-world places they share while attending to inequalities they experience, which enabled them to collaborate on the same level when shaping the game while still inputting their specific expertise into its design [328]. Khaled and Vasalou's work also explored game co-design with young members of relevant communities, synthesizing strategies for when and how best to engage with children as co-designers during the game design process well as what kinds of thinking to scaffold based on their preexisting game literacies [162]. Our framework calls for a combination of these approaches and proposes further extension.

To support working with community collaborators as fellow game designers, we can design co-design research activities in which collaboration explicitly values diverse expertise and clearly demonstrates how different inputs from community collaborators directly inform counterspace game design. This could include facilitating statements like "your expertise in your personal joy will inform what players will be able to do to support their well-being in the game." In our prior work, we explicitly discussed participants' lived experiences as invaluable sources of expertise, asking them to help a fictional character as they navigated a chilly STEM campus while cultivating their joy, rest, and healing [251]. This also prioritizes learning what community collaborators are already doing to support their shared values. Game creators have the opportunity to support these efforts by centering counterspace game design on what the community collaborators are already trying to build for themselves, whether that's in terms of mechanics, aesthetics, or both. This can also inform what a counterspace game could offer as a place that might not be possible outside of play. For example, the same focus groups we conducted included asking participants to both apply their expertise *and* imagine having access to resources and capabilities not available to them in real-life [251].

Relatedly, "Have a Place Vision, Not a Design" is a principle of placemaking that distinguishes between designing a public space for people and community-led placemaking as a process that works towards maximized shared value of the people who live, work, and play

there [254]. Critical placemaking goes beyond by attending to how a place can be a site of collective action like civic participation to reclaim public space for communities when they are designed *with and not for* them [18]. Our work builds upon this further by framing a counterspace game not just as something to play or experience but rather as a place: a space generated by the magic circle that has meaning for the community of players. Flanagan, Howe, and Nissenbaum's work synthesizes methods for iteratively discovering, analyzing, and integrating values of game designers and related stakeholders, including players and design partners, in a game's design and development–including recognizing and addressing values-based conflicts towards verifying that values emerge in play *while* teaching coding [93]. In this way, their project RAPUNSEL both empowers their design partners as game designers and developers *and* imparts how they can create games to reflect values present in players' complex social environments [93]. Prior work has demonstrated how collaborators can be supported to think about and build games with value-specific lenses.

For counterspace games, in which a marginalized community's joy, rest, and healing are central, our framework has similar needs for supporting community collaborators as fellow game co-designers. In addition to scaffolding game design and development methods during collaboration, game creators can leverage RAPUNSEL's methods to support community collaborators as they not only identify their values but also understand and create a game that reflects them. For example, game creators can ask community collaborators to practice critically reflecting on games they already play together, focusing on why they think they enjoy them and how that might relate to their personal and shared values. From there, game creators can highlight how values can be similarly reflected in other games and invite community collaborators to imagine what their values could look like in play.

We can help highlight how the game becomes a place that is special because it is built upon the community collaborators' values in playful practice. This can be approached in a number of ways, including how game creators talk about the game with their community collaborators. For example, instead of framing playing the game as doing a specific activity to reach some kind of win state, game creators can provide structure for community collaborators to think, share, and design focused on their values. In our prior work with artists from marginalized communities, we framed co-design and ideation of a virtual counterspace as creating a shared place that champions and cultivates their value through playful interaction design. These participants identified a shared value of challenging dominant, oppressive culture's messaging to marginalized youth that art and playful practice are not "for" them - that they cannot be artists themselves. From this, they co-defined a key interaction for the virtual environment: they wanted art installed in an AR layer in the Pop District to especially highlight representation of marginalized artists and their work to show marginalized youth they do indeed belong in art practices and communities. Similarly, supporting community collaborators to understand and approach games as places where they can infuse and cultivate values important to their joy, rest, and healing, our framework could empower marginalized communities to create and enjoy playful counterspaces they can directly shape for their needs and desires.

5.5.2 Place Vision (Not a Design) as Creating Counterspace to Envision a Counterspace Game

5.5.2.1 Research Study Activities Designed as Counterspace

An important part of understanding a marginalized community's prior experiences is creating space in which they can speak about their lived experiences in an oppressive dominant culture safely. This calls for a research activity facilitating such a sense of safety, in which a marginalized community trusts they will be heard and their privacy will not be compromised as a result. With this in mind, our framework proposes that because counterspace games are made *with* the marginalized communities they are meant to uplift, then the research study activities and/or collaboration activities involved in the process must all be counterspaces themselves. Our prior focus group design meant to rapidly facilitate sharing about sensitive experiences of intersectional racism and sexism in STEM among strangers in a relaxed and closed setting, functioning as a counterspace in and of itself with explicit focus group practices drawn from community practices used to foster safe space [251]. Furthermore, To et al's work investigates methods for facilitating marginalized communities' engagement with complex and sensitive experiences of interpersonal racism as part of research study activities to explore the design of technologies to support their agency, privacy, and safety during experiences of interpersonal racism beyond the study [315]. Both of these prior research use interactive fiction during research study activities to provide a degree of safety via psychological distancing [161] while still engaging directly with complex and uncomfortable on-topic situations of sexism and/or racism in game and narrative contexts.

Distancing techniques like fictional, relatable narrative mechanisms for exploring complex interactions without turning collaborators into objectified victims whom research extracts learning from their trauma is critical to designing research study activities that also function as safe space for marginalized community collaborators. Our framework calls for building upon such work and digging into cultivating counterspace in research study activities (and in the counterspace game itself) for engaging with discomfort and the harder parts of a marginalized community's joy, rest, and healing. For example, research activity practices (also drawn from existing community practices) can explicitly communicate the importance of community collaborators' agency, privacy, and safety throughout all processes. Research activity practices can also make it clear that while joy, rest, and healing are central to the counterspace game design process, the collaboration has more than enough safe space for difficult emotions, experiences, and discomfort that may be intertwined with their lived experiences and how they come to the research activities and game design. We envision these research activity practices as explicitly laying the structure for research activities as counterspaces themselves, to be communicated at the opening and facilitated by game creators throughout collaboration. By cultivating counterspaces for marginalized community collaborators to enjoy as they co-create counterspace games, our framework can support critically placemaking play with marginalized players.

To complement this, we adapt placemaking's "Place Vision" step as the key phase in which we co-synthesize a value-centric vision of the magic garden: the game as place for commu-

nity collaborators' values they wish to cultivate. In this phase, we continue to build upon the placemaking principles "The Community is the Expert" and "Have a Place Vision, Not a Design" by designing co-creation research study activities that facilitate community collaborators contributing directly to game design as collaborating creators during each iterative phase of the counterspace game project. This step also includes co-synthesizing a counterspace game Play Vision that game creators must align with at any time the community collaborators' hands are not directly manifesting and shaping the game (e.g. when game creators are acting upon the community collaborators' vision of the counterspace game to create game assets in between collaboration activities as unified counterspace game creators).

5.5.2.2 Creating Counterspaces informed by A Community's Existing Counterspaces

"You Can See A Lot Just by Observing" is a placemaking principle that holds that ethnographic observation and inquiry in and around a place and it's community can provide much data to support making great places [254]. This includes understanding what the community likes and dislikes about a public space and what they do while they are there–it also includes studying similar spaces and noting how that relates to the space in question and how insights from the similar places can inform great placemaking [254]. Critical placemaking builds upon this further by attending to how studying similar public spaces over time can illuminate patterns of marginalization that some community members experience across different places and histories towards understanding how to combat them [135]. Our proposed framework builds upon these by requiring using ethnographic observation of community collaborators in the places and play they already enjoy (i.e., observing communities in their existing counterspaces (if any) and playful contexts.

Prior game design research demonstrates how complex concepts and values explored in play can cultivate rich experiences of critical practice and reflection [92]. Tiltfactor Laboratory's *Massively Multiplayer Soba*, played in Queens of New York City, and *Massively Multiplayer MuShu*, played in Hell's Kitchen of the same city are both place-specific games that created space for players to explore ways of thinking and moving through diverse spaces that challenge them to practice more curiosity and cultivation of deeper connections with the local communities, in contrast to typical place-based find-and-collect scavenger hunt interactions [91]. In the sense that the above works looked to the existing nature and practices of the communities to inform the games, game design research has also studied looking to the existing nature and practices of games to inform critical game design. Bo Ruberg proposes an instance of understanding games and critical studies together as part of synthesizing knowledge at their complex intersections: specifically by illuminating that game studies needs trans studies, trans studies need game studies, and thus the clarified need for trans game studies [267]. Ruberg's work highlights games studies' need to decenter normative player identities among many axes *and* critical studies' need to leverage the power of games to create play and places for uplifting marginalized communities [267].

Our framework builds upon these works by looking to the community collaborators' existing play and places as deep wells to draw from to inform counterspace game design. This can look like observing and learning from the way community collaborators already play and cultivate

place with each other using ethnographic research methods. For example, we can ask community collaborators for permission to attend community gatherings to understand what their joy, rest, and healing looks like in the context of their local spaces and relationships with each other. Likewise, game creators can turn to research literature in critical studies on how marginalized communities create and sustain counterspaces, having the opportunity to leverage documented and researched practices for potentially translating into playful interactions in a counterspace game. By learning from how community collaborators cultivate their own play and place, our framework can support co-creating counterspace games that effectively center marginalized communities joy, rest, and healing in play.

5.5.2.3 Counterspace Game as Place, Defined by Play Vision

We propose composing a guiding accountability document that builds upon the placemaking principle "Have a Place Vision, Not a Design" [254]. Critical placemaking digs further into the idea of community-led processes of shaping public space by centering marginalized communities and processes to support their reclamation of spaces they are not typically able to derive value from because of perpetuated oppression [18]. Our proposed framework's required Play Vision shapes the counterspace game as a place community collaborators can co-define iteratively, creating guidance to which we can hold ourselves accountable during design and development processes. Prior game design framework research has demonstrated how accountability while working with community stakeholders and collaborators can be effectively supported: Culyba's Transformational Game Design Framework includes a compass method that functions as game designers' and developers' "north star" to iteratively align with their games' higher level purpose throughout the complex creation processes [65]. Transformational game design often involves marginalized communities as community stakeholders and game co-designers, and the compass and higher level purpose both support diverse game creation teams in orienting their design and development decisions to point to the transformational goal of the game as many times as needed while the game grows and evolves.

Our framework can build upon this work by requiring that we do the same when making counterspace games with marginalized communities. We define a Play Vision as underlying value-driven statements that describe the place that a counterspace game creates for players, as opposed to outcome-based requirements that a game must be designed to satisfy as a product. For example, instead of a design requirement of "in the counterspace game, players will learn and practice strategies for expressing emotions collectively in uncomfortable settings to achieve the victory state", the Play Vision might include "The counterspace game is a place where players can safely explore expressing emotions collectively in uncomfortable settings to cultivate their own strategies and preferences." This Play Vision characteristic was additionally informed by our prior work with marginalized artists, who defined a vision for a communal AR environment for art by focusing on how they wanted their fellow community members to feel when experiencing interactions meant to support them. The Play Vision could further include values-driven statements to further preserve the power of community collaborators beyond defining the place the counterspace creates: for example, "the originating community collaborator creators of this counterspace game flag violence as an unacceptable form of expression in play".

5.5.3 Ongoing Re-evaluation as Iterative Prototype Alignment and Play Vision Updates

Where the Play Vision is a place vision for a counterspace game, we can use it as a metric for loyalty and accountability to what community collaborators envision the counterspace game to be without requiring that they are present at every step and meeting during the complex and demanding game design and development process. As it is an iterative process, this Play Vision is also meant to be iterated upon as needed. Ideally, at community collaborator's discretion and explicitly prompted during each collaboration activity with game creators, the Play Vision would be revisited and revised to reflect the clarified and evolving needs and desires of marginalized communities. For example, there may come a time in which community collaborators would like to more specifically define violence and what is flagged as unacceptable to explore in play for communal expression in difficult situations. At that time, it is important to engage with the evolving Play Vision to make room for engaging with the complexities and difficulties of critical values in play. In our prior work with marginalized artists, we iteratively worked with them to assess the prototype's progress and alignment with their Place Vision. Later on in the project, their assessment of the prototype highlighted a need for their Place Vision to be updated – they added a need to create systems of communal stewardship of the AR environment as they further explored the pros and cons of a system in which anyone could upload virtual content. By doing the above, our framework can cultivate and preserve community collaborator's power in designing counterspace games across iterations

5.5.3.1 Supporting Iterative Community Collaborator Feedback

Critical placemaking work consistently calls for taking additional considerations related to already marginalized communities into account when drawing from placemaking [18, 318], and in this instance we propose an additional opportunity for empowering community collaborators as creators and not just consumers of games. As part of our framework, we propose adapting key strategies from the EOTA (Experiences, Observations, Theories, Advice) method [129] which supports fast, high quality and actionable feedback in a learning setting. The EOTA method guides learning game designers and researchers through critically evaluating games in varying stages of prototyping quickly and effectively, and in a group setting [129]. This process focuses on sharing Experiences, Observations, Theories, and Advice about the game they are providing feedback about in turn, facilitating the practice of formulating and communicating playtesting feedback that is rapid, high quality, and actionable [129]. This is a key practice for game designers to practice on other games as well as their own, and community collaborators will be able to not only develop and hone such skills as part of their work with game creators but also apply it to their own game-related endeavors moving beyond the counterspace game. Iteratively using EOTA to evaluate their counterspace game as it emerges in the design and development process can better illuminate how their design input and decisions influence the way they and other players can experience the counterspace game. It also provides convenient, structured opportunity for game creators to prompt revision of the community collaborators' Play Vision, which may be especially applicable after evaluating an iteration via EOTA.

For example, counterspace game-specific EOTA may reveal Experiences of discomfort with communal expression of disapproval in the form of shunning an npc that went against the values of the counterspace game. This may lead to Observations about how not every player got to weigh in on the decision to shun the npc, and that after only a few suggested it, the group seemed to jump to enacting it without much time for reflection or discussion. This may generate Theories about how not every player may be ready to contribute to considerations on communal expression via in-the-moment verbal communication, especially if some players are observed to dominate verbal discussions (even if they don't mean to). All of this could culminate in Advising that the Play Vision be updated to enable multiple ways of contributing to considerations of communal expression in the counterspace game, e.g. providing silent or even asynchronous options for collecting input on communal expression. By supporting high quality and actionable feedback from community collaborators (that can also iteratively inform Play Vision updates), our framework can facilitate counterspace game design where play is enjoyed in a meaningful and safe place generated by the game and its players. Equally important, EOTA-informed playtesting and Play Vision updates can contribute to holding game creators accountable if and/or when they get something wrong when collaborating with community collaborators.

5.6 Discussion: You are Never Finished as an Opportunity for Counterspace Game Stewardship & Community Care

Our translations so far reveal the need for more in-depth adaptation of placemaking's "You are Never Finished" principle. At a high level, this translates to a counterspace game prototype as never being a fully finished project, resulting in terminating our engagement with the community collaborators. Instead, it positions counterspace games as shared playful places that need tending and maintenance for the foreseeable future. Future work to complement this theoretical framework could focus on framing the game as community counterspace instead of a self-contained playable product, wherein its status as place requires maintenance and the acknowledgement that it will not reach a state of "finished".

This principle speaks to a community's public place naturally experiencing change and needing maintenance and how placemaking as a process must attend to those realities. Future work could also draw from critical placemaking's utilization of participatory design strategies of interacting with community collaborators that is not the typical, extractive practice of concluding the collaborative relationship as part of the finishing a project [18]. This in practice could counter what Samper-Martinez et al. observed in which game co-creators are left without power and ownership when Social Network Games are discontinued [274].

Future work must also consider that stewardship of a counterspace game will likely involve modifications that require no input from us as researchers, designers and developers who originally worked with community collaborators. This calls for building in structures that sustain agency and power of community collaborators in the counterspace game design long after our work with them is "done". Prior game design research explores 3 types of "virtual liberty" that

can be experienced in relation to a game: Koster defines freedom to play, freedom to design, and freedom to design together [171]. The freedom to play is the virtual liberty of players to interact with the virtual world; the freedom to design is the virtual liberty of designers to shape and maintain the virtual world; and the freedom to design together is the collective virtual liberty of the designers *and* players to further build upon and improve the virtual world that is the game [171]. These virtual liberties pertain not only to how games are designed, but also to how they can be enjoyed after their initial release.

Iterative work on our framework could build upon these virtual liberties by centering and extending the freedom to design together as the collective virtual liberty of community collaborators, their communities, and future players as stewards of the counterspace game. This extended virtual liberty involves both understanding the counterspace game as a shared place of meaning for community collaborators and future players as well as approaching play as a potential form of virtual stewardship. Future work could approach this as *the community care of collective stewardship*. Beyond framing the counterspace game as a place that is meant to grow and change with the players that enjoy it, future work could explore shifting the power of change, care, and maintenance of a game to no longer solely rest with game developer teams after initial release.

It's also important to be mindful of this shift not becoming a form of abandonment in practice. One way to address this could be future work that builds upon Taylor's work that highlights the value of players' unexpected and/or unintended play of games that game owners typically try to moderate or regulate away [309]. Instead of fearing and curbing the ways players can reshape play in unexpected ways, this kind of play can be included in the valued design work that contributes to the magic of a game's virtual world. Ideally, game creators would stay in contact with community collaborators and be available to take care of if not assist with counterspace game updates requested by players as needed, indefinitely. As this is usually not possible for myriad reasons, future work should explore creating structures to support community care and stewardship.

This can involve making it explicit that the game is meant to change and grow, and that players should expect their input to shape what the game plays like as time passes. Steward Community Practices would be additionally important to help define what kinds of mods, patches, refined releases etc. are in alignment with the originating community collaborators' Play Vision. Steward Community Practices could likewise include the use of EOTA playtests and Play Vision updates (which could be facilitated by stewards in the community as desired) to further support the ongoing growth and development of the counterspace game to match the evolving needs of the community it is meant to uplift.

Game creators can facilitate this shift to community collabotors' control of the trajectory of the counterspace game onward by compiling resources and tutorials that reflect what community collaborators have learned and practiced throughout the co-design process. This can include strategies for thinking about games as places for their values, EOTA playtesting, Play Vision composition and revisions, and even free tools for game mods for beginners, etc. Ways to reconnect with game creators and their home labs or studios should also be included at the very

least so that community collaborators remain community collaborators and do not become past participants. We understand this can be especially challenging given the existing systems of game design, development, and research, but we hope exploring and trying new ways of being in community with each other now can inform standards for the near future.

5.7 Limitations & Next Steps

In its current state, this theoretical framework has been informed by relevant research synthesis to propose approaching designing counterspace games as critically placemaking play. Evaluation and further refinement of the framework is necessary, which we will complete by applying this theoretical framework to the co-design of a counterspace game with community collaborators as our most immediate next steps. While our theorized framework builds upon existing theories, practices, and prior work related to counterspace game design and is yet to be formally applied and rigorously evaluated, what we propose here raises important considerations.

In terms of theoretical synthesis, our framework begins by translating and adapting the Project for Public Spaces' placemaking process in 5 steps due to its documented and demonstrated success, as well as the quality of resources available for others in different disciplines to learn about and apply the approach. First, here we translate and adapt key elements the Project for Public Spaces' placemaking process and strategies, chosen for its well documented nature and demonstrated success. This choices does not discount other approaches to placemaking that may also be useful for applying to game design, and thus our theorized framework is not comprehensive, but rather a specific dive into how layering critical placemaking considerations upon this established placemaking process can support counterspace game design to pursue similar benefits for marginalized communities. Similarly, to the best of our knowledge, critical placemaking is still an emerging process and approach relative to placemaking. We draw from existing work in this important space and layered it upon our chosen placemaking process as an initial way to apply critical processes to our game design translations and adaptations. We look eagerly to continued knowledge synthesis regarding critical placemaking with full intent to apply emerging insights to our framework iteratively to best uplift marginalized communities.

Regarding example applications of our theoretical framework described here, we expect that different marginalized communities will require different ways of translating our frameworks' intent into effective practice. While counterspace games are discussed in the context of supporting marginalized communities broadly, in practice we envision each application of critically placemaking play to be specifically tailored to a given community. For example, when working with Deaf and Hard of Hearing community collaborators to co-create a counterspace game, application of our theorized framework would entail additional considerations. Some examples are making sure EOTA methods accommodate sign language and building-in structures for adapting existing game strategies and mechanics to be inclusive to players who will not enjoy the game with audio. Additional, critical next steps include centering communities with disabilities when iterating on this framework for creating counterspace games to uplift marginalized communities by centering their joy, rest, and healing.

Discussion of developing collective stewardship among players, where power does not rest solely with game creators or game owners, also raises important considerations around community culture and moderation around games. Virtual liberties as freedoms to play and affect games are no doubt invaluable, but as research about communities in and around games has revealed (e.g., Gray's work on the experiences of women of color gamers [120, 121, 122, 123]), marginalized players will experience oppression reproduced in game spaces if not combated intentionally. Even in a counterspace game, players being able to make sweeping impact on how other players experience a counterspace game can be harmful if effective systems for collective stewardship are not developed and iteratively evaluated in practice, which currently lies out of scope of this paper but is part of future work.

In addition to collective stewardship practices, we are hopeful that game creator and game owner originated strategies for cultivating community (as opposed to regulating a product they own) can explore valuing player impact on games after release or even meet unexpected play with reciprocal playfulness, perhaps akin to how *Diablo* creators responded to counterfeit rare currency in a way that cleared away fakes and rewarded players for helping over time [87]. We hope this work spurs more work about how players can shape communities in and around games that leave behind othering and exclusionary practices that seem to dominant game spaces presently, instead revealing more ways to uplift and support each other in and outside of games.

5.8 Conclusion

In this paper, we present theorized strategies for approaching counterspace game design as critically placemaking play. At the intersections of game design, counterspaces, and placemaking, the concepts of critical placemaking, games as places, and counterspace game design come together to synthesize our proposed process and strategies. Based on related work and my own ongoing explorations, we propose:

- Supporting community collaborators to approach thinking about, designing, and evaluating games as places that can support their values, joy, rest, and healing
- Focusing on defining and following through on a vision for a playful counterspace with community collaborators as an alternative to working only from design goals
- Approaching counterspace game design as an ongoing process with community collaborators in order to support evolving needs, desires, and realities
- Future work exploring what stewardship and community care of a counterspace game might look like when adapted from how placemaking is a process that is never finished

We also discuss next steps to apply, evaluate, and refine strategies as well as early limitations that arise from current theorization. We contribute what we hope is the start of a variety of approaches to designing games that can function as places that center marginalized players and explore joy, rest, and healing made possibly by the power of play. We hope that this work can support additional work in game design that centers the joy, rest, and healing of marginalized

players for the sake of such joy and pleasure, and we hope creating counterspace games can shift the norms of magic circles so that games no longer require marginalized players to combat oppression while trying to have fun.

Chapter 6
A Counterspace Game for Rituals

Like the strategies explored in the last chapter, applying aspects of placemaking to my research further highlighted how a place could become counterspace. To explore this, I used a strategy derived from placemaking that supports communal well-being by facilitating related activities within a place. Below, I apply this by co-designing and developing a counterspace game embedded with rituals that foster effective mentorship for uplifting marginalized people at work. This work shows how a counterspace game can support marginalized people by hosting uplifting culture and practices as the norm. As part of my dissertation, this work also informs my proposed work's focus on a counterspace game for another "ritual" that uplifts marginalized communities.

This chapter was adapted from my paper:

Erica Principe Cruz, Cheng Yao Wang, William Moriarty, Blair MacIntyre, and Fannie Liu. 2025. Growing Together at Work: Cultivating a Mentorship Garden. *Proc. ACM Hum.-Comput. Interact.* 9, 2, Article CSCW090 (April 2025), 31 pages. https://doi.org/10.1145/3710988

Abstract

Workplace mentorship is critical for career advancement, sense of belonging, and well-being. However, historically marginalized groups face barriers to effective mentorship including misaligned commitments, difficulty establishing comfort with mentors, and relationship persistence. We explore how 3D virtual environment (VE) counterspaces, or spaces that center the well-being of marginalized people, can circumnavigate these barriers and generate dedicated environments for workplace mentorship. We present Mentorship Garden: a digital counterspace designed to facilitate mentorship communication around commitments, goals, progress, and well-being. We deployed Mentorship Garden with 10 mentor-mentee pairs, recruited from DEI mentoring programs at a large global company, and interviewed them about their experiences. Overall, Mentorship Garden provided a relaxing space for participants to engage in rituals supporting historically marginalized individuals via mentorship, but revealed potential challenges in seamlessly integrating it in the workplace. We discuss design implications for creating virtual mentorship counterspaces in the workplace and opportunities for future research.

6.1 Introduction

Social connection and belonging in professional environments are critical to employee performance and retention [49, 176]. However, historically marginalized groups face major challenges to developing these feelings, including workplace incivility and microaggressions [294], which can negatively impact their well-being and lead to burnout [208]. Such toxic environments can lead to high turnover, contributing to what has been dubbed the "Great Resignation" in recent

years [307].

One important intervention to address these challenges is to provide mentorship opportunities for historically marginalized groups in the workplace, such as through formal programs supported by workplace organizations. Workplace mentorship is an essential platform for learning, career development, and social support, that can lead to career advancement and subsequently greater diversity within leadership [157]. However, while mentorship programs can start new mentorship relationships, participants often face challenges building and maintaining these relationships [270]. Issues such as power imbalances, stigma and implicit biases, lack of consideration for identity and culture, misaligned values and more can affect the strength and persistence of mentorship relationships for marginalized people [131]. To address this, we propose a novel intervention to transform mentorship meetings into *counterspaces*, or "safe spaces" that exist at the margins of dominant culture and foster a sense of belonging, self-expression, and empowerment for marginalized individuals [232].

We present Mentorship Garden, a research prototype that provides a counterspace for mentorship in the workplace. Mentorship Garden is a desktop-based 3D virtual environment (VE) that enables mentor-mentee pairs to grow a virtual garden together. Pairs partake in virtual mentorship rituals that encourage them to establish goals together, discuss important mentorship topics, track progress, and express their identities. Mentorship Garden provides a persistent space for pairs to return to and make their own, along with a chat system for pairs to engage asynchronously, to encourage continuous engagement in their mentorship.

We deployed Mentorship Garden in a field study with 10 pairs of participants (N=20), who held two mentorship meetings with each other using the prototype (except Pair 9, due to availability barriers). Our results demonstrate that Mentorship Garden helped participants ground and build their relationship, as well as facilitated important conversations around mentorship and overall well-being. Mentorship Garden indeed became a counterspace for participants, who felt like they were transported to a comforting, playful alternate reality from work. As such, participants described the potential for such a counterspace to uplift marginalized individuals, such as by fostering a balance in power as well as identity expression. At the same time, participants described concerns around its adoption in a professional setting. Taken together, we contribute: 1) the design and evaluation of Mentorship Garden, a 3D VE for facilitating conversation-based mentorship through a set of rituals, and 2) design implications and opportunities for future work to explore designing VE counterspaces that empower marginalized people in the workplace.

6.2 Related Work

6.2.1 DEI and Mentorship in the Workplace

Over the last few decades, researchers have explored several interventions to promote diversity and inclusion in the workplace. At the start of the workforce pipeline, CSCW researchers have synthesized a framework for designing support tools for socially and economically marginal-

ized people seeking decent work [74]. Within the workplace, researchers have explored improving well-being through diversity training supporting LGBTQIA2S+ groups [241] and people with disabilities [245], as well as psychological belonging interventions for women and racial minorities in STEM [52].

Across diverse fields and identity groups, mentorship is perhaps one of the most implemented interventions in the workplace [16, 20, 29, 39, 50, 149, 157, 165, 193, 204, 290]. Mentorship is a support-based relationship in which people guide others through career advancement (e.g. sponsorship, apprenticeship) and psychosocial development (e.g. role modeling, counseling) [193, 219]. Mentorship can range from traditional senior-to-junior pairs, where a mentor provides guidance for people less experienced in their careers, to informal support groups between peers in laterally similar positions, where mentorship is multi-directional [219]. Mentors can provide social support, teach skills, and act as role models [193]. For marginalized individuals, mentorship can be a source of positive social and psychological capital (e.g., self-efficacy, hope, resilience) in the workplace [257]. Mentorship also supports the success of marginalized groups in the workplace by facilitating entry, professional transitions, and expertise development [33]. Intersectional mentoring can further help marginalized mentees, wherein reflexivity can uncover the intersecting ways that oppressive systems affect them, informing a mentorship with their well-being at the center [44]. Mentors who also function as sponsors, by leveraging their seniority and connections to advocate for marginalized mentees, can be key for career promotions [17, 219].

With the prominence of remote and distributed work, researchers in CSCW and broader HCI communities have explored how mentorship can transfer to the virtual context [132, 167]. Much CSCW and HCI work has found that remote technologies (online portals, video calls, etc.) that enable online mentorship facilitate access to career development, career advice, skills building, and employment opportunities [88, 150, 172, 203, 236, 268, 317]. Informal, supportive communication patterns (friendly language, using emoticons, showing interest in the mentee as a person, etc.) in online mentorships are especially effective [284]. Moreover, research shows how online mentorship can lower access barriers and nurture meaningful relationships across communities, including marginalized ones like older adults [343]. It can also enhance mentees' motivation and self-efficacy through positive representation, such as in the experiences of Black women mentoring Black girls during virtual computer science camps [39]. Further, research indicates peer mentorship online can be beneficial for self-worth, as seen in online communities for professional women [281]. Mentors can even engender belonging in hybrid teams with isolated remote members [167].

Despite the known benefits of mentorship, both online and offline, recent research suggests that while marginalized individuals may be able to access mentorship at work, they can have difficulty establishing and maintaining relationships with mentors. Beyond simply matching with someone who is more experienced, mentees value personality fit, where they need to establish a sense of connection and trust with the mentor [270]. Building a mentorship relationship at that level can be even more challenging at a distance, where a lack of local context can limit perceptions of authenticity [78]. Workplace relationship building can become further strained

amongst barriers in remote communication, such as a lack of nonverbal cues or misinterpretations in tone [342]. Additionally, mentoring that only focuses on skills may position the mentee as someone who needs to be "fixed" [212]. Rather than assuming deficits, mentoring should provide a safe space for people to authentically express themselves, including their various identities and lived experiences. Our research explores the design of interactive virtual environments (VEs) as *counterspaces* for workplace mentorship, i.e., safe havens of support and connection for marginalized individuals [232] where mentors and mentees can build their relationship together. As a first step in this direction, we focus on one-to-one relationship building in workplace mentorship.

6.2.2 Counterspaces for Marginalized Communities

Like mentorship, counterspaces can help marginalized individuals thrive in the workplace. Counterspaces are temporary social environments [141, 184] and are not necessarily tied to physical places (though they can be). Higher education research demonstrates that counterspaces contribute to the success and persistence of marginalized communities like Women of Color in STEM fields [232] and low-income, first-generation, and/or working class students in selective institutions [181]. Likewise, access to a workplace counterspace can significantly improve the quality of their work experiences, as seen in a Justice, Equity, Diversity and Inclusion initiative for Black, Indigenous, and People of Color (BIPOC) employees at a predominantly white institutions' library [86]. Research also highlights that counterspaces challenge oppressive dominant culture through direct relational transactions [53]. This includes creating a sense of community and sharing adaptive strategies for responding to oppression [53], practices similar to those in mentorship meant to empower marginalized mentees [44, 286]. Prior CSCW research shows that online platforms can also be counterspaces, where marginalized communities have created and sustained spaces of work-related peer-advice on platforms like Reddit [281]. While these platforms may not necessarily exist within the workplace, virtual counterspaces can generate practices that strengthen the persistence and belonging of marginalized communities at work [280, 281].

Counterspaces are manifested by the people and practices that bring meaning to a space because they center marginalized people and counter oppressive dominant culture [232, 322]. Exemplars of counterspaces in the workplace are Employee Resource Groups (ERGs), employee-led communities formed around shared identities and affinities, which can improve marginalized employees' sense of connection and belonging [54]. ERGs create counterspaces in the workplace when historically marginalized individuals and their allies collectively occupy a physical (e.g., a conference room) or virtual (e.g., video conference platforms) space towards supporting marginalized groups, including practicing mentorship. After ERG sessions end, however, such spaces revert to their typical workplace use. These counterspaces are temporary and often do not offer opportunities for historically marginalized groups and their allies to shape and maintain the space as shared havens of expression and long-term advocacy in the workplace. Thus, we explore how persistent virtual counterspaces, through the use of VEs, might create visible representations of long-term relationships focused on historically marginalized communities in the workplace.

6.2.3 VE Counterspaces and Training VEs in the Workplace

Counterspaces for historically marginalized communities have been explored and developed as and within VEs, or interactive digital worlds, predominantly in social video games. Despite oppressive mainstream gaming culture, historically marginalized communities have enjoyed safe spaces for identity formation in *Second Life* [47] that can carry positive effects into the physical world [48]. In another Massively Multiplayer Online Role Playing Game (MMORPG), LGBTQIA2S+ groups and their allies established alternative communities with inclusive social policies in *World of Warcraft* [291]. More recent digital games, like *Kisima Ingitchuna* or *Never Alone*, a cooperative video game developed by Iñupiat and with Iñupiat elders, also function as counterspaces. Its virtual world embodies and celebrates Iñupiat culture while also forming community beyond playing the game, and decolonizing the education of Iñupiat youth [338].

While VE counterspaces have shown promise in gaming, their potential in the workplace is relatively unexplored. Prior HCI research has used VEs in the work context for collaboration [104], reducing implicit bias [31], experimenting with workstation configurations [71], training humans to work with robots [12], facilitating remote adolescent psychotherapy [115], and even for mentoring in specific fields such as higher education [191, 287] and healthcare [57, 112, 330]. Additionally, desktop-based VEs have been used to teach and develop complex job-specific skills, (though not via mentorship), including first responder situations training [216, 217], military training [55], mechanical assembly operations [42], spatial route-learning [195], and health care team training for high-stress critical-care situations [139]. Training VEs that *do* involve workplace mentorship are being explored in HCI research, e.g., AR and VR applications for practical guidance between expert and novice surgeons [112, 264, 330]. Still, VEs designed for holistic mentorship focused on historically marginalized individuals at work have yet to be investigated. Thus, we propose leveraging the affordances of VEs to design immersive mentoring counterspaces that could support historically marginalized groups in the workplace. For this initial exploratory research, we focus on desktop VEs, which are known to provide a sense of immersion [329].

6.3 Design Focus Groups

As a preliminary step to inform the design of a VE mentorship counterspace, we conducted three one-hour focus groups with nine participants over video using Zoom. We conducted these at JPMorganChase, recruiting from internal DEI mentorship programs focused on historically marginalized groups[1]. We recruited the same way from a DEI sponsorship program, where sponsorship includes mentorship practices such as guidance as well advocating for and promoting sponsees in the workplace [144].

[1]Due to institutional policies, we were not permitted to collect individual demographics unless voluntarily self-disclosed

For each group, we asked participants to imagine a 3D VE dedicated to one-to-one mentorship, with a focus on historically marginalized individuals. To facilitate descriptive imagination, we asked ice breaker questions based on scaffolded self-disclosure protocols [238] to warm up participants to share about themselves. We then asked participants to share about their most recent experience with career-related mentorship, including what was especially impactful about their experience, what they would change about it if they could, and why. We then introduced the concept of VEs using examples from HCI and CSCW research, including their potential to provide immersive spaces for work meetings [233], social connection [289], and to cultivate community among historically marginalized individuals [11, 103]. We used narrative prompts to help participants imagine immersive VEs for mentorship. We asked them to imagine they were having a mentorship meeting in a VE to discuss strategies for expanding their roles towards promotion in the workplace (a common goal within mentorship programs at the institution). Participants responded to prompts around how the environment should be setup, what tools or abilities they would need to explore strategies towards role expansion, and what they would want to see upon entering/leaving the space.

6.3.1 Insights that Informed Prototype Design

Participants highlighted the importance of mentorship alignment on purpose and expectations. Past experience of misalignment included when mentors/sponsors were "volun-told and not volunteered. I didn't feel there was a real passion, it was more of a check the box," as one participant, a former sponsee, shared. Similarly, opaque mentorship practices and lack of communication made a mentee wonder about long stretches without interaction, questioning, "is this a test? If I sit down and do nothing are you going to do nothing too?" Relatedly, prior CSCW work suggests that sharing commitments to a collaboration can help build rapport and meaningful connection [180], which is key for building mentorship relationships [44, 148, 286, 321]. Because of this, we aimed to design a VE that encourages explicit communication around commitments via rituals, or built-in tasks for prompting communication.

Participants were also excited about relaxing, playful VEs in the hybrid workplace that supported their mentorship goals. They imagined virtual mentorship spaces that "provide a sense of openness with purpose." VEs could bring novelty to workplace contexts, but it was key to ground focus in workplace-relevant interactions. With this in mind, we aimed to design an environment that could be engaging and delightful without derailing a mentorship meeting. Participants also wanted meaningful objects and "more continuous engagement" with topics and the mentorship relationship itself. HCI research shows that indeed, for historically marginalized groups, cultivating continuity for a strong, long-term mentorship relationship can be key to experiencing belonging and success in the workplace [130]. To address this, we considered including unique artifacts that could reflect mentorship in practice and serve as visual histories of the relationship.

Based on insights from the focus groups, we designed Mentorship Garden, a VE where users grow a garden together. The garden serves as a visual metaphor to symbolically ground mentorship practices and growth for users. We chose to leverage visual metaphors in the prototype, as

prior HCI work shows that the flexibility of metaphor-based communication can support shared understanding. Ambiguity in a visual metaphor allows an individual to assign and interpret its meaning based on their personal lived experiences [261], which we felt could help users personalize the experience and share about themselves. While we envision mentorship VEs in the workplace could use various visual metaphors (e.g., constructing a house), we started with a garden because of its connotations of growth and established use as a metaphor in prior mentorship work [258]. Moreover, several participants imagined having a mentorship meeting in nature because it might be relaxing. We describe Mentorship Garden below.

6.4 Mentorship Garden Prototype

Mentorship Garden is a multiuser VE built on Babylon.js, a 3D engine for the web. We leveraged Babylon.js to create the VE, which users can enter through the web browser, navigate a first-person view with their keyboard, and interact with 3D objects with their mouse. The prototype used Azure Communication Services for synchronous audio/video communication, Colyseus for state synchronization of the VE, and leveraged Microsoft Teams for asynchronous chat and file storage.

6.4.1 Chatbot

Mentorship Garden includes a chatbot for users to input data to change the VE asynchronously. The chatbot enables easy, at-will personalization of a VE by mentorship pairs, without requiring them to code. Inspired by prior HCI work, which describes the need to empower marginalized individuals to create and shape technology [234, 288], we designed this feature to enable users to customize the VE with their own input. We developed the chatbot as a custom app within Microsoft Teams. It asks users to share their mentoring values, topics or experiences they want to discuss, their mood, and 3D objects they want in the VE. The chatbot sends their input to the VE, which changes based on users' answers, detailed below. Figure 6.1b shows the chatbot collecting input for users' mentorship values. We discuss how these input affect the VE below.

6.4.2 Garden Environment

We designed the mentorship counterspace as a garden based on previous studies' mentorship garden metaphors [258]. We designed it to appear as if the user is outdoors, where they can move in a small wooded area with a stream, bridge, gardening tool shelf, and a mound of soil. We chose this design based on insights from the focus group, where participants imagined holding their meetings in nature, as well as prior HCI research, which shows that outdoor nature VEs can be physiologically and psychologically restorative alongside the same benefits experienced physically in nature [225]. We chose simple, lowpoly 3D assets to populate Mentorship Garden, and included relevant ambient sound (birdsong, flowing water, a breeze) to facilitate a sense of being outdoors. We made these design decisions according to prior work, which shows that ambient audio, rather than high visual fidelity, is effective in supporting presence and immersion



Figure 6.1: (a) A pair moves stones from the shelf to placeholder locations in their garden to build a retaining wall that symbolizes what they value in a mentorship relationship. (b) Pairs choose what they value in mentorship through the chatbot. (c) A pair has planted their shared purpose seed and prepares to water it with their topic watering can labeled "share expectations." (d) Glowing placeholders where pairs plant the mentee's mood flowers in Session 1.

in a VE [76]. Also, because the prototype runs on the web, lowpoly assets were less likely to cause lag during loading and use. Users enter the VE via web browser. In the VE, users' webcam feeds are visible as video tiles with their names, which they can move in the garden using arrow keys. They can also interact with glowing objectsby clicking and dragging on them. Users can view each other's webcam tiles moving, as well as objects they both move, while hearing each other.

6.4.3 Mentorship Rituals

We designed a set of rituals for facilitating mentorship conversationswhile providing comfort and immersion in the VE. Since mentoring pairs typically hold multiple mentoring sessions to build their relationship and discuss various topics, we developed rituals for two types of sessions. The first session introduces the garden and aimsto help mentoring pairs build the foundation for their relationship, while the second session facilitates check-in conversations. We chose this structure based on prior work, where developing early shared understanding, and checking for alignment periodically after, can lead to better mentorship experiences for marginalized mentees [45, 286].

6.4.3.1 Session 1: Building Foundations

In Session 1, users interact with objects in the VEto establish the foundation for their mentoring relationship, and future sessions together. Based on insights from both the focus groups and prior research [132], which emphasize alignment between mentors and mentees, we designed the rituals in this session to focus on explicitly defining goals and expectations at the start of

mentorship. The interactable objects sit on the garden shelf and prompt users to engage in these foundational conversations. Once users interact with the objects and complete a ritual, new objects appear on the shelves to guide users through the conversation.

Build a Retaining Wall Together

This ritual focuses on aligning mentors and mentees on their values for mentorship, which is key in effective mentorship relationships [209]. The first objects that users encounter on the virtual shelf are a set of stones. Printed on the stones are users' mentorship values, which they can input through the chatbot prior to entering the VE by selecting from multiple choice options. To determine potential values for users to select, we worked with organizers of the DEI sponsorship program from which we recruited participants for the design focus groups. We chose this program as it had a well-defined toolkit around structuring mentorship with a fixed set of values. We included values such as clear goals, clear communication, clear commitment, openness, new opportunities, holistic support, and expert guidance. In this ritual, pairs can move their value stones to virtually build a retaining wall around their mentorship garden together, using their answers on the stones as prompts to share what they value in mentorship and why. Figure 6.1a shows a pair placing their value stones around their Mentorship Garden together.

Plant Your Shared Purpose

This ritual focuses on aligning mentors and mentees on their purpose for mentorship, which is also important in quality mentorship [148, 209]. We aimed to encourage mentoring pairs to explicitly define their shared purpose using a virtual symbol, which functioned as a visual metaphor that can be flexibly interpreted, as in prior HCI work [261]. This way, they could assign their specific shared goal to the symbol. After completing the ritual to build a retaining wall, a virtual seed and watering can will appear on the next level of the shelf along with directions to "Plant Your Shared Purpose." Users can virtually plant the seed in the mound of soil and then use the watering can, labeled "share expectations," to water it as they explicitly discuss their shared purpose for the mentorship relationship. Watering the seed causes a sprout to appear in their Mentorship Garden, symbolizing the start of their progress on their shared mentorship goal in the VE. Since a growing plant could symbolize the progress of many different work-related goals, pairs could interpret it according to their own goals.

Plant Mentee's Mood Flowers

We included this ritual in Session 1 as part of users' initial setup of their garden, which they would see change over time in Session 2. After users plant their shared purpose, a set of grey flowers appear on the next level of the garden shelf. Users can drag and drop these flowers into designated spots on the mound of soil to add to their garden. These flowers are meant to represent the mentee's mood over time before their next session, which we explain in more detail in the following section about Session 2.

Decorate Your Garden

This ritual design was informed by prior CSCW research on how virtual objects of personal significance can be a helpful tool in relationship building online [138]. We envisioned that these objects could function as a means to share about oneself, by personalizing the space and prompt-



Figure 6.2: (a) A pair's custom items from Session 1 and Session 2: a mini SUV, a chessboard, a bird, and a slice of pizza. (b) A pair decorates their Mentorship Garden with their custom pizza and football items. (c) A "wrap it up" reminder appears when 25 minutes have passed since their meeting started.

ing personal conversation, and thus build connection with each other [24]. The final objects that appear on the shelf in Session 1 are custom items that users can request through the chatbot, prior to entering the VE. For the purposes of this study, a researcher would search for 3D models of requested items on free online repositories. When we were unable to fulfill specific requests or participants did not input requests, we chose 3D objects that fit the setting, e.g., a bird matching the ambient noise. The custom objects appear on the bottom level of the shelf, and users can interact with them at will, dragging and dropping them anywhere they would like as a means to decorate their garden or the space as a whole.

Open Time

We included this ritual to enable mentorship pairs to define a portion of the mentorship meeting themselves, such that the entirety of their time together would not be just pre-designed rituals. After completing all the built-in rituals, pairs are free to use the VE and remaining time in the prototype however they want. This can include exploring the virtual space, openly discussing topics of their choice, and if desired, leaving the prototype early.

Closing Time

We designed this ritual to unobtrusively inform pairs that their mentorship meeting is almost over by transitioning the ambient sound into music of their choice. This design is informed by the focus group participants sharing that music preferences could be a fun way to learn about their mentorship counterpart. Similarly, self-disclosure in this way can facilitate closeness [24]. Five minutes before the end of the meeting, the prototype plays music in the background, and a reminder to "wrap it up" appears over their garden. Pairs can select their own closing time music from a set of options that we provide through the chatbot, prior to entering the prototype. We

provided calming music options that matched the comforting, relaxing atmosphere we wanted to foster, while ensuring that the change in audio would not be a jarring or stressful transition to the end of the meeting. Pairs can then leave the virtual mentorship garden at their discretion.

6.4.3.2 Session 2: Progress Check-ins

In Session 2, mentorship pairs have the opportunity to discuss their state and progress since the last session. The rituals in this session aim to encourage continuous engagement between mentors and mentees. We designed them according to feedback from the focus groups, as well as prior work suggesting that structured sessions that build on previous ones can strengthen mentorship relationships [68]. The garden starts in the same state that users left it, with users' seedling and custom objects from the previous session, enabling a persistent VE for users to reference their prior meetings and continue to build and make their own. Users will also see new objects on their garden shelf, prompting new conversations about their experiences and goal progress since the last time they met.

Use Your Custom Items at Will

This first ritual in Session 2 builds on Session 1's Decorate Your Garden ritual, where pairs can continue to share about themselves and personalize the space to build their relationship with each other [24]. Users will have new custom objects, which they can request in the same way as they did for Session 1, and place wherever they would like at any point.

Tend to Mentee's Mood Flowers

We designed this ritual to encourage check-ins about emotions, as discussing emotions related to work as part of workplace mentorship can facilitate well-being [156]. Furthermore, participants in the design focus groups desired such support in mentorship, including discussing topics such as "mental health...it's not something we talk about in the office." Drawing from HCI research suggesting the use of visual objects to communicate emotions [169], and prior HCI work on effective visual metaphors [261], we use colors as symbols for moods that could be flexibly interpreted. Prior to entering the environment in Session 2, the mentee can asynchronously input their mood through the chatbot. The chatbot prompts them to select colors that represent their moods in the days between the current and last mentoring session. The garden uses this input to spawn watering cans of the same colors on the shelf. Pairs can use these watering cans to water the flowers they planted in Session 1, and subsequently color them with the mentee's mood colors. This feature encourages pairs to discuss the mentee's color choices to understand the mentees' emotions over time since their last session. For the purposes of the prototype, we designed the ritual to hold mood colors for five work days, assuming one work week between mentoring sessions.

Tend to Your Seedling

This ritual aims to spur meaningful engagement with mentorship progress. The design focus groups emphasized a need for long-term continuity in their relationships, wanting to address goals without spending too much time recounting prior conversations. Drawing from prior work, we use artifacts to represent the history of their professional relationship, which can also help



Figure 6.3: (a) The chatbot collects input about the pair's progress since their first session. (b) The pair waters the mentee's mood flowers to reflect the color that best represented how the mentee was feeling over time since Session 1. (c) The pair completes their watering can topics and tasks, and their mentorship seedling has already grown as tall as it can in the prototype. When they nurture it further, it glows to show that they are continuing to grow their mentorship.

form positive connection [266]. Mentorship Garden uses the seedling planted in Session 1 as an informative artifact, saving the state of the seedling's growth for reference and further interaction in following sessions, and structuring the time with a focused check-in based on the seedling's state. Between sessions, the chatbot prompts users about any progress on the shared goals they discussed in Session 1 (Figure 6.3a). The chatbot also collects up to two new topics or tasks users want to go over during this session, which appear on the new topic watering cans that spawn on the next level of the shelf. We include a third watering can labeled "expectations check-in," to encourage pairs to explicitly communicate and align while in their Mentorship Garden. Each time they cover a topic or complete a task on the watering cans and water their seedling, the plant grows to reflect their mentorship progress. For the purposes of this research, we limited the growth of the plant to four stages. Pairs can continue watering the plant after it's fully grown; while it will no longer grow, it will sparkle with a particles effect to indicate that they are continuing to nurture it.

Open Time and Closing Time

These rituals are the same as in Session 1, giving time for users to use the space as desired and reminding them that their meeting is almost over.

Table 6.1: Participant Table. * indicates individual also participated in design focus groups.

Pair	Mentee (level)	Mentor (level)	Mentorship Background
1	P1a (mid)	P1b (senior)	Not yet engaged in mentorship, paired per request and by level
2	P2a (junior)	P2b (mid)	Prior informal mentorship relationship, bidirectional
3	P3a (mid)	P3b (senior)	Prior mentorship relationship, carried over after mentee's role change
4	P4a* (mid)	P4b (mid)	Prior mentorship relationship, carried over after initial mentorship program's end
5	P5a (junior)	P5b* (mid)	Prior mentorship relationship, carried over mentee's role changes
6	P6a (mid)	P6b* (mid)	Prior mentorship relationship, includes shadowing
7	P7a (junior)	P7b (mid)	Prior mentorship relationship, guiding the mentee with work and interpersonal goals
8	P8a (junior)	P8b (mid)	Prior informal mentorship relationship, akin to a new-hire buddy
9	P9a (mid)	P9b (senior)	Prior but relatively new sponsorship relationship, getting to know about each other's work
10	P10a (mid)	P10b (mid)	Prior mentorship relationship, carried over with mentee's role change

6.5 Methods

To evaluate Mentorship Garden, we ran a field study at JPMorganChase, with 10 mentoring pairs who used the prototype for two mentoring sessions each.

6.5.1 Participants

We recruited people who had participated in internal DEI mentorship programs, inviting them to join as a mentor or mentee with a mentoring partner of their choice. We also recruited from our prior focus group participants; three participants joined the study with partners who had not been part of the focus groups. Two participants did not have a mentoring partner; therefore, we paired them up at their request to start a new mentoring relationship. We recruited 10 mentoring pairs, or 20 total participants. Pair mentorship relationships included senior-junior and peer mentorship. Due to the institution's privacy and data policies, we report the demographics of our participants in aggregate. We recruited all participants from pre-existing groups focused on supporting historically marginalized employees, some of which were identity-based and some which also included allies. This included ERGs, DEI programs, and DEI mentoring programs. We only report individual-level demographics that were self-reported during semi-structured interviews (detailed below). Participants included 4 people who were within the 20-30 age range, 6 in the 30-40 range, 6 in the 40-50 range, and 4 who were 50+. We had 13 female participants and 7 male participants. 3 participants identified as Hispanic or Latino, 6 as Black or African American, and 10 as White. Of these participants, 1 participant also identified in their post-interview as a member of the LGBTQIA2S+ community. Participants joined from various locations across

the United States. Participants had different levels of seniority in the institution, including 3 senior-, 13 mid-, and 4 junior-level employees.

6.5.2 Procedures

Each mentoring pair participated in two online 1-hour research sessions on different days during their work hours. The first research session involved the rituals described in 6.4.3.1, while the second research session involved the rituals described in 6.4.3.2. Sessions were held 1 to 5 workdays apart, with smaller gaps necessitated by participants' schedules. Each session was segmented as follows:

Onboarding Phase (15 mins)

Research sessions opened with a research team member facilitating technical setup with participants. Then participants were asked to answer questions from the chatbot, which would update the content of their Mentorship Garden accordingly. Then, they were introduced to Mentorship Garden and its rituals before entering the prototype via web browser.

Interaction Phase (30 mins)

We designed the prototype for 30 minute meetings during the workday to reflect participants' typical work mentorship meetings. Because mentorship meetings may include discussion of private and sensitive topics [43], we did not record audio so that participants could feel free to discuss any topic during their meetings. During both sessions, a research team member joined the participants in the prototype (without a webcam tile so that they appeared invisible) and facilitated as needed via audio, i.e., answering questions or resolving technical issues. The research team member also observed pairs in real-time in Mentorship Garden, noting salient interactions. The observations informed possible questions for the next phase, i.e., post-session interviews (e.g., the research team member observed that a mentorship pair moved their custom objects while laughing, which we later asked about during interviews. Participants shared how they enjoyed "goofing around" together in the VE, even if they were still at work. This in turn informed our results, such as themes around play).

Interview Phase (15 mins)

Finally, we conducted post-session interviews with mentors and mentees in separate video calls, which we audio recorded for analysis. We asked participants about their experiences in the prototype, their thoughts about the rituals and metaphor of the garden for mentorship, as well as how they envisioned using technology like the prototype in the workplace for mentorship and other potential uses. We also asked about their thoughts on how the prototype or similar technology could support historically marginalized employees in the workplace given their personal experiences with technology, DEI in the workplace, and ERGs. The protocols for the interviews after each of the sessions differed only in terms of which rituals were discussed (i.e., rituals present in only the first session were not discussed in interviews for the second session).

Throughout the study, we iteratively refined the usability of the prototype based on observations during the Interaction Phases and feedback that participants shared in Interview Phases to

reduce technical hangups.

6.5.3 Data Analysis

We conducted reflexive thematic analysis [46] of our post-interview data. To do this, we reviewed salient quotes (from manual transcriptions of audio recordings) of post-interviews, and generated a set of code categories (e.g., "transforming work meetings"). We iteratively coded transcripts according to these categories, discussing frequently to ensure alignment on the codes. We then used affinity diagramming and open discussion to inform themes and their definitions based on the participant quotes. We conducted this affinity diagramming and open discussion several times during data analysis to refine our themes and insights.

6.6 Results

Our findings demonstrate that the design of the Mentorship Garden supported mentorship in the workplace. The metaphor of the garden and its rituals helped provide a visual grounding for participants' mentorship relationship and conversations, when participants were not distracted by its mechanics. Mentorship Garden also fostered new kinds of work interactions, including more opportunities to bond and connect with each other. Participants described some concerns about how to integrate such a prototype in the workplace, but ultimately perceived it as a counterspace that centers the well-being and professional development of marginalized individuals [232], existing as a comforting environment distinct from their typical work settings. Finally, participants imagined the potential for this counterspace to be used in workplace communities focused on historically marginalized identities. We describe these themes in detail below.

6.6.1 Effects of Visual Metaphors on Mentorship

Our prototype used the visual metaphor of a garden to leverage connotations of nurturing practices and healthy growth. We designed mentorship rituals to match the underlying garden metaphor, so that across conversations and interactions, participants' mentorship interactions in the garden could feel cohesive. As many participants shared, the design of the environment and its rituals had the intended effect of supporting pairs' mentorships in the workplace. At the same time, some participants had difficulties relating to the visual metaphor or felt it was distracting.

6.6.1.1 Visually Grounding Mentorship Relationships

Overall, participants felt the visual metaphor of the garden and their interactions with it through the rituals helped ground their relationship with each other. In particular, the Tending to Your Seedling ritual in Session 2 became a way to embed pairs' mentorship relationships and progress in the VE. After planting a seed of shared purpose together in Session 1, participants returned to their Mentorship Gardens to continue to work towards that goal, virtually and symbolically watering their seed as they progressed. Participants shared that planting, watering,

and growing a seed into a plant reflected the work they did together as well as their relationship with each other.

Pair 3, for example, felt that the large, lush plant they had at the end of Session 2 was a good representation of their progress on their shared mentorship purpose, and a reminder to maintain their relationship. Pair 3's relationship had shifted from manager-direct report to mentor-mentee in the past year, after P3a changed teams. P3a appreciated visualizing this shift through their garden:

> "Tending to my tree or plant makes me think about how [my mentor] and I... need to care for this relationship, just like I'm caring for and growing this tree...I've worked with [my mentor] for about a year now...our relationship has changed...it's blossomed and bloomed...it's really grown...it was a really good representation of how our relationship and mentorship has grown in the last year." - P3a

Aligned with prior work, nurturing and maintaining a professional mentoring relationship in this way can cultivate belonging, persistence and success of marginalized people in the workplace [332]. As participants shared, the visual metaphor helped frame the mentorship sessions as not just individual meetings, but the effortful growth of a professional relationship over time.

Custom items in the VE also served to visually ground self-disclosure during mentorship sessions, as designed. Self-disclosure is a key aspect of building relationships [24, 238]. Participants disclosed about themselves by requesting custom objects for the VE that they liked or were of personal relevance to them, to express their identity to each other.

For example, Pair 4 had been in a mentorship relationship with each other for almost a year. Despite the length of their relationship, the items they requested allowed them to learn new things about each other:

> "[My mentor] is a chess player. I actually didn't know that [before the session]...I play chess too...they pick[ed] a chessboard [for their custom item], so already, from before we even have a conversation, because we pick those things...it gives you some insight into that individual." - P4a

Building rapport by sharing about oneself can signal commitment and interest in the mentee's professional *and* personal development [72]. For historically marginalized individuals, welcoming non-work topics into mentoring sessions can create a sense of connection that contributes to quality mentorship experiences and, subsequently, retention of employees [286, 321].

As described above, choosing custom items for the VE led to new discoveries that facilitated holistic rapport, even in a long-established mentorship relationship. Thus, by visually representing mentorship progress over time and providing a lightweight means to self-disclose, the Mentorship Garden could provide a layer of personal connection for grounding and strengthening relationships.

6.6.1.2 Facilitating Important Mentorship Conversations

We designed most of the rituals in the Garden to kickoff key mentorship conversations, informed by the experiences of participants from our focus groups. The Build a Retaining Wall Together ritual aimed to do this by highlighting participants' mentorship values on the stones that they used to build their garden wall. Participants' responses showed that the ritual indeed facilitated pairs to explicitly communicate and align their desires and expectations for the mentorship.

P5b had been a mentor for P5a for over a year, usually working with their mentee on preparing them for new roles. They described how they used the stones in the ritual as a focal point for their mentorship session that helped align their goals:

> "I really like [the stones] because you're setting a foundation...'these are things that I value and I want to make sure that we work on'...you can set that foundation of what our goals are versus what your mentee's goals are so that you can make sure that they're aligned." - P5b

Similarly, we designed the Tend to the Mentee's Mood Flowers ritual to facilitate dialogue about the mentee's feelings in between mentorship sessions, where pairs could water the mentee's mood flowers to see color representations of their mood. This encouraged social support, where mentees could open up about their struggles and seek help when needed.

P2a, for instance, appreciated the opportunity to talk about their feelings when they normally would not have. They described having a long-term, informal mentorship with P2b, akin to a peer mentorship in it's bidirectionality. P2a reflected on the five mood flowers they watered with P2b:

> "Being able to choose the colors to represent the [mentee's] moods to discuss the flow from day to day instead of just a general topic really helps open up and build a mentorship relationship because normally you wouldn't talk about your feelings day to day, it would just be like 'I'm having this issue' but the feelings can drive out issues that you might not realize are going on." - P2a

Taken together, the Mentorship Garden rituals provided structure for important conversations, including those to help pairs ensure they were aligned on their values, as well as dedicated time and space to speak about emotional well-being as a norm. Moreover, creating an intentional, safe space for mentees to express their feelings is important for marginalized individuals, who experience micro- and macro-aggressions both in and outside of the workplace [286]. Mentorship Garden provided opportunities to engage in deeper conversation and recognition of issues at work.

6.6.1.3 Detracting from Mentorship Practices

Though most participants appreciated the visual metaphor of the garden, a few participants felt they were too on-the-nose and struggled to connect with them as part of their mentorship

practices.

This was P1b's experience as the the mentor in Pair 1. Unlike all other pairs, Pair 1 had no prior relationship with each other and had asked to be paired with someone new. Thus, Pair 1's mentorship interactions were fully remote and contained within their 2 sessions in their Mentorship Garden. P1b reflected on how the rituals may be too childish for them to use for establishing mentorship:

> "It's neat and creative...but probably a little cheesy...the concept of it and what you're trying to relay from an interpretation standpoint, I get it...my kids would think it's cool...but for me, I don't know I get a lot out of that." - P1b

On the other hand, participants like P2a shared, "I like the ritualistic part of it...I think some people might see this as cheesy. I like cheesy." Participants thus had divergent opinions on how to to engage with mentorship rituals in 3D VEs.

For some, the VE was less helpful and more distracting. While this in part is due to early interaction controls that we iteratively improved upon during testing, some participants felt that interacting with the rituals in general affected their existing mentorship practices. As detailed in the previous section, P2a found the mood flower ritual supportive of mentorship; however, their mentor felt differently:

> "Honestly, when [the ritual] stopped working [could not finish watering flowers], it was like 'okay, cool, let's just forget about everything else' and that's when we actually started talking, and it was less about like the simulation and more about just actually talking and engaging." - P2b

These instances of distraction, particularly due to having to perform actions to complete rituals to progress through the mentorship session, highlights the importance of different mentorship preferences and styles that need to be considered when designing virtual mentorship environments.

6.6.2 New Kinds of Work Interactions

In addition to supporting existing conversation-focused mentorship practices, Mentorship Garden fostered new types of interactions between pairs in the workplace. This was in part due to the novelty of engaging in a 3D VE at work, where many participants had "never experienced anything like it" (P8a). The design of Mentorship Garden created opportunities for participants to interact differently, as well as helped them imagine new ways to collaborate using 3D VEs. However, participants also considered what it would mean to integrate these novel interactions into the workplace, given existing tools and preferences.

6.6.2.1 Expanding the Bounds of Workplace Interactions

Building, decorating, planting, and watering objects in the Mentorship Garden together in real-time helped pairs experience new kinds of collaboration in the workplace. These rituals added a layer of shared focused interaction that offered a change of pace in typical work days that involve "being on [video conferencing] meetings all day long" (P2a).

This was the case for Pair 6, a mentorship relationship involving the mentee (P6a) "shadowing" their mentor (P6b) as a new hire on their team. Their mentorship meetings typically take place remotely over [video call]. As a relatively early mentorship relationship, this pair enjoyed the ability to connect in new ways:

> "I've been in a mentor-mentee situation before and it would help rather than just talking about what you can do for your mentee or how they can help you teach them or make them feel comfortable, [the prototype is] a good way for them to do it as a hands-on experience." - P6b
>
> "[The experience in the garden was] more intimate... you're doing a little bit more bonding as opposed to just sitting there and talking to someone on [video call]..." - P6a

Participants also envisioned their own custom rituals for their Mentorship Gardens that could further expand how they connect. For example, P7b, the mentor in Pair 7, used their Mentorship Garden as a space to express gratitude before the holidays. Based on their experiences, P7b imagined a ritual for recognizing people and their work:

> "Recognition is really powerful...I want to take a moment to reward her and recognize her for the work that's done...like 'I see you, and I see the work that you've done, and great job'." - P7b

P9a, the mentee of Pair 9, proposed rituals that could support new interactions around career development. Pair 9 is a sponsorship relationship; as P9a describes, the sponsor is an "advocate...someone who's going to have your back at the end of the day [when] there's a decision to be made." To demonstrate their professional development to their sponsor, P9a imagined an environment akin to *Farmville*, focused more on programs and projects and featuring a final presentation:

> "Each of these projects represents a sort of plantation...you can have different kind of farm animals that represent your [professional] spirit and your experience, your excitement about these [projects]...it makes it playful and engaging...really showcase your world and your growth through this project...like 'this is a farm built on top of the work that I've done over the past two years with my sponsor'." - P9a

Like P7b and P9a, participants were eager to use their VEs for mentorship and new forms of workplace interactions. Not only did participants experience a new way to collaborate in their Mentorship Gardens, they also rapidly proposed additional formats to connect and communicate with each other in 3D VEs in the workplace. The spaces and rituals they described

(e.g., celebrating each other's work, showcasing personal/professional development over time) demonstrate their desire for VEs to simultaneously support professional utility (e.g., learning in an interactive setting vs a video call) and more personal connection (e.g., feeling closer despite being remote). Both of these aspects can inform quality guidance built from positive relationships, in which marginalized mentees can feel seen, heard, and supported [45, 72, 286, 321]. Mentorship Garden could thus help expand how people interact with and uplift each other at work.

6.6.2.2 Integrating with the Workplace

Participants noted that video conferencing dominates the workplace, and that tools for mentorship may already exist. While they recognized the value and potential of introducing 3D VEs for mentorship, they also considered what it may take for employees to adopt the technology, even just as an option.

First, though participants described benefits to using interactive VEs over "the monotony of just sitting in a room or staring at someone on [a video call]" (P2a), they also pointed out that structure and guidance may be necessary to ensure that they stay on task. If they are unable to accomplish their mentorship goals, an experience like the Mentorship Garden may lose its value compared to existing meeting platforms:

> "If you just went into that room without a structured plan... it would really be more of a distraction and learning curve than using the time to talk to someone in a [video call]." - P1b

Participants also wished for additional features that they typically use in their mentorship meetings, such as screen-sharing and taking notes. They highlighted how these features would be useful not only to help users keep track of their activities and discussions, but also to support task-oriented discussions. P10a, a seasoned mentor with several mentees, shared:

> "[We mentor to] help them improve performance...help them understand where their metrics stand... So screen sharing is important. Note taking is important. Being able to work on any content you want to work on is also important." - P10a

Finally, due to the low-poly appearance of the virtual environment and the manipulation of 3D objects in the web-browser, many participants viewed the prototype as similar to a game, likening it to *Minecraft* or *Roblox*. While some found this delightful, others cautioned that games may be difficult to integrate in the workplace. Mentee and mentor participants across all generations in our sample pointed to age as an important factor for this. P4a brought up further concerns around individual experience, background, and preferences around game-like environments:

> "I've been [with the institution] 26 years...I've noticed in some of our mandatory training is that they've introduced some gaming elements... it's just kind of fun to me, but I think if people aren't necessarily geared that way I don't know if they'll come back to it." - P4a

At the same time, P4a shared that the design of the prototype could also create the opportunity to act as a bridge connecting different generations in the workplace:

> "If people are thinking about 'well how do I bridge the gap of connecting more senior people with more junior people'...would this help with that? Possibly it would, because the people we're targeting to mentor, to apply mentorship to, that might catch their attention." - P4a

Participants recognized the added value of mentorship interactions in a 3D VE. However, they highlighted existing tools and features that set standards and expectations for what should be included in virtual mentorship spaces in the workplace. Still, participants felt integrating virtual mentorship counterspaces in the workplace could be beneficial, e.g., bridging connections between senior and junior employees.

6.6.3 Mentorship Garden as a Workplace Counterspace

Despite concerns around how to integrate 3D VEs at work, participants' experiences suggest that the Mentorship Garden functioned as a counterspace [232], purposefully distinct from typical work settings. In corporate settings, employees (especially members of historically marginalized groups) can experience high stress and pressure to perform, which can negatively affect their well-being [168]. In contrast, participants felt their Mentorship Gardens were spaces of comfort and play at work, as if they were in an alternate reality from their usual work setting.

6.6.3.1 Feelings of Comfort in the Mentorship Garden

The design of the 3D VE and its contents set a positive tone and atmosphere for participants. "Little touches" like ambient noise, surrounding clouds, and the ornamental objects in the environment encouraged a sense of comfort and ease. P5a highlighted how the Mentorship Garden felt distinct from their typical work environment, and how they felt so at ease through its design that they would also want to have their performance reviews with their supervisor in the space, which is typically a stressful conversation. P5a shared:

> "It's work related, but in a relaxing place...I would love to have my sessions with my manager [here]...you leave the whole conversation and mentorship session so positive, so relaxing...to me it changes the whole thing." - P5a

Participants also felt the rituals matched the relaxing atmosphere of the environment, while balancing the need to stay focused and productive. For instance, the Closing Time ritual, which gently alerted participants when their meeting was almost over with background music, contributed to pairs' comfort while still helping them keep time. P3a described how the ritual did not rush them nor break the positive atmosphere of their Mentorship Garden:

> "It was just subtle...it wasn't like a gong...or a buzzer... we're like, 'oh, yeah, this is our cue. We've got to go back'...it wasn't alarming or overwhelming...it's soothing." - P3a

Additionally, the rituals as well as the environment were conducive to more comfortable communication that was still situated within the context of the workplace. While we designed the prototype with a focused area centered on the garden rituals, participants were free to move around other parts of the environment. The prototype encouraged them to explore, where they could flexibly pass through the ground or fly through the air, and not be locked into viewing the webcam tiles of their counterparts. For some participants, this provided a less rigid experience of communicating with someone they were virtually co-located with. P9b spent most of the mentorship session flying through the air and heading off in different directions to explore. They enjoyed being able to freely view the space, rather than only their sponsee (P9a):

> "I couldn't really see [my sponsee]...normally you see the person...I felt that you could have even a more open dialogue because there's that extra layer. You just don't really see the person but you have this peaceful nature around you and it just makes you feel very safe and very open to have a dialogue."

Our prototype design fostered a sense of calm, safety, and space for both open expression and exploration. Providing this space is especially important in mentoring for marginalized individuals, where they can intentionally have sensitive, complex dialogues around intersectional identities and their marginalized experience [200]. Mentorship Garden began to do so for our participants by making room for open and vulnerable communication.

6.6.3.2 An Alternate Reality from Typical Workdays

Although the Mentorship Garden was contained in a web browser window, which participants accessed during their typical work hours, participants felt they entered a place distinct from work, yet still part of their workplace. The "little touches" previously described, all contributed to an atmosphere that was in strong contrast to corporate office spaces, and helped immerse participants in an alternate reality:

> "[This] virtual reality[2], it works with the brain...you are really believing that you're growing [your mentorship garden], it makes you have that feeling...you're experiencing something different." - P17

Participants appreciated this change in environment as they shifted from their typical workday activities to a mentorship meeting. This was especially the case for people who typically held their meetings over video calls, such as P2a and P2b. P2a recalled:

> "It was a nice breath of fresh air and took you out of that meeting mindset and got you comfortable in a different environment, almost like you were in an office and you went for a walk for your mentorship...I would do that again over [a video call] any day." - P2a

[2]Some participants referred to the prototype as a web-based virtual reality, even though it did not use virtual reality headsets.

Furthermore, some participants noted how being transported to a comforting space in the context of work, yet apart from their work environment, encouraged more open engagement. P5b compared their Mentorship Garden to their typical work environment in the physical reality of their office, where they usually met their mentee:

> "We're not so used to being outside and hearing things other than other [coworkers] taking calls or hearing people walk by, by having that more natural feel by being out in nature, you hear the birds, you see the sun...you're in a different space...you're more likely to open up because you're focused on the nature side of the setting you're in, versus that cold office space." - P5b

Participants felt immersed in a space set apart from their physical environment, a place where they could see their coworkers and themselves communicating differently in the workplace with a sense of openness. This aligns with prior research on workplace environments and their positive effects on employees' performance and experiences, where relaxing environments for collaboration are key to commitment [346]. Research shows that even brief exposure to nature [269], e.g., a garden [299], can improve employee well-being and reduce stress, even virtually [225]. These effects could be especially impactful for marginalized communities, as they typically endure compounded stress daily [222, 344].

6.6.3.3 Playfulness in the Mentorship Garden

Throughout our study, we observed many instances of play between mentorship pairs. Custom items and the ability to defy laws of physics in the environment enabled this, especially during the Open Time ritual, where pairs could "do whatever they wanted." Moreover, participants engaged in play even in moments of breakdown, where the prototype was not functioning as expected or where participants got random custom items (either due to not requesting any, or the research team being unable to find objects they requested). As detailed earlier, the sense of comfort, ease, and openness in the prototype made room for play.

This was especially salient to P3b. Since this pair did not make custom item requests, we provided 3D objects that might fit the outdoors environment, such as a lowpoly dog. Though Pair 3 did not request the dog, they spent their Open Time moving it around and discussing it, thinking it was a pig. This unexpected addition created a moment of play:

> "It's actually not a bad thing sometimes...to throw pieces in there that have absolutely nothing to do with it...[my mentee was] like, 'Let's name the pig,' and I think it drives conversation around the randomness of that. And [it] could lead back to good conversation around, why do you think that thing is here? ... I don't think it should all be so scripted. Sometimes just throwing it off like that is a good idea." - P3b

Similarly, Pair 4 engaged in play at a moment when the prototype did not function as expected. They ran into a technical bug when trying to complete the Tend to the Mentee's Mood Flowers ritual. As the research team facilitator troubleshooted the prototype in real-time, Pair 4 played with the custom items in their garden. P4b recalled://

> "We just were kind of goofing off and it was kind of a free 'Hey, checkout my BMW' and 'Look, I can move it over my pizza' and it was a way to relate to the other person in just a human, fun way...we kind of made up our own little 'Hey, let's do it this way' type thing." - P4b

These participants found moments of play in the prototype valuable for their professional mentorship sessions. This notion is reflected in research, where play can support how employees can adapt to change and uncertainty [41], their inspiration, innovation, and well-being [163], their work performance and self-efficacy [194], and collaboration, flexibility and creativity [178]. Play also has a history of positively impacting historically marginalized groups, including through theatre [239], poetry and dance [152], and digital play [338]. In Mentorship Garden, pairs were able to experience an intersection of play and professional practice, finding new ways to enjoy their time together at work.

6.6.4 Supporting Workplace Communities

Recognizing the Mentorship Garden's counterspace qualities, participants imagined how the VE could foster workplace communities for those who are historically marginalized. This included using the prototype as a way to balance power amongst mentors and mentees, as well as foster openness to difficult but important conversations about DEI in the workplace, and cultivate allyship. Furthermore, participants highlighted the opportunity for identity expression within historically marginalized communities through customization.

6.6.4.1 Balancing Power while Learning to Work in a VE Together

As the Mentorship Garden helped create distinct places from participants' typical work environment, some participants imagined the potential for these places to level out power imbalances in the workplace. The physical reality of work environments includes systems and implicit norms that privilege certain groups above others [334]. The design of Mentorship Garden thus provides a new setting that can minimize if not do away with that power imbalance, as both mentor and mentee need to learn to navigate that setting together. P2b reflected:

> "[The prototype] strips away the environmental aspects [of the workplace] and creates a shared area that both of you have literally no clue on. It's a brand new world. It just makes it base level." - P2b

This result builds upon prior research, which shows that VEs like *Second Life* can mitigate power imbalances (in their case, through the relative anonymity of avatars) [73]. Similarly, simply interacting in Mentorship Garden can mitigate perceptions of power between mentorship pairs because they are both new to and learning together in the VE. As historically marginalized individuals in the workplace are especially vulnerable to negative effects of power imbalances [155, 190, 201, 211, 244], the design of our prototype demonstrates the potential to nurture their well-being at work through a shared learning experience.

6.6.4.2 Facilitating Important Difficult Conversations at Work

Just as some participants felt the prototype could function as a good icebreaker and conversation starter, P1a imagined similar use for supporting historically marginalized communities in the workplace, especially in the context of Employee Resource Groups (ERGs). P1a described their experience learning as an ally, as ERGs helped them better understand the experiences of other historically marginalized individuals at work. They highlighted that conversations around DEI at work are often difficult, but that the Mentorship Garden could help facilitate those difficult conversations. P1a reflected:

> "[In the past I learned about situations] that I would have never imagined people feeling uncomfortable in...I'm a white woman, there are certain things that, just innately, everybody has different experiences...[using the prototype and rituals] you could have the different rocks be about examples of when you felt vulnerable, or when you felt uncomfortable...so it'd be the opening of the conversation...the interactivity to get people to open up is what VR can really bring to the table that you don't get always in just a regular conversation..." - P1a

P1a also recognized the importance of consent and agency when historically marginalized communities share about their lived experiences in any space. Rather than making individuals objects of another group's learning, they imagined how the VE (which they viewed as akin to VR due to their sense of immersion) could protect their privacy, personhood, and provide space for expression.

> "When you click [on the rocks] maybe it's a video of someone opening up about their example. And that would be like we're all watching it together and then 'okay now let's talk about that'...it could be almost anonymous too if you didn't feel really comfortable...you could [configure] it where you could feel safe being a part of that conversation." - P1a

Along the same lines, P4a envisioned how conversations like this in the prototype could cultivate allyship. P4a imagined virtual counterspace like our prototype facilitating allies learning about the experiences of historically marginalized groups, and how to better support them:

> "[Using 3D VEs] with the hope that allies walk away with a slightly better understanding of people that don't look like them or people that aren't in their position...and then maybe the people that we're trying to make sure that we elevate, get some additional insight into [how allies] can help in some way...it's definitely a two-way street."

Participants felt the VE could facilitate new ways to understand their coworkers, while also protecting marginalized individuals who vulnerably and bravely share about their own experiences. They imagined Mentorship Garden could serve ERGs which already celebrate marginalized communities, and cultivate allyships without identifying individuals as props for others' learning.

6.6.4.3 Identity Expression in the Workplace through Customizability

Throughout our study, participants interacted in a 3D VE via webcam tiles, which they could move around the space. Though this enabled participants to see each other's faces and facial expressions directly, many participants wished to have the option of 3D avatars. Aligned with prior work on the experience of queer people in social VR [103], P5b shared how customized 3D avatars in the workplace might provide space for historically marginalized individuals' identity expression:

> "I'm [involved in the LGBTQIA2S+ ERG leadership], and I definitely feel something like this would be really beneficial, especially if you're having a mentorship with someone [who is] transgender or non-binary, being able to choose an avatar that is more closely matched to who they are, they would be more comfortable with themselves and be able to open up to you about their experiences." - P5b

Participants further highlighted the importance of being able to express identity through the rituals and the environment. Participants proposed several alternative metaphors to symbolize mentorship in the workplace, such as building a house, working on a car, or doing activities on a beach or in the mountains together. They explained how the experience needs to be relatable, or otherwise can become restricting instead of supportive. For example, P4b shared:

> "I'm not a garden person...I'm not saying there needs to a be a female and a male version or anything like that, but if there's something gender neutral that everybody can identify with, it would be nice." - P4b

Participants described how the environment could also change according to community needs. P6b noted how each ERG has specific identities and cultures that could be reflected in the space, to help make it theirs. As ERGs typically have members who are distributed, this could subsequently help them establish their own space that they can return to:

> "I am a member of the [Hispanic and Latino ERG group] and so I think...maybe tweaking it to that specific ERG, for example, we just celebrated Dia de los Muertos so having that type of environment to tailor to that, or to the [Black Leadership ERG group] like different colors, different schemes...would be more appealing to those...groups to make them feel like they actually would want to try to use it because it's something new, it's something different, but it's also tailored to them and their specific [ERG]." - P6b

Participants viewed their Mentorship Gardens as sites for potential customizability to make way for various forms of identity expression in the workplace. This included avatars as mediums of personal expression for marginalized groups, options for more relatable environments, and the ability for people to reflect their culture and other things important to them in the space. This aligns with prior HCI and CSCW work, which suggests the need for online counterspaces to meaningfully engage marginalized individuals with their intersectional identities while connecting with others [79, 80, 81, 113]. Mentorship Garden could thus provide a space for meaningful

marginalized identity expression, with pairs imagining further customized environments and rituals.

6.7 Discussion

Our results suggest how the design of Mentorship Garden can support mentorship for marginalized individuals in the workplace. At the same time, our participants imagined how its benefits could extend to all employees. This aligns with prior work in HCI, which shows that long-term professional mentorship uplifts not only marginalized people, but also everyone in the workplace by challenging oppressive patterns [130]. We discuss opportunities for further research on virtual mentorship counterspaces for marginalized individuals – which can benefit people in the workplace in general.

6.7.1 Balancing Form & Function: Play and Distraction in Mentorship and the Workplace

Our results indicate that Mentorship Garden and its rituals structured mentorship in the workplace, but could also potentially distract from mentorship practices. Though many participants enjoyed structure and play through the rituals, some struggled to follow the rituals and instead fixated on exploring or arranging objects rather than conversing. Participants' views of play also differed: some liked the contrast with typical work activities while others felt it might not be appropriate in serious work settings. Based on prior research (including from CSCW), we argue that play has an important place at work, where social playfulness and gamification can support inspiration, innovation, creativity, self-efficacy, work performance, collaboration, learning, and well-being [41, 163, 178, 194, 301]. These are especially important for historically marginalized individuals, who face barriers in work and compounded stress due to oppressive systems across all contexts [222, 344]. The value of play alongside the tension we observed suggests the need to balance the form and function of mentorship VEs in the workplace, so that it can provide delight without running the risk of being distracting or seeming unprofessional.

One approach to balanced play could be providing more options for rituals that can adjust to differing mentoring styles. The play in Mentorship Garden primarily focused on conversation-oriented mentorship, encouraging conversation around important topics and preserving visual metaphors of progress. In practice, mentorship approaches extend beyond conversation as needed, e.g., applying learning-by-doing for key skills and tasks to uplift marginalized mentees [166]. Moreover, prior research suggests that mentors should develop individual-focused strategies to bolster the emotional well-being of their historically marginalized mentees, which would be a deeply personal and complex process unique to each relationship [286]. Thus, it is important to design VEs that are not overly prescriptive and/or distracting, but can still foster valuable experiences for historically marginalized mentees (e.g., normalizing discussing emotions related to work). This might entail building customization options for metaphors that are personally meaningful or selection of rituals they find useful.

Additionally, briefer interactions, rather than multi-step rituals, could minimize distraction, while giving users the time to explore freely. Researchers might consider prior HCI work on lightweight, playful interventions in the workplace, such as digital sensors in physical space to promote group creativity [316], and "talking" seats in office environments to foster a playful and creative atmosphere [226]. From prior work in CSCW, *Mood Squeezer* engaged an entire building of employees without becoming an inconvenient distraction. Employees squeezed a colored ball to indicate their mood as they passed through a common area, and their input affected an ambient light display of the building's collective moods. This interaction took only a few seconds and still brought delight and greater feelings of connection to others in the building [109].

Inspired by the brevity of *Mood Squeezer*, mentorship counterspace design might offload manual interactions to features like our chatbot, which could automatically make changes in the environment. For example, for a mood-oriented ritual, rather than requiring users to interact with mood directly (i.e., by watering a mood flower as in Mentorship Garden), the system can nudge pairs to talk about the mentee's mood simply by changing the color of objects or the environment as a whole based on any input into the chatbot. This content could be further blended into the environment as a more subtle cue, such as a mood stone path that users could walk through, thus virtually and metaphorically walking through mentees' feelings. These nudges could facilitate important conversations without requiring more action from pairs for those who find rituals distracting. Less ritualistic options for facilitating mentorship in the workplace could also offset cheesiness due to their greater subtley. Future work should explore balance between the interactivity of rituals and the brevity of nudges to integrate different mentorship styles and needs in 3D VEs.

6.7.2 Digging Deeper: Supporting Historically Marginalized People in the Workplace

Our results reveal opportunities for how VEs can be safe spaces for marginalized groups in the workplace as counterspaces, for mentorship and other activities. Participants imagined several possibilities, including using the space for personal expression, connection, and allyship. We discuss future directions for exploring counterspace design that provides greater agency and ownership to marginalized groups in the workplace, as well as to strengthen allyship in the workplace.

6.7.2.1 Agency & Ownership in Virtual Counterspaces for ERGs

Like prior counterspace work [331], participants highlighted the importance of marginalized group agency and ownership of VEs meant to uplift them. Participants discussed this in the context of customizing appearance and related features, such as personalized 3D avatars. Prior HCI work has shown how 3D avatar design can indeed create space for identity expression for marginalized groups [105]. Building on this work, our results suggest the need to personalize VEs as a whole to enable identity and cultural expression for marginalized groups. Shaping the virtual space that they will share with each other can empower these groups to decide what their safety and comfort looks and feels like. For example, participants imagined virtual counterspaces

for celebrating accomplishments and cultural events.

Future work could explore the potential for marginalized groups to become authors of immersive mentorship counterspaces. For example, prior CSCW work shows how marginalized groups can create counterspaces of enrichment and empowerment by authoring digital spaces, like subreddits [280]. As another digital space, the Mentorship Garden prompted participants to imagine how to customize the environment and rituals to reflect what they value and ways they wish to mutually develop their professional relationship together. Participants envisioned a more powerful chatbot that could make changes by request (akin to generating AI art) or making changes in the virtual space themselves in real-time. This suggests a need for a wide range of customization options that support diverse prior experience with manipulating 3D VEs. 3D workplace VEs like the Mentorship Garden could thus function as a sandbox for marginalized groups to shape and cultivate culture that advocates for them within the workplace context.

6.7.2.2 Virtual Counterspaces for Allyship in the Workplace

Participants felt the design of Mentorship Garden could build connection and guide important, difficult group conversations, including for cultivating allyship in the workplace. Counterspaces are often heterogeneous [232] and include allies. Related work on *Stardew Valley shows how games, conceptualized as a VE*, could support solidarity and practicing new strategies for creating and sustaining community, such as learning allyship practices [64]. Prior research on games has also shown how playful interactions can facilitate receptivity to DEI conversations and transformative learning experiences [161].

Mentorship Garden similarly demonstrates potential for game-like, 3D VEs to foster comfort and become counterspaces for workplace allyship, where playfulness could facilitate important yet hard conversations about DEI at work. Mentorship Garden can be cultivated as a space where historically marginalized groups and allies can connect. For example, it could be a platform for ERG meetings, or even exploring new cultural strategies and ways of working together that are more equitable and just. Rituals could be group activities for better understanding the experiences of historically marginalized people at work and developing strategies for allyship. Future work could explore design of additional rituals to facilitate difficult allyship conversations. This should engage with prior CSCW work on fostering critical reflection and transformative learning that acknowledges discomfort around DEI topics (e.g., engaging with decolonization despite discomfort [127]. Additionally, boundaries and balance around the intersection of marginalized individuals' personal and professional lived experiences are important. These can be defined by the preferences, needs, and nature of mentors' and mentees' professions and workplace [321], and help them navigate sharing personal testimonies and push back against oppressive systems together.

6.8 Limitations

Our study results show how 3D VEs can support mentorship in the workplace. However, there are limitations in the current work. As an initial exploration, our research aims to spark future work around research opportunities that arise from these limitations.

First, this research was conducted within one institution, albeit a large global institution with hundreds of thousands of employees. Mentorship in the workplace, especially for marginalized individuals, may be experienced differently in other workplaces. These differences may stem from differing workplace cultures and mentorship perceptions and practices, as well as cultural differences across countries (our research was conducted solely in North America).

Second, our study design focused on interaction with the prototype during two sessions, targeting relationship building and progress check-ins. Future work should explore longer-term mentorship, as mentorship relationships may change over time and require new rituals and structures. Researchers may also consider comparing the long-term use of systems like Mentorship Garden to existing mentorship programs within organizations to better understand their impact.

Third, while we recruited diverse pairs across seniority levels, the mentorship relationships we focused on were limited. All pairs except 1 had been engaging in some form of mentorship prior to participation. Prior relationships might affect the way people interact during the rituals; thus, future work should consider exploring how new or early mentorship relationships might compare. Additionally, our study focused on mentorship in pairs. Future work should explore different types of mentorship (e.g., group, peer) and how immersive VEs might adjust to accommodate them. We also faced challenges recruiting mentors higher in the organizational chart. Senior-level participants tended to have limited availability (e.g., Pair 9, for whom we were unable to schedule a second session). Thus, our results provide limited insight into how VEs like ours might apply to mentoring at the senior level, which might require considering different workdays and career goals.

Also, our study explored VEs for mentorship in the workplace accessed via web-browsers on computers. Future work could include exploring different platforms, including VR headsets, which could leverage embodied interaction, or AR devices that can integrate counterspace design and mentorship practices into the physical workplace. Their immersive nature could bolster the environment and rituals' effects on workplace mentorship perceptions, behaviors, and collaborations.

Finally, our prototype and rituals are visually-dominant experiences. Future work includes exploring different modalities for constructing VEs for more inclusive, accessible mentorship in the workplace, e.g. audio- or haptic-based interactions. We have begun further work addressing this limitation via a focus group with accessibility experts to explore how VEs can support accessible mentorship in the workplace for people with disabilities.

6.9 Conclusion

We present Mentorship Garden, a web-based 3D VE counterspace for mentorship in the workplace to uplift historically marginalized individuals. Based on findings from 3 design focus groups, we designed Mentorship Garden to be a relaxing outdoor environment for pairs to engage in rituals that guide mentorship discussions and build their relationship. We evaluated Mentorship Garden in a field study with 10 mentorship pairs who used the prototype in mentorship sessions during their workdays. Our qualitative analysis revealed that Mentorship Garden facilitated important mentorship conversations, fostered new kinds of workplace collaboration, and created mentorship counterspaces at work for employees, including workplace communities of historically marginalized people. Our findings also indicated that mentorship rituals can be potentially distracting and need to be carefully incorporated into work settings. We contribute a virtual mentorship counterspace prototype and rituals that structure mentorship, as well as insights and opportunities for further research on virtual counterspaces for empowering historically marginalized groups in the workplace via mentorship and beyond.

Chapter 7
Mobile AR for Counterspaces

So far, this work has focused on counterspaces created as places apart from the daily environments of marginalized individuals. However, counterspace research shows that they can be central places instead of peripheral. Furthermore, game design research shows that "magic circles" can (and in some cases should) be permeable. With all this in mind, my current counterspace game research has pivoted to leverage emerging technology that supports such centrality and permeability. Below, I discuss the powerful potential of a counterspace game played in mobile AR. In the context of my dissertation, this work directly informs my proposed work on a counterspace game that need not exist at the periphery.

This chapter is adapted from my paper:

Rafael M.L. Silva, Erica Principe Cruz, Daniela K. Rosner, Dayton Kelly, Andrés Monroy-Hernández, and Fannie Liu. 2022. Understanding AR Activism: An Interview Study with Creators of Augmented Reality Experiences for Social Change. In *CHI Conference on Human Factors in Computing Systems (CHI '22), April 29-May 5, 2022, New Orleans, LA, USA*. ACM, New York, NY, USA, 16 pages. https://doi.org/10.1145/3491102.3517605

Abstract

The rise of consumer augmented reality (AR) technology has opened up new possibilities for interventions intended to disrupt and subvert cultural conventions. From defacing corporate logos to erecting geofenced digital monuments, more and more people are creating AR experiences for social causes. We sought to understand this new form of activism, including why people use AR for these purposes, opportunities and challenges in using it, and how well it can support activist goals. We conducted semi-structured interviews with twenty people involved in projects that used AR for a social cause across six different countries. We found that AR can overcome physical world limitations of activism to convey immersive, multilayered narratives that aim to reveal invisible histories and perspectives. At the same time, people experienced challenges in creating, maintaining, and distributing their AR experiences to audiences. We discuss open questions and opportunities for creating AR tools and experiences for social change.

7.1 Introduction

Augmented Reality (AR) has followed an adoption pattern that resembles prior technologies, i.e., moving from the lab to the home, and onto the public realm. Most of today's information technologies were first embraced by scientists, then consumers and activists. For example, the internet and the web were initially conceived and adopted by scientists at DARPA and CERN,

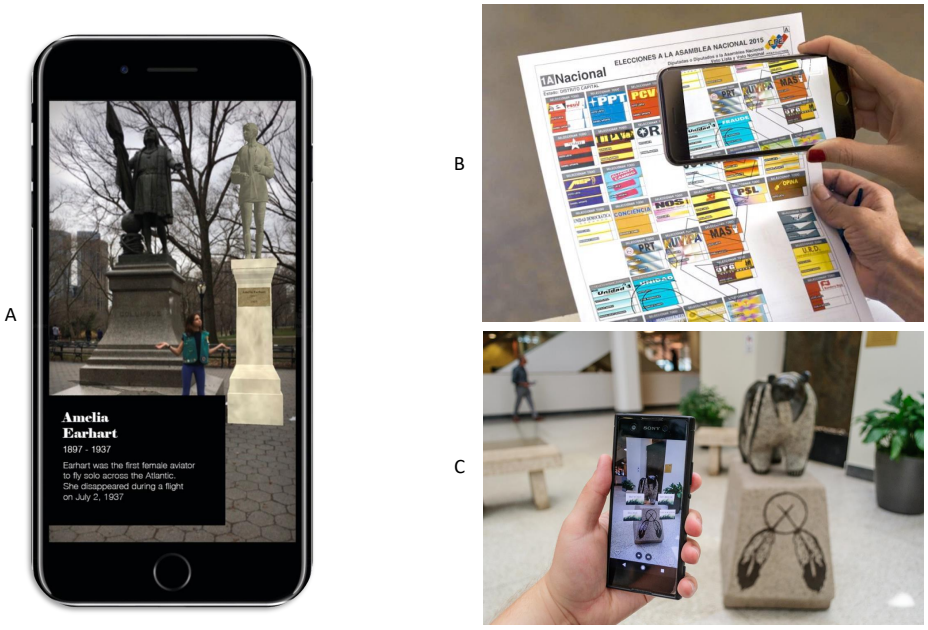


Figure 7.1: Examples of AR Activism projects: (A) Viewfinder of "Whole Story" app featuring a person standing between physical and virtual AR statues that highlight gaps in gender representation, (B) "Hack de Patria" project augmenting voting ballots to expose attempts to mislead voters, and (C) "SweetgrassAR" augmenting a symbolic sculpture with stories about Indigenous knowledge.

respectively. Decades later, ordinary people embraced these technologies for work, school, and social life. Upon reaching mass adoption, activists used them to spread political opinions and help mobilize protests, among other activities. Scholars describing this pattern of technological adoption have argued that everyday uses of technology are prerequisites to its use for activism. For example, Zuckerman [347] posited that mundane online activities, such as posting photos of cute cats on the web, help people gain fluency with the medium and subsequently enable them to use it for activism. Furthermore, they argued that these pervasive uses make censorship a politically harder calculation for authoritarian regimes.

Although still in early stages, AR has, too, grown into a platform for activism. Nearly half a century after Sutherland's 1968 AR prototypes [308], AR has become widely adopted through consumer applications like Snapchat's "filters" and location-based games like Pokémon Go. More recently, AR creators have begun using the technology for activism. For example, the "Whole Story" project (Figure 1A) created a GPS-enabled app that activates AR monuments of influential women at historical locations to address gender gap representation [252]. Similarly, the "Hack de Patria" project (Figure 1B) exposed attempts to defraud voting ballots and overlaid subversive messages over the political propaganda of the Maduro regime during the 2015 Venezuelan elections [262].

AR is particularly interesting for "activist tech" research because the technology's core fea-

tures are uniquely aligned with key activist practices. For instance, AR creators and activists are motivated by a desire to change the world and help people see it in new ways. Activists aim to alter the physical world and people's perceptions of it according to a social cause. Similarly, AR creators change the way people perceive the world by augmenting what people see and hear. Furthermore, activists are often tightly connected with the places and physical things that relate to their causes. AR experiences are likewise tightly coupled to the physical world because they rely on the environment's physical attributes to detect and augment objects, surfaces, and even plants, animals, and humans. Additionally, unlike other digital technologies, like social media or virtual reality, AR moves away from the illusion of digital dualism [159], i.e., the idea that the online world is somehow separate from the "real world." AR breaks that dualism and deeply builds on the interconnectedness of the physical and digital world. In AR, Barlow's declaration of independence for "cyberspace" becomes a fight for independence in the physical world itself, often a core goal of activists [27].

At the same time, we know little about AR activism, including what influences people's decisions to use the technology for social change, opportunities and challenges in their subsequent experiences, and their ability to achieve their activist goals. To answer these questions, we conducted 60-minute interviews with twenty people who participated in AR activism projects (with project start dates ranging from 2009-2021), based in six different countries. Our qualitative analysis of these interviews elicited the following key insights: (1) participants' **decisions** to use AR is driven by the possibility **to create rich multilayered narratives**, where they perceived **lower technical barriers and physical risks** to convey those narratives in the physical world. At the same time, their decisions were sometimes stymied by uncertainties around short- and long-term legal and ethical consequences. Furthermore, (2) participants identified **immersion** as a central means of changing people's perceptions and reshaping the world due to its potential for embodied storytelling, and **interdisciplinary collaboration** as key to achieving high quality immersive experiences. On the other hand, the AR platforms and collaborations needed to create those experiences can come with their own challenges around resource management and expertise. Lastly, (3) we found that participants' **perceptions of AR's impact** on their projects involved eliciting a strong **emotional and physical reaction** among their audiences. However, they struggled to get a broader reach due to challenges with the distribution and adoption of the technology.

We conclude with a set of open questions and opportunities around supporting multidisciplinary teams and communities for AR activism content creation, expanding activist-control by attending to maintenance and proprietary decision-making, addressing concerns around broader issues of discoverability and accountability in AR, and realizing radical transformations that support minoritarian groups.

7.2 Related Work

To set the stage for our study of AR activism and its creators, we turn to the variety of work on social and civic change that people enact with and around immersive technology. This scholarship and practice involves two central bodies of work: (1) digital design practices for activism, (2) AR-specific social and organizational change. We review these areas in the sections that follow and outline core questions they raise for our analysis.

7.2.1 Design and Digital Activism

Understanding activism and immersive technology involves comprehending the specific speculative practices and planning through which people engage with notions of social or political transformation, a topic commonly termed design activism [99]. Design activism encompasses a diverse body of work at the intersection of urban studies, social movement theory, and critical design studies [179, 202, 341]. To date, this scholarship has examined a range of phenomena around the conditions for organizing social and political change, including the influence of "counternarrative" [108], the design-specific contours of community organizing [313, 319, 326], and the importance of communal accountability and care [62, 99]. One crucial facet of this work concerns the specific forms of intervention that rely on digital platforms and services. Reviewing this literature, George and Leidner define *digital activism* as "digitally mediated social activism," where social activism includes "taking action to create social change." According to this growing body of scholarship, people engage in a range of digital activist actions at different levels of engagement. For example, "clicktivism" at the lowest level includes "liking" a social media post, while "hacktivism" at the highest "gladiatorial" level involves hacking for a social/political goal [114].

Social media, such as Twitter and Facebook, are perhaps the most explored digital media for activism. While George and Leidner suggest that social media can be used at all levels of engagement [114], a number of HCI researchers have highlighted their ability to coordinate and broadcast messages. By quickly disseminating information to a large number of people, social media can help raise awareness, spark discussion, and organize both online and offline movements around violence [213], corruption [323], accessibility [189], racial inequality [69], economic inequality [116], sexual harassment [75], and more. For marginalized groups in particular, it can play an important role in democratizing their voices and increasing feelings of empowerment around their identities [75, 189, 192].

At the same time, several scholars have questioned the impact of digital activism, especially at the lowest level of "clicktivism." Such online actions have been criticized as "slacktivism" for being low-cost, low-risk, and done in order to feel good despite little to no real-world effects [215]. Others describe its main purpose as lowering the barrier for coordination, with primary activist actions happening in the physical world, such as protests [32, 145]. While recent work suggests that even low-level actions can lead to or correlate with real-world impact [182, 210], physically "putting your body on the line" is still considered highly meaningful among activists [189].

"Hybrid activism" is an emerging form of activism that blends online and offline action [189, 210]. This activity can include using online tools to support offline action (e.g., coordinating a protest on social media) as well as synchronous online and offline action (e.g., attending a protest through telepresence [189]). Recent activist actions suggest the emergence of another style of hybrid activism: using digital media *in* the physical world for social change, rather than the two existing separately. For example, recent HCI research has investigated Internet of Things devices, which equip physical spaces with sensor technologies, and location-based mobile technologies for menstrual resource accessibility [100], civic engagement [240, 272], public expression [174], and sustainability [77, 160, 175]. In this work, we explore *augmented reality* as another such ubiquitous technology, which introduces the layering of digital media onto physical spaces as a new affordance to hybrid activism. By investigating people's decisions and experiences around AR activism, we seek to understand how this new kind of activism fits into the broader activism hierarchy.

7.2.2 Augmented Reality: Digital Activism in the Physical World

For purposes of this paper, we define AR as a technology that embeds digital information, such as virtual images and audio, in physical environments. AR has evolved over the years to become a widespread consumer technology, with popular mobile phones now featuring AR capabilities [279]. The wide reach of AR has opened up possibilities for a range of applications, including AR for education [340], collaboration [126, 248], health [22, 218], and, perhaps most commonly, entertainment [237].

More recently, AR has shown potential for contributing to broad cultural shifts. In addition to individual groups that focus on direct action, incubators and collectives offer fundraising, technical support, and mentorship directed at AR-led structural interventions (such as overturning physical monuments) [89, 90, 107]. Skwarek suggests that AR can provide an accessible, low-cost yet high-impact way to achieve activist goals – particularly, spreading messages and sparking conversation around a relevant physical location or object. For example, #arOCCUPYWALLSTREET was a global protest at the New York Stock Exchange and Wall Street area. Since physical protests were prohibited, activists held tablets using an AR application to overlay the area with images and audio submitted from global protesters. AR on relatively inexpensive devices thus helped to lower the (literal) physical barrier of protesting, while opening global participation for those limited by travel costs. In addition to protests, AR has been used to "hack" buildings, corporate logos, monuments, nature, and more with subversive messages [275, 292].

AR's immersive quality could also benefit activism. People can use AR to tell stories in more expressive ways, transporting audiences into a new reality defined by the creator. Immersive storytelling in mixed reality more broadly can arouse strong emotional reactions, including for those with whom people typically struggle to empathize [140, 170]. AR, being physically tied to the real-world, could build on these aspects by using stories to intervene on and at specific objects and places. In particular, recent work suggests the potential for AR to support *placemaking*, i.e., the planning, design, and management of public spaces. For example, Sweetgrass AR (Figure 1C) is a place-based experience where college students and Indigenous knowledge keepers col-

laborated to create experiences that educate the settler population about the relationship between Indigenous and the colonized land. At specific locations of interest, they augment granite sculptures that carry strong symbolism to tell stories about Canada's Saddle Lake Cree Nation [205]. Through overlaid digital content, citizens, especially those from marginalized groups, have a venue to voice their opinions, discuss and critique decisions, and even reclaim their identities and histories connected to specific places [19, 90, 118, 276].

Despite the potential promise of AR activism, we still have a limited understanding of how people are actually using AR for activism. What drives people to use AR for activism, and what are their subsequent experiences? To what extent do AR creators feel they are able to achieve their activism goals? As AR is an increasingly ubiquitous and evolving technology, we must understand both the opportunities and challenges of using AR for social change. To this end, we conducted an interview study with people who have created AR experiences for activism in order to explore the following research questions:

RQ1: Why do creators use AR for activism?
RQ2: What characteristics of AR do creators find conducive or detrimental to activism?
RQ3: What role does AR play in achieving creator's goals?

7.3 Methods

7.3.1 Pilot Study

To ground our interview guide, we ran a pilot interview study with an initial set of eight activists who use AR and AR-adjacent technology such as VR. Focusing on U.S.-based creators, the pilot study examined people's motivations and understandings of AR platforms across varied sites of public engagement, from a celebration of a historical march to community-based youth education initiatives in a historically Black neighborhood.

Across creators' reflections on their varied contexts, AR technology emerged as a tool with the potential to raise awareness and spark radical engagements with everyday life. A Chicago-based artist spoke of the contrast between reading the news about gun violence and "making it real, truly real" through AR: *"the fact that, my God, I am on the street right now. And there are young people who are on the street and they're thinking about, you know, what might happen to my life [now that] I lost my friend the other day on the streets." A Seattle-based artist emphasized the capacity for AR to make the impossible possible, a process with profound implications for Black people in a world rife with anti-Black racism. She created an installation that swapped the sky and the ground for Black and queer participants, looking to AR's potential for stretching physical limitations and visualizing aspects of our world that seem un-fungible:* "the Black community could imagine itself out of the limitations of our physical reality . . . it's a radical imagination or reimagining of blackness and present that does not even imagine us to be here." *Ultimately the interviewees viewed AR as a tool for prototyping the realities they wanted*

to build together, and less as a solution to societal problems. "Technology is not a savior in this situation," *an interviewee explained.* "I don't think it's technology that makes a difference, I think that it's community that does. And [AR] technology can be used to build community."

Based on these responses, we refined our interview guide to dig deeper into people's reflection on their experiences creating with AR technology. In particular, we focused on their hopes, expectations, and perceived outcomes for what they could accomplish with it, and the trade-offs they faced while using particular platforms. We also used the pilot to explore possible limitations to remote interviews during the pandemic and to inform any shifts in our recruitment approach, such as focusing more specifically on AR creators. We describe the subsequent participants and interview study protocol in the sections that follow.

7.3.2 Participants

We recruited participants involved in projects that created AR experiences for activism, based on the definitions of "AR" and "social activism" stated in the previous section. We initially found participants through a web search for relevant projects (e.g., using keywords such as "augmented reality activism") and referral from other participants. We aimed to include a wide variety of participants who engaged in activism projects that ranged across location, scale, and purpose. Of the 48 people we contacted, 20 people living across six countries agreed to an interview. These 20 participants worked on projects for a range of social causes, such as addressing institutional racism, environmental justice, and more, with some projects initiated as early as 2009. Our participants are summarized in Table 7.1.

7.3.3 Procedure

We conducted 60-minute semi-structured interviews with participants over Google Meet. All participants were interviewed individually, with the exception of P1 and P2, who had jointly worked on a project and asked to be interviewed together. Building on our pilot study, our interview protocol included questions about their work background, their understanding of AR activism, their rationale for using AR, the influence of AR on their project, and their broader experiences with AR. In exchange for their time, we offered participants a $50 gift card or a $50 donation to a non-profit organization[1].

7.3.4 Analysis

We analyzed transcripts of the interview audio files using an inductive analysis approach [311]. We used the ATLAS.ti qualitative analysis software to code the transcripts. We first generated inductive codes using a subset of transcripts, looking for similarities across participants' experiences and labeling the ideas that emerged (e.g., "making the invisible visible"). We conducted

[1]Participants chose between the American Civil Liberties Union, Habitat for Humanity, and the National Association for the Advancement of Colored People Legal Defense and Educational Fund

three rounds of open coding on three transcripts each. We created a codebook from the generated open codes, focusing on codes that were prominent across interview transcripts and relevant to our research questions. Two independent coders validated this resulting codebook on another subset of transcripts, discussing any disagreements to ensure high inter-rater reliability. After achieving Krippendorff's α above 0.8, the two coders divided and coded the rest of the transcripts. We then grouped similar codes together to form higher level categories, which we further discussed and refined to identify cross-cutting themes around perceptions and use of AR activism. Throughout this process, we revisited the interview transcripts when necessary to clarify codes. We organize these themes in the following section according to our research questions around people's decisions to use AR for activism, the characteristics of AR activism, and the impact of AR activism.

7.4 Results

7.4.1 Why do creators use AR for activism?

We wanted to understand the factors that influenced participants' decisions to use AR for their projects. These factors included prior AR-relevant experience and the perception that AR content is more engaging and safer to deploy, given today's undefined legal and material constraints. At the same time, participants expressed concerns around the potential for future legal or ethical repercussions.

7.4.1.1 Prior AR-relevant experience

Fourteen of our participants shared that their paths to using AR for activism projects included their prior experience with AR and/or development of AR-relevant skills such as programming, design, and storytelling. P3, a professor of design and computing, outlined their path to using AR for activism through developing myriad relevant skills:

> *"My current work explores . . . a lot with AR [and] experimentation and challenging technocratic power through . . . creative experimentation and hacking. I come, really, to AR from starting with exploring things like cryptography, steganography, obfuscation . . . which lead to looking at multilayered narrative. How can we augment the physical space with the virtual space, and create layers of narrative?"* - P3

P3's years of exploration in both emerging technologies, including early versions of AR, and steganography (concealing information in non-sensitive data, e.g., embedding a message in an image) motivated their use of AR and enabled them to create multilayered narratives around "dirty money" in the art world. This experience manifested in how their project presented previously obfuscated information to museum-goers, using AR to overlay visual statistics and audio recordings about the opiod epidemic on top of museum art bought with opiod money.

Other participants shared diverse experiences influencing their use of AR that were not necessarily technology-centric. P13, a historian, artist, educator, and cultural organizer whose project augmented locations with digital artifacts about a pioneering Black woman entrepreneur and philanthropist, shared:

> *"I call myself an unbound artist because I'm not tied to any one medium. I usually center my work on a lot of deep research in the world, but then also research in the books and in a lot of archival research. My work is really about . . . how do I take the knowledge that has been ignored from dominant narratives and create a space for more people to see it outside of the academic towers. I'm a memory worker . . . specifically as it relates to the work that I do with monuments."* - P13

As a "memory worker" who aims to share overlooked histories with wide audiences, P13 was drawn to AR as a means to combine their skills in history, performance art, and multimedia, using archival image and audio data to tell stories about a historical figure and imbue physical locations with new narratives.

As seen in these two exemplars, participants drew from their background to envision rich multilayered narratives for their activism projects. Their prior experiences motivated their use of AR as a means to compose those narratives through a combination of skills in technology, history, art, storytelling, and so on.

7.4.1.2 Ease of creating engaging content

Participants described experiencing a relatively low barrier to creating compelling experiences for activism in AR using modern technology. Twelve participants had worked with AR before, but described requiring fewer resources to create AR experiences for activism compared to their experiences in the past. P10, a multimedia artist who created an AR installation centered on Asian American identity, described changes in AR development technology in their experience:

> *"I think, nowadays, the platform is much [more] intuitive for artists to adapt. There's not much coding. It's much easier, but at the beginning, it was a challenge."* - P10

Here, P10 speaks to how modern AR creation programs have introduced UX features and supporting material (such as prefabricated digital assets and tutorials) that make it easier to create AR content, even without programming expertise.

Building on this insight, many participants felt that it was easy to use AR platforms to create new, compelling interactions that could enhance how they deliver their message, especially when tied to the physical world. For example, P15 described the ease of creating an AR experience that layered videos telling stories about Indigenous heritage onto physical sculptures important to cultural preservation:

"We didn't use animation or anything, it was essentially just an interface where you could click on videos, and then the video would play but just layered videos, it's pretty simple AR. We chose HP Reveal, [which was] YouTube-style, where you just upload a simple video." - P15

P15 felt the AR tools they used enabled them to create a simple yet rich experience, with which they aimed to create new understandings and perspectives around the history of Indigenous communities.

Taken together, participants felt AR is an approachable yet powerful medium for activism, especially with the rise of more novice and non-programmer friendly platforms and features. The ability to create immersive content without coding, including the ease of uploading videos and attaching them to physical objects and locations, made AR an attractive tool for delivering their message without specialized skills or expensive resources.

7.4.1.3 Potential legal and ethical consequences are still being shaped

Eleven participants noted that AR activism seems less risky than traditional activism, even as the consequences of those risks specific to AR remain uncertain and under-defined. P1 and P2, artists who collaborate on global activist interventions, described how AR enabled them to accomplish what would be too risky if attempted through another medium. They remotely created an AR experience to expose fraud by augmenting the election campaign ads of a corrupt government. They noted,

"If you would have painted the words on the posters, I can guarantee you these people would be imprisoned, if not dead by now . . . " - P1 & P2

By augmenting posters, rather than physically painting over them, these participants were able to distribute their message, tied to physically relevant objects, while avoiding physical risk. With AR content existing only on a digital rather than physical layer, creating controversial content feels less high-stakes for activists, especially compared to the risks of engaging in gladiatorial forms of traditional activism outside of AR that P1 and P2 mentioned.

At the same time, half of the participants raised concerns over the lack of certainty about legal ramifications associated with activism in AR, even if it enabled their work. P7, an innovation art director who created an AR project that commandeered Trump election signs, spoke to these uncertainties:

"I was just the whole time, a bit afraid . . . because the Trump campaign is known to sue anyone and everyone, and I was a bit afraid of, 'Where do we overstep? Can we use this name? Can we use the look of his sign?' . . . we also brought [a law student friend] in to basically double-check everything just to make sure like what are the legalities and everything of this project." - P7

P7 highlights that while activism in AR can mitigate risks associated with traditional forms of activism, it still brings its own set of potential negative consequences. The lack of legal precedent

on controversial uses of AR does not eliminate the risk of liability and prosecution, especially when AR content involves material typically subject to legal protection outside of mixed reality, such as US presidential election campaign materials.

Alongside the immediate risk of physical harm and legal liability, creators worried about long-term ethical repercussions. In particular, creators struggled to make sense of their use of platforms that are created, sanctioned, or funded by companies with strong ties to "anti-social" activity. P15, a settler scholar working with Indigenous communities on technology development, described the complex ethical implications of creating accessible digital media based on Indigenous knowledge:

> *"I think for the communities I work with, they need a balance between user friendliness, which is very important, [and] low costs, hosting fees, design fees ... I think the biggest thing is that control and ownership ... this Indigenous data sovereignty is really, really strong now and I think for Indigenous peoples in particular, where is their data going? How can you access it? ... They have a lot of protocols about even what time of the year you can access information and stuff like this. If there was some off-the-shelf platform, maybe free and open-source that would allow for local hosting of data, that kind of thing, non-commercial, I think [they very much] don't want to commercialize it unless somehow it benefits the community."* - P15

For P15 and their team, one of the main criteria for considering AR and choosing an AR authoring tool relates to the level of control they felt they had over their own data. Deciding what data to retain and how, who drives changes to data practices, and who is responsible for ensuring equitable access was a bigger constraint than any other technical or logistical barrier.

From well-established democracies to countries governed by authoritarian regimes, AR activism can appear to lessen risks typical for traditional activism, though with murky legal and ethical bounds. On the one hand, participants point out that AR-based activism can remove the need to physically alter the world or even be physically present to augment it, which can reduce associated risks and make the use of AR more appealing. On the other hand, due to the emergent nature of AR activism and a reliance on proprietary and commercial platforms, participants described some hesitance in using AR due to the lack of understanding around legal risks and social harms associated with fewer (or selective) restrictions.

7.4.2 What characteristics of AR do creators find conducive or detrimental to AR activism?

Participants discussed features of AR that facilitated or limited their activism projects. This included characteristics of the technology itself, as well as the development platforms they used and collaborations they formed to create their projects. In particular, participants felt that the ability to visually layer narratives in AR could be beneficial for changing perceptions and reshaping

physical places. At the same time, despite the aforementioned lower barriers for creating AR content, participants still faced some challenges when using modern AR development platforms for their projects.

7.4.2.1 Potential for changing audience perceptions

Like many activism projects outside of AR, 15 of our 20 participants aimed to change people's perceptions through their AR activism work. Participants described how AR could expose audiences to crucial, yet under-recognized, aspects of their social cause through immersive narratives. P20, an artist and professor of new media who created a narrative AR scavenger hunt centered on African American history, shared how they hoped AR could change perceptions of Black and Brown women:

> *"[As] someone who'd like to become a parent, I'd like the landscape to look different even if it's through augmented reality for a young person so that they can get a vague sense that there's someone who's really invested in letting them know that they come out of a legacy of resistance, of activism, of agency, of making significant change. A legacy of people making significant changes and alterations to the would we live in today. This world did not come into existence without Black and Brown people and women, it was made by them."* - P20

Using AR to overlay videos of reenacted stories about the hidden histories at specific murals, plaques, and other physical urban spaces, P20 designed the scavenger hunt to give people digital windows into the past that could change their existing perceptions about the city. In particular, they aimed to make the invisible presence, agency, and work of marginalized individuals, in this case African Americans, *visible* in the world.

In addition to making the invisible visible, participants described a sense of *immersion* in AR, deeply connected to the multilayered narratives they created, that could further influence people's perceptions. P14, a history professor and author, worked on a narrated AR tour of a historical park in the US where African Americans flourished during the Reconstruction Era. Though their project was publicly available, they discussed immersion in the context of students:

> *"[I think] this additional layer of reality, it brings the ability to immerse people in stories. I think that sort of immersion is what's important. What I see happening is a good thing for me because I see increasing abilities of technology to allow me as a teacher to immerse my students in the story. By immersing themselves into the story, they become part of the story, the story becomes personal. It is not just something that happened to somebody else 200 years ago. It's something that, in a way, is sort of happening to them. Everything seems to be self-centered these days. If you can relate to the story and that helps people learn it, then I think that's great."* - P14

P14 hoped that audiences would feel immersed in AR's "layers of reality," and therefore more connected to the historical content as narratives relevant to themselves. They aimed to establish this connection in their AR tour by layering aural and visual historical content (e.g., music, pho-

tographs) over key physical areas, such that people could feel transported to the past where they stood.

Overall, participants felt that the immersive characteristic of AR, which ties narratives to the physical world, could help their audiences better understand new perspectives and connect with their message, such as the importance of forgotten moments and people of history.

7.4.2.2 Reshaping the physical world

Beyond surfacing invisible information to change perceptions, 17 out of 20 participants also discussed using AR to *reshape* elements of the physical world, such as public spaces and objects, by using AR to envision how they wanted the world to look. P8, for example, contributed to a project that aimed to reshape a university space associated with sexual assault:

> *"We started brainstorming different ways to use AR like a really lightweight means for someone to take a fairly ubiquitous technology and be able to use it to basically modify the space in ways that they wanted to without needing the prerequisite political or physical power to be able to modify that space."* - P8

P8 highlights how the virtual nature of AR can facilitate reshaping a physical space without having to grapple with the typical requirements for doing so. In their project, they used AR to overcome the hurdle of campus administration, which had installed a memorial for a sexual assault survivor but rejected quotes the survivor proposed for a plaque. Through AR, they could virtually bring the plaque with the desired quote read in the voice of the survivor to campus, along with voiced-over letters from other students. This layering enabled them to reshape the memorial, such that viewers could better understand its context and meaningfulness.

Similarly, P11, a student who created an AR tour on their university campus around legacies of slavery and racism, spoke about using AR to reshape a part of their campus museum:

> *"When we did the stop [on the tour] for the museum where we studied the [a physician who] collected hundreds of skulls, and organized them by race, and used different measurements to create a racial hierarchy, and medical misinformation that's still extant in the medical field today. We did a kind of dome. Not only are you inside of a skull, but you're also being encompassed by all this information. You're being surrounded and immersed by the institution, by the original things that founded white supremacy, much like white supremacy surrounds us as a country."* - P11

By manifesting a large virtual skull that people could walk into, this participant reshaped the museum on their AR tour to reflect the hidden structures in the country's and educational institutions' histories. Distinct from using stories to reveal or recreate the past, P11 created a new artifact as symbolic representation of the unethical legacies that the university physically perpetuates on campus. Thus, participants felt that AR's virtual nature, unbound by involved

processes for changing physical space, could help audiences envision and contextualize spaces in new ways.

7.4.2.3 Interdisciplinary collaboration and support

As most participants mentioned, a diversity of backgrounds and skillsets are relevant to crafting activism projects in AR that are high quality and effective experiences. Seventeen participants reflected that AR activism more often than not requires interdisciplinary collaboration between developers, designers, storytellers, etc. More specifically, participants described collaborating with independent art groups (P1, P2, P4, P5, P9, P10, P13, P18, and P19), non-profit organizations (P6, P19, and P20), academic institutions (P3, P5, P8, P9, P11, P14, P15, P17, and P20), and private companies (P12, P13, P16, P18, and P19).

P18, a film and media maker whose project overlays a city with 3D animated renditions of historical figures and buildings to retell the lived experiences of a civil rights activist, described a large collaboration network that facilitated her work. An initial tech fellowship and residency program, as well as starting her own production company, helped her form connections with technology companies, the film industry, and artistic partners. Her project collaborations included a local 3D modeling team, a local historical society to ensure historically accuracy of AR content, an award-winning actress to record voiceovers and motion capture for animations, and a local AR company to help her put everything together. P18 described how collaborating across disciplines supported the quality of her AR activism project:

> *"Yes, I had companies that . . . would take my design and bring it to life . . . then having other local companies do prototypes for me so that I could see how [the main historical figure] is moving. [I would ask them] 'Does the motion capture that I got really work? Can they add some animation? Can they add some a flare here, a flare there, some special effects that enhance where people are looking and directing their eyes, and getting them to go to the next step?"'* - P18

P18's interdisciplinary collaborators all contributed to bringing P18's vision for the project to life, and addressed many challenges she may not have been able to tackle on her own or had limited expertise in.

However, interdisciplinary collaboration for such projects can have negative aspects. While P18 appreciated her collaborations, she also discussed difficulties in the collaboration dynamics:

> *"Again, these are things that the ebbs and flow of like, do you have enough money? Do you lose your space? [Beyond that] I get paired with these very nice Caucasian companies . . . these white boys they're not interested . . . I got a bunch of work to do to add a layer of, 'Now I got to convince you that this is important or that maybe you should stay up another hour to help me get this done?' [The project's main character] doesn't strike them as cool, 'She's not cool. She's not that interesting. Oh, she's not a superhero. Oh, she doesn't have big breasts. She's not a*

sexualized object.' That's the stuff that makes me feel like, 'Oh, I wish I had just not been paired with certain companies.' They're wasting my time and they're wasting everybody's time." - P18

Here, P18 speaks to how resources like money affect interdisciplinary collaboration as well as how racism and sexism, in the face of her intersectional identity as a Black woman, affects how collaborators treat her. These collaboration issues can become obstacles in pursuing an AR activism project, as well as more broadly affecting the creator's quality of experience. Thus, while many participants reflected on interdisciplinary collaboration being conducive to their project's success (including those who did not have collaborations but wished they did), P18 illuminates the importance of the collaboration being founded on a professional, healthy, and respectful relationship.

7.4.2.4 Uncertainties and difficulties in AR development and distribution

Seventeen participants struggled to keep up with shifts in AR development platforms. AR creators reported using a variety of development platforms, including ARCore, Artivive, HP Reveal, LayAR, Lens Studio, Metaio, Reality Composer, Unity3D, Vuforia, WebAR, and Zappar. P4, a multimedia artist whose AR work displayed political messages in the sky, discussed how the varying lifespans of AR platforms affected their work. They were particularly frustrated with the disappearance of LayAR, their previous platform of choice:

"[LayAR was] probably the most advanced at the moment. All of a sudden, they're gone. All right. I had a few projects I was using on that platform too . . . " - P4

Other participants praised and trusted this platform, and found that its abrupt end affected not only the continued development of their work but also its distribution, as people could only experience the content on this platform. Upon losing a valued tool like LayAR, creators, especially those without programming expertise or who have built platform-specific expertise, must spend time and energy learning how to effectively use another platform. Moreover, translating their work to new platforms was not always straightforward, as platforms may not support the same features, e.g. uploading videos YouTube-style.

Despite improvements in modern AR creation tools for non-developers (e.g., interfaces to easily attach AR content to the physical world discussed in 7.4.1.2), eight participants still described difficulties related to specialized skills aside from coding. P9, who has experience with various AR development platforms, described how working with those platforms can be resource-consuming due to platform-specific development and publishing requirements. However, P9 also noted that some platforms are considerably easier to get started in and efficient to use, such as when comparing Unity and Lens Studio:

"With Unity, I often end up working a lot of time with . . . things not working . . . There's so much 'not working' in Unity. If you're a beginner, it's difficult . . . [In Lens Studio] you can't make it too complicated, so it saves you a lot of time. If I'm

collaborating with somebody in a Unity project, they keep telling me about things I've never heard of and the good thing with Snap is that I think I've seen most of the tools at hand now, the mechanisms, and that allows me to be an expert quite rapidly. With Unity, that's not the case, and when you're an expert with the tool you can make anything." - P9

P9 also compared the publishing approach on both platforms:

> *"With the Snap Lenses, you can say, 'Well, [the project is] there, and if you want to use it just download the app and there you go.' A lot of the technical struggles are taken care of by such a platform tool . . . it's a WYSIWYG tool . . . . With Unity, you always have to think, 'Okay, what are the platform-specifics' and then clients want high-end renderings and they want baked lighting and all this terrible stuff that takes a little time away from the essence of making something interactive, something cool, something new."* - P9.

This comparison brings attention to characteristics of AR development platforms that can facilitate or hinder the creation of activism projects in AR. In particular, creators saw "what you see is what you get" tools, mechanisms, and publishing processes as enabling efficient completion of projects as well as simplified sharing. Unreliable and unnecessarily complex features and publishing requirements can detract from building platform expertise and actually creating content.

At the same time, it is important to note that platforms may be designed for specific purposes, to which participants had to adapt for their goals of activism. For example, Lens Studio is a platform for developing AR filters for Snapchat, while Unity is a game engine for creating AR *in addition to* VR, 3D, and 2D games that can be published to a variety of distribution platforms. Thus, certain development platforms may be more or less conducive than others to creators' goals (barring unforeseen discontinuations) depending on creators' experience levels, project complexity and longevity, and target distribution.

7.4.3 What role can AR play in achieving creators' AR activism goals?

Participants reflected on their projects' impacts, and how AR may or may not have contributed to achieving their activism goals. It is important to note that we discuss impact based on participants' *perceptions*, including their aspirations through their work, and what they heard and observed from people who engaged with their project. Participants shared that while they feel AR has the potential to influence physical action and strong emotional reactions, AR also had limited reach to audiences in terms of awareness of the project and ability to access and use it as intended.

7.4.3.1 Eliciting physical action and strong emotional reactions

Fourteen participants discussed the potential of AR to affect physical action and/or strong emotional reactions among their projects' target audiences. P8, the aforementioned participant

who introduced an interactive AR plaque for a sexual assault survivor at a university campus, shared how their project may have contributed to the university's decision to install a physical plaque at the memorial:

> *"What is interesting about the plaque [that the university physically installed] is that it looks like the [AR] plaque that we designed for our project. [Our AR project] ended up being an inspiration to what actually ended up happening in the physical space . . . ."* -P8

P8 further noted that while they did not issue any official statement with the university, their team did discuss their project with the university administrators, including its context and the barriers around installing a physical plaque. They felt that this discussion, along with the virtual plaque they created, may have contributed to the ultimate outcome of having a physical plaque installed.

Participants perceived that AR could also elicit strong emotional reactions in audiences. Because AR is a novel technology, seeing and hearing an additional layer of reality can be a completely new and emotional experience for many. P5, a professor of multimedia filmmaking who used AR to alter US currency to highlight foreign relations, stated:

> *"Technology is quite emotional for people, our world being shaken up by what's possible for you to see or hear combinations that you can make in your immediate perception . . . it's maybe this positive thing and so we're still taking this traumatic moment of things being shaken up for us and the possibilities and what you thought was possible in the world being changed, but instead of just responding with this fear, instead, we have this strange experience of fascination, of engagement, of small joy."* - P5

P5 describes a strong emotional experience that they believe someone can have while engaging with AR, which could make the user more receptive to content that challenges what they previously thought or believed. Participants further note that AR's novelty alone cannot achieve their activism goals, but paired with well-crafted content, such as the compelling multilayered narratives participants aimed to integrate, they may produce something emotionally impactful.

Relatedly, one participant highlighted the unique role they believed AR played in sparking emotions, based on the experience of someone who interacted with their project. P17, an artist, activist, and academic, created a project based on their own lived experience that exposed how global warming is affecting the lives of the already most vulnerable. They compared the use of AR in the project to their previous work on the same topic:

> *"I didn't want people to look away from the world, I wanted people to look at the world, and I thought that augmented reality was a way to do that . . . What I want is for people to think about [climate change] and engage with it and look at it and face it and face the fact that we have to do something . . . . [Compared to my previous web-based game on climate change], I think that the AR project has*

a more emotional impact... [someone who interacted with it] said to me that they felt implicated because they had to move their body to engage with the work. As opposed to the disconnect of sitting in front of a screen and just clicking on a mouse, which is such a familiar feeling that it can be really disembodying, dissociating, disconnecting for people I think." -P17

P17's project required users to physically move around, collecting oxygen capsules and narrated stories about climate change's effects while navigating an AR forest. Drawing from their prior non-AR work and what they learned from users, the participant felt that the embodied interaction in AR could emotionally immerse audiences in the content without virtually removing them nor their gaze from the physical world, unlike other forms of technology that inherently draw attention away from the physical world.

Additionally, a few participants discussed the potential for AR to elicit strong emotional reactions in marginalized individuals in particular. P17, for instance, described another interaction they had with someone who engaged with their project, which focused on the effects of climate change on marginalized groups:

"[She said] she felt just very good [about] having felt represented ... [she said] as somebody living with chronic respiratory illness, she felt like nobody had made artwork about having asthma and being in the middle of a pandemic or being in the middle of a climate change event. [My project's goal] was to point out how climate change is already harming people and disproportionately harming marginalized people, like trans people and chronically ill people and immigrants. That felt like a real success to me, that somebody from one of those groups said like, 'Oh, I feel seen by this work."' - P17

In addition to emotionally engaging people with a social cause, participants like P17 suggest that AR may have the potential to empower marginalized individuals. They see AR as intentionally centering under-recognized narratives and voices in a layer of reality that blends with the physical world. One participant, an artist, creative technologist, and educator who created monuments of Black and Brown historical figures, further envisioned how such empowerment could have implications for the future:

"Part of the work that we're doing is ... being able to inspire the kids to do their work ... in the future, I see us ... allow[ing] students to design their own monuments or design their own experiences [in AR]. I think just allowing people to see that they can be more than just a consumer of these technologies, but they can actually build them, and scale them up, and be able to create their own tech companies or whatever, art companies, [etc.]. That's a big part of [our AR activism project] as well, and why we're always speaking and talking, and why we're focusing on the kids now." - P12

Participants thus aspire for AR to not only help people feel seen and uplifted, but also help people learn about and celebrate the legacies of those who look like them as sources of inspira-

tion and affirmation of their own capabilities.

Overall, participants believed that AR could help achieve their activism goals. For creators aiming to reshape physical spaces, AR could play the role of raising awareness and prompting people to consider changing the spaces re-envisioned through AR. By grounding identity-specific AR content in the physical world, creators hoped AR could spark highly emotional reactions to their projects.

7.4.3.2 Limited Reach

While participants saw potential in the impact of their projects, seventeen participants felt that AR activism still has a narrow reach. In particular, they felt that AR is not quite a ubiquitous technology yet, which can limit people's ability to understand and interact with it. The aforementioned P12 shared:

> *"I was showing AR . . . to seniors. It didn't work very well. They didn't understand it. I tried to explain it and they weren't getting it. I don't think anything I could have said was going to help them understand it. I feel there's a blocker if you're too old to understand what is going on in augmented reality on average. I'm not saying every person who's a senior can['t] understand augmented reality, but that is my experience."* - P12

Though creators may target a variety of audiences for their projects, not all audiences are necessarily familiar with AR or relevant technology. This can limit people's ability to understand their project and connect with the underlying message. Moreover, participants shared that they encountered people who did not know how to find these experiences in the first place. Some participants attempted to address this issue by using social media to advertise and instruct people how to access and experience their projects. For instance, P19, a lawyer and community organizer who created AR educational materials centering Black people's historical achievements, described how posting on social media helped distribute their project to wider audiences including adults, children, and potential partners and supporters:

> *"We just put it on social media and then a lot of people . . . picked it up so that I think that also on social media, it looks really good. [A singer in the UK] put it up and she [had] over 300,000 followers . . . I think social media was the main pusher. Then, after that, we had [a big company] approached us and a couple of these big tech companies [were interested in the project] . . . "* - P19

Participants describe challenges in people's general awareness and exposure to AR. While social media can be one tool to share their project to a large network, particularly if they have access to social media influencers, some populations may struggle with using and understanding their project even if they engaged with it. Participants highlight that the varying levels of access to AR and ability to engage with it can be a major barrier, as being able to spread their message and reach target audiences is key to their activism work.

In addition to limited engagement and awareness, seventeen participants noted that AR distribution platforms can also limit their reach. P17 described how art venues and distribution platforms can affect reach:

> *"I feel like very few people know that my app exists. I think it got some visibility from being [featured on an art venue] and winning an award. Mostly, people just experience my work through art venues . . . that's okay with me, but it would be nice if a lot more people knew about the project. I put it on the [Apple] App Store. One challenge is [that it is] artwork that deals with difficult themes, so I labeled the app in the App Store as 17 and up. It's for adults, it deals with violence, just descriptions of violence. That may be a barrier to people finding it. I think another barrier is that the way I made [the project] platform-specific, so it's only for iOS."* - P17

From art venues to the Apple App Store, AR activism projects may not gain exposure without being featured or winning an award, and may only circulate within specific, niche communities, like multimedia art galleries or museums. Because of limited methods of distribution, AR activism works may not be able to have the reach that creators aim for, which could negatively affect achieving their projects' goals. It is important to note that even if creators find publishing on some platforms easy (e.g., Lens Studio, as previously discussed), they may still be limited by that platform's distribution capabilities (e.g., search tags and content restrictions, platform specificity, and requirements to download and register for specific apps).

Also potentially affecting reach is that much of AR content, including some participants' projects, can only be experienced at specific locations in the physical world. Our participants discussed how this could limit exposure to audiences, given the need to travel to that location, but at the same time make the experience more special. Specifically, P16, who created an AR monument tied to a public space in the physical world, reflected on this tension that surfaced when their project was shared by someone else on social media:

> *"[They think,] 'why do we need to tie [the project] to a location when there's no reason to do that?' In [their] mind, building an AR monument and then making people go see it when you have your device right here and I could see it on my desk just as easily, we're putting an artificial constraint on something that doesn't exist in this medium. I can totally understand that philosophically, except that I can also see the value in giving a specialness to something. . . . what I struggled with about one of the qualities of AR is it can be anywhere all the time . . . If we're talking about monuments and locations and specific histories, as a medium that's ever-present everywhere, does that cheapen it for me to be able to see it on my desk, or does that facilitate something for me and make it better? I don't know."* - P16

P16 describes how rather than a constraint, location can be an important design decision or feature that contributes to AR activism goals. As described in the previous sections, many participants relied on location to immerse people in content central to where they stood. At the same time, people may not be able to access those locations, limiting the content's overall reach. Keeping these potential trade-offs in mind, the role of location-specific AR in creators' activism

goals relies heavily on their specific activism goals, content, and target audiences.

Overall, participants felt that limited awareness of AR and their projects, varying audience readiness to engage with AR, distribution platform constraints, and possibly even location-specific features can negatively affect their projects' reach. Limited reach can in turn hinder their connection with audiences, and thus, their goals of changing their perceptions of the world. Still, as shared throughout our results, participants perceived AR as a powerful medium for activism due to its potential to facilitate the creation of compelling multilayered narratives that can elicit physical action and strong emotional reactions.

Returning to our research questions, we learned of a variety of motivations, values, and expectations that drove creators' use of AR for activism, and their subsequent experiences. We found that creators used AR for activism due to relatively low barriers to creating compelling content – technically, legally, and physically (RQ1). Creators highlighted that AR's ability to immerse people in narratives that reveal or imagine realities could be conducive to activism by changing perceptions and raising awareness. Conversely, creators discussed challenges that AR introduces which could be detrimental to activism, including limitations to creating, maintaining, and distributing content (RQ2). Finally, creators described their perceptions of AR's role in achieving their goals, specifically in influencing physical changes in the world and empowering their audiences. At the same time, they questioned their ability to reach large audiences given limited access or distribution of their projects (RQ3). In the following section, we discuss these findings in the context of prior work, and highlight open questions and opportunities for future research.

7.5 Discussion

Across our interviews, participants saw AR as an emerging form of *hybrid activism* [137] that incorporates digital media in the physical world for social change. As creators, participants provided a variety of testimonials, from guerilla installations at museums exposing questionable art donations to geofenced memorials highlighting the voices of oppressed people. They perceived AR as an effective tool for expressing unique and engaging messages, with the potential to change perceptions and help people reimagine public spaces. But they also faced several challenges reaching broad and diverse audiences and noted emerging ethical and legal considerations related to user control, author responsibility, and platform circulation. Ultimately participants sought to use AR to elicit strong reactions and inspire action among their audiences within a fraught and precarious sociotechnical landscape.

Recalling George and Leidner's hierarchy of digital activism [114], our work suggests that project creators view AR activism as enabling a high level of engagement, potentially within the gladiatorial level. Like hacktivism, they see AR activism as requiring technical skills (e.g. programming knowledge) in order to take action. However, unlike hacktivism, creators see AR as becoming accessible to the general public and currently having few legal restrictions. Additionally, creators perceive AR as having the potential to generate high impact by triggering

audiences' emotional reactions, which might catalyze civic participation. At the same time, creators worry that the platforms' limited reach may hinder the impact compared to hacktivism or other gladiatorial level actions.

7.5.1 Open Questions and Opportunities

Looking beyond AR's promise for social change, creators point to several open questions and opportunities. Below we summarize these lessons around themes of interdisciplinarity, platform control, discoverabiity, accountability, and radical change.

7.5.1.1 Supporting Interdisciplinary AR Content Creation

To create immersive experiences that could elicit strong reactions, participants required specialized expertise and engagement with collaborators and organizations from multiple fields. Many participants established interdisciplinary collaborations to overcome technical limitations and generally create higher quality and more impactful projects. At the same time, collaboration can bring challenges in coordinating resources as well as perspectives around the topic and vision of the project. Worth noting, and illustrated by P18, these collaborations can also reproduce unethical patterns (such as racism and sexism) that are embedded in broader social contexts which the technology has limited (or no) means to directly address.

Informed by these experiences, we encourage researchers, activists, and supporting organizations to reflect on the conditions of these interdisciplinary collaborations and the values that underlie these interactions. Within research and activist organizations, this work involves adapting community-driven strategies that emphasize long-term engagement, participatory planning, and the placement of technical decision makers in service of existing practices [38, 60, 63]. For those working specifically on creating AR authoring tools, we encourage expanding support for the integration of well-established standards (e.g. widely used 3D models and video formats), mechanisms for collaboration (e.g. intuitive data management systems, discussion groups, and brainstorming boards), and greater number of practices and skill sets (e.g. traditional painting, physical installations, architecture, and informal education) that are already familiar to a range of potential users. Inspired by efforts like Mozilla's WebXR [199], AR development platforms should also consider the integration of universal and public AR project formats to facilitate content access and the migration of projects among platforms, so future activists can have more reliability and flexibility for their work.

7.5.1.2 Confronting Maintenance and Proprietary Barriers

Participants saw the development of impactful AR activism experiences as just the first step. Although AR offered an entry into civic engagement, they described struggling with the maintenance and distribution of the projects. Sometimes this concern reflected uncertainty around the future availability of their projects on particular AR platforms, which could shut down at any moment. Other times participants reflected on the consequences of not having full control over the content and experiences developed using proprietary platforms. In addition to losing

access to platforms, and thus losing time and effort, their remarks point to the importance of platform ownership itself. When creators like P15 centered community, they sometimes viewed a platform's capitalistic values as running counter to their own goals. They expressed feelings of unease about the corporate partner managing their platform and that decides what could be seen, extracted, recirculated, and more. Their concerns focused on the potential for surveillance, monetization, and various harmful structural interventions that lay outside their control. Even compared to social media platforms like Facebook, where organizers can share web links that make content accessible outside the platforms, AR currently tethers organizers to particular corporate or commercial interests. Participants' reflections as creators suggest the degree of control they have over the AR platform — how the data gets used, where/how it gets circulated, and to/for whom — is core to understanding AR's long term potential for building conditions for social change.

7.5.1.3 Improving AR Discoverability

Participants suggested that the distribution of an AR activism project can be as challenging as the creation of the project itself. Their reflections suggest that improving the discoverability of AR content would go a long way toward improving AR access and broadening its impact and reach. Indeed, discoverability is a known issue with AR technology, where people may not know about existing applications or realize they are available, and creators may not actively promote or have the means to promote their content [70]. While work in e-commerce has highlighted the need for better calls-to-action while browsing and better transitions into AR [133], increasing discoverability more broadly might involve nurturing open source and other grassroots AR toolkits that enable more flexibility and adaptability around access conditions. Conversely, it could involve further integrating AR authoring and viewing environments into existing social media platforms (amplifying the surveillance concerns outlined above). With this integration, AR environments might enable audiences to communicate back to the broadcaster and with each other, giving creators a better sense of how audiences react to and engage with their messages. Such feedback might also generate a limited degree of accountability, allowing creators to keep track of the impact and reach of their work, but also raising important questions around data privacy and control.

7.5.1.4 Accountability and Co-option

With the recent hype and adjacent criticism surrounding the metaverse, an imagined virtual environment extending the capacities of AR, we find much overlooked around questions of accountability. Similar to prior metaverse instantiations like Second Life[36], the parallels drawn between the social media and AR, in terms of its trajectory [27] and potential [347], raise questions about its propensity for co-option and expropriation [223]. What would stop someone from using the same platforms designed for equity and justice initiatives as tools for hate speech? How does the lack of legal restrictions shape what corporate platforms might extract? These questions resonate with some notable elements we found in our data, such as P3's initiatives to challenge technocratic power, P15 reluctance to store Indigenous knowledge within certain platforms, and P18's bittersweet experience with collaborators. As creators continue to develop new and differ-

ent ties to AR platforms, what allows those platforms to hold onto their liberatory potential lies less in the tool itself than the institutional conditions in which its situated. Creators' reflections suggest that what matters most is how those platforms are collectively managed and to whom they are accountable.

7.5.1.5 Radical Change Driven by Minoritarian Groups

Participants felt AR may be especially beneficial for activism projects focused on people disproportionally harmed along existing lines of inequity (race, class, gender, disability). By causing strong emotional reactions and overlaying key aspects of their own identities onto physical locations, creators believe that members of these groups could feel empowered and represented. Creators could center their experiences and feelings within the very environments that tend to shut them out. We note that a number of participants built experiences around marginalized groups, including recent AAPI struggles in New York (P10), repairing settler-Indigenous relationships in Canada (P15), creating monuments for historical Black figures in Los Angeles (P13), and creating formal and informal AR educational material about the historical contributions of people of color (P19).

We observed that the immersive potential of AR experiences encouraged a certain radical imagination among participants. Participants used AR tools to help people not only visualize what might be (making the invisible visible), but also realize the what might never be (making the impossible possible). The idea of making the cosmos the ground, and the ocean the sky, a notion we saw in both our pilot and main study data, came up repeatedly in interviews around the particular features of AR platforms that enable the revising of physical realities. "I think it was very important for us to create this space where people can actively participate in that dreaming so it's like daydreaming. How we might extend our realities, our concepts of liberation ... outside of you know, our limits," a pilot study participant told us. To push against the limits of a physical reality mired in structural racism and oppression, participants found a subtle but profound sense of hope in the remaking of everyday landscapes. The dollar bill or the street sign stood for mundane pillars of a pervasive system of social control that could be meaningfully changed or subverted through artistic intervention.

This idea of revising the 'impossible' undergirds some of the most compelling and celebrated interventions of 20th century, from the activism of Ida B. Wells to the artwork of James Luna. The fact that AR creators also play with this sensibility suggests an important aesthetic dimension to hybrid activism. By inviting people into alternative realities, AR authoring environments seemed to ignite creators' radical imagination, drawing attention to the mutability of some of the most fundamental and seemingly permanent fixtures of our surrounding world.

7.5.2 Limitations & Future Work

We interviewed a wide variety of participants with different types of AR activism projects, and learned how they view AR's potential as a tool to advocate for social causes. However, several aspects of our study design limit our findings. We outline these limitations and explore how

they might be addressed in future work.

One limitation of our work is the difficulty of evaluating the impact and effectiveness of AR activism. Our assumptions and claims are based on creators' anecdotes and reports. Future work should consider interviewing or surveying audience members (i.e., people who viewed the creators' projects) and other stakeholders (e.g., property owners) to understand broader perceptions and experiences with AR activism. Additionally, participants were unaware of reliable ways to assess or measure their project's impact. This limitation is particularly problematic for researchers trying to understand the ability of AR activism to achieve social change. To address this shortfall, future work might run longer-term ethnographic fieldwork or controlled studies with both creators and audiences to test the potential for AR activism experiences to affect community-driven or prosocial outcomes, such as changed perspectives or attitudes, the strength and type of emotional reactions, or taking additional action.

A second limitation of this work involves the majority of non-disabled participants chosen for this study and the corresponding challenges around centering access. Even with the best intentions and investments in discoverability, AR faces several barriers to engagement and use that greatly limit its engagement with disability justice movements and intersectional advocacy [15, 142]. Creators mentioned the hurdles to participation among groups without technical know-how, awareness, or familiarity. But they did not discuss the limitations associated with platforms that disproportionally exclude people with disabilities, as AR authors and audience members. The overwhelming emphasis of AR experiences discussed by participants was visual—relying on representations with few, if any, accommodations for blind users, a fact likely related to who and what we focused on in this study [142, 283, 345]. These overlooked access issue suggest the need for additional diversity in the selection of interviewees, projects, and projects audiences to understand the limitations to radical imagination in its current visually-oriented form.

By interviewing a range of contemporary AR activists, our work has only begun to scratch the surface of their activity. As the technology and its adoption evolves, this work offers initial insights into creators' needs, and the potential opportunities and challenges of using AR for activism. Future work should build on this analysis by describing the broader design space of AR activism, including the impact of different contexts for activism, technologies or devices used, strategies for augmentation, audience perspectives on participation, and consequentially, considerations around platform ownership and maintenance in the creation of new AR tools for social change.

7.6 Conclusion

We contribute, to our knowledge, one of the first studies detailing creator's experiences with AR activism, including their decisions, expectations, and ability to achieve their goals. We interviewed twenty people who worked on projects that used AR for social change, ranging from augmenting objects to display truths about corruption, to augmenting public spaces to reveal hidden histories of marginalized groups. We found that AR can be a tool with low barrier to en-

try and potentially high impact in emotional reactions to messages. However, limitations in the technology and available platforms still restrict participants' abilities to create and distribute their created experiences to audiences. We discuss open questions and implications for researchers, activist communities, and AR platform developers to consider around AR activism.

Table 7.1: Participant Table

Participan	Project Goal	Augmentation	Country
P1 & P2	Combat political corruption	Overlays text on political campaign advertisements	Germany
P3	Expose unethical art donation sources	Overlays textual data, audio, and video stories on museum art	USA
P4	Promote free speech	Displays cloud-shaped political text in the sky	USA
P5	Satirize US foreign relations	Distorts the visual appearance of US dollar bills	China
P6	Pro-democracy	Juxtaposes historical news images and videos in an art installation	USA
P7	Counter political misinformation	Overlays textual facts and data on political campaign banners	Germany
P8	Sexual violence prevention	Overlays text and audio on a physical memorial	USA
P9	Art democratization	Overlays digital guerilla art over physical paintings in a museum	Netherlands
P10	Spotlight Asian American identity	Overlays digital version of a cultural painting over an iconic location	USA
P11	Address institutional racism	Displays holographic historic images and objects at specific landmarks as part of a tour	USA
P12	Promote diversity	Overlays interactive narrative text and animations on one's surroundings as part an educational game; displays holographic statues at specific locations	USA
P13	Celebrate women of color	Displays an artistic holographic monument consisting of images, audio, and animations at a specific location	USA
P14	Black history awareness	Overlays videos over specific landmarks as part of a tour	USA
P15	Indigenous culture awareness	Overlays videos on cultural sculptures to tell stories	Canada
P16	Celebrate women of color	Displays artistic holographic monument featuring visual design and audio at a specific location	USA
P17	Environmental justice and awareness for marginalized groups	Displays holographic objects and avatars in one's surroundings, with which one must physically interact as part of a narrative game	USA
P18	Celebrate women of color	Displays a holographic avatar narrating historical stories at specific locations	USA
P19	Black history awareness	Displays educational holographic sculptures in one's surroundings	UK
P20	Black history awareness	Displays holographic avatar guiding a scavenger hunt and city tour	USA

Chapter 8
Playful Mobile AR for Reclamation

With confidence in mobile AR as a useful counterspace technology and excitement for exploring more central counterspace games, this chapter describes my dissertation research. Below, I explore another uplifting role of counterspaces *and* critical placemaking: *reclamation*. This chapter covers prior work that demonstrates how reclamation can uplift marginalized people and explains how a mobile AR counterspace game could especially support it as a ritual. Here I also present my dissertation contributions: 1) a playful method for envisioning counterspace across realities with marginalized people (synthesized from my application of critical placemaking to counterspace game design) and 2) an understanding of challenges and opportunities for counterspace games using emerging technology like mobile AR, including playful resistance and reclamation.

8.1 Introduction

Reclamation is the process of claiming something back or of reasserting a right. Reclamation has long been a practice of resistance for marginalized communities, ranging from reclaiming voice (e.g. [117, 293]) to different kinds of power (e.g. [300]) to reclaiming space (e.g. [188, 282, 327, 337]). In the context of resistance against oppression, spatial reclamation is challenging and dismantling oppressive systems in environments so that they become places that support the well-being of all communities, not just the privileged. This process includes multiple barriers at various levels of power and action, which is why emerging technologies like mobile AR are especially positioned to circumnavigate the limitations and bottlenecks of the physical reclamation process [288].

Spatial reclamation is especially important in places where oppression festers and marginalized communities strive to resist, e.g. urban spaces where inequality is perpetuated [14]. However, similar to placemaking, when activities under the label of "reclamation" are not practiced critically and reflexively, there is risk of instead creating and maintaining gentrification [339]. With this in mind, I pair mobile AR with counterspace game design to support marginalized peoples' spatial reclamation in-context and in real-time.

At the same time, its vital to keep in mind that emerging technologies like mobile AR are not immune to perpetuating oppression, consciously or not. For example, we see in the emerging metaverse how oppression has been carried into virtual spaces, and people have created even more ways to further marginalize vulnerable communities within them [34, 35, 106, 285]. Building upon my prior work on critically placemaking virtual, playful counterspaces *with* marginalized communities to support their well-being, my research begins to explore AR mobile game design to support spatial reclamation. In this chapter, I collaborate with marginalized individuals to envision how playful mobile AR can be used in unwelcoming environments to support their

overall well-being as a form of spatial reclamation. My work contributes a playful method for co-envisioning counterspaces across realities with marginalized communities as well as insights for how mobile AR can support BIWOC+ well-being in STEM contexts. From these, I additionally identify challenges and opportunities for counterspace games, including for resistance, radicalization, and revolution.

8.2 Motivation & Background

8.2.1 Injustice in Places

Systems of oppression are embedded within the physical environments we inhabit and navigate. This reality is apparent throughout all of my counterspace games work; it is why my earlier work is focused on creating separate environments that are purposely different. To further address this reality, I now turn to creating counterspace games within the same physical environments in which oppression is perpetuated. To begin, I draw from prior work on the nature, effects, and efforts against injustice in such environments.

8.2.1.1 Spatial Injustice

Spatial injustice is "an intentional and focused emphasis on the spatial or geographical aspects of justice and injustice...this involves the fair and equitable distribution in space of socially valued resources and the opportunities to use them" [296]. One example of spatial injustice is plants and factories situated near or within low income neighborhoods like the Bronx County in New York City, polluting the air where people live, work, and play [61]. Effects of spatial injustice disproportionately affect already vulnerable communities – for the example above, the asthma rate of children in the low-income neighborhood is three times the national average [61]. Efforts to combat spatial injustice have included community-driven and -centric interventions; one example is how the spatial injustice discussed above was addressed: with one exemplar of location-based, communal storytelling and speculative futuring interventions in the Bronx County of New York City [61].

8.2.1.2 Environmental Injustice

Environmental Injustice is "insight into the social, economic, and political dynamics of environmental decision-making, and the impacts of those decisions on minority communities" [187]. One example of environmental injustice is settler colonialism, which is "ecological domination, committing environmental injustice against Indigenous peoples and other groups." [333]. Effects of environmental injustice include settler colonialism undermining Indigenous peoples' social resilience and community sovereignty [333]. Efforts to combat environmental injustice like the settler colonialism discussed above include using and circulating Indigenous place names, creating an "Indian Country" map which is all of the US, and "disruptive truth telling" in spaces where Indigenous histories are being denied, like museums [303].

The two examples of spatial resistance against settler colonialism intervene in physical spaces, ranging from how they represent those environments to what stories will be told about their communities in those environments. To learn from and build upon this work (as well as my prior work on using AR for activism), my research explores how counterspaces can be similarly created in-the-wild. By using mobile AR, my work aims to facilitate reclamation at-will and in-context, essentially creating a counterspace game that can fit in your pocket.

8.2.2 Playing Games in Different Places

This work has previously spoken to the "place"-ness of the magic circle generated by playing games. The prior work that I draw from in this subsection pivots to understand how game design has interacted and intervened in physical environments.

8.2.2.1 Environment as Game Object

Prior work in AR and mobile AR has explored how these technologies can effectively make the physical environment in which play takes place a game object; that is, the environment, it's characteristics, and how players interact with it all affect gameplay. Examples include mobile AR games for co-located players that use clouds in the sky as interactable game objects [66] and even the movements of a domesticated cat within a physical environment [263]. In mobile AR used for social good, activists and artists have focused experience and play on the environments as sites for representing histories of marginalized people [288]. My work is inspired by the above and hopes to similarly use mobile AR to interact with the physical environment as a game object that can be reclaimed and reshaped to uplift marginalized people.

8.2.2.2 Pervasive Game Design

Pervasive games are characterized by play that extends into the "real world" [23, 214]. *Pokemon Go* is a popular example of this: using location services and mobile AR, players can visit physical locations all around the world to have different interactions with regional pokemon and battle in gyms defended by other players nearby [146, 237]. Going beyond entertainment, artists and activists have used physical location and mobile AR to similarly reshape what players experience in an environment, e.g. experiencing a future, climate-change ravaged dystopia while physically navigating the public space it once was in the game narrative [288]. Pervasive games' extension into the physical world has many forms, including mechanics that carry play across media, realities, contexts, etc. [23, 214]. My work aims to leverage the possibilities of these kinds of extensions while leaning on the immersive effects of overlaying digital content over physical environments in real-time.

8.3 Study Design

Building upon my prior work on developing playful XR environments and rituals to support overall well-being among marginalized communities (e.g. Mentorship Garden), my research explores creating in-context counterspace games through playful mobile AR design. To co-design

with participants, I iteratively designed and conducted playful counterspace vision workshops with BIWOC+ in STEM (as a way of circling back to my earliest collaborators in my counterspace games research), drawing from my previous adaptations of critical placemaking to counterspace design (i.e. Art across Realities).

In these workshops, I investigate:

- **How do BIWOC+ navigate and/or push back against oppressive environments?** Understanding this will provide insight in how they already experience and interact with hostile spaces in their every day lives. This will further inform an assets-based approach [173] to co-designing the pocket counterspace prototype by building upon the community's existing practices and strengths as opposed to creating an intervention to address a perceived deficit.

- **How do BIWOC+ interact with mobile AR or want to interact with mobile AR, if at all?** Understanding how participants already use and perceive this emerging technology will reveal participants' current relationship with mobile AR. This will inform how we might co-design for engagement and embodiment.

- **How do BIWOC+ imagine using mobile AR to create counterspace through reclamation of physical environments?** Understanding how participants envision this directly informs the Counterspace Game Vision.

From this, I contribute a refined co-storytelling method for co-envisioning how technology can playfully support marginalized individuals' well-being – including through joy, rest, and healing. At the same time, I analyze workshop data to understand the challenges and opportunities for using mobile AR in counterspace games. Specifically, I examine how participants envision AR being useful or delightful to their communities, to support their well-being, including its potential for reclamation. Drawing from my prior work where participants created semi-autobiographical fictional characters as part of playful storytelling, I elicit perceptions and experiences. I detail my workshop methods in the next subsection.

8.4 Methods

8.4.1 Participants

I recruited BIWOC+ in Pittsburgh and the surrounding areas to co-envision playful mobile AR for reclamation, seeking 9 to 15 participants across at least 3 workshops. Similar to my earliest counterspace game design research, I made it clear that nonbinary, gender fluid, and other nonconforming gender individuals who are part of communities of people of color are welcome and encouraged to participate. With this I was able to co-design in-person with participants as

PID	Race and/or Ethnicity	Gender Identity	Connection to STEM	Fictional Character
PA1	Indian American	Woman	PhD Student	Meera
PA2	Chinese American	Agender	PhD Student	Ginkgo
PA3	Filipino American	Woman	Master's Student	Tala
PB1	Korean	Woman	Industry Exp & Researcher	JoJo
PB2	Korean American	Nonbinary	Master's Student	Kiki
PC1	Puerto Rican - Hispanic	Woman	Undergraduate Student	Alana
PC2	Asian	Woman	Master's Student	Aqua
PC3	Black	Nonbinary	PhD Student	Wanda
PC4	Asian	Woman	Undergraduate Student	Yi

Table 8.1: Participant Identities, STEM Relationships, and Fictional Characters

well as monetarily compensate them $18 per hour.

I conducted three 1.5 hour playful research workshops with 9 participants total. Across workshops, participants identified as Asian, Black, Chinese American, Filipino American, Indian American, Korean, Korean American, and Puerto Rican - Hispanic. They also identified as women, nonbinary, and agender people of color. Participant grouping across workshops was based on overlapping availabilities, resulting in varying participant group sizes. Participant details are in **Table 8.1** below, with each individual participant referenced alphanumerically according to the workshop they attended. To contextualize my findings below, I include a section of brief portraits of each participant's fictional character as part of illustrative evidence.

8.4.2 Playful Research Workshop Design

I begin co-envisioning with BIWOC+ by learning about how they navigate oppressive physical environments, as well as their strategies for reclamation or mobile AR use, if any. The workshops present physical scenarios for roleplaying to understand how they envision using mobile AR in unwelcoming spaces, including by practicing reclamation in familiar STEM spaces. To understand their existing practices and perceptions, I iterated on the psychologically distanced but relatable fictional storytelling activity from my prior work [251]. This was to facilitate participants sharing about potentially sensitive, personal practices by asking them to co-create a fictional narrative about characters they personally create and could relate to. To scaffold this fictional storytelling, I draw from lightweight adaptations of table top role playing games (TTRPGs) like *Dungeons & Dragons*. Drawing from my prior work, scenarios include common experiences of marginalized people when entering environments dominated by oppressive STEM culture. Narrative scenarios also include the underlying premise that environments can be reshaped and thus reclaimed using mobile AR, available on their characters' mobile phone. Following roleplay in familiar STEM environments, I facilitate sharing and reflection on what

Wkshp	Character	Recruitment	Resources	History & News	Outdoor Sign
A	Meera			Reacting to OP	Original Poster
A	Ginkgo	Reacting to OP		Original Poster	
A	Tala	Original Poster			Reacting to OP
B	Jojo	Original Poster	Reacting to OP	Original Poster	
B	Kiki	Reacting to OP	Original Poster	Reacting to OP	
C	Alana	Original Poster	Reacting to OP		
C	Aqua			Original Poster	Reacting to OP
C	Wanda	Reacting to OP			Original Poster
C	Yi		Original Poster	Reacting to OP	

Table 8.2: Record of characters annotating as original posters and reacting to previous annotations at different roleplay scenes (all participants in each workshop annotated the Reception scene together at the same time)

they created in scenes using AR.

8.4.3 Playful Co-storytelling Roleplay

8.4.3.1 Semiautobiographical Fictional Character Creation

To center the wellbeing of participants as much as possible while asking them to navigate unwelcoming environments, I used Character Creation Sheets (see **Fig 8.2)** to facilitate making fictional characters. In workshops, I explicitly encouraged participants to include semiautobiographical details based on their personal comfort. To get them started, I asked participants to think about someone they admire in STEM and to use their traits as inspiration for their characters. As I guided participants through prompts, I used the fictional character I created for the workshops, Fern, as an example. Below is Fern's character portrait, assembled from all examples I shared verbally with participants during workshops:

> I admire my mentor, who works hard to make me feel welcome in STEM. This inspired me to create Fern, a character who cares deeply about diverse belonging in STEM. Fern uses they/them pronouns, has brown eyes, and prefers wearing comfortable clothes like sweats, etc. They have black hair and enjoys cozy games, like I do. Fern likes reading in quiet spaces to recharge, and they want to learn how to make 3D models of bread in Blender. They value community, innovation, and kindness. Fern has a favorite corner of a local library because it's almost always completely quiet there. In unwelcoming environments, Fern will do their best to stick it out if they absolutely have to be there, and they'll get themself a pastry as a treat afterwards. Fern is a web developer and has mixed feelings about STEM because of unpleasant experiences at work conferences. They are familiar with Snapchat filters that put an animal's face over their own, and they briefly played Pokemon Go when it was released.



Figure 8.1: Fern's Character Design Mood Board

As with all participants' characters, I also created a visual mood board to convey Fern's character design (see **Figure 8.1**). Across mood boards, I use participants' drawings whenever possible, and chose images that reflected any written details as needed.

8.4.3.2 Imaginary Mobile AR App for BIWOC+ Connection

To explore how participants and their characters might playfully use AR for reclamation in unwelcoming STEM spaces, I introduced an imaginary mobile AR app for BIWOC+ Connection, which they would roleplay using to create AR in physical environments (by annotating scenes using markers, colored pencils, crayons, stickers, washi tape, etc.). Below is how I verbally explained the tool:

> Now that you've created your characters, let's start telling stories about them! Let's say Fern knows each of your characters, and they tell them to try a mobile AR app for connecting with other women and nonbinary people of color in STEM. They explain how in the app, users can add any virtual content on top of physical environments, and that other users will be able to see it when they're in the same place. Fern shares they added the lock code for a single person restroom in a STEM building using AR so that other people in the community could use it too. They also saw AR hearts next to books recommended by other users in their favorite library! Fern asks your characters to try the app while they navigate different STEM environments

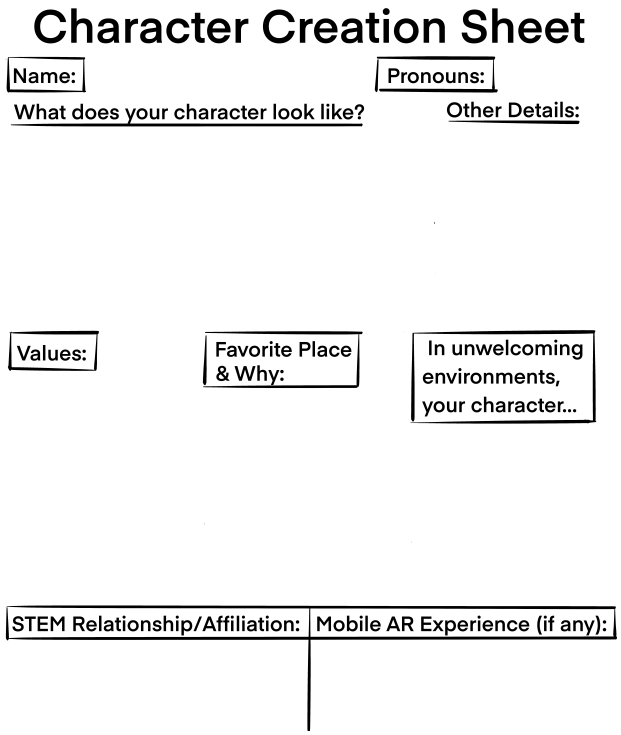


Figure 8.2: Co-Storyteller Character Creation Sheet

because it might be fun.

8.4.3.3 Roleplay Scenarios: Drawn from Real Events (Unfortunately)

For each scene representing a physical environment in STEM, I created sketches on large sticky poster sheets, which I affixed to walls in the workshop room. Below are descriptions and the bases of the roleplay scenarios:

STEM Recruitment Booth (Figure 8.3)

At a STEM Career Fair, students visit a tech company's table to network and ask questions. Two recruiters are giving their full attention to one student on the left. On the right, a woman of color (denoted verbally during the workshops) has been waiting for her question to be answered. Unfortunately, experiences like this are common among BIWOC+ in STEM.

BIWOC+ STEM Resources Table (Figure 8.4)

At a STEM Conference centered on uplifting BIWOC+, attendees crowd a resources booth. However, many of the attendees seeking these resources are not BIWOC+ (verbally noted during workshops). Unfortunately, this scenario is derived from a recent Grace Hopper Tapia conference, where men were everywhere and rude all over a conference meant to empower women in STEM [230].

STEM History & News Exhibit in Hallway (Figure 8.5)



Figure 8.3: Sketch of BIWOC+ person being ignored at a recruitment booth

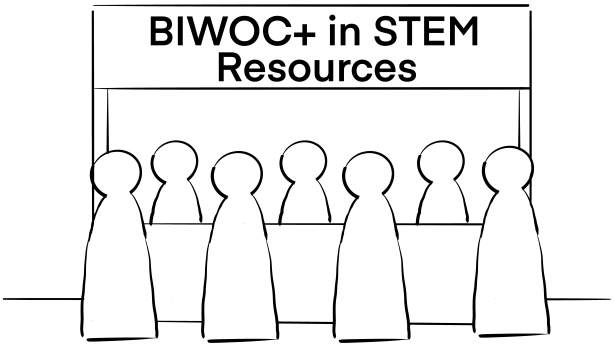


Figure 8.4: Sketch of non-BIWOC+ overrunning resources distribution for BIWOC+



Figure 8.5: Sketch of STEM location hallway celebrating non-BIWOC+ only

At a STEM institution, a high-traffic hallway wall showcases STEM historical figures, news of STEM awardees, and group photos at STEM social events. Notably, these images are dominated by white men (noted verbally during workshops). Unfortunately, this is a common scene in STEM environments – even when women and people of color are included, they are more often than not simply tokenized, nameless faces and bodies.

Community Sign on STEM Campus (Figure 8.6)

In a STEM environment, a sign for communal freedom of expression welcomes a well-known bigot. Several people linger around the sign to prevent the message from being changed or covered. This is most closely derived from CMU's Fence, though shared surfaces for communal expression are common in other STEM environments. The Fence is a point of controversy, and most recently it has been used to call out crimes of prominent figures [320]. For the workshops, I composed this scenario to parallel the more often incidents of communal messaging implicitly excluding already marginalized people in STEM environments.

STEM Conference Reception for BIWOC+ (Figure 8.7)

At an international STEM conference, women of color are invited to a reception as a special welcome for their community. Upon arrival, attendees find the reception is a room with a table, a sign, and some cups and beverages. Unfortunately, this is derived from prior experiences of women of color in STEM conferences.

8.4.3.4 Playful Research Workshop as Counterspace

Drawing from my prior work in workshops with marginalized individuals and critical, playful placemaking, I configured the physical room I ran workshops in to foster a comfortable, open atmosphere for guided roleplay and co-storytelling that centers BIWOC+ joy, rest, and healing. As environments with softer, warmer lights can be calming [147], I used only tabletop lamps with

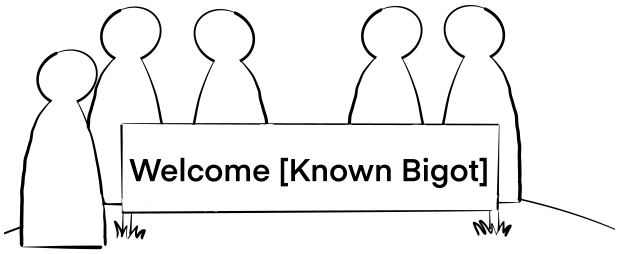


Figure 8.6: Sketch of non-BIWOC+ guarding a message welcoming a public figure who is anti-BIWOC+



Figure 8.7: Sketch of a sparse welcome reception for BIWOC+ at a STEM Conference

warm light to spotlight participants' character sheets and the roleplay scenes affixed to walls around the room. With the overhead lights off, I also drew from my earliest work by playing lofi music softly in the background throughout data collection, which can support wellbeing [83, 84]. Beyond this, I provided a wide array of supplies to signal the playful, exploratory, and joyful nature of the guided study activities (e.g., stickers, varieties of writing tools with finishes in glitter, metallic, etc.). Paired with simple snacks and a quick round of high-level introductions between participants, these choices fostered a sense of the BIWOC+ participants' joy, rest, and healing being central to the room and the workshop. This was additionally confirmed by participants who informally shared the workshop was restful, healing, and they enjoyed it thoroughly.

8.5 Fictional Character Portraits

For clarity, I present all participants' fictional character portraits here and separately from other descriptions of my study data and findings. Because each character design is rich and informs how participants envisioned using playful mobile AR in unwelcoming STEM environments, I introduce each here, prior to sharing the stories they told together. All character portraits were synthesized from character sheets and audio transcripts, and as much as possible use participants' original words. Similarly, all character mood boards feature participants' drawings whenever possible.

Meera (she/her)

PA1's fictional character Meera is South Asian, queer, and masc-presenting. She is tall and has dark, curly hair. She's into skateboarding and fashion. She wears a lot of jewelry, and dresses slightly goth, emo, and punk. Meera values justice, fairness, community, loyalty, and compassion – and she's super into activism (she goes to every protest and stands at the front). When she needs a break from being so active and public-facing, she likes to fade into the background at Coffee Tree Roasters while enjoying coffee and ambient noise. If she is with familiar people in unwelcoming environments, she becomes colder, and if something or someone rubs her the wrong way, she will become hostile. If she is alone in an unwelcoming environment, she becomes so anxious that she doesn't say anything and is unable to defend herself. She regrets not standing up for herself after. As a 4th year Physics PhD student, she loves her work but doesn't enjoy the experience of a Physics PhD because her lab and classes are unwelcoming. PA1 noted she is probably just forcing herself to finish the degree. Beyond this, Meera is super privacy conscious in STEM, including when using mobile AR. So far, she has used Snapchat and Instagram games and filters, but she hasn't wanted to use filters recently.

Ginkgo (any pronouns)

PA2's fictional character Ginkgo is Asian and looks androgynous, but will present in more gendered ways. They like fashion, fiber arts, and fabrication – so they often wear clothes and accessories they made themselves (all of which have experimental vibes). They enjoy and cook Asian food. They have many interests, and can be indecisive. Ginkgo has bright eyes, likes smiling, and they are friendly and kind to others. They have multiple animal companions. Ginkgo



Figure 8.8: Meera's Character Design Mood Board

values DEI, anti-imperialism, open-mindedness, kindness, empathy, compassion, gently challenging normative standards (when appropriate), and supporting community, community spaces, and mutual aid. Their favorite place to be is cuddled up in bed with their animal companions while enjoying good music, books, shows, or conversation with a friend. In unwelcoming environments, Ginkgo shuts down a little bit, and they find it difficult to talk or form thoughts. If they are challenged on a belief, they will reason back but also recognized sometimes you have to walk away. They don't try to engage much with people who are being unwelcoming. They grew up in a tech-heavy environment and studied computer science focusing on cyber security and computational geometry. Currently, they work on STEAM (Science, Technology, Engineering, Arts, and Mathematics) education tool kits. As a researcher, they are interested in reducing harms of technology and its creative or artistic applications. They pursue interdisciplinary projects, collaborating with people across fields. They work with local community for STEM education workshops. They actively connect their research with various activism work. Their experience with mobile AR includes getting pulled into various AR mobile games by friends. They also built their own AR mobile AR apps, but didn't have time to live test them deeply – though they have playtested experiences for friends in research and creative tech spaces.

Tala (she/her)

PA3's fictional character Tala Reyes is average height and has long black hair with purple balayage. She is very tan, has some freckles, and her eyes are brown, bright, and curious. She wears a capsule closet wardrobe of neutrals, but she likes adding surprise pops of color. She has a soulder tattoo, lots of ear piercings, and always wears jewelry from her home country or grandmother. Her parents immigrated, but she spent summers back in her motherland. She has love for gerbils, cats, and latin dancing(?). Her favorite place is a humid, powdery beach with high sun and access to a lot of history; on vacations, she wants to be close to water and to learn a lot. Alternatively, she enjoys being at a game table where she can finally have just the right amount of "relaxing" but fun mental stimulation and not take things seriously. In unwelcoming environments, Tala initially may exercise her resilience and compliance for the sake of harmony. If it gets really bad, she'll speak up, wait for a proper response, or leave to journal about it later while eating ice cream. As a design strategist and Product Lead in mobile games, Tala loves the work but is turned off by those who value name recognition over human decency. She previously worked in tech corporate before pursuing her passion for accessible games. Her experience with mobile AR includes playing Pokemon Go and using AR for home renovation. She also enjoys AR public art and Google Maps AR, but she doesn't like holding up a phone too much in public spaces because she has a tendency for being clumsy or hurting herself.

Jojo (she/her)

PB1's fictional character Jojo is fuzzy, cushy, warm, and loves wearing flowy skirts and vibrant colors, because being girly is also cool! She is charismatic and has a big smile, loud laugh, and cool hair. She always welcomes whoever reaches out for help–she had a challenging life and understands the value of endurance, resilience, and support. Jojo values kindness, openness, accepting, and resilience. Her favorite place is around people she can talk to, like the unique coffee place she recently found; she loves to take people there and chat. In unwelcoming environments, she will leave immediately, because she's busy doing things she loves. But if it's necessary to

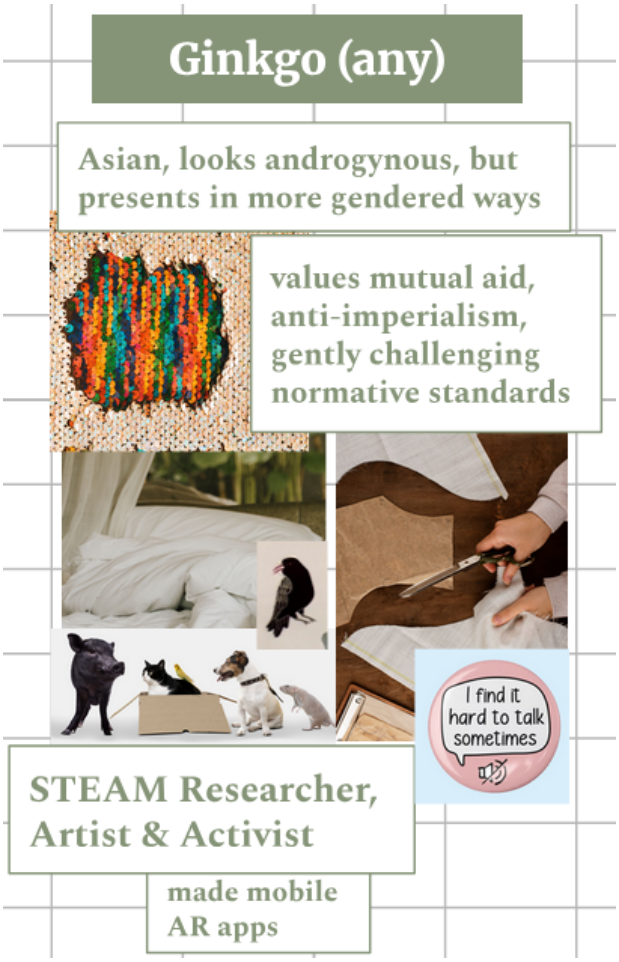


Figure 8.9: Ginkgo's Character Design Mood Board



Figure 8.10: Tala's Character Design Mood Board



Figure 8.11: Jojo's Character Design Mood Board

stay, then she'll target one thing at a time, e.g., making one friend, finding one thing she likes. In STEM, Jojo is a designer and researcher, working in a lab for mental wellbeing. Her work is a large part of her mobile AR experience: her team is developing AR game technology for helping people with negative rumination and navigating male-dominated tech culture.

Kiki (they/them)

PB2's fictional character Kiki has a round, friendly face. They are fashionable and dress in colorful, cozy, cottagecore, or goth styles. They love whimsy, cozy vibes, Moomin, and mushrooms. They play D&D, and have a PHAT orange cat named Soy (who has purple and yellow eyes). Kiki has lived in Europe, Asia, and the US, and they are a VERY RICH philanthropist. They value empathy, open-mindedness, friendship, DEI, accessibility, and quiet and cozy environments. Their favorite place is their mushroom cottage in the forest, surrounded by friends and loved ones, with their garden that can feed everyone. Alternatively, they enjoy being in a quiet, respectful library with no kids but with banned books – or coffee and tea shops. If they feel unwelcome in an environment, they use skills like DEARMAN from DBT therapy, or point out the word or behavior gently to assert themself. If someone else feels unwelcome in an environment, Kiki will check in with them ASAP, preferably one-on-one, to ask if they're okay, how they feel, etc. Kiki might just have to stand up for that person if they don't – or if the person does, they will do it with them so they're not alone. As a veteran researcher and designer in healthcare and



Figure 8.12: Kiki's Character Design Mood Board

social justice in HCI, they founded their own successful startup and wrote a book about their work and journey. They mentor women and nonbinary people of color students while they make art about STEM and run a YouTube channel on art and technology. Their mobile AR experience includes playing Pokemon Go, using Snapchat and other filters for AR makeup and clothing, as well as for video editing, animation, and art. Beyond that, they tried making a mobile AR robot in Unity, though they qualify it as very elementary.

Alana (she/her)

PC1's fictional character Alana has short black hair and wears very unique, groovy clothes with a lot of patterns, similar to 80s style. She is kind, easygoing, adventurous, active, and willing and able to go the extra mile for anyone or anything. She is hardworking and interdisciplinary. She is a dancer, triathlete, and entrepreneur. She values community, inclusivity, acceptance, authenticity, curiousity, passion, and being your best self. It's really important to her that everyone is able to be represented and everyone is able to be who they are. Her favorite place is the dance studio because she enjoys letting go and being free; dance helps her relieve stress and makes her feel like her. In unwelcoming environments, Alana tries to go beyond by really connecting with the people there, like breaking ice. She is a pretty curious person, so she wants to understand why that environment is the way it is, and then try to provide a solution in that way. She asks



Figure 8.13: Alana's Character Design Mood Board

herself what can be done to make this environment into one that is welcoming. She goes beyond the status quo and small talk towards connecting with people to change the process and possibly ideology that makes the system the way it is. As a product designer who majored in HCI, her feelings about STEM are mixed. While she enjoys the creative aspects, diversity in application, and learning material that come with UX and UI, her post-grad jobs left her shaky. She feels there are moral differences between the tech industry and who she is as a person, so it makes the relationship a little bit cloudy and difficult to balance. She is a big fan of mobile AR – she has taken classes focused on AR and VR, and she likes filters. As an entrepreneur in the tech industry, she focuses on mobile AR quite a bit – as a tech enthusiast, it is something she is passionate about.

Aqua (they/them)

PC2's fictional character Aqua is inspired in part by a past psychology lab mentor. They speak when it matters, stay organized, and always have brilliant ideas. They generally enjoy exploring themself. They care about their peers, they value critical thinking, creative ideas, inclusiveness in community and workspace, growing together, efficiency, and a sense of accomplishment. Their favorite place is a park or community playground, as they can interact with and learn more about different people, and sometimes recruit children as volunteers for their research. Alternatively, they enjoy being in their own room, where there is enough time and space to do things they really enjoy. In unwelcoming environments, Aqua tries to get started by approaching other people who may share a similar identity, or look friendly, to have some conversation. They probably



Figure 8.14: Aqua's Character Design Mood Board

wouldn't leave immediately, but stay a bit longer to see if things will change. If not, then they'll leave to continue doing their own things. As a psychology researcher, they love STEM and their work, but for them, academia is not an easy place to navigate. Because they're used to doing research with children, they have been exploring how to integrate AR so their study scenarios feel more realistic.

Wanda (she/her)

PC3's fictional character Wanda is tall, has long hair that she wears in braids or a curly pony. She wears hats and punky polo shirts with STEM designs. She is the CEO of a nonprofit robotics outreach company, and is in part inspired by the person PC3 met the day prior. Wanda is passionate about serving her community, especially mentoring and uplifting young people in and out of the classroom. She enjoys rollerblading, cooking, and hosting kickbacks for artists and people to play card games and have a time of fellowship and fun! Wanda values community, service, education, having fun and not taking herself too seriously, quality time with loved ones, and alone time for meditation, relaxation (resisting grind culture!), and reflection. Her favorite place is the YMCA because she gets to blow off steam, meet new friendly people, and see flyers for community organizations and plan to volunteer. In unwelcoming environments, Wanda thinks of jokes to cheer herself up (e.g., "that's why they're not coming to my kickback"). To additionally reduce some tension, she'll try to have a conversation as an education opportunity to learn about the way others think and talk to them about the many more ways we are all similar than different.

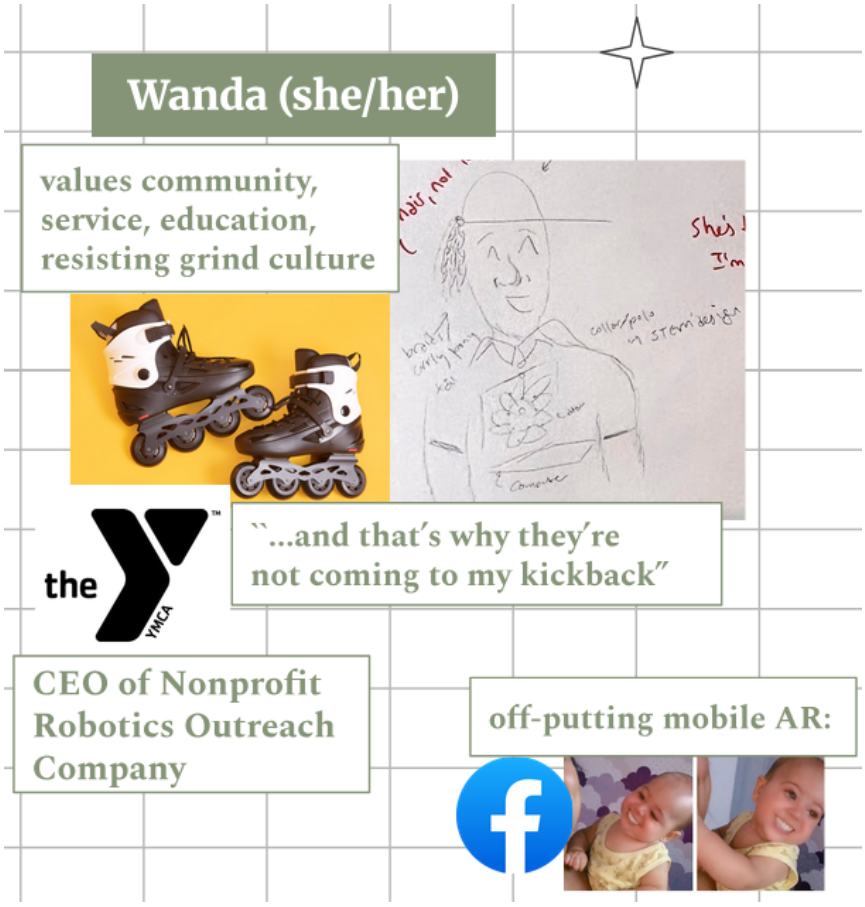


Figure 8.15: Wanda's Character Design Mood Board

However, Wanda recognizes when to walk away (at least for now), to not lash out, or to give herself and others space. As the CEO of a nonprofit robotics outreach company, Wanda frequently gives talks at universities and schools, especially her alma maters. Her mobile AR experience includes looking at Facebook and Instagram posts where people have a filter. Particularly on Facebook, people post pictures of their kids with an AR filter that makes them look weirdly adult ("Sometimes they have all these teeth, and they're a baby"), which can be off-putting for her.

Yi (she/her)

PC4's fictional character Yi is Asian, and she wears her hair in a low ponytail. She is inspired by PC4's friends who have written books, founded startups, are working in Africa, and pursuing PhDs in AR-related fields. Yi loves drawing, reading, hiking, tennis, meditation, and is a founder of an edu-tech startup. She values integrity, helping others, making a better future for the world, self-discipline, spirituality, and both STEM and the humanities. Her favorite places are cafés, where she loves to read, and parks, where she can enjoy nature. In unwelcoming environments, if it is necessary to stay, she tries to find out why it is unwelcoming. If it is a matter of stereotypes, she will break it by showing her professional abilities. Alternatively, she will seek out an authority or mediation method; she will ask for help from people to step in. If it is not necessary



Figure 8.16: Yi's Character Design Mood Board

for her to stay, Yi will simply leave. As a STEM startup founder, she wants to use technological methods to help more students in underdeveloped areas access learning resources. Her mobile AR experience is directly tied to this: she is exploring showing objects in museums using AR so students who cannot afford to go to the museum can see and learn from them.

8.6 Data Analysis

To derive design strategies and insights from the stories that participants told together, I analyzed their co-storytelling artifacts and audio transcripts of workshops. This included analyzing their fictional character creation sheets and mobile AR annotations drawn, written, or affixed on roleplay scenes. Transcript analysis focused on each participant's descriptions and explanations of their character designs and mobile AR annotations, which I elicited using think-alouds and reflections during each workshop. For both kinds of data, I conducted iterative thematic coding and analysis. First, I conducted initial coding and affinity diagramming to uncover potential themes. Next, with my research collaborators, we engaged in reflective discussion about emerging themes and their contributing codes and definitions. From there, we refined codes and the themes they illustrate, which I describe in the Findings section below.

8.7 Findings

Across my playful workshops, 3 themes emerged around how BIWOC+ envision using playful mobile AR in unwelcoming STEM environments: 1) Celebrating and empowering BIWOC+ and themselves, 2) Inviting and structuring support from non-BIWOC+, and 3) Embedding navigation information in-context for BIWOC+ well-being. Overall, participants envisioned playful, private AR creating protected, persistent opportunities for connection in-context. Below, I present participants' AR annotations in scenes along with their explanations to lay out these themes.

8.7.1 Self-Celebration & Empowerment Using Playful AR

8.7.1.1 Celebrating Community & Self

Across roleplay scenarios, participants playfully augmented the environment to challenge dominant narratives about who belongs in STEM, which includes who is respectfully represented and enjoys professional recognition. At the History & News Scene (see **Figure 8.5**), Jojo playfully used AR to celebrate BIWOC+ in STEM, including herself. As seen in **Figure 8.17** (in green ink), she added STEM content that recognizes and celebrates BIWOC+, clustering them to virtually fill in the gaps of the physical, incomplete representation of people and success in STEM. PB1 explained:

> "JoJo is bad [laughs]. She searched every information about women and nonbinary people of color, and what they did, and posted all over. She realized she wanted to post awarded news, but she realized there's not many...[she found] what exists, only two. That was all."



Figure 8.17: Jojo virtually fills physical gaps of BIWOC+ recognition and celebration

In the face of the dearth of celebration of BIWOC+ in STEM, Jojo added AR content that circumnavigated the traditional channels and metrics of STEM recognition and success – she added her own portrait as well as her colleagues on the playful layer of AR, where her community members would be able to enjoy them any time. In doing so, JoJo playfully used AR to reclaim a space that originally (intentionally or not) excluded BIWOC+ in STEM, turning it into a space that she and her community could use to celebrate themselves and each other.

Aqua similarly recognized and celebrated BIWOC+ in the Hallway Scenario. In **Figure 8.18** (in green ink), they filled physical gaps with AR content about BIWOC+ in STEM. Also, Aqua created a playful interaction for people to enjoy the AR content while learning about, recognizing, and celebrating BIWOC+ in STEM:

> "instead of only seeing this one frame, I'm imagining, AR can make this a booklet, so you can see multiple news of different people over different time..."

Like Jojo, Aqua included themself in their AR additions – they even added a group photo with Alana, Wanda, Yi, and Fern, the characters of everyone who was co-storytelling with PC2:

> "...assuming all five of us know each other, I would put pictures... like, one of us doing the presentation at the conference, or a new product launch from one of the companies. And also some sort of poster that we've made. So, just essentially make this space more feel like our space..."

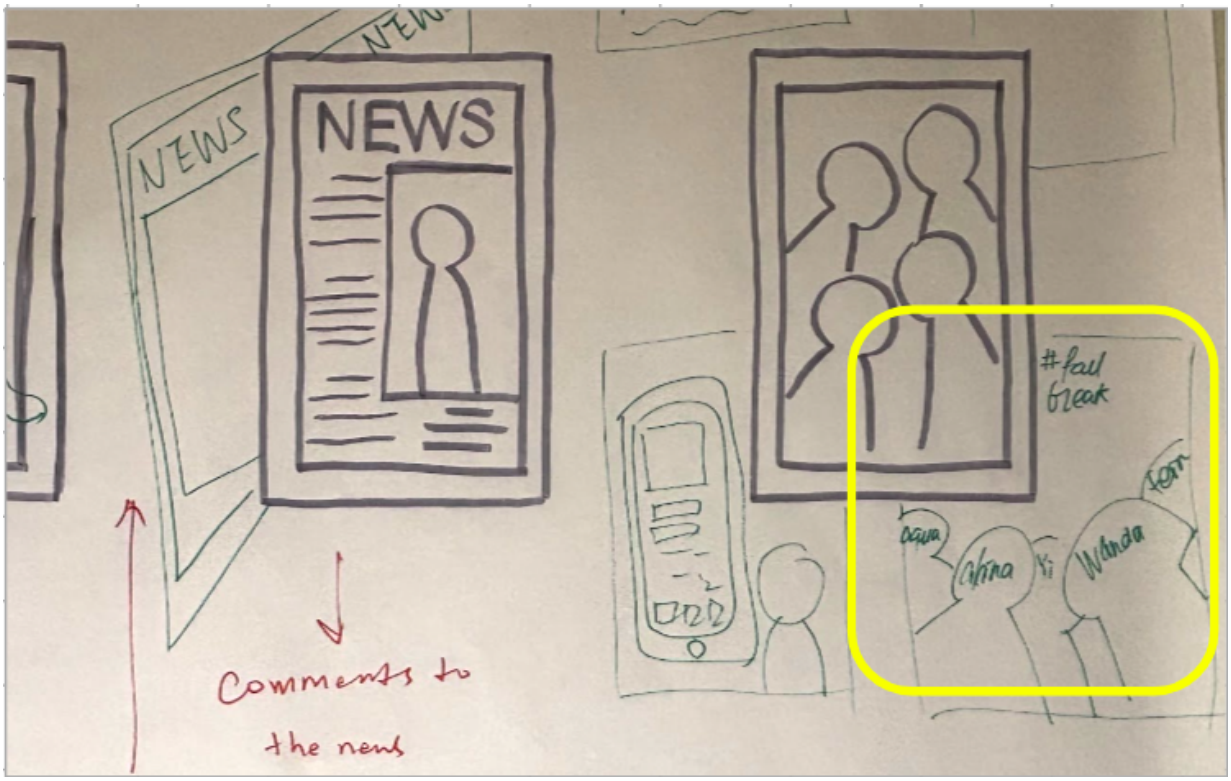


Figure 8.18: Aqua celebrates themself and their fellow BIWOC+ characters in STEM

Aqua added playfulness and inclusivity to the physical environment using mobile AR. They added an interactive AR news booklet, adding new opportunities for BIWOC+ in STEM to pause and enjoy recognition and celebration of their community in-context. On top of this, Aqua illustrated how connection among BIWOC+ in STEM can be uplifting even asynchronously with persistent AR: although other characters were spread across scenes at the time and Aqua wasn't sure when they would see their AR content, they created a lasting artifact that celebrates all of them for each to enjoy at their own time.

Here, Jojo and Aqua instill playfulness using mobile AR by joyfully centering themselves and their fellow BIWOC+ in an environment where they are initially invisible. They challenged the dominant narrative through this celebratory subversion, spotlighting their own and their community's presence and success in STEM. In doing so, play and mobile AR became their tools for reclaiming and reasserting their place in an environment that typically signals they don't belong.

8.7.1.2 Future Selves & Future Power

Participants also unexpectedly incorporated a bit of fictional time travel while envisioning using AR to support BIWOC+ in STEM spaces: they roleplayed as their future selves, equipped with more power to change STEM environments than they have now.

An exemplar is how Yi leveraged her experiences and resources while using the imaginary AR app at the Resources Table Scene. Like many participants, PC4 shared that Yi's character design was a mix of people she admires and her future self. Specifically, Yi is a founder and CEO of an

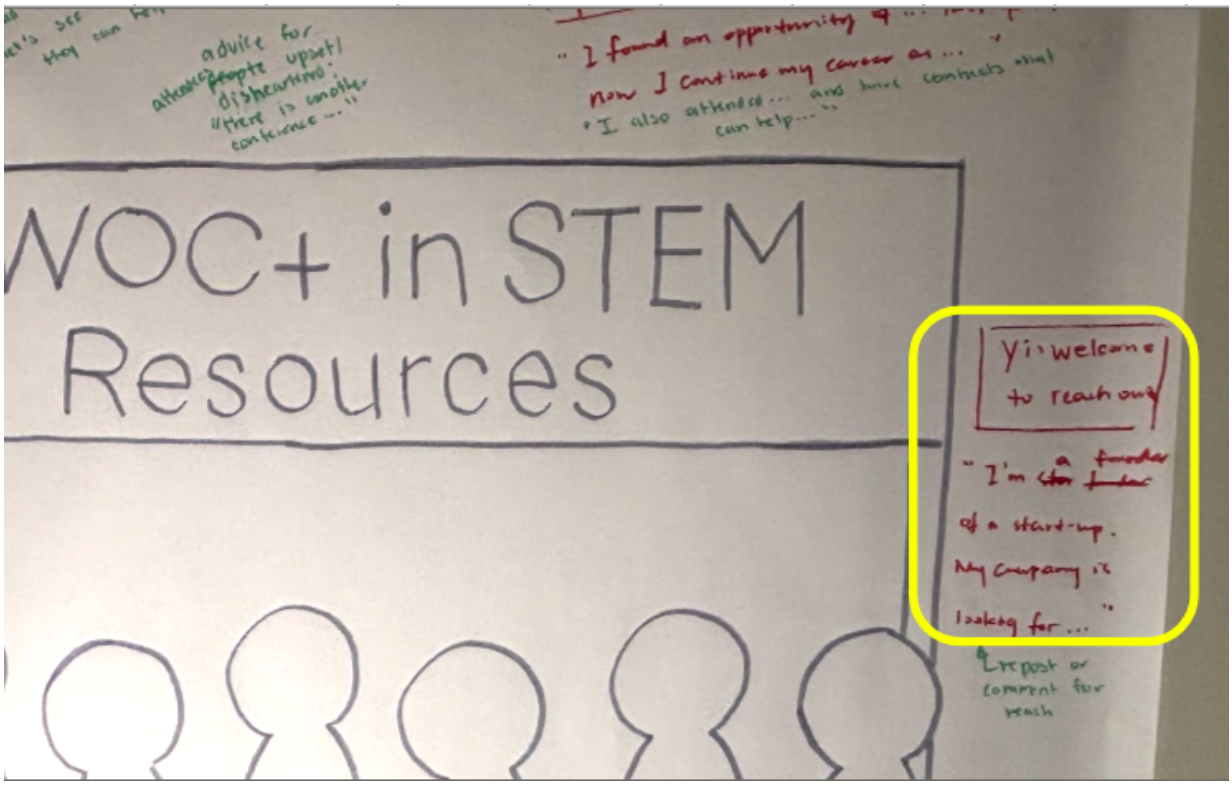


Figure 8.19: Yi uses her power as a CEO to provide opportunities to BIWOC+ where non-BIWOC+ are physically blocking their access to resources

edutech startup, and upon encountering the scene, she proceeds to use the resources and power available to her in order to support BIWOC+ in the space, synchronously and asynchronously. As seen in **Figure 8.19**, she left a way to contact her, info relevant to her company's hiring practices, and shared her own experiences for encouragement. PC4 explained:

> "...because Yi is a founder of a startup, so some people like Yi can also [do some] recruiting. 'I have some resources if you need opportunities.' And also encouragement from the past experience to say that I found some example opportunity last year. From here, now I continue my career as a software engineer. I'm encouraged like that."

By illustrating how Yi would use her experiences and position as a CEO, PC4 was expressing how she envisioned using mobile AR to support BIWOC+ now and in the future. More immediately, Yi's actions show how people with more power currently (including non-BIWOC+) can similarly support BIWOC+ in STEM using mobile AR in-context.

Here, PC4 and participants employ play, particularly exploratory roleplay of their future identities, to transform othering physical environments. They assumed the roles, qualities, and capabilities of their future selves to experiment with how they could intervene in STEM environments where they recognized BIWOC+ being marginalized. Through this form of play, participants were able to play-through and articulate how they – and others with more power– could use mobile AR to reclaim spaces to support BIWOC+ (with some strategies like those

described in this chapter being playful themselves!) .

8.7.2 Facilitating Allyship from Allies & Potential Allies

Similar to leveraging the power of their future selves, participants envisioned playful mobile AR as a platform for allies and almost-allies to effectively leverage their own power and privilege to make spaces more BIWOC+ friendly.

8.7.2.1 Calling in Almost-Allies

While one premise of the imaginary AR app was that it was a private and protected for BIWOC+ in STEM only, some participants envisioned opportunities to involve potential allies in changing physical environments. This included applying strategies for critical communication with mobile AR as a relatively low-stakes tool for productive discourse with people outside the BIWOC+ community. Wanda's annotations at the Community Sign Scene (in green ink) exemplify this. As seen in **Figure 8.20**, she uses playful mobile AR to express her reaction to what is happening in the physical environment. In addition to weeping emojis and *crying, sobbing*, Wanda leaves the message:

Yes, everyone is welcome. But this hurts. Where's the remediation? The Uni should stick up for us, especially when he's here.

PC3 further explains:

> "I thought about defacing it, but that was already what they [did], so I was like, let me not do that if I'm saying people shouldn't do that. And I wanted to leave room for other comments...for there to be some room on the same space. I don't know if they would overlap... but I was just saying, 'I felt really hurt at the language is just, like, 'welcome', ...you're hurting a lot of people, let's talk about it.' I thought it might be a better use of the campus time and resources to have a conversation with people who care, and not to just ignore the people who are hurting."

This scenario is in reference to when President Trump visited Carnegie Mellon University campus, which participants across workshops recognized. While The Fence's history includes calling out the racism of people invited to the campus as guests, during that time, the fence was used to address this politician as a rapist [125], which resulted in university leadership removing the message. While the roleplay scenario featured a different message, the implication remains the same: an individual who is a known bigot is welcome at CMU. Through Wanda, PC3 uses mobile AR as a way to start critical communication in a space that might otherwise only be charged with controversy and taking sides. Instead, Wanda uses emojis and shares her own experience to express how the environment affects her, highlighting the need for remediation and begin dialogue with allies and almost-allies. In doing so, Wanda showed how playful mobile AR could be used to shift and expand how non-BIWOC+ process and interact with an environment that is implicitly othering marginalized people.

Similarly, Aqua wanted to call in allies and almost-allies at the Community Sign Scene using mobile AR. Specifically, PC2 shared she is aware that international students sometimes do not know contextual, historical, and other US-specific details that contribute to an environment

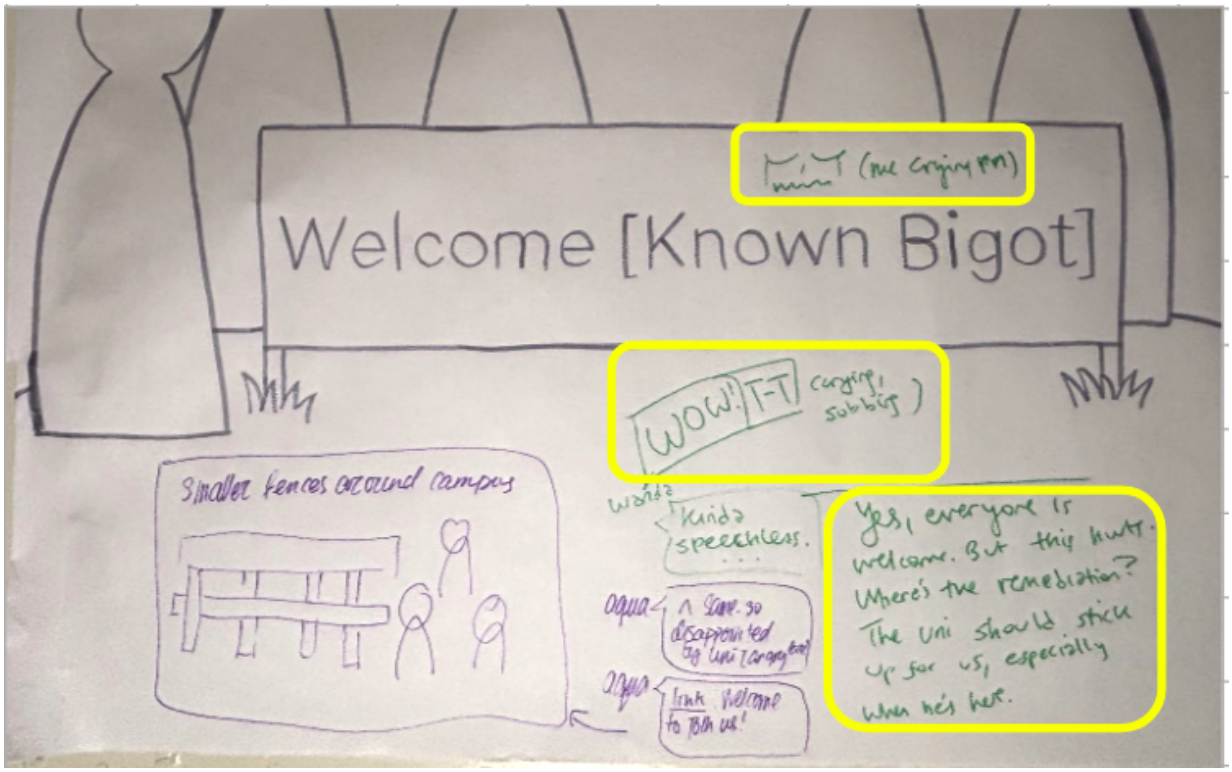


Figure 8.20: Wanda expresses hurt and calls for remediation in-context at the Welcome Bigot sign

becoming unwelcoming for different groups and as a result don't engage. Because of this, Aqua thought about using mobile AR to present these details and connections in-context so international students could get a sense of the layers that make the space what it is, and why it's necessary to support BIWOC+ and other marginalized people who share it.

As seen in **Figure 8.20**, Aqua added news as a trusted information source to better contextualize the message on the fence and what it means for already vulnerable populations on campus. Aqua follows this up by linking to more pertinent information, as well as validating the personal expression that Wanda shared in AR. In showing this support while presenting key context, they use mobile AR to uncover and embed the previously invisible circumstances and facts that can illustrate the gravity of the situation. PC2 shared:

> "...when people passed by, they were like, okay, whatever. But, if they can see a news article or previous report about what this person did or why we should care about this, maybe people will care more about this...I think when this person visited earlier this year, campus was not really a safe place, so I was leaving the message 'stay safe'."

In addition to their rationale, PC2 recalls what campus was like in the real-life event, which contributed to the serious affects it had on marginalized people. This informed how Aqua used mobile AR to show concern and support while also explicitly signaling that the environment is not safe for already vulnerable communities.

Here, Wanda and Aqua address critical matters using a technology that can support playfulness as desired, but can still be used to share important information in-context to illustrate gravity. Wanda begins with playful emojis for expression, but both she and Aqua contextualize the environment by highlighting facts and experiences to convey the seriousness of the message on the fence. In this way, they used mobile AR's range to reach out to allies and almost-allies, where playfulness was helpful for getting things started without detracting from the pressing reality, towards making that environment feel safe for BIWOC+.

8.7.2.2 Practicing Counterculture as Allyship

Participants also envisioned AR-mediated structures that present and encourage more inclusive practices in STEM professional settings. They envisioned playful mobile AR as a platform for BIWOC+-centric support as part of conference culture.

In the second workshop, Kiki visited the Resources Table Scene, set in a conference meant to especially empower BIWOC+ in STEM. There, in response to many non-BIWOC+ taking space, she envisioned playful mobile AR structuring allyship interactions between them and BIWOC+. As seen in **Figure 8.21**, Kiki imagined a companion mobile AR app for non-BIWOC+ allies that mediates how everyone can share and empower the BIWOC+-centric space: one area is reserved for BIWOC+ access to resources, another for "non-BIWOC+ to-be allies" to learn professional practices for supporting BIWOC+, and a shared space for allies and BIWOC+ to play a collaborative AR game (led by a mobile AR robot that Kiki created). PB2 elaborated:

> "So, if there's a BIWOC+ and a non-BIWOC+ pair, maybe they're friends, they're a couple, they're mentor and mentee, they come in, and they both are on the Ally or BIWOC+ app, they can unlock resources for them to collaboratively use.

> Both need to be there for the resources to be unlocked. And then there's also an AR robot, that if both parties scan their member code, then it leads a game that walks them through a situation of navigating a difficult or unwelcoming environment. And then they have to collaborate to successfully navigate. And then they can unlock achievements on the app."

Here, PB2 imagines playful mobile AR mediating how non-BIWOC+ occupy space that is BIWOC+-centric in a way that both supports them *and* creates an opportunity for non-BIWOC+ to learn countercultural practices they can carry beyond the conference and into their professional environments. PB2 goes on to similarly imagine how mobile AR could be playfully used to incentivize better, inclusive practices among companies in STEM. As seen in **Figure 8.22** (in purple ink), PB2 imagined AR heart badges could signal if a hiring company is BIWOC+-friendly, which are earned by welcoming company practices, and BIWOC-unfriendly points can signal bad experiences. PB2 detailed:

> "if the company has a heart badge, then that unlocks a feature for the BIWOCs to join the company's group chat on the AR app. So that's BIWOCs who want to work there, who are working there as an intern or full-time, or people who have already left or retired. Yeah, so they can all share their information about the company...[if a recruiter is unwelcoming,] they could gain BIWOC-unsafe points. Each point has a review, so the person gets to talk about their experience, and people can see that about that person. They scan, and they're like, 'oh, you're kind of dangerous'...[BIWOC+] can see the hearts and the broken hearts...like, if there's a lot of hearts here, that's a cool opener to check out, which also reinforces companies to house this feature."

As PB2 envisioned, Kiki can use the signals generated by playful mechanics to hold companies accountable for their treatment of BIWOC+ *and* to spare themself and fellow community members from bad experiences when possible. Gamified aspects like AR badges that represent upstanding reputation provide BIWOC+ with key contextual community knowledge to support better experiences in the recruitment event environment. Broken hearts or unsafe points complement this by making it desirable for companies to be welcoming, as more hearts means more people visiting their booths. In this way, they used mobile AR and playful community signaling to encourage individuals and companies to make STEM environments more inclusive for BIWOC+.

8.7.3 Protected & Persistent: Helping Each Other Navigate & Connect

8.7.3.1 Pushing Back in-Context & Portals to Alternative Spaces

In some scenarios, participants reclaimed and repurposed space not so their communities could safely and joyfully occupy them, but so that they became gateways to alternative, more welcoming environments as needed. In this way, unwelcoming environments that used to be dead ends became persistent portals, waiting to connect community members to friendlier, inclusive places and fellow BIWOC+.

Alana's AR annotations at the Recruitment and Resource Scenes were especially illustrative of this. As seen in **Figure 8.23**, Alana shares her experiences in the environment to inform the

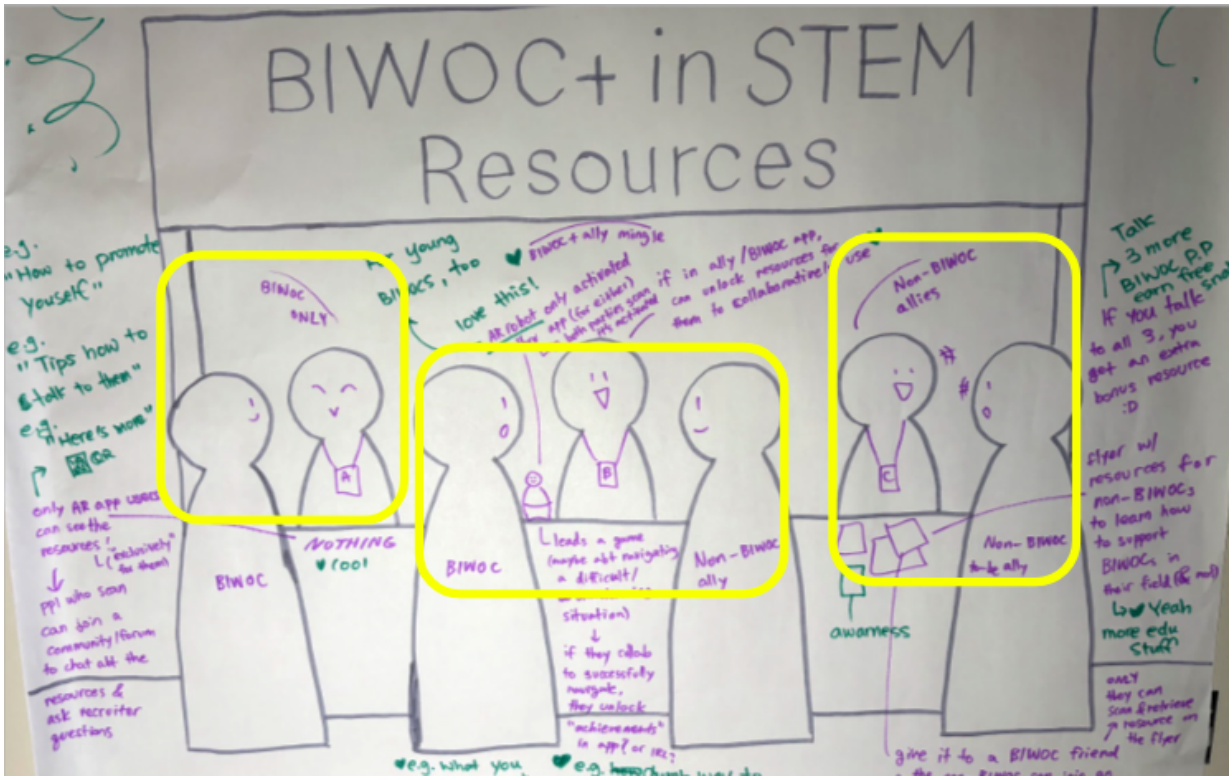


Figure 8.21: Kiki lays out how mobile AR can mediate who and how people share BIWOC+-centric space

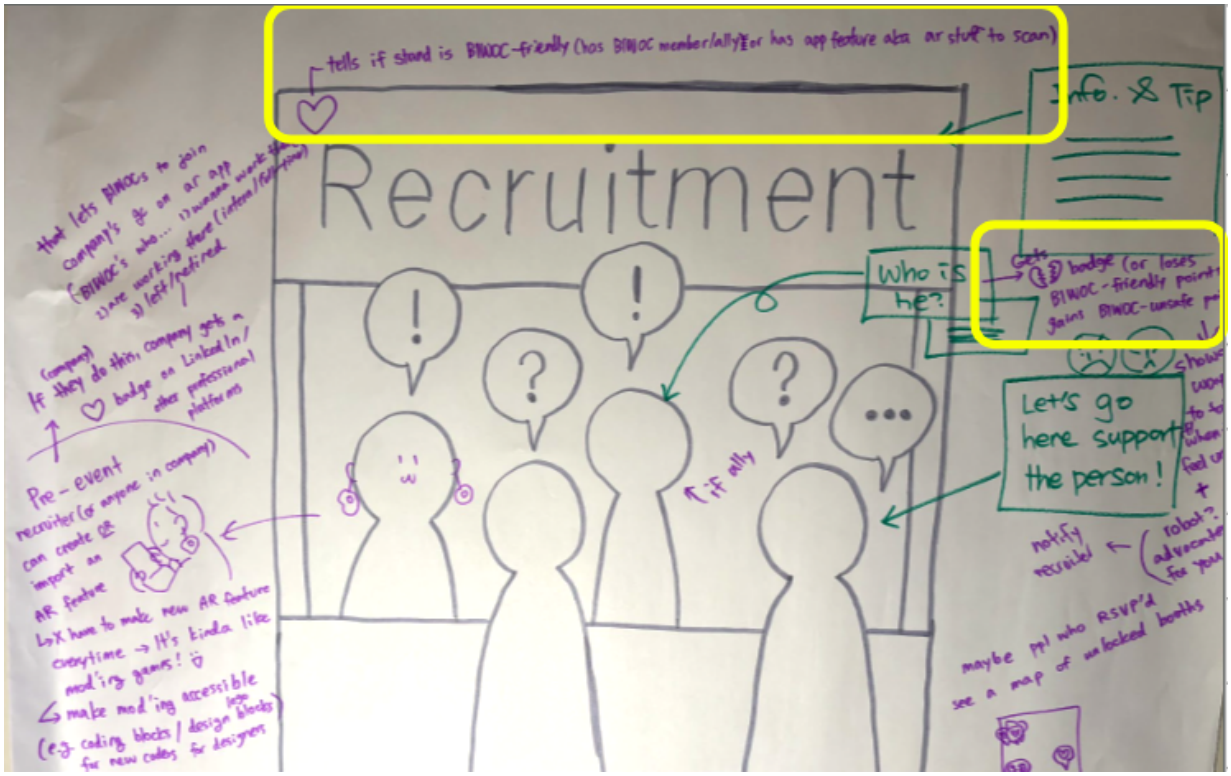


Figure 8.22: Kiki lays out how companies might be incentivized to treat BIWOC+ well

wider BIWOC+ community, pointing them to more welcoming ones as needed. PC1 explained: "Alana's talking about her experience...there could be a tag specifically for cases like this, where a company or an event might not be the most friendly for people using the app... if they were leaving her out on purpose, she could put that and list it so people don't have to waste their time on this station."

Through Alana, PC1 shows how playful mobile AR could be used for the BIWOC+ in STEM community to share important information in-context and asynchronously. In this case, Alana uses it to let BIWOC+ know what happened and that it might be best to skip this environment if possible. Similarly, Alana uses it to share alternative environments with other BIWOC+ in STEM. As seen in **Figure 8.19**, Alana shares about a professional environment were things are comparatively better than what is happening at the Resources Scene. PC1 elaborated:
"...for people who are upset or disheartened, [sharing] that there's going to be another conference that she knows about, she can help provide sort of awareness of that event, so their efforts don't go to waste."

Still, PC1 asserts Alana is not relinquishing the space by sharing information about an alternative conference:

> "Alana is a very empathetic person, she wants to understand other people's ambitions and goals, talking to the men who came... she's also not afraid of confrontation, so sharing what the conference is about and how it might not be the best fit for them...not trying to embarrass them, but being like, 'you know what this is, right?'

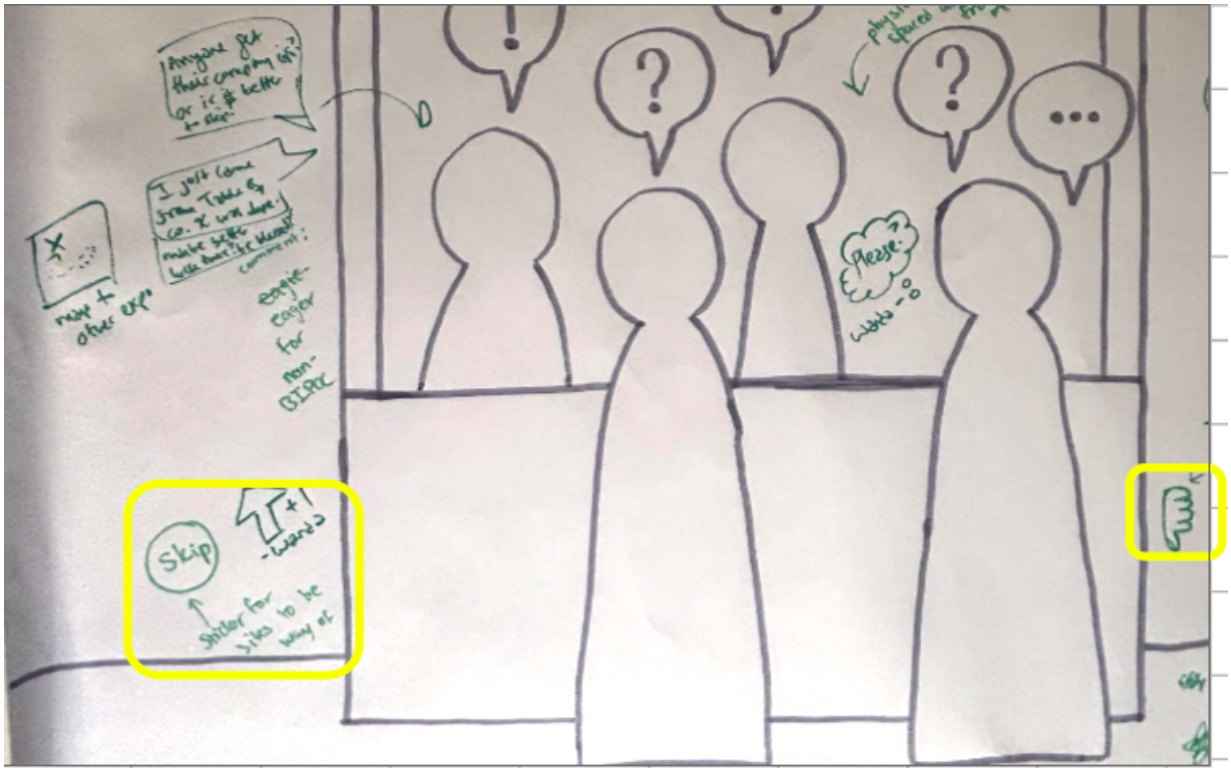


Figure 8.23: Alana uses playful visuals to keep fellow BIWOC+ safe and redirect them to better alternatives

And bringing up that awareness so they know the grounds that they're stepping on."

Here, Alana enacts how PC1 envisions mobile AR helping BIWOC+ in STEM navigate unwelcoming environments and even spaces for BIWOC+ that are being occupied by non-BIWOC+. Using playful signals like AR tomatoes for rating experiences, tags, and skip buttons, Alana and other BIWOC+ can push back in-context to help each other navigate (or when necessary, leave for better places). In this way, they used mobile AR and playful rating systems to improve how BIWOC+ can navigate and experience the physical environment, reclaiming and reshaping the space to support them.

8.7.3.2 In-Context, A/synchronous, Playful Community Connections

At the same time, participants envisioned AR creating structures for more connections between BIWOC+ in STEM environments. They augmented these environments to become settings for joyful connection both related and unrelated to BIWOC+'s STEM identities and professions – in ways for both synchronous and asynchronous community building.

Participants in the first workshop and their joint annotations at the Reception Scene explore some of these possibilities. Together, Meera, Tala, and Ginkgo augmented the lackluster "welcome" reception to become a collection of playful paths to shared BIWOC+ joy. As seen in **Figure 8.24**, in addition to expressing their reactions to the environment, the three characters leave persistent AR content to facilitate connecting soon and later.

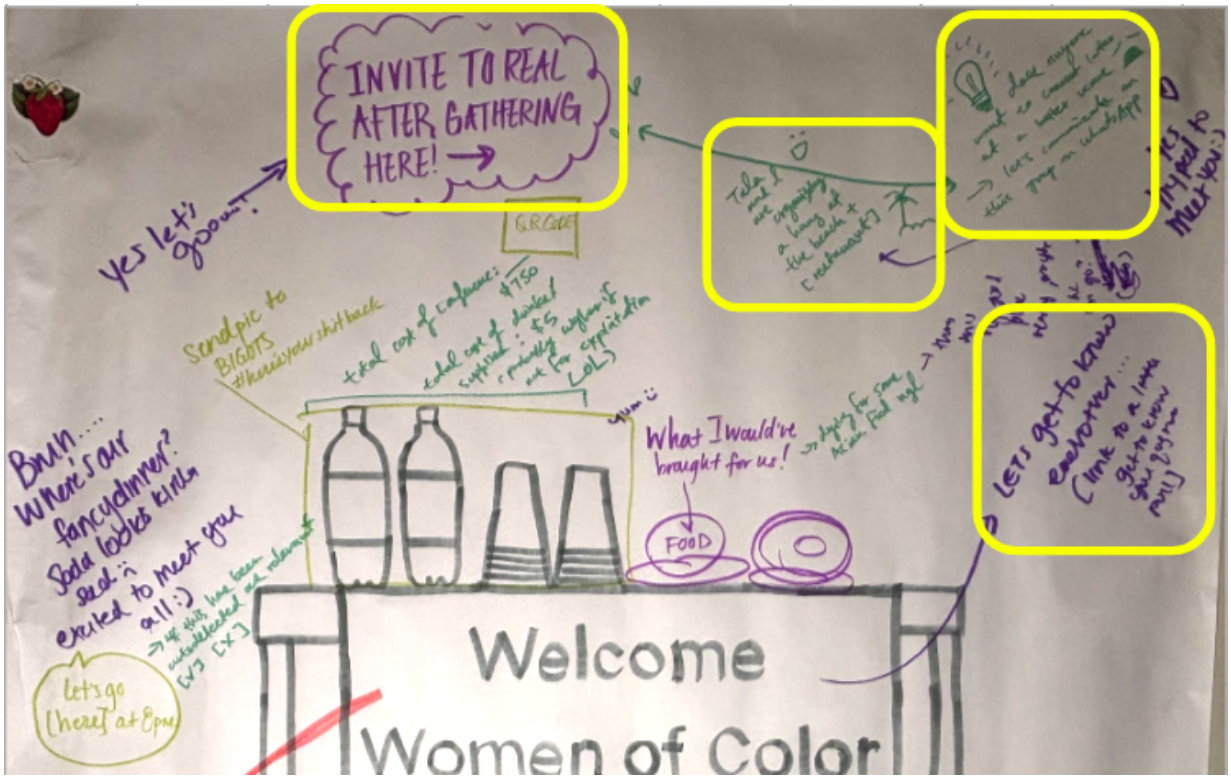


Figure 8.24: Meera, Ginkgo, and Tala annotate together to shift the sad reception to a joyful way-point leading to many opportunities for BIWOC+ connection

This includes *INVITE TO REAL AFTER GATHERING HERE!*, *Tala and I are organizing a hang at the beach + [restaurant]*, and *does anyone want to connect after at a better scene? let's communicate on this group on WhatsApp*, all of which invite BIWOC+ to synchronous communal gatherings that are being put on elsewhere. As persistent AR content, even after Tala, Ginkgo, and Meera physically leave the space, other community members will be able to follow their inviting trail to alternative, more welcoming receptions. Additionally, they left messages of excitement at getting to meet other BIWOC+ in STEM if they end up leaving the sad reception to meet up with them in another environment. Beyond the conference itself, the characters also left AR paths for asynchronous connection, including the aforementioned WhatsApp group and *Let's get to know each other...* with a link to a poll for the community.

Through playful AR visuals (e.g. emojis, icons of hearts, light bulbs, clouds) and inviting, welcoming words, they transformed the sad reception into a way-point full of eye-catching AR signs pointing to BIWOC+ joy, community, and celebration opportunities. This AR content directly counters the atmosphere created by the physical environment, generating a sense of excitement for connection. In this way, Meera, Tala, and Ginkgo enact how mobile AR can be playfully used to repurpose unacceptable environments as leads to better ones, and in a sense even reject these environments to continue to nurture their own joyful connections and experiences.

In relatively more permanent physical environments, Tala and Kiki used mobile AR playfully to foster similar asynchronous connections among BIWOC+ in STEM. As seen in **Figure 8.25**,

Tala, who likes gerbils *a lot*, included parts of her in AR that don't need to be STEM-related or even have a function beyond being delightful. PA3 explains the rationale for her AR gerbil and messages of encouragement to other BIWOC+ at the Recruitment Scene:

> "Yeah, I was like, I should just leave gerbils around [laughs]...I felt like I'd be very nervous to go up into this kind of conversation, but I wanted to put motivating signs around it...this is our time to be at this recruitment booth...so, there's some signs here that are hopefully motivating."

Through Tala, PA3 uses mobile AR to make the physical environment less intimidating, cutting through the unwelcome atmosphere using playfulness in the form of a surprise AR gerbil and warm words. The gerbil and messages are not only subverting the stiff norms of the space – they are also joyful pieces of Tala herself, who created them to share with the BIWOC+ community as a form of synchronous and asynchronous connection and support. Here, Tala uses playful AR to soften the unwelcoming AR and asynchronously support her fellow BIWOC+ in STEM, taking space that excludes them and using a communal layer of reality to joyfully welcome them instead.

Likewise, as seen in **Figure 8.17**, Kiki builds upon Jojo's AR annotations, envisioning AR content that could facilitate BIWOC+ asynchronous connections as they pass through the hallway. PB2 detailed:

> "I also like the idea of having hearts, but kind of like sprouts on their head, and that means they're looking for friends. So you can scan their profile then, see their bio, and maybe talk to them."

Through Kiki, PB2 additionally envisioned playful mechanics for fostering connections in-context asynchronously. They even extend the potential for asynchronous connection to non-BIWOC+. PB2 imagined:

> "maybe sprouts can evolve. And you can customize it...I guess it could be engagement: if it's an ally, it could be about their BIWOC-friendly points...with that they level up."

Here, PB2 further develops playful community signaling that could help BIWOC+ navigate physical environments by denoting welcoming spaces and potentially dangerous ones. Using similar signals, this playful mobile AR could help BIWOC+ navigate connections with non-BIWOC+ in their physical STEM environments. Specifically, they might be able to share about experiences with non-BIWOC+ whose actions show they are safe and supportive. In this way, Kiki and other BIWOC+ use playful signals in mobile AR to revise an unwelcoming physical environment as a source of contextual, social information that centers their wellbeing.

8.7.4 Design Guidelines from Participants' Visions

Taken together, my findings highlight key playful mobile AR strategies that underlie my co-storytellers' visions. These use strategies not only articulate what is possible – they also point to preliminary design guidelines for mobile AR counterspace games that support BIWOC+ in STEM's well-being in-context. Each strategy derived from their visions is linked to an underlying game verb, which is where these guidelines begin to form. In Celebrating and Empowering



Figure 8.25: Tala softens a potentially intimidating environment by leaving joyful pieces of herself for connection

BIWOC+ and Themselves, I can see that they were using mobile AR to playfully ***subvert* oppressive narratives in environments**. In Inviting and Structuring Support from non-BIWOC+, I can see that they were using mobile AR to playfully ***teach* allies and almost-allies how they could operate in spaces where others are marginalized**. In Embedding Navigation Information for BIWOC+ Well-being, I can see that they were using mobile AR to playfully ***redress* the kinds of experiences available to their community in those environments**. For example, to subvert oppressive narratives in environments, a counterspace game might reframe the space as a platform for players' counterstorytelling by superimposing memes templates for them to fill in. Similarly, to teach non-community members how they can help reclaim spaces that marginalize marginalized individuals, a counterspace game might leave trails of secret clues for players to follow to uncover dark patterns and practice working against them with their own privilege and power. Further, to redress the experiences that community members have in environments, a counterspace game might transform a physical place into a virtual gift giving hub, where players can anonymously leave digital pick-me-ups, words of affirmation, etc. for other community members to enjoy in that space asynchronously. Moving forward with these preliminary design guidelines, we can begin to create counterspace games that reclaim physical spaces for marginalized individuals' joy, rest, and healing.

8.8 Discussion

In reclaiming physical environments using mobile AR playfully, participants also highlighted juicy challenges and opportunities for further research: 1) the complexities and implications of marginalized communities using AR to annotate people while reclaiming space and 2) rethinking perceived limits of how AR can transform a physical environment through play.

8.8.1 Augmenting on People in Reality while Reclaiming Space

With the exception of the History & News Hallway and the Conference BIWOC+ Welcome Reception, I included people in sketches of physical environments because their presence and actions were key for context (e.g. how they were interacting with BIWOC+ or what messages they were promoting in the space). The premise of persistent content in the imaginary AR app created conditions in which participants could annotate relatively static aspects of the environment knowing that others would be able to see and interact with their content asynchronously, but it also enabled them to annotate changing, moving parts, such as people, while knowing that they would eventually move, leave, etc.

Primarily, participants annotated people and their actions; e.g., recruiters earning heart badges based on their behavior towards BIWOC+, or BIWOC+ asking in AR "who is he?" about a recruiter that was ignoring a community member. Participants were careful to clarify these annotations were not for attacking or "canceling" individuals, but rather marking their experiences with them in-context for the benefit of fellow BIWOC+. Across scenes, different configurations for who could see the AR annotations and who the content is meant to intervene with emerged: 1) AR annotations for BIWOC+ to see to help them navigate unwelcoming environments and 2) AR annotations for BIWOC+ *and* non-BIWOC+ to see as public signals of accountability that

incentivize inclusive practices among non-BIWOC+. These configurations warrant further study. What are the implications and ethical considerations of using AR to create on, about, and around people, even in a context of reclamation?

Participants were explicit about their AR annotations on people not being meant for attack, public scorn, etc., and this firmly grounds their intent in sharing useful information to keep other safe and/or creating opportunities for allies and almost-allies to learn about transforming environments through their actions in support of BIWOC+. However, it's important to investigate how in general, a playful ubiquitous technology like mobile AR can be used on people with intent to do harm. Broadly, there is opportunity here to explore how users might be able use AR to annotate others and their actions with respect for their privacy, safety, and consent. More specifically in the context of my research, there is opportunity to explore how marginalized communities might be able to use AR to annotate others in efforts to uplift their communities and keep each other safe, as well as how mobile AR annotations might be motivation for cultural shifts in STEM. Such work might begin by understanding how marginalized communities have semi-privately shared individual-specific information to keep others safe, like location-specific lists of creepy people to avoid in dating apps [10], and how that might have affected the people reported on.

An equally important concern is the onus of transformation of unwelcoming spaces. Taken together, participants' visions of playful mobile AR for reclamation present a potential middle ground where both BIWOC+ and non-BIWOC+ are in positions to transform unwelcoming spaces; however, it's likely that more often than not, BIWOC+ are adjusting how they navigate STEM environments as opposed to these spaces changing without prompting to better support them. Correspondingly, it's important to understand how to foster change motivated by genuine care, and not just public image. Future work in this area might start with gaining a deeper understanding of strategies for critical communication, like those presented by participants. In tandem, following research can continue to interweave insights from transformational frameworks and interdisciplinary approaches to environmental justice like critical placemaking and digital placemaking. In the meantime, it's also important to continue to explore more immediate approaches, as sweeping systemic change may take generations.

Beyond this, further research is needed to explore how BIWOC+ might annotate *each other* using playful mobile AR. In this explorative study, due to it's physical setup, participants would not have been able to annotate each other while roleplaying as their fictional characters; however, Tala did annotate a BIWOC+ person included in the Recruitment Scene, adding the words "FREE HER!" with an arrow. Further research might iterate my methods to make participants annotating each other possible, should they choose to, to explore potential interactions and implications. For example, using a readily available mobile AR app that enables users to add text, visuals, etc. to be persistent at specific locations (perhaps a custom app built in Lens Studio and usable through Snapchat) during co-storytelling and roleplay. Pursuing this thread of research further is detailed more in the concluding section of this chapter.

8.8.2 Potentials for Playful AR to Further Transform Physical Space

In environments like the Reception Scene, there are clear limits to how AR content can affect a space. For example, participants could not use mobile AR to make actual food available to eat,

and it cannot create a perfect, safe space in any given environment. While these limits hold (for now), participants have shown me the different forms of reclamation that are possible as they playfully created a new communal layer of reality in-context.

8.8.2.1 Towards a Mobile AR Counterspace Game Vision

Given that a Counterspace Game Vision is a document in which the community defines what "good design" is, future work could build upon the findings shared here to articulate juicy potentials for designing a mobile AR game that can counter dominant cultures of oppression in physical environments. Using findings from my BIWOC+ community collaborators as a starting point, articulating this vision via a followup study activity might generate statements like those below:

Playful mobile AR which centers BIWOC+ in unwelcoming physical STEM environments...
- changes who is recognized and valued in the space
- enables BIWOC+ to envision their potential futures and power
- forefronts facts, experiences, and other community truths
- shifts, and when necessary reinforces, who the space serves
- facilitates non-BIWOC+ learning and doing better by BIWOC+
- pushes back by holding non-BIWOC+ accountable for their actions
- sets an atmosphere in the space for BIWOC+ belonging
- rejects unacceptable spaces by making them signposts for alternatives
- connects disparate BIWOC+ synchronously and asynchronously
- embeds information in-context towards keeping BIWOC+ safe and well

Serving as a "north star" for the game design and development of a counterspace game, this vision can be honored using a variety of mechanics, starting with how participants already envisioned using AR. Further research in this direction can illuminate even more ways emerging technologies like mobile AR could be combined with the power of play to uplift marginalized individuals across contexts.

8.8.3 Fictional Character Actions in Context of Personal Choices & Concerns

With their fictional characters inspired by people they admire and sometimes a version of their future selves, participants shared they might have different concerns and make different choices when using mobile AR to reclaim STEM spaces in real life. For example, PA3 noted nuance in how she might approach the process compared to how Tala proceeded:

> "Tala is the woman I want to be, more outspoken. I hope I'd do the same and I think I would! I would just be conscious how to make AR surrounded by people if I don't feel safe around them."

Other participants shared similar thoughts, like PB1, when she reflected on how she might use the technology compared to Jojo:

> "I try but right now I don't have much to offer [crying face]... too busy to only survive..." though PB1 knew how she *wanted* to use playful mobile AR like this if she could: "raising more opportunities to collaborate with BIWOC+ people, teach/guide young BIWOC+, teach non-BIWOC+"

These reflections highlight the need for future work to explore how we as STEM professionals, community members, and culture-makers can support BIWOC+ feeling safe or like they're more than surviving. Because the onus of transformation typically falls on already vulnerable people like BIWOC+ in STEM, future research should explore playful mobile AR that shifts or at least shares the onus to non-BIWOC+, wherein reshaping spaces to be more inclusive could become a standard part of playful STEM practices.

Finally, participants had valid questions and concerns around privacy and safety of the imaginary AR app used for roleplay (e.g., how can we know for sure that it's only BIWOC+ creating AR content?). I told them to assume that whatever it takes for the app to be protected in the way they need, that it satisfies those requirements – this meant that their fictional characters could move forward without concern, but not the participants themselves. Future work should additionally explore how potentially uplifting technologies like playful mobile AR could keep marginalized users safe as well as not introduce new forms of harm. While this was out of scope for this exploratory study, understanding, envisioning, and defining this with BIWOC+ in STEM is critical.

8.9 Limitations

My dissertation findings articulate how we might use mobile AR as a playful tool for supporting BIWOC+ in STEM in-context. As an initial exploration, my research aims to spark future work around using playful, emerging technologies to uplift marginalized communities, building from approaches of refuge, ritual, and reclamation. As such, its limitations highlight additional opportunities for further research.

This research was conducted within one US city, and in an area centered around at least two universities, each with reputable STEM programs. Roleplay scenes were designed to be familiar to participants by echoing common experiences and major environment characteristics specific to this area. As such, the roleplay scenes are not comprehensive nor universal storytelling abstractions of unwelcoming environments in STEM and BIWOC's experiences within them. Co-storytellers from outside of this area may interact with the scenes differently, given their STEM environments and experiences within them as BIWOC+ might differ from my participants'. While my findings with my co-storyteller participants can be articulated such that an array of game designs and mechanics can be derived from them, it's critical to explore how these stories might unfold differently in different places, and with their specific BIWOC+ in STEM community in mind. Further research in this vein would require collaboration with ethnography researchers towards articulating a more diverse and comprehensive abstraction of STEM environments, their characteristics that make them unwelcoming to BIWOC+, and how specific BIWOC+ communities navigate them (and how they envision navigating them using playful emerging technologies). As a BIWOC+ in STEM who has lived in this study's area for six years, I pulled from my own experiences and the documented and shared experiences of BI-

WOC+ around me to inform the design of the roleplay scenes. Collaboration and application of ethnographic methods could further formalize these aspects towards better exploring all the ways mobile AR and play could support BIWOC+ in STEM wellbeing. One possible start can piggyback on the playful, communal culture of global game jams, going further by centering BIWOC+ in STEM and their storytelling within the context of their physical locations. By facilitating their visions in scenes they can relate to, this research has the potential to amass and distill a more comprehensive collection of potentials for mobile AR as a playful tool for their flourishing.

Also, my study design focused on interaction with an imaginary app during one-off workshops and does not yet explore how these reclamation strategies and playful interactions might be affected by time, the nature of a working prototype, and the unpredictability of actual physical environments compared to roleplay scenes. Because one priority in my study design was providing a counterspace for BIWOC+ in STEM participants to co-storytell, my decisions to abstract phyiscal environments and personal experiences and actions were necessary. However, further work built upon mine could add more understanding of how BIWOC+ co-storytellers envision using this kind of playful mobile AR themselves in the wild of their realities, beyond the self-reflection in my study. Relatedly, the "working prototype" need not be created from scratch – for example, existing mobile AR-capable apps like Instagram and Snapchat could be used as a stand-in for the imaginary app. Doing so could uncover important aspects of in-context interaction design not yet unearthed by my co-storytelling study activity (including the conditions for even deciding to use the mobile AR app in real physical STEM environments that are unwelcoming). Further building on the above, additional work should explore these in-context interactions over time, like the future work I describe in the next section.

Finally, my study is focused on visually-centric mobile AR. While this means many people would be able to use this playful technology (i.e. people who have access to smartphones), at the same time it means that low-vision and blind people are marginalized, and further deprioritized within BIWOC+ communities. Further research in this thread can expand whose voices and stories are centered in the design of playful emerging technologies used in-context across realities. For example, modding my dissertation methods to center spoken storytelling or other technology-mediated modalities of communication is one step towards exploring how low-vision and blind BIWOC+ in STEM can be supported in-context, without relying on visual content and interactions. Future work exploring audio-centric AR and other more accessible platforms is necessary and will no doubt reveal more opportunities for technology-mediated methods for playful resistance, especially when co-envisioning with communities with disabilities.

8.10 Conclusion

In this work, I explore how counterspace games could be designed to support reclamation of physical environments that are unwelcoming to BIWOC+ in STEM. Based on findings from playful co-storytelling about playfully using mobile AR in-context with 9 participants, I present 3 strategies: 1) Celebrating and Empowering BIWOC+ and Themselves, 2) Inviting and Structuring Support from non-BIWOC+, and 3) Embedding Navigation Information to Support BIWOC+ Well-being. In addition to these, I contribute my playful method for conducting research activities as counterspace to further support marginalized participants' joy, rest, and healing. My

findings also highlight opportunities for further research, including 1) concerns around augmenting people using mobile AR, 2) how playful interactions in mobile AR can breach perceived limitations of this emerging technology's effects on physical space, and 3) how these preliminary insights on counterspace game design for reclamation have prerequisites of safety and well-being, which highlights the need to share and shift the onus of transformation so that already vulnerable people need not do extra labor in order to exist and enjoy play across contexts. Taken together, these contributions inform preliminary design guidelines for counterspace games for reclamation: 1) subvert oppressive narratives in environments, 2) teach allies and almost-allies how they could operate in environments that marginalize others, and 3) redress what experiences are possible for players in otherwise unwelcoming environments.

Chapter 9
Conclusion

Taken together, my research in all the previous chapters presents how co-creating counterspace games with marginalized communities for playful refuge, ritual, and reclamation can support their well-being. Here, I summarize my dissertation contributions. Applying what my research has illustrated so far, I discuss paths for further research below. Beyond my research study designs for continuing work on exploring mobile AR counterspace games for reclamation, I discuss 3 emergent threads of counterspace game research which are central to my professional and playful research practice.

9.1 Summary of Contributions

Play is essential to well-being. Beyond entertainment, playing games can foster positive experiences and connect players with each other in lasting bonds. However, players who differ from the cisgender heterosexual white male player archetype often experience racism, sexism, and other attacks in and around digital games. Players of marginalized communities have always played games, and in response to the harassment and other abuse that is rampant in game spaces, they have developed practices of playful resistance. Strategies like counterplay, inclusive game modding, and centering their own voices in game design and development have long combated oppression and uplifting marginalized players in games; however, this does require extra labor from already marginalized players in contexts where they should be able to simply have fun. To complement these important strategies, **I propose co-creating counterspace games, which function as safe spaces that center marginalized players' well-being *without* requiring their labor, resilience, etc.**

In **Chapters 1** and **2**, I conceptualize counterspace games as places that can be designed to combat oppression and uplift marginalized players.

In **Chapters 3** and **4**, my co-storytelling study with BIWOC+ in STEM and my autoethnographic play analysis show how games can function as refuge from dominant oppressive cultures.

In **Chapter 5**, I theorize how approaching game design as critical placemaking can support counterspace game creation.

In **Chapter 6**, my Mentorship Garden research shows how playful counterspace can be cultivated in a work context by embedding uplifting rituals.

In **Chapter 7**, my work on understanding AR use in activism conceptualizes how marginalized creators have used this emerging technology to combat oppression in physical environments.

In **Chapter 8**, my work with BIWOC+ in STEM to envision using playful mobile AR shows how counterspace games could reclaim physical spaces.

My dissertation collectively introduces, characterizes, and positions counterspace game design as a strategy for combating oppression via refuge, ritual, and reclamation across contexts and realities.

9.2 Future Work

Beyond the scope of my dissertation research, my contributions will inform my future iterative design of a prototype mobile AR pocket counterspace game for reclamation of physical environments, and together with participants I will investigate how it can support them as individuals and communities. Further drawing from my prior placemaking adaptation work, I will convene with participants in prototype alignment and play vision check-ins throughout the design and development process. Then, I will deploy a refined prototype for participants to use at will in the wild for 3 weeks, during which time in-game surveys and prompts will collect data about when, why, and how they use the prototype. I will conclude this qualitative study by conducting 1:1 semi-structured interviews with participants, focusing on their experiences throughout the design process and their experiences with their pocket counterspace games in the wild. From this, I expect to synthesize design principles for mobile AR counterspace games for reclamation as playful resistance. Throughout this process, my work will seek to answer the research questions detailed below.

In my post-dissertation qualitative study, I will explore:

- **How do BIWOC+ perceive their agency and roles in physical environments across contexts with the pocket counterspace?** Learning this from in-game surveys and prompts will provide insight into the participants' pocket counterspace use over the 3-week period and further inform lines of inquiry in semi-structured interviews.

- **When, why, and how did BIWOC+ use the pocket counterspace prototype in the wild, if at all?** Understanding if and how participants used the prototype unprompted across contexts will provide insight in how a mobile AR counterspace could support reclamation as an uplifting practice.

9.2.1 Iterative Prototype Alignment Checks & Play Visions Updates

Also drawing from my placemaking translation, participants will be involved with the design and development of the prototype at every stage. This will be possible through multiple prototype alignment checks, during which the same participants from the workshop will be able to interact with the prototype's current state and provide feedback. Open-ended prompts for feedback will be included to continue to leverage the invaluable experiences and insights of participants, further applying the principle of the Community is the Expert from the placemaking process [254]. The core purpose of the alignment checks is for participants to assess and discuss how well the prototype adheres to the Play Vision they generated during the workshop. In other words, some misalignment may call for changes to the prototype trajectory - and others may instead call for changes to the original Play Vision, depending on participants' assessments. Completing this process iteratively can ensure that research and design remains connected with and under the influence of participants' original *and* changing wants and needs for the counterspace.

9.2.2 Pocket Counterspace in the Wild

The qualitative study will culminate with participants taking a refined pocket counterspace into the wild for 3 weeks, so that I can better understand how they might interact with the prototype in their day to day lives, unprompted. When they do choose to play the prototype, they will respond to in-prototype prompts about their experiences with their pocket counterspaces, which will include questions about the physical environment they used the game for, and how they used it to intervene in it if at all (and why). After this, I will conduct semi-structured, 1:1 interviews with each participant to further understand when, why, and how they used the prototype if at all. Probe questions in the protocol will be informed by the in-context collected in-prototype. Part of these interviews will also be dedicated to prompting reflection on their participation experiences with the methods I translated from placemaking.

9.3 Playful Resistance, Radicalization & Revolution

In parallel to the future work above, I am moving forward from my dissertation by building upon my 3 main findings of the previous chapter, with special attention to sharing and shifting the onus of transformation so that already-vulnerable communities like BIWOC+ are not required to do labor in environments where they should simply be able to exist and play. Specifically, my research will further explore and develop the underlying playful counterspace game design guidelines of each. Where celebrating and empowering BIWOC+ and themselves is specific to my study's exploration of envisioning mobile AR for use in physical contexts, my continued research will continue to explore subverting oppressive dominant narratives in physical environments using playful technologies. Accordingly, from inviting and structuring support from non-BIWOC+, my continued work will explore using play to introduce and teach how privileged people can move in spaces that marginalize others. Likewise, from embedding navigation information for BIWOC+ well-being, my work from here will explore how play can both reveal and enact ways we can redress what experiences marginalized communities endure across realities. Below, I explore the root play verbs of these 3 emerging, underlying counterspace game design guidelines to present opportunities for continued research on counterspace games for resistance, radicalization, and revolution.

9.3.1 Counterspace Games for Resistance

Playful counterspaces in my research *resist* by design: in them, *play refuses and rejects oppressive dominant culture*. This can look like playing through healing narratives of hope amidst entrenched systems of oppression (see **Chapter 4**) or even placing previously invisible individuals center-stage in places they experience erasure (see **Chapters 7** and **8**). As instances of uplifting counternarrative and subversion, these counterspace game design strategies are just two examples of playful resistance in practice. This highlights the opportunity for further work on counterspace games for resistance – for subversive play that does not require counterplay from already marginalized players. The creative works in **Chapter 7** are exemplars that can guide further research in this direction, where player re-inscription of resistance is not necessary,

as it was in **Chapter 4**. Furthermore, this is just one way we might share and shift the onus of transformation to game designers, developers, researchers, etc. instead of leaving it solely to already marginalized players. So, moving forward, my research asks: how can we create counterspace games that subvert oppression as playful resistance?

9.3.2 Counterspace Games for Radicalization

Similarly, my research includes playful counterspaces that *radicalize*: *through play, they educate and facilitate how we can change, transform, and do better by each other*. Radicalization via play might look like normalizing whole human being check-ins during mentorship meetings (see **Chapter 6**) and an AR robot guiding non-BIWOC+ through alternative ways to move in environments that exclude BIWOC+ (see **Chapter 8**). Such examples of teaching alternative practices additionally show opportunity for further research on counterspace games for radicalization. Perspective and personal practice-shifting play, built upon behavior change, could radicalize players and their communities to actively combat oppression using their privilege and power. In this way, counterspace games for radicalization could function as places where players can learn and practice strategies for fighting oppression, and at the very least not perpetuating it. As participants in **Chapter 8** envisioned, counterspace games for radicalization could bring allies and almost-allies into ongoing fights against oppression. In turn, this can help share and shift the onus of transformation so that already marginalized people need not combat oppression alone. With this in mind, future research might ask: how can we create counterspace games that can recruit and guide those with more power and privilege as playful radicalization?

9.3.3 Counterspace Games for Revolution

Intertwined with resistance and radicalization, playful counterspaces in my work seek to *revolutionize*: *to fundamentally change our practices and cultures through play*. This can look like a mobile AR game that facilitates equitable distribution of resources or playful signals for tech company and recruiter accountability (see **Chapter 8**). Counterculture-cultivating play like this could combat oppression by redressing the norms, expectations, and systems that are typically oppressive. This also aligns with the goal to share and shift the onus of transformation by baking counterspace practices into how we operate as community members, professionals, etc, as in **Chapter 6**. Instead of requiring marginalized communities' resilience and endurance, we can use play to experiment, practice, and refine what our cultures and systems *could* be, what they *could* do after transformation. Like my work in **Chapter 8**, leveraging emerging technologies and design strategies that help play bleed into the real lives and physical environments beyond the magic circle have the potential to support counterspace games for revolution. As interwoven with resistance and radicalization as revolution is, future work on this includes the questions posed above, as well as: how can we design counterspace games that support cultural, systemic transformation as playful revolution?

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