Negotiating Systemic Racial and Gender Bias as a Minoritized Adult Design Researcher

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ABSTRACT

Fostering equal design partnerships in adult-child codesign interactions is a well-documented challenge in HCI. It is assumed that adults come into these interactions with power and have to make adjustments to allow childrens' input to be equally valued. However, power is not a unilateral construct - it is in part determined by social and cultural norms that often disadvantage minoritized groups. Striving for equal partnership without centering users' and participants' intersectional identities may lead to unproductive adult-child codesign interactions. We codesigned a game, primarily facilitated by a black woman researcher, with K-5 afterschool programs comprised of students from three different communities – a middle-class, racially diverse community; a low-income, primarily African American community; and a working-class rural, white, community over a period of 20 weeks. We share preliminary insights on how racial and gender biases affect codesign partnerships and describe future research plans to modify our program structure to foster more effective adult-child interactions.

CCS CONCEPTS

• **Human-centered computing** → Interaction design; Interaction design process and methods; Participatory design.

KEYWORDS

Participatory Design, Codesign, Cooperative Inquiry, Children, Design Methods, Minoritization in Codesign

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1 INTRODUCTION

As a research approach, codesign is an extension of participatory design; it allows users and design experts to work together to create a product that equally considers input of all stakeholders [2, 31]. While children have historically acted as active contributors when working with adults, prominent participatory design researchers have stipulated that the goal of this interaction should be that of equal partnership [7, 14, 22]. They advocate for equal power in the midst of these interactions as children need to know that their ideas are taken seriously. However, other researchers have challenged the practicality of this goal, citing that adults have unequal access to knowledge, influence, and power, compared to children [23]. They insist that even without equal partnerships, children can still contribute meaningfully in design partnerships as informants, testers, experts, and design partners [24, 32].

Both positions assume that adults come into these interactions from a position of power, and either have to reduce this power to elevate childrens' authority or retain their power while elevating and validating childrens' ideas. In most studies on codesign with children, adult facilitators are described in monolithic terms as people who have training and expertise that will be respected by children. However, researchers themselves present with obvious cultural, racial, and gender identifiers; the assumption that children will treat researchers with the same levels of authority and respect seems naive given increasing evidence of racial, gender, and systemic inequality in the United States [33]. Research studies show that even children as young as three years old express racial bias amongst their peers and towards adults [1, 17, 28, 29].

While this evidence of bias amongst children is not new, the topic is underexplored, especially related to the quality of adult-child interactions in codesign settings. The few studies, e.g., [40], that even describe the demographic composition of children and adults in codesign interactions involve researchers who come from racially dominant groups and/or are of similar race with the children. HCI researchers have yet to investigate whether these biases exist in codesign interactions with researchers from minoritized groups, how these biases affect power dynamics, and how researchers can modify their roles in such spaces to foster effective codesign partnerships. Our research team codesigned programming games with students aged 5 - 12 from middle-class diverse race, low-income African American, and rural working-class white communities over a period of 20 weeks. These sessions were primarily run by an

African-descent woman researcher with a PhD from a well-known school in the city. Using a bias-understanding activity, we investigated if children in codesign interactions demonstrate bias towards women and racial-minority adults, whether these biases affect their interactions with codesign facilitators, and if this degrades the efficacy of codesign partnerships. Our research contributes to a number of fields where participatory co-design is employed, illuminating potential breakdowns in codesign partnerships as a result of preconceived stereotypes. The present research takes place in the domain of video game design, where long-standing biases toward white, male developers and audiences have been underscored through both prevailing patterns of underrepresentation [10, 27] and high-profile incidents [27, 30].

2 LITERATURE REVIEW

There is a theoretical collision between the widespread assumptions of codesign as a strictly power-ceding methodology and the realities faced by researchers and designers who are members of minoritized groups in the domain in which their work occurs. Codesign facilitation is flexible, but there is a gap in the practitioner literature around exactly how a minoritized facilitator may successfully navigate this space through the selection of suitable personas or roles.

Codesign with Diverse Youth: Codesign ideally places equal priority on input from all stakeholders in the creation of products and services [31, 34]. Using different creative techniques, it can result in better ideas, more thorough need finding, greater creativity, higher quality outcomes, and collaborative relationship-building across people and organizations [34]. Successful codesign partnerships strive to shift power from researchers to end users, centering their contributions and insights [39]. Ideally, its structure and power dynamics should be conducive to amplifying participants' contributions and voiced needs, as they are the experts of their own experiences [37]. Research on co-design with youth advises adult facilitators to carefully attend to the power imbalance that comes from their implicit authority as adults. Working towards a culture where children are regarded as equals in the codesign process requires time and effort, and is one of the most challenging aspects of adult-child codesign. The culture may be nurtured by sitting at equal height, wearing similar casual clothing, and setting common goals and social opportunities such as 'snack time' for adults and children to get to know each other as people outside of the design work [8]. If scaffolded in the right ways, codesign with youth participants can yield fruitful insights for game design.

Prior work has shown that children of different backgrounds bring valuable and diverse insights [18], but few studies center the dynamics between identities of researchers and participants as a critical factor that affects design output. For example, Bonsignore et al. [4] partnered with black and Hispanic 13-17 year olds to codesign a STEM-learning alternate reality game for teenagers. It resulted in original game features and offered unique findings on attitudes toward STEM concepts. However, the study did not disclose or account for the demographics of the researchers themselves in their insights. Similarly, Mazzone et al. [21] partnered with youth to design a game intended for teenagers to develop emotional intelligence skills. The study noted challenges related to ideas being too abstract as a barrier to participant contribution, but no demographics beyond age were mentioned. Power sharing is key to the definition and intent of codesign; without considering intersectionality issues such as how race and gender bias affect the perception of power, communication breakdowns are likely.

Minoritization in Teaching: Another major factor in power dynamics are relations between dominant and non-dominant groups in subcultures, specifically, minoritization. Beyond simply being a member of a statistical minority, minoritization refers to the sociological effects of marginalizing members of a racial group due to their underrepresentation [3]. These sociological effects persist across adult-child interactions, even in the face of nominal authority. Studies of minoritized teachers suggest that race is a significant factor affecting adult-youth interactions. Minoritized teachers face multiple obstacles to establishing and sustaining credibility and authority while teaching, particularly in predominantly white environments [5, 12, 19]. Instructors may struggle with an 'outsider status' due to marginalized facets of identity [16, 36]. When interacting with teachers of color, students may challenge their status in ways that are intertwined with race, gender, and systems of oppression [15, 20, 36]. For example, one study reported that learners inappropriately questioned if an instructor of color was teaching a topic from a biased standpoint [12]. Elias & Loomis [9] found a significant effect of instructor race and gender on student compliance showing that black women instructors had less power in the classroom. These insights underscore the complex interplay of power that exists between race, gender, age, and setting.

Minoritization in Gaming: Research studies show that women are more likely to be minoritized in the context of video games, especially by members of the dominant self-identifying "gamer" demographic (masculine/hypermasculine, white) [30]. Despite women currently accounting for 45% of video game consumers, the stereotype of who plays video games, and who is considered a serious gamer has primarily been male dominated [26, 35]. This perception is usually supported by the lack of diversity within high profile gaming communities and companies, and compounded by the persistent myth that though women may play games, they are exclusively casual gamers [11]. In addition, women game developers regularly receive targeted harassment from men who believe that they incorporate feminist ideologies targeted against them in their designs [6]. Therefore, women codesign facilitators may find themselves treated as gaming culture outsiders and may receive outright skepticism of their expertise or receive direct ridicule and harassment simply for being in the space. They are likely to experience pushback when presenting their expertise in games especially by those who identify with "gamer" norms and see them as interlopers–"not "true" gamers simply based on their gender identity and presentation. Therefore, a black woman researcher will likely be minoritized in game settings, and research on racially minoritized teachers suggests that age and authority alone are not enough to overcome them. Our research investigated whether these effects are present in codesign settings, how they manifest, and what it means to design partnership equality in codesign settings.

3 METHODOLOGY

Our research team partnered with an afterschool organization located in the Mid-Atlantic region of the United States with 15 club

houses located in different demographically diverse areas in the city. The goal was to codesign a novel type of video game in which players program robot partners to accomplish in-game goals collaboratively. Our program was broken down into three phases: game design (6-8 sessions) focusing on mapping and designing game narrative and characters, programming (5-7 sessions) which measured and taught coding skills to control robots, and testing (3-5 sessions) where prototypes were tested and iterated on. The research team was composed of HCI researchers, professional game designers, game developers, and robotics educators from different backgrounds including black women, white men and women, and East and Southeast Asian men.

Most sessions were facilitated in-person by HCI researchers with extensive adult-child codesign experience, while another member of the research team joined each session remotely and took notes on session interactions. Sessions typically lasted for one hour consisting of eating snacks, an ice breaker question of the day, the planned codesigned activities, and students playing video games from a curated selection to give them a more diverse game playing experience. Sessions were also attended by staff members in each clubhouse who joined in the codesign activities. The program was designed to be attended by 6-8 children but sometimes had to accommodate much larger groups to comply with different clubhouse policies. Written consent was obtained from the families of each attending student, and our research was approved by our university's Institutional Review Board (IRB).

3.1 Participants and Program Partners

In this paper, we describe our initial experience codesigning a video game with three different clubhouses in the partner network: Green Hill, Clear Bridge, and Golden Grove (pseudonyms). The Green Hill clubhouse is located in an economically depressed suburb with the primary ethnic groups being Black or African American (58%) and white (39%). Clubhouse administrators shared that the club served as a place to keep students safe, learn new experiences, get homework help, and be surrounded by loving friends and adults. Our program was attended by a total of 24 students ages 5-14, 22 black and 2 white, 6 girls and 18 boys. The Clear Bridge clubhouse is located in a rural county with the five largest ethnic groups being white (95%), multiracial (2%), Hispanic (2%), Black or African American (0.8%), and Asian (0.2%). Our program was attended by 7 white students aged 5-11, 2 girls and 5 boys. Club administrators shared that families really appreciated the homework help and structure they provided as they (parents) were mostly unable to help with homework (especially math) at home. Finally, the Golden Grove clubhouse is located in a middle-class neighborhood in an urban city. The largest ethnic groups in the city are white (68%), black (23%), and Asian (6%). Our program was attended by 10 students aged 7-12, 7 white and 3 black students, 5 girls/5 boys. In addition to clubhouse staff, they had a dedicated STEM coordinator and sports director, collaborated with local universities regularly, and ran different special interest STEM, arts, and sports programs concurrently.

3.2 Data Gathering and Analysis

Each session was facilitated by a primary researcher (black woman) in person, and at least one other secondary researcher joining remotely via zoom. The secondary researchers rotated through different clubhouses giving students the opportunity to interact with game designers, game developers, and other HCI educators and practitioners. The primary researcher coordinated all session activities while secondary researchers took notes on session interactions. Sessions were audio and video recorded. After each session, researchers debriefed on areas of confusion, and each researcher augmented the notes with their personal reflections on what happened during the session. The entire research team met weekly to review the session notes across clubhouses. In these meetings, we adjusted program activities to be better suited to each clubhouse, reflected on how our codesign interactions differed across each site, refined research questions to investigate, and discussed how the insights gathered contributed to the design of the video games and the scientific community at large. These weekly research meetings were often recorded and notes were taken as part of our research data. For this study, we conducted a thematic and artifact analysis on all session activities that investigated students' predisposition towards adult facilitators from different races and genders [5], as well as a review of the session notes gathered from the three clubhouses. Finally, we triangulated our findings with watching additional session videos, and photos of artifacts generated to ensure that all evidence was mutually supportive.

3.3 Bias Understanding Activity

To understand our students' internalized biases about race and gender, we conducted a bias-understanding activity during one of our codesign sessions. The purpose of this activity was originally to inform our understanding of participants' biases toward STEM (particularly programming) career fields, but turned out to also be informative in understanding their biases toward the researchers as STEM practitioners. The activity was embedded at the start of a session to practice programming using materials from different websites (code.org and scratch.org), to inform the programming in our codesigned video game. Students were told that programming was a popular career path and important for game design, and we were going to play a game called "guess the programmer". They were then presented with four sheets of paper, each containing pictures of five adults. Each page had a black, Hispanic, east Asian, south Asian, and white adult dressed in different formal and informal outfits and in different environments. Altogether, there were 20 pictures evenly split by those 5 racial groups, and then by gender (M/F) within each group. In reality, every single picture was that of an actual adult who was currently enrolled in or had completed a PhD in a computer science related field (see example in Figure 1), but students were not given that information. Each adult gave permission for their pictures to be used in our research study. For each picture, students were instructed to vote on whether they thought the person was a programmer, and their reasoning behind each vote. Given the arbitrary nature of the activity, we expected students to either make guesses based on explicit bias factors (race, age, or presented gender) or weaker factors such as clothing, hair, or photo background, which might or might not be tied to race, age, or gender.

Figure 1: Sample page of image that students were presented with sourced from unsplash.com - students were shown images of real computer programmers who gave permission for their photos to be used in our research study

4 PRELIMINARY RESULTS

In this section, we share results from our bias-understanding activity uncovering students' existing biases towards minoritized adults and their STEM affiliation.

Green Hill: Students in this club relied heavily on environmental markers to cast votes for who was a programmer in each picture. They assumed that almost everyone who wore eyeglasses was a programmer regardless of race, that people who wore very fashionable outfits or looked "cool" were *not* programmers and used background clues to decide if that was a "programming office" or not. There was one black woman who they all unanimously agreed was not a programmer - she had white earphones and they assumed it was a stethoscope, so they all concluded that she was a medical doctor. They all unanimously agreed that the other black woman presented was a programmer because she reminded them of a black woman game designer on our research team and that she was "cute". They also unanimously concluded that another east Asian picture was definitely a programmer because he reminded them of an east Asian researcher from our team.

Students in Green Hill communicated some bias related to hairstyles, clothing, and gender. There was one picture of a black man with dreadlocks and round metal-framed eyeglasses (vs square-framed plastic glasses in other pictures), standing in front of a red brick building. They all concluded that he could not possibly be a programmer because "look at his hair", "look at his kind of glasses" etc. At the end of the activity, we informed them that one of the pictures was that of a person who was a Minecraft game designer. While discussing, one student said out loud, "it has to be one of the boys!", and they all agreed that it was "dreadlock guy". Overall, students expressed these biases related to gender and other environmental markers especially as it related to their affiliation with a career path that was socially acceptable by their peers but not as a predictor of their STEM knowledge or expertise.

Clear Bridge: Students in this club relied almost entirely on their implicit beliefs around race and gender to make their predictions in this activity. Regardless of outfit, they predicted that all the black people were not programmers giving reasons such as "he looks like a guy who works from home", "she does not look very intelligent", "he looks like Lebron James, or a rapper, or football player", "she looks like Lebron James' mother". They insisted that one black woman (the one with the earphones) was the same person as the black researcher who had facilitated sessions with them for at least 10 weeks. Even after the facilitator clarified that it was not her, one student followed by "If that's you, then I guess she can be a programmer." Students also predicted that most people of south Asian descent were not programmers. For one darker skinned woman one student said "she looks like an Indian from Mexico" while another said, "she looks like she is from Africa. Do people from Africa program?". For the other south Asian woman, a student said, "she looks like the lady that works for the government [*referring to US Vice President Kamala Harris*]. She's just dumb" and another said, "she looks like she does nothing".

Students predicted everyone of east Asian descent was definitely a programmer citing reasons such as "he looks like he programmed GTA, Minecraft and everything" and "he does not look like a lazy man, he's Asian!" Students did not seem at all surprised when we told them that one of the east Asian women was actually a Minecraft programmer in real life. They also assumed that most white people were programmers, except for one white woman whose background looked like a farm. Finally, they mostly used environmental markers to make predictions on whether or not the Hispanic people were programmers. Overall, students in this clubhouse expressed clear racial biases related to adults' STEM ability and professional competence.

Golden Grove: Most students in this group responded that nearly everyone, regardless of race or gender, was a programmer except they found clear indications that they weren't (e.g., black woman with white earphones was a medical doctor). Regardless of people's outfits, demeanor, or background environment, they looked for justifications on why they could be programmers. They cited reasons such as "sometimes, programmers look like artists in a house", "The airpods that she has on was made for coders", or "she looks like she took that selfie in front of a computer so she must be a programmer". Even for those that they deemed unlikely, they still found reasons to connect them to programming e.g. "he looks too young to be a programmer, maybe he is a programming student", "he looks like he is on a boat, maybe he is a programmer with a zoom background", and "she looks like she is in a library, she may be reading programming books". It was interesting to see how much students tried to make programmer connections for each picture, e.g. "she has bags under her eyes and programmers stay up all night to code". Finally, they seemed excited to learn that there was an actual Minecraft programmer in the picture set, but had no reactions to their race or gender.

Overall, students in this clubhouse did not express racial and gender biases towards minoritized adults related to their STEM affiliation. This behavior may be explained by the racial diversity and socio-economic status of the students at this particular club. The club is also physically located in a neighborhood with lots of amateur and professional artists, with many diverse race residents who work for the local hospitals and universities. Finally, unlike the other clubs, they regularly collaborated with the local universities on many STEM initiatives including robotics and programming.

5 ONGOING AND FUTURE WORK

In the previous section, we provided evidence that children as young as 5 years old embody and express racial and gender biases towards adults related to their STEM affiliation. We are interested in understanding whether those stereotypes affected how facilitators were treated in the different clubhouses, and if they negatively impacted the overall quality of our codesign programs. A preliminary analysis of data revealed some marked differences in how the researchers were treated in the three clubs. We found evidence that students in Clear Bridge regularly undermined the researcher's credibility, refused to acknowledge the researcher as an important part of the codesign space, and routinely refused to comply with codesign instructions. Some students caused intentional disruptions to the codesign activities which granted permission to otherwise well-behaved students to participate in derailing the activities as well. These interactions were not only distressing for the minority researchers in the space, but also for students from other minoritized groups e.g., girls in the codesign program. In a longer form version of this paper, we will perform an in-depth data analysis on how these breakdowns in communication occurred, and how they impacted the quality of our codesign program.

Our research underscores the importance of investigating students' embodied stereotypes about adult facilitators early in the codesign process to allow researchers to anticipate where interaction breakdowns are likely to occur. Approaching equality in codesign partnership using an intersectional lens shows that all these imbalances exist, and formal titles and expertise may not shield minoritized adults from their negative effects. A review of the literature on intersectionality in HCI and other disciplines such as [25] can guide our understanding of how different identities intersect and interact in codesign spaces. In examining the positionality of minoritized researchers, we can understand the likely ways that their identities may be targeted.

In the future we will also be investigating the effects of making several changes to our program to improve our design partnerships with children. We have an opportunity to make education about racial and gender biases an important part of our codesign program. Specifically, exposing students to models and media that contradict their stereotypes, normalizing the presence of minoritized researchers in codesign spaces, and showing non-minoritized adults deferring to them may provide some benefits. To address students acting out on preconceived stereotypes, we suggest a management structure where responsibility is visibly shared between researchers of different backgrounds, some of whom share similar identities with students, and having them model proper behavior towards minoritized researchers. Prior research studies show that same-race teacher assignments significantly improve learning outcomes for black and white students [13], so this structure may have benefits above and beyond improving adult-child interactions in design spaces. Also, leaving the responsibility of conduct management to local clubhouse managers, where both researchers and students alike defer to their authority, has the double benefit of promoting equality between researchers and students, as well as maintaining a respectable code of conduct in the space for all members of the design team.

Finally, our research team will also design and iterate on a classroom management strategy that is culturally responsive. The lack of clear communication on the consequences of students intentionally disrupting design activities does not only impact researchers but also other minority students in the space. Weinstein et al. [38] provide a framework for designing a management approach that recognizes researchers' ethnocentrism, considers students' cultural backgrounds, incorporates knowledge of the broader social and economic context, and uses culturally appropriate management practices with a commitment to building caring spaces for adults and children alike.

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