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UNIVERSITY OF CALIFORNIA,
IRVINE

Reconfiguring Innovation with the Homeboy Art Academy: Community-based AI Design
Methods in A Healing Informed Art Center

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Informatics

by

Richard M. Martinez

Dissertation Committee:
Professor Kurt D. Squire, Chair
Professor Constance Steinkuehler
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2025

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Martinez R. (2022, December 09). Toward Reunion: Conversations, Criticisms, Reconfigurations of ICTD, Designing Social Co-located Mixed Reality Applications with Youth Through Participatory Design [Conference Presentation]. Society for Social Studies (4S)/ESOCITE Conference. Cholula, Puebla, United Mexican States.

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ABSTRACT OF THE DISSERTATION

Reconfiguring Innovation with the Homeboy Art Academy: Community-based AI Design
Methods in A Healing Informed Art Center

By

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Doctor of Philosophy in Informatics

University of California, Irvine, 2025

Professor Kurt D. Squire, Chair

As industry and academic institutions innovate with artificial intelligence (AI) systems, they become intrinsically woven into crucial social institutions (1). These innovations promise positive impact, but their designs have included biases against and produced unequal outcomes for historically marginalized groups (2; 3; 4). Such marginalized groups have no meaningful role in shaping AI technologies, and often regard such technologies as exploitative of them. This project, Homeboy Technologies, explores the hypothesis that a creative technology program for marginalized youth, featuring AI-enabled tools, might uncover specific problems with AI, improve youth literacy with AI, and open new life trajectories for participants leveraging AI. Using community-based participatory (CBPD) methods, I designed, implemented, and researched a series of workshop programs for young adults (18-26) through The Homeboy Art Academy, a community art center for justice and gang-involved persons. Each workshop explores increasingly refined hypotheses about how to engage youth in discussions of the role of AI in their lives. Increasingly sophisticated critiques of AI emerged among youth, beginning with the observation that AI-enabled applications "are not designed for them", because they ignore their interests, violate linguistic conventions, and assume differing lifeworlds. Youth's interests, the capacity of AI, and their life worlds intersect productively when they help youth navigate their multiple, often conflicting life worlds, ameliorate trauma, care

for primary social groups (i.e. close friends and family), or engage in entrepreneurial pursuits. Youth valued prototyping workshops connected to their immediate creative impulses and entrepreneurial pursuits. However, disruptions in youth's life worlds and discrepancies in required infrastructure created frictions, which revealed contradictions between research agendas, student personal aspirations and needs, and the goals of the Art Academy center. Finally, this dissertation reports on a sustained partnership with a technology company (Google), which demonstrates the potential for sustained engagements to improve designers' understanding of AI and recruit youth into complex AI-enabled practices. However, creating meaningful on-ramps for marginalized youth requires substantial commitment. Increasingly sophisticated understandings of AI, including its limitations, its uses, and specific tools and procedures emerged within Homeboy Technology, suggesting that a future of such AI-enabled tools for marginalized people may be in local community resource centers responsive to local needs.

Chapter 1

Introduction

1.1 Who Gets to Innovate and What Ways of Being Are Considered Legitimate?

It is a bustling Friday morning in January at Homegirl Cafe, the air thick with fresh coffee and sizzling chilaquiles. To the uninitiated, the scene might read as disorderly —the door’s bell punctuating the ding, inked arms gesturing through animated conversations, and the rhythmic slap of palms as greetings echo across the hard surfaces of the busy, urban cafe. Murmurs of the ever-elusive, yet ever-present figure known simply as “G” weave through the crowd. For regulars, though, this is just the heartbeat of another day.

I stand in line, lost in reverie over my soon-to-be breakfast - chilaquiles, crisp tortilla chips drowned in fiery chili sauce crowned with scrambled eggs, black beans, red onions, cilantro, and, because I can, a side of off-the-menu chicken. My culinary daydream is interrupted when my companion nudges me back to reality, introducing me to the cashier as “the AI guy.” Without missing a beat, the cashier’s eyes light up.

"Oh, like ChatGPT, right? I use that all the time. We have some deep conversations."

Intrigued, I lean in.

"Really? Tell me more."

"Yeah, I get philosophical with it. Throw different scenarios at it and make sure it understands empathy. Someone's gotta train it so it doesn't end up killing us all, you know? It's a reflection of us, after all."

I am momentarily speechless. The cashier is blanketed with tattoos with words only rivals can decipher and images that depict the duality of man. These types of tattoos would surely make any Silicon Valley veteran sidestep or clutch their belongings. Yet his candid response reflected a kind of wisdom only experience can bring to articulating one of AI's most pressing dilemmas with striking clarity. The profound impact of automated decisions on our social, political, and economic realities. His insight cuts through the complexity, laying bare a truth often overlooked: Those most affected by technological design frequently possess an innate understanding of what is needed and what is just. These moments, raw, pure, and deeply human, crystallized my belief that AI design must be a democratic process incorporating diverse tacit expertise and lived experiences. But how do we capture, cultivate, and share these critiques of technology back with those who are inventing them? How might we empower people from marginalized communities to take an active role in shaping them?

As AI becomes ubiquitous, the need for AI that serves *people's* interests is a pressing concern (5). The processes by which we design and innovate make visible particular beliefs, values, and narratives of those who construct them. So-called "big tech," the handful of companies with sufficient resources to develop and implement AI, hold individualistic, techno-utopian, capitalist views that chronically ignore critiques and even suppress views of dissenters (5). The concentration of capital required to develop AI models begs questions of: Who gets to innovate? Who gets to create? Who decides which problems deserve solutions? Whose

expertise is deemed valid, and how are that expertise and worldviews encoded into the design of emerging technologies like AI?

This dissertation investigates what happens when marginalized youth are given opportunities to design applications on emerging platforms with AI. The dissertation seeks to understand how marginalized youth encounter and conceive of AI, describe problematic components of AI, as experienced by a marginalized community, engage in activities and conversations designed to improve fluency with AI, and explore how marginalized youth can be engaged in using AI to further their interests and pursuits. The dissertation employs community-based participatory design (CBPD) to engage youth at the Homeboy Arts Academy in an ongoing engagement, including several focused workshops spanning 4 years to increase youth access to AI tools and technologies. I illustrate pathways forward by operationalizing these methodologies and revealing the often “*messy*” negotiations that emerge when balancing community needs, my research interest, and the fast-paced and often elusive emerging technology landscape. My positionality fundamentally shapes my scholarship as a member of the community I engage in. This dual role allows me to share an inside (or emic) perspective on the inner workings of the Homeboy Arts Academy and the experiences of its members, and an outsider, or etic perspective, speaking to issues of theoretical concern.

1.2 Community-Centered Approaches at the Homeboy Art Academy

This research study investigates marginalized youth’s relationship with AI through participation in *Homeboy Technology*, a program that I created to help prepare youth for the creative workforce. Homeboy Technology is embedded in the Homeboy Art Academy, a trauma-informed art center in Los Angeles which itself is embedded in Homeboy Industries. The

Homeboy Art Academy (HBAA) serves justice-impacted, gang-affiliated, and young people who are considered “in crisis” and beyond “at risk” between the ages of 18-26. The Homeboy Art Academy was created by award-winning artist Fabian Debora, a former member of Homeboy Industries, to use artistic practices to assist in healing and prepare youth for participation in the creative workforce. Debora’s art studio is located on site, in the building, and youth are introduced to the Mexican muralist tradition, which Debora is situated in. In addition to traditional classes and workshops, youth participating in Homeboy Art Academy have access to a full suite of services including mental health resources, academic assistance, and career advising. The Homeboy Art Academy is a spin-off of Homeboy Industries, the world’s largest program for helping high-risk youth founded by Father Greg Boyle in 1988. I am from the Boyle Heights neighborhood and have lifelong ties to Homeboy Industries. A fuller description of the Arts Academy at the communities that it serves is provided in Chapter 2.

By studying youth enrolled in Homeboy Technology interact with AI, this study investigates what biases they might experience, how AI intersects with their interests, what workshop experiences contribute toward their developing fluency, and under what conditions AI might support their participation in the creative workforce. Specifically, it asks:

1. How can community-based, participatory design methodologies be used to engage marginalized youth in leveraging artificial intelligence for their own creative, entrepreneurial, and social pursuits? What designs do they imagine and create?
2. How do justice-impacted youth at the Homeboy Arts Academy initially perceive and critique artificial intelligence based on their lived experiences, and how do these perspectives evolve through sustained engagement with community-based participatory design (CBPD)?
3. How do they engage in activities and conversations designed to improve fluency with

AI? What impact does this fluency have on the Art Gang?

Through the course of this study I have become increasingly committed to community-based participatory research (CBPR) (6). CBPR seeks to create just and equitable technology by situating technology development within the actual communities in which it might be used, with a particular emphasis on empowering marginalized and overlooked communities. As a method CBPR engages users not just to improve usability or efficiency, but to engage participants in shaping the nature and purpose of these technologies, toward understanding how they support or hinder the life of communities in which they are situated. In the process of design, I hope to also expose the institutional and infrastructural forces shaping AI and affiliated emerging technologies. For example, this dissertation began by studying co-located interactions in mixed reality, but soon it became clear that the most pressing questions of equity and power were not in the mixed reality interfaces, but in emerging AI-enabled technologies. The emphasis of workshops then shifted toward studying youth experiences with AI as aspiring members of the creative workforce.

This dissertation responds to calls for greater participation by marginalized populations in technology design. It seeks to contribute a study of what happens when historically marginalized communities, particularly recently incarcerated and gang-affiliated youth at the Homeboy Art Academy, co-design AI technologies. Secondly, the study explores how these grassroots design approaches reflect their lived experiences, cultural knowledge, and socio-economic realities. I posit that situated and communally attuned approaches to building AI tools, including processes that foster innovation at the community level, are essential as AI becomes ever more embedded into our social institutions and automating decisions at large scales. Evidence already suggests that AI systems already are distributing resources, opportunities, and constraints in ways that can either reinforce or challenge existing power dynamics(7).

This work is situated within a tradition of scholarship arguing that social and cultural practices profoundly shape technological interaction (8). As such, this dissertation considers AI not only as a technical artifact, but as an institutional and infrastructural system embedded within broader power dynamics (9). The current “rules” of AI development and innovation are not neutral; they are the product of boundary work that actively maintains a system of power (10). As the opening vignette might suggest, youth in this community already have questions about how large technology companies are encoding values into AI, and how they are contributing or hindering human values like fostering empathy. The structure of AI, particularly the capital required for its development, testing, and deployment is poised to keep marginalized communities, especially those like at the Homeboy Art Academy, on the outside and ensuring that only one type of expertise, elite, technical expertise, shapes our collective technological futures and societies. Critiques of AI design that exclude marginalized voices raise critical questions about whose expertise is recognized, how knowledge is legitimized, and what constitutes innovation. By directly involving the Art Academy in AI design and building vertical capacities of AI, this research aims to challenge and reconfigure boundaries around who gets to design the futures of society.

This dissertation is part of a broader argument for an expanded definition of technological expertise that values tacit knowledge, lived experience, and community-defined priorities alongside formal education and professional credentials. Like any technology, AI is not natural; it encodes biases that reflect socio-economic, racial, and political inequities (11; 12; 13; 14). Biased algorithmic systems, often misaligned with the realities of historically underrepresented communities, reinforce and even amplify structural disparities rather than mitigating them (15; 16). To that end, the design process itself reinforces particular perspectives and techno-solutionist ideals that do not address the underlying infrastructural issues that cause marginalization in the first place. Instead, designs often reward the same goals, features, outcomes, and types of personhoods that created systemic inequities (17; 18). This work seeks to challenge the assumption that technological innovation is inherently beneficial, in-

stead advocating for methodologies that critically examine how emerging technologies are built, especially in an era where AI dominates and may dictate who gets access to economic, political, and social opportunities.

As a Community-Based Participatory Design study, this dissertation seeks to produce knowledge by introducing a series of design hypotheses (e.g. by engaging youth in the design of AI-enabled tools will reveal their existing understandings of AI, what functions they want AI to assist them with, and perhaps discrepancies in the goals and value systems of AI designers and marginalized youth). Consistent with design experiments generally (see Collins, 1992), the knowledge generated in this study is situated within the everyday practices and realities of these communities(19). Reports from each workshop are reported as naturalistic case studies that draw from field notes, video recordings, interviews and document analysis. I employ an interpretive lens and to these cases, relying on membership in this community. As such, case studies of design experiments do not yield generalizable knowledge, but rather, increasingly sophisticated design hypotheses, tangible products (such as workshop materials) useful to other practitioners, and warranted claims that can contribute toward broader theoretical projects describing people, technologies, and design.

Workshop activities are based on established HCI usability and design practices. As I worked with youth, I observed what activities produced generative interactions. Workshop activities evolved (as described in chapters 3, 4, and 5) as I observed patterns in interactions, saw what activities captured them, and discussed creative aspirations with youth. I introduced a variety of speculative future, ethnographic inquiry, and participatory design interventions to examine the tensions between AI governance, social justice, and lived experience. Direct engagement with youth in the Homeboy Art Academy, highlighted the importance of trust, cultural sensitivity, and collective agency in AI design. As is described in chapters 3, 4, and 5, design activities quickly became very personal. The Art Academy students described dreams of fostering neglected children, a desire to create a family photo including an incarcerated

parent, or a desire for a virtual therapist, so a loved one could access essential mental health services. The students, corporate partners, and myself valued these design activities, but they often reminded us of the substantial systemic barriers facing marginalized communities.

Not only is Homeboy Technology a new program, but the Art Academy itself is recently established (2018) and developing as it expands its services and the amount of people it serves. Complex tensions emerge as students navigate working alongside former gang rivals while simultaneously reforming their identities as “gang members” through artistic work. This environment is further shaped by Fabian’s vision for the academy as director and artist, with his own, sophisticated ideas about AI and technology. Likewise, Homeboy Technologies rests upon a support service of therapists, case workers, and administrative support structures with their own demands.

All these elements are deeply entangled with the localized social, political, and economic realities of the neighborhood where the academy is physically situated. Through these cases, I seek to make visible the social, temporal, and material systems that enable and prohibit grassroots innovation. I take a deeply social historical approach to this work, seeking to situate these design activities not “just in any marginalized community,” but specifically in Boyle Heights and East LA generally (20). These activities take place in a particular time in place, in this case, in marginalized communities on the edge of the creative entertainment capital of the world. This community has gentrified throughout the course of this study, with small fortunes being made from the lands that these youth occupy. Similarly, during this writing, any number of television shows, films, musicians, or other artists emerged mining the culture of this community. At times, community members profit from these successes; other times they don’t. Likewise, using AI and MR tools in workshops is not neutral; it is deeply political. Through speculative fiction and design, the Art Gang takes up, resists, and redefines these technologies through their respective lenses and lived realities. The contradictions between institutional definitions of innovation and the embodied experiences

of these youth create opportunities to learn new concepts, build skills, and create community-driven re-imaginings of technological futures.

1.3 Situating the Work: A Review of Literature on Community, Design, and Technology

Participatory and Community-Centered design approaches emerge from several intellectual traditions, each sharing a concern with creating more equitable, just, and human-centered technology systems. First, this review traces the evolution of participatory design methodologies, from their origins in workplace democracy to their contemporary application in community-based and justice-oriented contexts. Second, it explores socio-cultural theories of knowledge and context. Repositioning lived experience not as a marginal perspective but as a central and legitimate form of expertise. Finally, it situates this work within the critical discourse surrounding artificial intelligence and the politics of innovation, arguing that participatory methods are necessary to ensure more equitable technological futures. By weaving these threads together, this section constructs a unique theoretical backdrop grounded in the principles of infrastructuring, asset-based engagement, and critical technical practice, providing a robust scaffold for the empirical work that follows.

1.3.1 Foundations of Participatory and Community-Centered Design

This section explores the methodologies that form this research’s ethical and practical core, moving from the history of participatory design to its application in real-world, community-led projects.

The Participatory Turn: From Workplace Democracy to Community Action

Participatory Design (PD) is a method that emerged in Scandinavia through research partnerships between academics and trade unions in the 1970s (21). As computer systems transformed the workplace, this new methodology emerged to give workers a voice in technological decisions affecting their jobs (21). Since then, PD has taken root in HCI research as a primary way to involve end users in the design process. Participatory design is not just about creating tools or systems, it is a learning process that deepens participants' ability to reflect and engage critically with the design itself (22). Across the literature, PD is recognized for its contributions to new domains of inquiry, methodological innovation, technological development, and theoretical framing (23). What distinguishes PD is how it reconfigures the typical designer-user relationship, emphasizing reciprocal dialogue and diverse forms of participation—from cultivating empathy and understanding across differences to fostering community ties and collective action (24). These practices take many forms depending on the level and timing of participant involvement, including structured workshops, ethnographic methods, low-fidelity prototyping, and speculative mock-ups (25).

CBPD extends traditional participatory design methods by specifically tailoring design work to *meet needs identified by community members themselves*.(26; 27; 28; 29; 30). While more prevalent in healthcare informatics, researchers increasingly use CBPD approaches to create more equitable AI technologies (31; 32; 33; 34). Researchers have used CBPD to engage Black older adults to envision equitable health outcomes (26), to build equitable mental health tools for teenage Latinas (27; 28), and have convened workshops to discuss engaging with Indigenous communities to build AI tools to preserve language and discuss privacy concerns (35; 36). Unlike traditional participatory design methods, community-based research engagements seek to center the participants as collaborators for political and local change and is often in line with Participatory Action Research approaches (29; 37). Furthermore, CBPD uses educational and social action elements to align research efforts localized to a particular set of challenges and needs within the community (38; 10; 39). Spinuzzi (2005)

observes a co-design orientation among sociologists and educational researchers whose work is informed by cultural historical activity theory, as CBPD centers participants' collective interests in the design endeavor(40).

CBPR practices position participants as the authorities on their own lived experiences, and engages community members as research partners balancing new ideas, experiences, and engage in conversations about current needs (41; 42). As a method, CPBD holds potential for engaging in conversation and bringing attention to populations such as the Art Gang, whose self-determination has long been stripped by judicial systems. Centering these participants' expertise sketches a path forward for research, uplifting their voices, lived realities, and concerns within a society that has primarily cast them aside (43; 44). At the vanguard of using HCI to empower people, Black and Brown women scholars like Dillahunt, Mengesha, Erete, Benjamin, Smith, and Cruz have made substantial contributions to engage marginalized racial groups, understand their technology needs, and create spaces where people can imagine new futures (12; 45; 13; 5; 46; 47).

Mounting interdisciplinary examinations urgently seek to address the systemic discrimination and inequities confronted by disenfranchised Black and Latina/o populations through fostering active participation and equitable partnerships with these marginalized groups themselves. Beyond one-sided inquiry, these deepening collaborative engagements empower underrepresented communities to have a voice in diagnosing and tackling the complex prejudices perpetuating their societal sidelining. This shifting, partnership-based approach recognizes that historically excluded communities must have agency in the work that aims to alleviate pre-existing biases embedded within technological design processes (48; 49; 50; 51). We risk further marginalization in digital landscapes by not accounting for these realities, integrating these groups' lived experiences and perspectives, and elevating participant's tacit knowledge as expertise. We also restrict chances to disrupt the structural characteristics of technology design that underpin the detrimental and material impacts on historically

neglected groups (52; 53; 5; 54).

Methodological Frameworks for Design-in-Practice I highlight design-based research to contextualize how I have used this method to frame my thinking and guide activities at the Art Academy. As a *research* method, CBPD parallels design-based research, or design experiments, a methodology rooted in the learning and educational technology sciences (55; 19; 56). Design-based research emerged as a research methodology the 1990s as learning scientists sought to study how learning unfolds in complex, technology-enriched settings that featured socio-technical configurations not commonly found in schools(57). Design-based researchers seek to understand how learning occurs in such environments, while simultaneously developing curricular experiences and supportive learning technologies (55). Alan Collins (1992) argues for design research as a central research method in educational technologies, so as to acknowledge the *artificial*, or *designed* nature of social systems(19). Design research, from this perspective, is a methodology for designers of tools and social systems to orchestrate environments that embody particular social values, and then to describe how they work. Good design research articulates design goals (e.g. creating a program to enhance creative work skills among marginalized youth), forms hypotheses on how such environments might work, engages in iterative cycles of design, and reflection, and then reports findings using mixed methods which might include interpretive observations, case studies, or and empirical measurements as necessary.

Knowledge, in design research, is contextual, typically formed as warranted claims supported by data(58). Design research does not often seek immutable laws of human behavior, but offers truth claims based on particular situations and conditions. Hoadley (2003) argues for the design narrative, warranted accounts of humans, technologies, and social groups interacting over time, as the appropriate knowledge form of knowledge production for design sciences(58). Rather than offer immutable truths free from context, such design narratives

offer descriptions of how particular technologies are used by different groups for different purposes, often generating *concepts* that designers might leverage for work. In one such case, Hoadley (2003) describes the dynamics behind online anonymity in the design of learning tools, describing the conditions in which it fostered generative learning interactions, and when it did not(58).

The design research process begins by engaging a diverse group of stakeholders in defining core features for a program, outlining participant structures (e.g. activities, reward mechanisms), and then articulating methods for studying its impact on participants and other relative stakeholders. Design research pursues practical outcomes, technologies, and organizational change with communities using research and theory pragmatically. A critical focus of DBIR is to center the “*messiness of real-world practice*” and the variables of the context in which the research is taking place as a critical element that shapes the practical outcomes of what is constructed (55; 59). In other words, through an iterative process, DBIR can be used to uncover how emerging technologies are used in real-life scenarios outside the laboratory or traditional academic contexts. Incorporating understandings of social circumstances and in-situ realities can impact technological design and tangible products, better aligning systems to community needs and value systems.

Design research has been used extensively to develop mixed reality technologies. Used in a research context investigating mixed reality (MR), Klopfer et al. show us how DBIR can focus research engagements on revealing the intersection of identity and place (60). Using the underlying metaphor of “*the world as a game board*”, Squire (2012) describes how MR can simulate and overlay data onto the physical world to understand environmental issues, gain historical perspective, or visualize sociological patterns not readily apparent(61). Martin et al. (2013) distinguish between place-based and place-agnostic MR applications to capture how applications can deepen user’s experience of a particular place (as with a historical tour of the Boston Freedom Trail, reliving historical events such as the Dow Day Protests at the

University of Wisconsin-Madison, or engaging in future scenario planning, as in the Saving Lake Wingra (62; 63). MR can also juxtapose a particular place with a fictional universe, as with Pokemon Go, Harry Potter, Wizards Unite, Ingress, or even educational applications such as Environmental Detectives (64; 61). However, as with MR, opportunities exist to address youth interests more directly by creating new AI experiences based on activities indigenous to urban youth interests, which arise through participatory design methods or include a higher degree of authoring than currently supported. My work creates a rare opportunity to center the voices of a largely overlooked demographic. In addition, engage early and often in an emerging field of research. By situating the study within the Homeboy Art Academy, the methodology supports iterative adaptation and long-term engagement while attending to the socio-cultural dynamics of investigating these emerging technologies in context.

1.3.2 Theorizing Context, Knowledge, and Participation

This section describes a cultural-historical approach to understanding participation, knowledge, and context(65). Human activity, from this perspective, is deeply historical, in that it arises in particular time and place, in relation to broader social, political, and technical forces(20). Researchers from a cultural historical activity theory (CHAT) perspective are especially interested in how particular tools (such as AI agents) are appropriated by specific actors within specific social and institutional constraints. Most CHAT researchers have sought to describe how socio-cultural systems operate, using concepts such as tensions or contradictions to predict change within a system(66), but more recent CHAT researchers engage in CBPD (40).

Unpacking the ‘Social’ in Sociotechnical Systems Researchers in HCI have long grappled with analyzing social constructs of “activity” and how tools influence how we interact

with one another. Activity theory, first introduced by Russian psychologist Alexei Leontiev and adapted by Finnish psychologist Yrjö Engeström, allows researchers to define activity constructs into smaller units of analysis (67; 68). The driving idea behind CHAT analysis is the “subject” to “object” relationship: The relationship between particular subjects (such as marginalized youth, or Art Academy leaders) and objects (Financial Success, Creative Art Skills). Findings within CHAT are often described as *contradictions*, such as a contradiction between Homeboy Art Academy Youth’s desire to experience immediate financial success vs Creative Art skills, which might require extensive training to develop.

Cultural historical activity theory is driven by a relational ontology. This means that as actors interact, engaged in meaningful social activity across time, all components (subjects, tools, social organization) mutually determine one another. In other words, “activities are influenced by the attributes of subjects and objects over time,” to the point in which they might be regarded as co-constitutive (69). Mediation, or the impact of tools, subjects and objects on one another is central to Leontiev’s activity theory. For example, CHAT researchers examining learning in college classrooms have observed objects (such as sorting and credentialing), subjects (students), and tools (personal computers) have co-evolved so that tools that software that might support learning but would undermine the sorting function of schools is abandoned (Barab et al., cite). The *historical* component of CHAT research seeks to capture how CHAT research is grounded in specific communities in time and place. Leontiev provides a three-layer mental model for conceptualizing structures of activity, which can be deconstructed as activities aligned to motives for attaining an object, actions directed towards goals, and operations ascribed by conditions (67). Kaptelinin succinctly describes this as a “tool mediation that allows for appropriating socially developed forms of acting in the world. Tools reflect the previous experience of other people” (70). Tools and their use are a form of accumulation and transmission of social and cultural knowledge. Situating *tool* use within the broader framework of human activity, with an eye toward examining when tools align with or contradict specific subjects’ goals, social objectives, or forms of social

organization makes it an attractive framework for researchers seeking to study technology use in context.

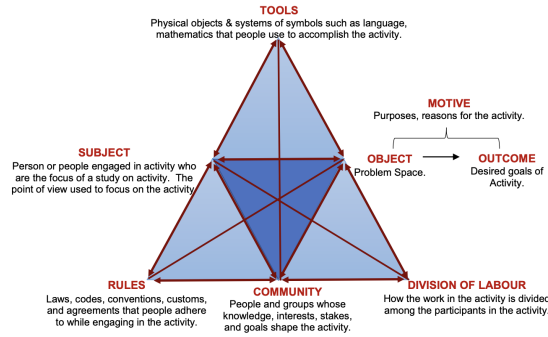
Engeström extends the original model to provide a systematic method to explore collective activity (68; 20). Mediation still serves a fundamental role in these models, but Engeström includes an additional node - community. The refined structure also expanded to reference an outcome of the activity and the “subject” to “object” relationship. This “outcome” is the intended result influenced by the “transformation of the object produced by the activity (69). Further, the mediational means of the model are described as the:

1. tools incorporated by “subjects” towards “objects,”
2. rules that govern relationships between “subjects” and “community,” and finally,
3. the separation of tasks within a community towards “objects.”

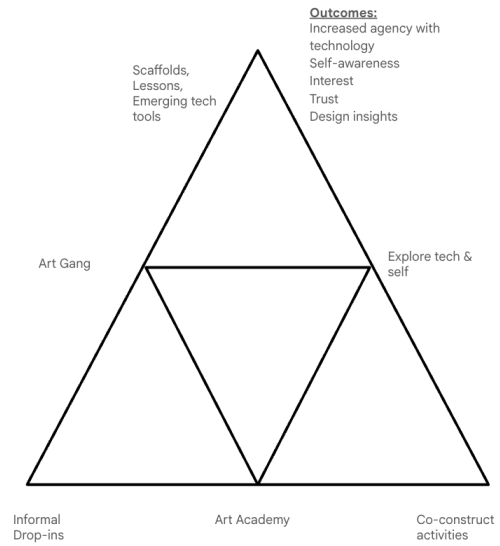
Treating the community as the unit of analysis is central to how I think about my work at the Homeboy Art Academy. The community itself often speaks of itself in such terms, with health, opportunities, and political and economic circumstances as concepts residing in the collective. As a program designer, Activity Theory suggests a model for designing a site of *collective*, rather than individual expertise.

The complete model is shown below; it provides a clear-cut instrument to operationalize context. Nardi also expands on the use of activity theory in HCI research and further concretizes the theory for capturing the context of use and the evaluation and design of technological systems in her detailed work named “Context and consciousness: Activity theory human-computer interaction” (66).

This hierarchical model prescribes how an activity can be delineated into smaller units. This description provides guidance based on theoretical groundings for probing the who,



(a) Activity theory as adapted by Engeström denotes the interrelated elements of an activity system.



(b) Activity theory as it related to the Homeboy Art Academy.

Figure 1.1: Activity theory

what, and how of activity and examining social context. Even though “activity,” “context,” and “social” can seem like general notions, the gradational nature of these concepts can occur differently for different people and may not be explicitly obvious. When investigating community-based design methodologies (CBPD) with historically excluded groups, these dimensions are essential when considering who and what perspectives get prioritized and elevated when designing technologies with broad impact, such as AI. “Social Interaction” can have multiple meanings for different social contexts (educational vs. personal) in which users interact with one another using AI-mediated tools.

Activity theory and its iterations provide a foundational theoretical lens to unpack and understand user intentions, material context, and power relations within in situ contexts - leading to more inclusive understandings of emerging technology from perspectives left on society’s margins.

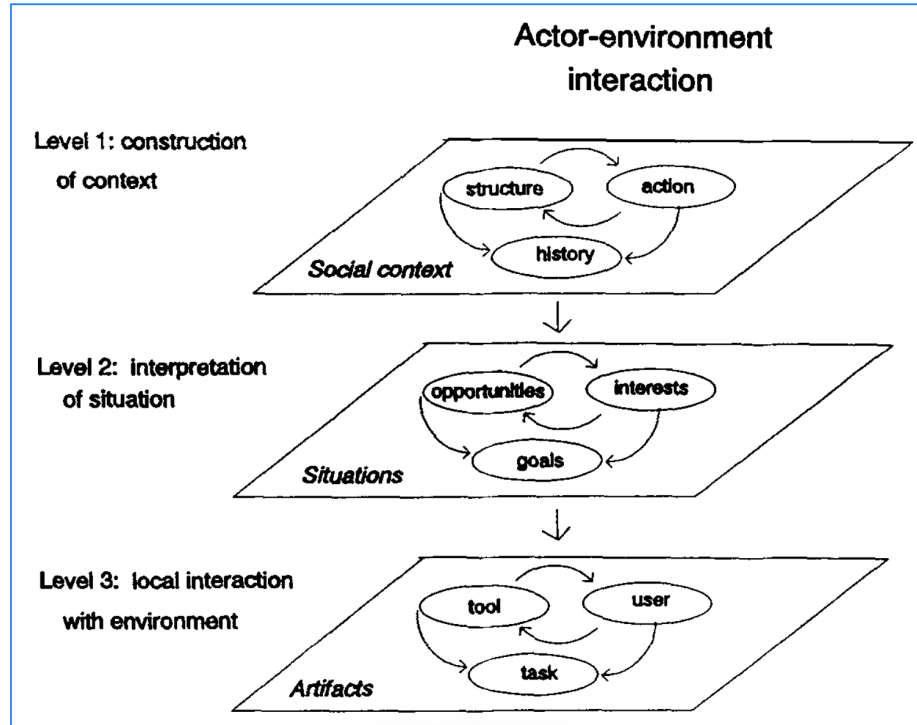


Figure 1.2: The hierarchical model of activity theory prescribes how an activity can be delineated into smaller units.

Social Context and Meaning-Making Context is not a static backdrop but is actively constructed and negotiated by participants, shaping how they interpret and reimagine technology. HCI researchers have long understood the importance of examining technology use and its adoption within the context in which it is used. Mantovani provides a thorough mental model for framing social context in HCI and divides the construction of interactions into three levels: construction of context, interpretation of a situation, and local interaction with the environment (71). The “actor” in this actor-environment interaction model refers to people, groups, and organizations. The model can be traversed up or down, where each level depends on the next’s influence. Level one of this model describes the interplay of “structure”- the cultural models (social norms) of a social context, “action,” and “history” - the intrinsically dynamic nature of action and structure. According to Mantovani, context should not be reduced to interpersonal relationships and information sharing occurring in a physical environment. Instead, it is “the prerequisite for communication: social actors

exchange meanings-which implies the existence of shared cultural references-not simply bits of information” (71).

Most importantly, context is deeply influenced by the transformation of shared social models, understandings, and rules, producing a notion of “context” that continually fluctuates due to the actions and choices of actors through time (71). The construct of everyday social situations within a context can be described as the collision between opportunity and actors and, more specifically, the collective opportunities, interests, and goals of a social environment. The shared social models of a particular point in time, place, and culture will dictate social context. In contrast, the previously mentioned elements will dictate the specific situation that actors are in. As actors interpret these situations in a particular context, according to their respective interpretation of the situation, “interests recognize in situations opportunities which may be grasped” (71), the interplay of goals, opportunities, and interest in any given situation dictates decision making and influences modes of collaboration. Mantovani describes the final level of the actor-environment interaction model and brings essential attention to artifacts within a social context (71). A framework for understanding the implicit influence of artifacts is necessary for understanding the nuances potentially afforded or detracted by technological and human systems. The context construction with these systems will largely depend on how users operate and dictate the features used and/or needed. More specifically, Mantovani describes the cyclical construction of tools and computation systems dictated by actions in a social context - informing new designs and inventions of systems (71). In other words, as many social-cultural theories suggest (Activity, SCOTs), computational systems cannot be separated from the context of use as the context dictates and transforms actions and use of tools. Mantovani sums this up by stating, “people performing tasks using given tools are the starting point for the invention of new tools-within the limits of the available technology-which are created to improve the quantity and quality of output, alleviate effort, reduce stress, and so on (71). These new tools, when adopted, modify the tasks for which they were designed and alter the situations, affecting both their technical

and social characteristics” (71).

Social interactions are varied and ever-changing because human desires, goals, and attitudes transform according to the context in which they are. As such, so do the tools and systems created for these motifs. Technologies are not discrete artifacts with no relation to other dynamic parts of our natural world. Technological artifacts are planted in more extensive social rules, histories, communities, and labor systems. Technologies are tools that influence the person and systems in a given context, as do the people operating in them. The political qualities of technological artifacts are the totality of abstractions that include context, social systems, individual goals and perspectives, and characteristics modified by changes over time. Through this communication, the tools change and adapt to their accumulated experience. As systems change and morph, technologies can also inherit political characteristics through human associations, ideologies, and culture, ultimately affecting agents and structures in a given time and place.

Technological affordances are inherent to the technology and what humans intend for them - encompassing cultural, legal, historical, and many more systems embedded in their use and changes over time. These theoretical and mental models for examining technological artifacts in situ help provide foundations for constructing specific research and design objectives in a community context. Mantovani’s multi-level social context model offers a valuable lens for understanding the sociotechnical dynamics in participatory design work at the Homeboy Art Academy. Like Activity Theory, Mantovani situates design practice within a historically and culturally mediated system, where actors, tools, and meanings are mutually constituted. This framing aligns closely with community-based participatory design, which views the “design context” not as a fixed setting but as a living system shaped by its participants’ social models, goals, and contradictions. In the context of HBAA, participants’ engagements with AI and other emerging technology systems were not simply reactions to technological affordances but acts of reinterpretation, refusal, and speculative re-imagination. As Mantovani

contends, context is a prerequisite for communication—and by extension, a prerequisite for ethical, culturally resonant design (71). Investigatively and on the ground, CBPD methodologically locates shared social models and situated knowledge as the foundation of the design process. Within this model, technologies do not precede participation; they emerge from it and are shaped by the histories, needs, and resistances of those who co-create them.

1.3.3 The Politics of Innovation and the Call for Participatory AI

Participatory design, community-centered methodologies, and socio-cultural theories of context provide a multidimensional understanding of how technologies are shaped by and shape social life. However, design does not occur in a vacuum—it unfolds within a broader political economy of innovation, labor, and capital. The following section engages with these political dynamics, mapping how AI innovation reproduces inequality and why participatory methods must evolve to meet this challenge.

Who Gets to Innovate? The Political Economy of Technology The dominant ideology of innovation celebrates a narrow archetype of the tech entrepreneur, propagating a form of progress that rewards a racialized, classist, and gendered worldview (18). As Crooks (2022) points out, this ideology renders knowledge in the form of communal relationships, tacit knowledge, and cultural care and values (such as familial-centered cultures) as invalid and invisible (72). In her book *Race After Technology*, Ruha Benjamin writes, “The desire for objectivity, efficiency, profitability, and progress fuels the pursuit of technical fixes across many different social arenas” (5). Benjamin argues that inequalities within technologies like AI—what she terms “The New Jim Code”—stem from power imbalances and biases encoded into systems through design choices. These biases are often obscured by the infrastructures that conceal the individuals and institutions behind them. Her analysis underscores the urgent need for transparency and representational diversity in AI development to challenge

the reproduction of societal inequities in technological systems.

Building upon Benjamin’s diagnosis of how structural inequalities are encoded into technical systems, it is crucial to examine the cultural narratives that shape who is seen as a legitimate innovator in the first place. The glorification of certain archetypes—typically white, male, and affluent—forms the narrative scaffolding that legitimizes exclusion in the name of innovation. When recounting the origin stories of technology giants like Zuckerberg, Bezos, Musk, and Kalanick, we are presented with the heroic journey arc—a tale of adversity, sacrifice, perseverance, ingenuity, and, ultimately, a breakthrough. These narratives often romanticize “humble” beginnings: the startup that grew from a garage or the entrepreneur who dropped out of college to pursue a bold vision. The media amplifies these stories, spotlighting traits like rebellion, cunning, and scrappiness as markers of ingenuity—traits that become moralized as ingredients of deserved success. Almost certainly, many of these “heroes” have laid the foundations on which our society now depends—social media, digital infrastructure, and new economies. Their stories are not just admired; they are institutionalized as templates for innovation.

Nevertheless, these heroic portrayals often obscure the structural conditions that scaffold such success. These myths distort our understanding of who gets to innovate and under what circumstances by foregrounding individual grit while obfuscating systemic advantage. Bezos, for example, received a “modest” \$250,000 loan from his parents to start Amazon. The Musk family, meanwhile, profited from South African apartheid. These are not just anomalies but indicators of a pattern: when privileged actors exhibit opportunism and hustle, they are lionized; when working-class individuals—particularly those from marginalized communities—demonstrate the same qualities, they are criminalized or dismissed.

If the tech entrepreneur serves as the mythic apex of innovation culture, examining the broader ecosystem that normalizes and benefits from this ideology is necessary. These are the extreme ends of the technology mythos—the lionized outliers—but what of the everyday

actors who sustain and benefit from the system? Those who capitalize politically, economically, and socially from emerging technology design engagements are typically college-educated, white, and male—profiles that dominate the tech industry and large segments of HCI research and design engagements (73). Being white and educated is not the issue, the issue is systematic exclusion that perpetuates one particular, and historically dominant, view of the world that runs counter to the lived experiences of a vast majority. by systematic exclusion, I mean, policies, processes, and perspectives carried out in the day-to-day leading to exclusion. A 2014 Equal Employment Opportunity Commission (EEOC) report titled Diversity in High Tech found that 68.5% of people recruited into tech positions were white males. Similarly, a 2020 Bureau of Labor Statistics report revealed that the tech workforce was 62.8% white and 24.6% Asian, underscoring the racial stratification embedded in the sector (74).

These demographic disparities are not incidental—they echo through the institutional spaces where design decisions are made, including within the HCI community. The following scholars, many of them Black and Brown women, have pointed to how technology reproduces social stratification under the guise of neutrality (5; 15; 75; 12; 13; 11; 54; 14; 10).

These forms of underrepresentation matter not only numerically but epistemologically. When dominant identities shape the worldviews embedded in our systems, technologies are built on a constrained register of experiences. Although the tech entrepreneur or the average tech worker may not be explicitly attempting to exclude or harm, the implicit consequences of failing to empathize with or understand the lived realities of those from lower socioeconomic or racialized backgrounds can lead to coded biases that are baked into the very tools we rely on every day (5).

Taken together, the mythologizing of innovation and the demographic realities of the tech industry reveal a deeper ideological pattern that elevates some worldviews while rendering others invisible in the innovation process. This romanticization of the tech entrepreneur

hero's journey, when paired with the homogeneity of the tech workforce, sets the stage for a technology landscape that routinely excludes. These realities provide the backdrop through which we can understand how emerging technology innovation, although sometimes well-intentioned, often perpetuates the systems of marginalization it claims to disrupt. By failing to democratize opportunity for underrepresented groups in designing and developing new technologies, imagining new futures, and non consequential opportunities to create, break, and fail, we risk reinforcing existing social biases and perpetuating institutional cycles of exclusion (76). Justice impacted and gang-affiliated Black, Indigenous, and Latina/o populations have especially faced complex marginalization.

Participatory Pathways Beyond Surface Level Inclusion The widespread application of AI across various disciplines has led researchers to think more critically about how these systems impact our everyday lives(77). As I have pointed out, systemic barriers in education and the tech industry disproportionately exclude historically marginalized groups from participating in technology design (53; 5). Community-based engagements reveal the social-cultural context in which technology is situated. These engagements provide a method to better connect with historically excluded populations (32).

Expanding who and how we enable participation among marginalized communities may mitigate such biases (78; 26). Participatory design is one approach to engaging marginalized voices within AI development (79). However, clarity is needed on what participatory design entails and what goals or outcomes it is expected to achieve (80). Deeper community engagement through reciprocity, reflexivity, empowerment, and meaningful duration is possible (80). Community-based design approaches can reveal larger societal issues within populations (81), increasing discourse on what, who, and how participation within the AI design process benefits (82). However, even critical approaches often do not aspire to improve living conditions for community partners, leaving them open to criticisms that marginalized

communities are simply a resource to be exploited (83).

How to move beyond surface-level inclusion and toward equitable involvement in creative economies previously accessible only to privileged groups remains a challenge. Community-centered methods seek to elevate marginalized users' influence and ownership throughout the technology development life-cycle. The goal is to improve products and empower users to drive an equitable distribution of creative possibilities enabled by new technologies. With greater participation in shaping tech innovation trajectories, marginalized groups can thrive through realizing their technological visions, not just surviving flawed systems but ultimately moving beyond damage-centered design initiatives (84).

More recently, many HCI scholars of color have spearheaded community-based initiatives to address the adverse effects of AI systems on social, political, and economic opportunities for marginalized populations (85). Knowledge production in technology design is undergoing a shift away from traditional research labs and privileged design teams at large technology organizations; it is becoming increasingly embedded in the cultural epicenters of marginalized communities (86).

My work posits that by amplifying the voices of individuals from communities that have faced hardships, experienced systemic exclusion from political, economic, and social upward mobility, and are less privileged, we can generate ideas more closely aligned with society's needs. These innovative ideas are rooted in real-life experiences and address immediate needs. They often highlight tools and situations that challenge the perceptions of more privileged researchers or designers, who have traditionally held greater influence over the development and alignment of AI tools(3).

AI as Social Infrastructure: Bias, Power, and Governance Rapid advancements in artificial intelligence (AI) and its algorithms have enabled the integration of these tools

into the fabric of our society (45; 87; 4; 5; 88). AI’s pervasive influence of algorithms on daily life (social media, health, economics, etc.) requires a shift in how AI is designed and implemented (1). Deploying misaligned designs embedded into AI architectures has been shown to cause fundamental harm to our most vulnerable populations and threaten some of our democratic processes (89; 90; 91). The concentration of AI innovation has been restricted to elite technology corporations and research labs. However, these innovations’ impacts on society have been far-reaching, both negative and positive, with minimal decision-making authority or input being redistributed to communities where the impacts have been felt. Orr and Crawford (2024) remind us that AI is not abstract or neutral (92). There is materiality to its development and implementation, starting with the datasets used to train these systems (92). Baked into the automated capabilities of AI are the biases of the people building it. When those viewpoints are concentrated on a narrow portion of society, these systems cause material harm (93). It is imperative to reconstruct our conceptualizations of these systems to concretize better the reality that these systems are permeating and automating foundational social, economic, and political structures. Algorithmic institutionalism is the idea that AI maintains characteristics of an infrastructure (some academics refer to AI as an institution, others as an infrastructure) in that it is sunk into other structures, invisible, and enables other forms of work or tools (94). Conceptualizing AI in this way helps us think about why it’s important to ensure that AI remains aligned with the broadest set of human values.

Cumming, 2018 reminds us that the oil industry in 1920’s Los Angeles experienced its peak, making it America’s fifth largest city producing just over 20% of the world’s oil (95). The relationship between oil and real estate and their impact on the lives of future Angelinos is a direct one. Cumming argues that the development of Los Angeles’s oil industry was inextricably linked with the creation and maintenance of racial segregation in the city. He posits that the mapping of subterranean oil resources, alongside the technologies of oil extraction, was essential to engineering a racialized housing market, particularly through the practice of “redlining.” The story of oil mapping in 1920s Los Angeles reveals how technolog-

ical infrastructures, such as resource extraction and urban planning, were deeply intertwined with social, economic, and racial systems. Similarly, AI operates as a modern infrastructure, embedding its biases and impacts into the scaffolding of society, shaping and reinforcing existing inequalities at a systemic scale.

AI systems function as social structures in several important ways. First, like traditional institutions such as education, healthcare, or the legal system, AI systems increasingly mediate access to resources, opportunities, and information across society. They determine who qualifies for loans, jobs, housing, or educational opportunities through automated decision systems. Second, AI embodies and perpetuates social values, norms, and power relationships. The design choices, training data, and operational parameters of AI reflect and reinforce particular worldviews while potentially marginalizing others. For example, facial recognition systems trained primarily on specific demographic groups may perform poorly for others, creating systematic disparities in how these technologies serve different communities.

Third, AI is increasingly integrated into governance structures. It shapes policy implementation, resource allocation, and surveillance practices. The algorithms that determine welfare eligibility, police deployment, or content moderation effectively function as unelected decision-makers with significant social impact. A growing academic line of inquiry of gov tech technologies is the concept known as rules as code (RoC), whereby res.

Finally, AI is developing its institutional logic and momentum. As organizations build infrastructure around AI systems, they create path dependencies and vested interests that resist change, similar to how traditional institutions develop self-preservation mechanisms. When marginalized communities participate in co-designing AI, they can challenge these institutional dynamics by embedding alternative values, priorities, and knowledge systems into the technology itself, potentially creating more equitable and representative technological institutions.

This perspective suggests that democratizing AI development is not just about fairer products but about reshaping an emerging form of social infrastructure that will profoundly influence how society functions for generations. AI systems can encode and amplify existing biases, reinforcing structural inequality (11; 5).

PD has gained renewed relevance in artificial intelligence (AI) development, where concerns have arisen about the lack of diversity among those designing and building AI systems (45). Critics argue that this homogeneity fails to reflect the populations disproportionately affected by biased outcomes, particularly historically marginalized groups such as Black and Latino/a populations (96; 85). Selbst et al. (2019) utilize the concept of abstraction to contend that machine learning engineers and others involved in the design process often narrowly focus on specific technological functions and tasks (97). Consequently, these “experts” become preoccupied with models in a manner that is far removed from understanding “any context that surrounds this system” (97). This disconnect between technological development and real-world implications can perpetuate existing biases and inequalities (77).

Answering the Call: CBPD as a Method for Participatory AI With the rapid development and expansion of consumer-grade AI technologies, participatory methodologies for AI development have become necessary and imminent to ensure that products are fair, accountable, transparent, and ethical (FATE) (98). Topics emerging from FATE scholarship reveal a critical opening to reimagine methodological approaches in ways that center the lived experiences and epistemologies of historically excluded communities beyond performative engagement (99; 100; 80; 101). AI and HCI researchers have expanded community-led efforts to increase the participation of marginalized populations, bringing attention to and countering the implicit and explicit harms of AI systems. These efforts have manifested in initiatives such as Black in AI, LatinX in AI, Indigenous in AI, and Diversity in AI, among others (102; 103; 39; 104).

The technical advancement of AI systems continues to exponentially outpace our understandings of their impact on society while they increasingly integrated into our public and private social lives (3). Researchers have argued that purely technical approaches to designing and evaluating AI systems will not be sufficient to address the social and ethical concerns of AI and its influences on society. Rather, socio-technical approaches and additional research conducted with a broader range of stakeholders, including non-experts and marginalized groups, is imperative to understanding its impact and for more fairer and just system designs (4; 81; 80; 105). In short, researchers have highlighted the need to respond to the need of better understand these tools as they become socially embedded and move beyond purely technical implementations and understandings.

Further, studies have called attention to the limitations of solely relying on expert-led approaches to ethical AI design, highlighting its implications in exacerbating bias and harms, especially for marginalized and historically excluded populations (5; 106). By centering engagement, rather than focusing on community deficits or pre-defined problems, we can better direct resources and effort toward innovation that is more inclusive, equitable, and relevant to community needs (107).

This approach not only addresses the immediate needs of a specific community but also has the potential to reshape the broader landscape of AI and HCI research, leading to more equitable and representative technologies. By centering the perspectives of marginalized communities in technology design, we can develop more inclusive and practical solutions that challenge the perceptions of more privileged researchers or designers who have traditionally had greater influence over how AI tools are built and aligned. While researchers have called attention to the need for more community-based AI design engagements, there remains minimal effort to build internal capacities that actively center the alternative forms of knowledge delegitimized by current “innovation” ecosystems.

This research posits that AI is more than just an application on our computing devices; it

is a tool enabler and a tool of tools. Current realities will continue to sink into the fabric of our society and automate inequality at massive scales. Communities must be empowered to build their capacities to innovate in ways that counter-current hierarchies of labor, centering on practices that align with their values, cultural ways of being, knowledge systems, and imaginations. If this moral argument does not resonate, here is the practical (business) one. If the goal is to enable communities to swiftly and readily adopt AI platforms meaningfully, working closely to develop pipelines between on-the-ground insights and technical realization will help scale “innovation.” Building generalizable AI models requires expanding the way we think about expertise to build robust models that can move across context and away from task-orientated intelligence and capabilities. The homogenization of AI models will be limited in performance if they are not built without extended and curated expertise found outside of elite technology or academic laboratories.

Addressing Structural Exclusion in Technology Design This chapter’s arguments are further strengthened by an emerging body of work that underscores the structural consequences of exclusion and the transformative potential of inclusion. The innovative process of creating, breaking, and failing has been afforded to the privileged who overwhelmingly have been white, educated, and male (3; 73). Extending the opportunity to marginalized populations can generate new ideas that have yet to be explored and incorporate more inclusive designs addressing persistent issues of equity and inclusion within design engagements (108). The urgency and importance of encompassing justice-impacted young adults is underscored by studies highlighting the need to democratize innovation, address issues of bias, and reduce harmful outcomes for historically marginalized groups. (109; 87; 110). Nearly 2 million people are currently being impacted by incarceration in America, and millions more have been affected in the past. This urgent situation also profoundly affects the families who continue to rely on technology in their daily lives (111).

Technologies sustain discrimination through biased designs that assume particular user qualities, intentions, and perspectives or misaligned implementations whose use cases run counter to the needs of historically underrepresented groups (75; 15; 12; 13; 11; 54; 14; 16). While only a handful of studies have interrogated systemic inequities in technology design and innovation, the HCI community has been slow to take bold, direct action.

A growing body of research has criticized the lack of research on historically marginalized groups in America and has responded by bringing attention to how their continued sidelining highlights the imperative to tackle systemic bias and prevent further harm perpetuated by their exclusion in technology design. (15; 112; 113; 114; 12; 13; 84; 110). Moreover, judicially impacted communities have largely been left out of technology design and have been engaged with as the subject of research (115). Incorporating the perspectives and lived experiences of communities impacted by the judicial system provides an additional critical lens to emerging technology design. Examining their insights can expose broader infrastructures and social orders contributing to societal inequities and problematic conventional design practices that disproportionately affect communities of color (116). More research must urgently join these few critical voices advocating for marginalized communities by scrutinizing “*who gets to innovate*” within emerging technology domains.

Reframing Expertise: From Deficit to Asset-Based Frameworks Dominant approaches to participatory design in HCI often operate through a “do-gooder” lens that frames marginalized communities as lacking, needing fixing, or awaiting intervention from expert designers (117; 118). This deficit-based lens not only devalues the complexity of lived experience but risks reinforcing power imbalances under the guise of inclusion (12; 119). Deficit-orientated frameworks inadvertently infantilize participants, treating them as passive beneficiaries rather than co-producers of knowledge (120; 121; 122). This tendency is particularly problematic when working with justice-impacted youth, whose interactions with

institutional systems—surveillance, policing, incarceration, and education—are too often framed solely through risk rather than resilience (123). By contrast, asset-based frameworks recognize that communities already possess rich epistemic resources, even if these remain unrecognized within dominant design paradigms.

Luis Moll’s (1992) concept of Funds of Knowledge offers a generative alternative (124). Developed within the context of working-class and immigrant households, the theory challenges traditional educational assumptions by positioning household practices as sites of cultural, historical, and intellectual richness. Reframing the Art Gang’s experience through this lens means acknowledging their embodied expertise in navigating systems of marginalization—expertise that includes informal economies, mutual aid networks, and an acute awareness of institutional power. This knowledge is not inferior but is a central form of design intelligence, crucial for imagining technologies that resist harm and cultivate care.

1.3.4 Building Capacity for Meaningful and Sustained Participation

This final section describes the concept of “infrastructuring” and introduces the idea of “backstage design” as the messy undertakings that enable participatory design engagements to occur in the first place. This section highlights the need to move beyond engagements that seek to create product outputs.

Beyond the Workshop: Design as Infrastructuring Participatory design engagements concerned with building technical solutions for social issues, have at times been misapplied in ways that limit genuine community engagement (13; 125; 126). Superficial engagement can occur when social problems are primarily defined from outside a localized community context and by those not from that context, leading to design engagements that

risk becoming one-sided despite their intent. It is crucial to recognize that simply involving racialized and minoritized groups in token activities—such as isolated research events—can be mistakenly presented as meaningful inclusion or participation (127; 128).

As Crooks (2022) aptly states, “What emerges then is a narrow and myopic approach to the question of how computers might contribute to a more just or fair society, one that casts racialized and minoritized subjects as bereft, as a social problem in need of technical solutions” (72). This narrow view perpetuates a “business as usual” approach to technology design that often fails to address the underlying systemic issues faced by communities of color and historically marginalized groups. Cunningham (2022y) illuminates the inherent privilege in using technology as a means to solve particular problems, highlighting the uncomfortable truth that design solutions can provide a “license to investigate virtually any walk of life and build systems that...center people but with distance, show limited and uncertain improvements to the conditions people, world-wide, live in” (114). One mechanism to accomplish meaningful engagement with racialized and minoritized communities is to develop internal capacities within the community that enable that group to realize their own “collective technological aspirations” (72).

The concept of “infrastructuring” in participatory engagements has been extensively explored by (129; 22; 130; 118), who posit that these types of engagements are inherently political acts. Bodker et al. push the concept further by introducing the uniting and defining the concept of “participatory infrastructuring” - activities that “engage users in processes of design and use” (118). As Bødker et al. (2017) remind us, design is not limited to the formal moments of structured co-creation and designed artifacts (118). The arena in which participatory design occurs is much more complex. It is inherently a social-political negotiation between power, local histories, and practices over time. Engagements are embedded within a broader ecology of situated negotiations, improvisations, and alignments, what Bødker et al. (2020) calls “backstage design” (118). These are the often invisible or “messy” processes

that enable participatory activities to occur at all. These interactions encompass creating the social-technical resources that enable participation in design beyond the initial design scope—or what Ehn calls “design after design - meta-design” (130). Through Dewey’s notion of “publics,” Le Dantec and DiSalvo (2013) develop the relationship between this concept and PD, where they argue that it represents the political qualities of PD - negotiations between and the long-term, ongoing work of building a community’s sociotechnical capacity to act on its behalf (131; 132).

Participatory infrastructuring is characterized by the following: (1) institutional infrastructural care work (132), (2) the constitution of publics - social organization and action that produces change (130).; (3) attachments - networks, processes (both implicit and explicit), and commitments of those involved in the formation of a public(129; 133); and (4) “the mess” - the existing power structures and infrastructures (both visible and invisible) that are sunken into the social context in which engagements play out (118). These components formulate the power and politics of operating in complex social structures. As highlighted by Bodker et al. (2017), these dynamics are often not discussed in participatory design discussions.

Infrastructural care work inherently involves the ongoing cultivation of relational social-material structures that, once established, deeply embed themselves in context. Like railroad tracks, these infrastructures are not repeatedly remade but become lasting foundations that enable and guide subsequent uses (130; 134). This “backstage” work is often messy and conflict-prone and involves preparations, negotiations, and political work beyond constructing design artifacts with a particular community. To genuinely empower historically marginalized groups to shape their technological futures, we must thoughtfully formulate our design lens, moving beyond superficial outcomes to address the invisible barriers they face. Central to these scholars’ argument is that infrastructuring can be used to move beyond enacting superficial participation in design. The social scaffolding and institutional care work

that sustains engagement constitutes “infrastructuring.”

In this dissertation, I formulated this design lens as I progressed through my engagement with the academy. Admittedly, at first, I resisted this viewpoint. My positionality as a scholar navigating the institution of academia and research led me to believe that design artifacts were valuable in these contexts - an attempt to show legitimacy, academic rigor, and scholarly prowess. In addition, as someone from the community I was conducting research in (what academics call “insider research”), I wanted to move beyond work that pigeonholed me to only examining marginalization and inequality. My community is more than that. Nevertheless, as with all forms of design - you cannot uncouple design from social context and the lived realities that inform technology use (18; 135; 136).

Towards a Critical Technical Practice This literature review has synthesized frameworks from participatory design, socio-cultural theory, and critical AI studies to build a foundation for this dissertation. The synthesis of CBPD, DBIR, Funds of Knowledge, and Infrastructuring provides a unique lens for understanding how to build community capacity for technology design. This approach exemplifies what Philip Agre (1997) calls a “critical technical practice”—one that does not simply build technology but simultaneously and reflexively interrogates the epistemological, political, and cultural assumptions embedded in the act of building (137). This dissertation, therefore, is an account of such a practice, demonstrating how centering the knowledge and agency of marginalized youth can transform our understanding of what technology is for and who it should serve.

1.4 Plan of the Dissertation

This dissertation is organized into six chapters, each exploring different phases of Homeboy Technologies. I used the method of CBPD to explore the intersection of technology, student

interest, and the pedagogical orientations of the Art Academy towards increasing creative skills for the creative economy. As time passed and my relationship with the Art Academy grew, I began to focus engagements on emerging AI design topics. In addition, it is important to note that engagements began within a particular time frame, i.e., chapter 3, where I implemented design sessions each Friday for 9 Fridays, a significant period for the project’s development. By my “second” engagement in chapter 4, my time at the academy became more constant and formalized into a “class” offering. I also frequented the academy 2-3 times per week in addition to the focused engagements. In each chapter, I attempt to invite readers into real exchanges and moments while providing a structured account of methods and ideological shifts that guided my engagement with the community.

Chapter 2 provides a socio-cultural context of the Homeboy Art Academy, situating the study within the historical, political, and social context of Boyle Heights community, where Homeboy Industries was founded, and the greater Los Angeles region. The Art Academy serves as a site of intervention for many youths who are beyond “at risk” and are in full-on crisis. These students are active gang members, recently incarcerated, experiencing homelessness, or dealing with a drug addiction. Often, it is the case that students are rival gang members, and the subtle negotiations that play out while at the academy can be challenging to see if you do not know what to look for. Paying attention to slight gestures, types of body postures, and developed intuitions can reveal these subtle battles. These dynamics are important to understand within a larger historical and political context.

Chapter 3 discusses the first CBPD engagement, detailing the methods and co-design interventions to facilitate AI participation.

Chapter 4 explores participatory AI design, examining how youth envision AI agents in mixed reality. I also examine the concept of “backstage” design and its importance in engaging communities.

Chapter 5 examines a partnership with Google’s Technology and Society organization and analyzes the tensions between corporate AI development and community-based innovation.

Chapter 6 concludes with actionable recommendations for CBPD in AI design, advocating for broader institutional shifts toward inclusive and participatory AI governance.

As AI emerges as the next generation of personal computing (138; 1), this research underscores the transformative potential of co-designing with historically excluded communities. Through a long-term engagement that sought to build and support internal organizational capacity building, this work organizes bold, direct, community-based engagements that challenge exclusionary design norms centering a young adult population that hardly ever gets recognized in the HCI literature in shaping AI’s future. This work is a call to action for the design community.

Chapter 2

The Art Academy and the “Art Gang”

2.1 Geographies of Exclusion and Resistance

This chapter introduces the community and partnerships that made my research possible, focusing specifically on the Homeboy Art Academy and its relationship to the surrounding neighborhoods of Boyle Heights and East Los Angeles. I begin by offering a historical and political overview of the region, tracing how overlapping forces of systemic neglect, criminalization, and disinvestment have shaped the local socio-cultural landscape. These structural conditions, which have often led to community violence and exclusion, gave rise to the Art Academy as a beacon of hope. It serves as both a creative and educational intervention, addressing the symptoms and the root causes of these issues. The Art Academy provides culturally sustaining spaces for self-expression and collective healing, countering the broader absence of such spaces in the community. Following this contextual overview, I describe the origins and organizational structure of Homeboy Industries and the Homeboy

Art Academy. This overview lays the foundation for understanding the Art Academy as a dynamic site of community-based practice and cultural production embedded within a broader ecosystem of care, advocacy, and resistance.

I then examine the meaning of “community” in community-based participatory research, reframing how participation is typically understood in technology design and HCI. Rather than defining participation solely through formal or institutional inclusion, I foreground lived experience, cultural expertise, and alternative ways of knowing as central to participatory design. In a subsequent section, I briefly examine systemic barriers to STEM degree attainment among underrepresented populations, particularly Black and Latina/o youth. This discussion serves to situate the limited access to design and technology development spaces not as a reflection of individual failure but due to exclusionary educational structures. I draw a throughline between access to STEM education and the opportunity to shape emerging technologies—particularly AI—which increasingly function as social infrastructures that influence and govern the lives of marginalized communities.

I conclude the chapter by outlining the educational design strategies used to support participation and learning during my engagement at the Academy. I describe how I applied the Universal Design for Learning (UDL) framework to scaffold multiple modes of engagement and expression, meeting students where they were and creating space for participation at different levels. These strategies were essential in making the workshops inclusive, culturally responsive, and adaptable to the dynamic needs of the participants.

This chapter aims to situate the Academy within a particular time and place, revealing the sociopolitical dynamics that structure everyday life for students and the cultural networks that inform their identities and creative practices. In doing so, I frame the Art Academy not just as a program or service delivery site but as a legitimate community of practice—one rooted in deep knowledge of legal, educational, and social infrastructures gained precisely through experiences of exclusion, surveillance, and systemic inequity.

This section provides the urban, cultural, and political context of Boyle Heights and East Los Angeles, emphasizing the region's legacy of systemic disinvestment alongside enduring cultural resilience. To understand the dynamics of the Homeboy Art Academy, it is first essential to consider the community in which it is situated. Boyle Heights is a vibrant, historically rich neighborhood deeply rooted in Latin American history, customs, and resistance. The community, predominantly Mexican American today, is a testament to the resilience of immigrant communities, having long been a cultural crossroads for various ethnic groups.

Historically, Boyle Heights has undergone significant demographic shifts shaped by racially restrictive covenants that once dictated where Jewish, Russian, Black, Japanese, Central American, and Mexican families could live (139). During the early 20th century, the area emerged as one of the few racially and ethnically integrated neighborhoods in Los Angeles due to these exclusionary housing policies elsewhere in the city. Many wealthy families left for suburban areas following World War II, leading to a sharp demographic transformation. The neighborhood became home to increasing numbers of Mexican and Central American immigrants, many of whom had previously been barred from residing in suburban areas due to housing discrimination and redlining.

Today, Boyle Heights is home to approximately 90,477 residents within its 6.5-square-mile area. It remains one of the most economically disadvantaged neighborhoods in Los Angeles, with a median household income of \$56,155, which is significantly lower than the citywide median of \$76,244 (based on 2018-2022 data) (140). The neighborhood's median age is 31, which is young for both the city and county of Los Angeles (140). Over 93% of residents identify as Latino or Hispanic, and a similar percentage of households speak a language other than English at home, most commonly Spanish (140; 141).

Boyle Heights is undergoing rapid transformation as gentrification accelerates and developers target the area for its proximity to Downtown Los Angeles. The expansion of technology and media industries into former industrial zones has intensified displacement pressures (142).

By 2020, companies such as Spotify, Warner Bros., Twitch, Accenture, Honey, and the USC Roski School of Art had moved into nearby areas, catalyzing over 25 major development projects and the construction of more than 5,000 new housing units. These shifts have already begun to displace long-term residents and threaten the cultural fabric of the neighborhood (see (143)).

At the same time, Boyle Heights contains one of the city's largest concentrations of public housing and remains one of its most heavily policed districts. As of 2012, the neighborhood was home to over 33 gangs and "at least 66 unique rivalries" (144). These overlapping economic, political, and social conditions severely restrict residents' access to high-quality education, technological training, and stable employment pathways (142).

Despite these challenges, Boyle Heights has long stood as a hub for civil rights organizing and cultural resistance. During the 1960s and 1970s, the Chicano Movement emerged in Los Angeles, and Boyle Heights played a critical role in shaping its ideological and cultural foundations. Activists fought for educational equity, labor rights, and political representation, often drawing on Indigenous and Mexican cultural traditions to assert pride in Chicano identity. Organizations such as the Brown Berets and United Mexican American Students (UMAS) were instrumental in mobilizing youth across the city, leaving a lasting legacy of community activism and resilience.

One of the most iconic events tied to this era was the "*East L.A. Walkouts*" of 1968, in which thousands of Chicano students from five high schools—including Roosevelt High in Boyle Heights—staged mass walkouts to protest racist school policies, overcrowded classrooms, and a Eurocentric curriculum (145). These protests became a catalyst for broader reforms in education and inspired youth-led activism nationwide.

The 1990s marked another pivotal chapter in the neighborhood's history as gang violence in Los Angeles reached unprecedented levels. At the time, the city was widely referred to as the

“gang capital of the world,” with Boyle Heights at the epicenter of this crisis. This period also saw the beating of Rodney King in 1991 and the ensuing Los Angeles Uprising in 1992, which further exposed the city’s deep racial and economic inequalities. Community organizations, including Homeboy Industries, were formed as direct responses to the structural violence and systemic neglect experienced by youth in neighborhoods like Boyle Heights.

These historical moments, ranging from the Chicano Movement to the rise of community intervention programs, reveal a pattern of collective resistance, community self-determination, and creative survival. They form the backdrop against which contemporary efforts like the Homeboy Art Academy continue to operate. However, despite its rich activism and cultural production legacy, Boyle Heights remains structurally excluded from the dominant circuits of technological innovation and design. Opportunities to envision, create, and participate in emerging technology fields are often limited due to underfunded schools, surveillance, and a lack of infrastructural support (26). Paradoxically, neighborhoods like Boyle Heights also serve as epicenters of cultural creativity that wealthier and more resourced communities routinely appropriate (146; 147). For example, the popular video game Fortnite has been accused of appropriating dance moves popularized by Black artists—including the “*Milly Rock*” and “*Shoot*” dances—without attribution or compensation (148). This phenomenon reflects broader patterns of cultural extraction, wherein the expressive practices of Black and Brown communities are commodify for profit.

In contrast, these communities are systematically excluded from the industries profiting from their creativity. Institutions like the Homeboy Art Academy represent more than localized interventions. They are embedded in a larger struggle to reclaim creative agency, assert cultural sovereignty, and build alternative pathways into technological and artistic futures—on their terms. Engaging in AI design and creating space to reflect on critical technology topics within a community at the crux of living through political, economic, and social tensions is necessary to influence institutional trajectories where these conversations would not oc-

cur. I recognize that this viewpoint may seem egocentric. However, my proportionality as a researcher who lives and is from the community I am engaging with is a different dynamic than engagement initiated by someone not from the community.

2.2 Community as Method: Reframing Participation

In discussion of enacting engagements with historically marginalized communities in technology design, scholars have argued that these communities have largely been the subject of research stemming from deficit based views as opposed to engaged with through flourishing or joy (114; 84). More often than not, research with marginalized communities has been shaped by deficit-based perspectives, which reduce participants' lived experiences to a series of problems in need of external resolution (26; 149). These perspectives, however well-intentioned, tend to frame marginalized communities as lacking expertise or capacity, inadvertently reinforcing extractive research logics and paternalistic hierarchies (31; 150). As such, they reproduce the power asymmetries that justice-oriented and CBPD methods seek to dismantle. In response, researchers have called to take an assets-based approach to these engagements (151; 152).

In response to these entrenched dynamics, my engagement with the Art Academy sought to disrupt deficit-based approaches by foregrounding lived experience as a legitimate epistemic resource and form of expertise. To address gaps in academic and industry practice, I repositioned lived experience, adversity, and survival as collective funds of knowledge and community members as active rather than passive contributors to technology design (124; 153; 154). This approach posits the idea that knowledge is socially situated and those most impacted by power systems are uniquely positioned to critique and reimagine them

Participatory design with historically marginalized communities has often remained entan-

gled in problem-solving frameworks that foreground externally defined issues (155). These frameworks frequently stem from institutional logic prioritizing deliverables over deep understanding and engagement, flattening the complexity of socio-historical experience into narrow categories of “need” or “lack.” Bødker refers to this dynamic as “do-good” design—“engaging co-design meetings between particular people and socio-material resources to set these people somehow free (a worthy cause indeed)” rather than addressing the broader organizational, political, and technological contexts in which participation occurs (117).

As Dillahunt et al. (2017) caution, such approaches risk infantilizing participants and constraining their agency in shaping the direction and meaning of design work (12). More importantly, the design process is an organizational practice of worldbuilding (136; 156). Those who have historically maintained access to educational, political, and economic institutional networks that design and produce emerging technologies (especially AI)—shape infrastructures that advance their worldviews, aspirations, and collective goals. The act of designing is thus inherently privileged. Methodologies that approach communities through deficit-based or techno-deterministic perspectives inadvertently reinforce the structures that produce marginalization.

These problems are not resolvable through technical means alone; instead, they are deeply embedded in structures of racialized surveillance, educational exclusion, and economic precarity (114). Recognizing the structural nature of these conditions, my approach to community-based engagement deliberately shifts away from problem definition and toward speculative and imaginative modes of inquiry. Instead of designing technologies for problems, this series was structured around exploration, play, and mutual learning, using emerging AI tools for co-creative experimentation. This reframing reflects the core tenets of asset-based community engagement, emphasizing local wisdom, resourcefulness, and collective resilience as the foundation of collaborative work (122; 121).

This orientation materialized through tailored and adapted hands-on collaboration with the

Art Gang, whose intellectual and artistic interest and program goals dictated much of the terms of engagement in the workshops. Activities provided access to developer-grade tools typically reserved for elite R&D labs. This deliberate redistribution of technological capital served a symbolic and practical function: it challenged prevailing assumptions about who belongs in technological spaces and provided the Art Gang with material opportunities to imagine and prototype AI-powered experiences in real time (84). By staging these workshops in a community-based setting, the research modeled what Philip Agre (2014) called a critical technical practice—a method for doing design work that both produces technology and interrogates the epistemologies embedded in its production work (157).

To ground these practices in a broader ethical and political framework, this work draws upon design justice principles to shape its goals and methods. The theoretical foundation of this work is rooted in the principles of design justice (78), which hold that those most affected by design decisions should have a central role in shaping design processes and outcomes. Within this framework, participant engagement is not reducible to usability testing or iterative feedback. Instead, community members are positioned as co-theorists and co-creators—contributors to the research agenda and the technologies. Technological exploration and personal storytelling were treated as entangled forms of knowledge production, surfacing emotional insights, embodied, and situated in lived experience (135). These methodological commitments signal a broader shift within my approach to participatory design: from a problem-first to a possibility-centered paradigm. Whereas problem-driven approaches often emerge from institutional mandates to “solve” inequality, possibility-driven research opens space for joy, cultural expression, and future-building work (84; 158; 159). By embracing creativity as a critique, this study expands our notions of expertise and innovation and reclaims the label of “innovator” for those historically excluded from such recognition. Importantly, such reimagining does not arise from technology alone but is made possible by the researchers’ relational infrastructure.

As scholars in CBPR (38) and HCI (133) have emphasized, the quality of participation depends not only on inclusion but on the conditions under which inclusion occurs. Trust-building was not an ancillary task in this study—it was infrastructural. With this population, trust is an essential ingredient for success. It enabled exploration to occur safely, authentically, and on participants’ terms. Building upon this foundation of trust and co-creation, we can begin to articulate a new vision for research practice that prioritizes participant agency, technological literacy, and narrative sovereignty.

Such approaches challenge dominant HCI and community-based design epistemologies, insisting on the value of plural ways of knowing, sensing, and designing. Ultimately, this research invites scholars and practitioners alike to move beyond intervention frameworks and toward practices that center ingenuity, joy, and collective imagination as a socially situated process in designing emerging technologies (160).

2.3 Community as Method: Reframing Lived Experience as Expertise

Traditional methodologies in CBPD research have often been shaped by deficit-based perspectives, which reduce participants’ lived experiences to a series of problems in need of external resolution (26; 149). These perspectives, however well-intentioned, tend to frame marginalized communities as lacking expertise or capacity, inadvertently reinforcing extractive research logics and paternalistic hierarchies (31; 150). As such, they reproduce the power asymmetries that justice-oriented and CBPD methods seek to dismantle.

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2.4 Designing With, Not For

This section describes the unique challenges and opportunities of working with justice-impacted, gang-affiliated young adults considered “at-risk.” I will describe key barriers this population faces as they transition into adulthood within the context of complex trauma from gang affiliations and identity navigation. Additionally, I will explain the intersectional challenges—namely social, economic, and political histories—that contribute to barriers to

attaining STEM degrees, ultimately leading to fewer people from historically underrepresented groups contributing to tech design. To connect these structural realities to design practice, I will also highlight how the unique perspectives of these young adults differ from typical populations that prominent research and industry institutions engage with. Through this description, I aim to demonstrate how their tacit and situated knowledge reflects broader societal needs and provides crucial input for designing AI technologies.

Research has shown that the transition from young teenage years to young adulthood is the most crucial for individuals who have been recently incarcerated (161). Youth who have had experiences within the judicial system are overwhelmingly Black and Latino males—a known and persistent issue in America (162). Incarceration is closely tied to social, political, and economic inequality, which profoundly shapes these youth’s life trajectories. Unlike their more affluent counterparts, who benefit from prolonged periods of identity exploration and structured support, formerly incarcerated youth often take on adult responsibilities prematurely, navigating environments that demand survival-oriented decision-making rather than academic or career exploration (163). This premature adulthood fundamentally alters their educational and professional pathways, limiting their access to opportunities that require long-term investment, such as pursuing higher education in STEM fields.

These systemic inequities persist beyond the prison gate and school threshold, influencing every attempt at re-entry, education, and economic participation. This reality intersects with the well-documented underrepresentation of historically marginalized students in STEM. Structural inequalities in education mean that low-income minority students are less likely to be academically prepared in K-12 settings, directly affecting their success in higher education STEM courses. For formerly incarcerated youth, the barriers to STEM success are even more pronounced. The lack of academic preparedness is compounded by the instability and disruption caused by incarceration, making it even less likely that they will pursue or persist in STEM fields. Thus, the systemic forces that accelerate adulthood for recently

incarcerated youth also limit their access to high-growth career fields, reinforcing cycles of economic marginalization and underscoring the broader implications of this research.

Factors experienced in the K-12 track are carried over into the college circuit and are often reproduced and accompanied by more influences that inhibit attainment rates for these students. The faults in these pipelines and the disadvantaged primary schools where many low-income Black and Latino students originate from place these learners far behind their affluent counterparts. Affluent students arrive at college already accustomed to and molded by systems that mirror the college environment they are entering. In contrast, low-income students of color arrive at their respective institutions having to learn to navigate the new dynamics these environments maintain. In other words, low-income Black and Latino students are forced to relearn how to be students for a system that favors their wealthy counterparts. The most important factors that hinder the success rates of low-income students of color originate from the exchanges between campus climates and institutional proxies (142). If institutional climates often marginalize these students, then technology design must start by doing the opposite: meeting them where they are, validating their identities, and inviting their participation in systems they have historically been excluded from.

2.5 Meeting People Where They are At - Educational Pedagogies as Mechanisms for Participation

This section outlines the educational framework that informed my approach to CBPD sessions. Situating the Homeboy Art Academy within the historical, political, and economic context of Boyle Heights underscores the need to design activities that reflect students' educational realities and cultural norms. Elite institutions often control AI design and innovation, reinforcing exclusionary power structures (?). Ensuring underserved communities partici-

pate in AI and emerging technology design is essential to fostering inclusive and equitable technological infrastructures. Education within participatory design is not solely about skill acquisition but about cultivating critical consciousness. Drawing from Paulo Freire's concept of praxis, which emphasizes reflection and action, the goal is to create learning environments where students can interrogate the technological systems that shape their lives (164; 165).

Through workshop activities, educational materials, and cultivated experiences with novel technology, CBPD can empower students with the technical skills and critical literacy necessary to challenge dominant narratives and contribute to designing systems aligned with their values and realities. This process is not about imposing knowledge, but about empowering the students to actively shape their learning and the design process. Putting this theory into practice required aligning educational and research goals with the everyday realities, educational needs, and institutional constraints of the Art Gang.

A critical aspect of designing workshop agendas was ensuring that I accomplished an interwoven set of goals: (1) align research activities to the needs expressed by Debora, which included having educational opportunities that centered on building creative economy skillsets; (2) engage with the intellectual interest of the students; (3) investigate the design method of CBPD in a socially situated manner; (4) uncover design dimensions for AI and other emerging tech and extend the process of innovation with a group historically excluded from these practices. I quickly observed that the Art Gang benefited from having hands-on experience with technical and design concepts that can often be abstract. It was also the case that hands-on experiences and activities produced greater engagement, especially when I infused activities with elements that directly addressed students' intellectual interests. For example, students like veronica, Andrew, Shankar, and Chiry were interested in learning more about web design and e-commerce. Activities such as wireframing or exploring e-commerce platforms were incorporated into the curriculum. Students like Justin interested in calligraphy were encouraged to explore MR tools for digital crafting.

In practice, this required constructing culturally relevant educational components and embedding them into the design activities—for example, reviewing foundational technical topics in AI and contextualizing them to students’ life worlds. Methodologically, Design-Based Implementation Research (DBIR) provided a robust framework for this approach. Barab and Squire remind us that iterative and long-term engagement invites insights into the “complexity, fragility, messiness” of context and how design and theory have produced practical change within that context (55). Barab and Squire describe DBIR as a methodology that acknowledges the “messiness of real-world practice, with context being a core part of the story and not an extraneous variable to be trivialized” (55).

Rather than viewing students through a deficit lens, I framed them as knowledge holders whose lived realities offer crucial insights for ethical and socially relevant AI design. In the case of engaging with the Art Gang, their immediate rejection of traditional educational formats underscores the urgency for innovative pedagogical approaches. By inviting participation and encouraging students to situate design and emerging technologies within their own experiences through educational scaffolding, we can bridge theory to practice. This rejection aligns with principles advocated in place-based learning theories, where local environments become dynamic classrooms, enabling connections between curriculum, community narratives, and ecological systems of being and knowing. Such hybrid spaces leverage students’ cultural funds of knowledge while fostering critical literacies and capturing interest and engagement in meaningful ways.

Based on my initial visits and prior experience as a curriculum designer, I recognized the importance of embedding scaffolding techniques into the co-design sessions. These techniques supported student engagement and created structures for meaningful participation. They also allowed me to capture student ideas and perceptions while simultaneously facilitating, providing just-in-time support, and troubleshooting technical issues—all roles I performed as a solo facilitator. My approach positioned students as experts in their lived experience

and innovation as a socially constructed practice shaped by people, the infrastructures they are situated in, and the lived experiences that they carry. Surfacing that expertise within a technology design context required providing students with a working knowledge of the discussed tools and systems. I avoided deficit framings by ensuring that scaffolding techniques were empowering rather than remedial. For example, I applied the Universal Design for Learning (UDL) guideline “use multiple media for communication,” which encourages diverse formats to help students express their ideas fluently.

Curating workshop activities required deliberate attention to students’ cultural backgrounds, educational histories, and levels of technical expertise. The Art Gang primarily consists of adults aged 18–25, with occasional participants up to 26. Although I use the term “students,” it refers broadly to individuals in this age range. Most students identify as Mexican American, with some identifying as Central American, Indigenous, or Black. Many also identify through gang affiliations or prior incarceration—identities often shaped by systemic neglect, surveillance, and expectations of early mortality. Trust-building with this population is not just essential, but also highly complex. Authority can be tested, rightfully so, and those who are not used to being able to identify when a student is acting out because they do not trust you or because they may be dealing with issues in their personal lives will burn out quickly.

Building authentic relationships with students who have experienced systemic trauma requires acknowledging how social constructs like race and class shape their relationship to learning and authority. Many have undiagnosed learning needs that are often dismissed and met with hostility or rejecting attitudes in traditional educational settings. These learning needs and or behavior can be tied to, or made worse, when students also face poverty, homelessness, familial or housing instability - resulting in being labeled as a "bad student"(166; 167; 168). This labeling can be made worse by assumptions tied to student appearance (i.e., tattoos or dress attire) or by friend affiliations leading to excessive dis-

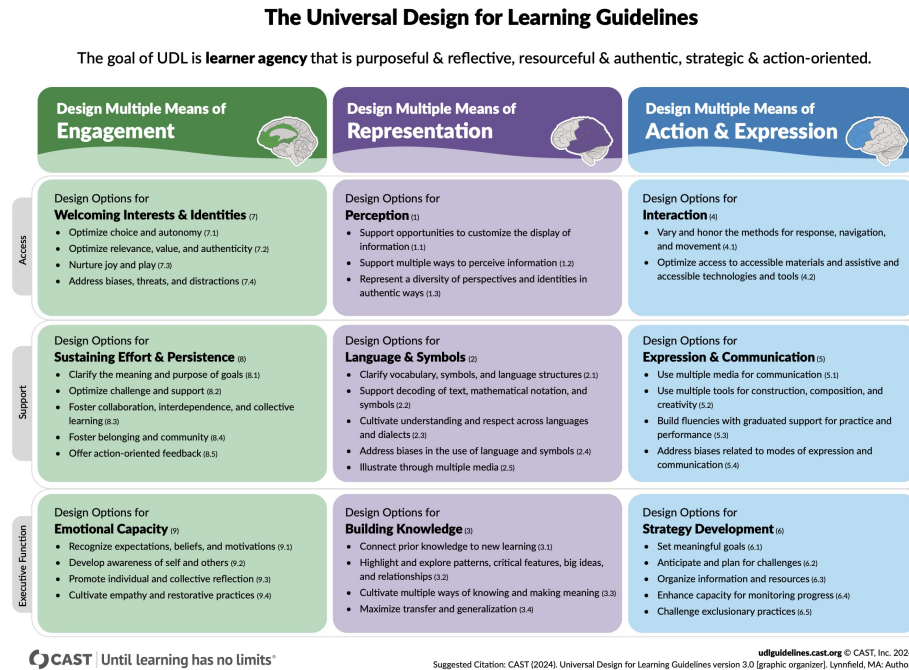


Figure 2.1: The Universal Design for Learning framework is a set of principles that guides the design of learning experiences to be accessible and inclusive for all learners.

ciplinary action and or failed intervention methods(169). This criminalization of behavior can begin as early as middle school resulting in punitive discipline cycles contributing to disengagement, feelings of distrust and abandonment, and ultimately restricts youth from reaching their social or academic potential(170).

These compounding challenges cultivate skepticism toward anything resembling traditional schooling or formal educational social structures. To engage students meaningfully, I drew on the principles of UDL and DBIR when designing the workshop series(171; 55). I constructed workshop activities that could scale into a more permanent technology program at the Academy. This required identifying educational gaps and addressing them through engaging hands-on co-design experiences. The iterative structure of this approach allowed me to create a feedback loop that (1) addressed knowledge gaps, (2) introduced core concepts in AI and technology design (such as large language models and storyboarding), and (3) used co-design practices to speculate on the development of AI and emerging tech.

What emerged through this method was not just a learning environment—but a collaborative design space where students could reflect challenge, and co-create visions for more just technological futures. Design activities emphasized hands-on engagement, sometimes using analog materials such as paper, markers, or sculpting tools to support ideation. I also incorporated flexibility into the research plan to respond to student feedback, real-time observations, and learning moments that arose during activities. When available, we used Oculus Quest 2 devices to explore the functionality of AI, spatial computing, and immersive interactions while discussing broader ethical and social issues tied to fairness, accountability, transparency, and ethics (FATE) in AI. UDL principles were incorporated across all sessions, with particular attention to “Welcoming Interest & Identities,” “Building Knowledge,” and “Expression and Communication.”

By integrating these principles and frameworks, the workshops created a participatory learning environment in which students could see their identities and experiences reflected. This approach bridged educational gaps and illuminated pathways for co-creating more equitable and responsive AI design frameworks. Through these engagements, students were empowered to speculate on and design ecological, culturally grounded AI agents—demonstrating the power of CBPD to democratize technological innovation and design futures from the margins.

2.6 Conclusion: Grounding Innovation in Place and People

In this chapter I have introduced the theoretical and methodological frameworks that inform my research approach. I have attempted to point to the social dimensions of technical systems to illustrate the importance in grounding my material and social efforts in the lived

experiences of Homeboy Art Academy students. By contextualizing the historical, political, and economic backdrop of the neighborhood and the Homeboy organization this work takes place in, I aim to show the necessity of community-centered technological innovation. Key takeaways include the importance of receiving institutional trust, recognizing power dynamics within community-based research, and the value of employing educational frameworks that empower participants rather than tokenize them.

The broader implications of this research investigate what happens when students at the Homeboy Art Academy are given opportunities to engage with emerging systems powered by AI. As AI continues to shape global infrastructures, historically excluded communities must have a say in their development. By investigating engagement models that situates more nuanced forms of expertise (tacit cultural knowledge, lived experience), community interest, and technology we can better understand the conditions necessary for meaningful engagements. The lessons learned from Homeboy Industries can serve as a blueprint for other community-driven technology initiatives, reinforcing that innovation is most potent when it is inclusive, collaborative, and rooted in lived realities.

Chapter 3

Focusing on Front Stage Design - A Mistake

It's a Friday morning, overcast, with just enough sun breaking through to make it unusual for a Californian spring day. As usual, I arrive at the Homeboy Art Academy an hour before class. I scramble to prepare my materials, glaring at the printer as it refuses to connect to the Internet. My computer is nearly dead, there's no coffee in sight, and the bags under my eyes begin to feel heavier by the second. I can hear students beginning to trickle into the studio while I frantically try to pull things together. Despite all my planning, I'm reminded once again that I, too, am subject to Murphy's Law.

As I wait for my computer to restart, a rhythmic thumping begins to echo in the distance. The vibrations ripple through the room, causing the canvases on the walls to sway gently—as if dancing to a beat only they can hear. For a brief moment, I brace myself, wondering if this is the dreaded “Big One,” the earthquake Californians are always bracing for. But then, the sound crescendos and crashes through the front doors like a 20-foot wave. Frantically, I rush to the entrance to find Emilio, bike at his side, a speaker blaring from his backpack, grinning

with his signature smile. “TOP OF THE MORNING MOTHAFUCKAS!” he shouts, setting the tone for the day with his usual exuberance.

Moments like this, chaotic, embodied, and profoundly human, are characteristic of my time in the Homeboy Art Academy. Well-intended artists, content providers, researchers, and community partners enter the Academy, aspiring to engage diverse youth in complex creative practices that will inspire them toward greatness. Practices in which art, technology, and survival intersect may always lean toward chaos, but that chaos is marked in an organization that is being built on the fly, with youth struggling to survive (172). Uneven participation, spotty infrastructure, and life events can derail the best of intentions and supersede scripted, or even planned activities. Usually it is the youth themselves who drag me back to the here and now. Moments such as this revealed the value in research approaches that capture the naturalistic unfolding of events - seeking to describe relational textures instead of crafting highly controlled hypotheses. As a designer, I’m reminded of Suchman’s (1987) critique of planned action in design contexts, which emphasizes the importance of situated action over formalized procedures (173).

This chapter traces the first structured workshop series that I facilitated at the Art Academy, which unfolded over three months. Drawing from these immersive encounters, I outline the initial goals that shaped the series: To explore through prototyping socially collocated interactions with mixed reality (MR) technologies. I then describe the rationale behind key methodological decisions, how activities were scaffolded and adapted over time, and what insights emerged. In doing so, I reflect critically on the affordances and limitations of my original technical framing, specifically, how a narrow focus on socially collocated interaction inadvertently constrained my ability to recognize the broader socio-technical entanglements. Those entanglements are the social configurations that the Art Gang endured outside of the academy walls or their perceptions of the design activities as it related to their personal goals and aspirations. In this case, designers’ imagined MR experiences in which a

solitary person converses with a personal agent (out of boredom? Loneliness?) in an isolated space in presumed leisure time. These activity systems offered little appeal for these youth, who perceived MR tools as not designed for them. These youth designed tools aimed at *immediate* needs, including negotiating multiple life worlds, caring for family, or addressing topics in mental health. Youth appreciated opportunities to "play," which they reported having precious little of in their lives. Using an MR application is a relatively isolated activity in which a participant is in a private, controlled space, either alone or connected to others who have their own MR device. For instance, for these youth, video game playing is usually social and occurs in shared living spaces and is important for maintaining or managing close familial bonds with siblings. Contradictions between these youth's expressed interest in MR and those as MR is currently constructed runs counter to how these youth envision shared social interactions.

As the workshops progressed, it became increasingly clear that my initial approach, to let youth play with MR and then design their own MR experiences, was overly tethered to the affordances of MR. The most significant insights emerged not from technology-centered outputs but from the relationships, tensions, joys, and improvisational dynamics that animated life within the Academy. Co-designing with youth was itself therapeutic. Design enabled them to describe daily struggles, critique dominant social patterns, and forge connections with me and one another. These moments made me reconsider where design happens and what counts as design knowledge. We often discuss the ethical dimensions of design in terms of the products produced, but engaging in co-design at Homeboy Art Academy suggests the power of design for helping people orient themselves to the world around them as designed objects and systems, created by people with particular goals and intentions.

Accordingly, this chapter is organized around three key contributions:

1. The methodological choices and rationales used in constructing and iterating on the

design activities;

2. A discussion of how privileging one dimension of design risks flattening the complexity of participatory work;
3. An argument for shifting attention from technological artifacts toward a broader inquiry into the construction of expertise, particularly as it emerges through affective, embodied, and culturally situated practice.

Ultimately, the question was no longer just what MR could do. However, what matters here, and for whom? It is in these often-overlooked, textured experiences, punctuated by moments like Emilio’s grand entrance, collaborative silences over shared sketchbooks, and spontaneous laughter during prototyping, that the deeper “why,” “how,” and “what” of design became visible. These encounters, I argue, offer vital cues for building more just, responsive, and situated technological futures. They paint a picture of the politics of CBPD and lead us toward understanding underlying social orders that technologies enable, prevent, deconstruct, or empower.

3.1 Approach

My approach utilized CBPD as a flexible method to explore Art Gang conceptualizations of using mixed reality (MR) for social, collocated interactions, focusing on face-to-face engagement. This work was motivated by a clear opportunity in the literature: a lack of research on socially collocated interactions within MR applications, presenting a significant knowledge gap. Concurrently, research with recently incarcerated and gang-affiliated young adults represented a notable population gap in the HCI literature (174). Fundamentally, the research sought to explore implementing CBPD with the Art Gang, understand where the technology intersects with the lifeworlds of the youth, and generate possible design dimensions for

socially collocated interactions for MR systems based on insights from the Art Gang.

This study provided an opportunity to investigate how technology-mediated interactions can move beyond simple enablement toward more profound social and cultural impact. Recent advancements in multimodal and immersive MR experiences, particularly MR smart glasses, present an underexplored avenue for examining technology’s role in face-to-face connections (175; 176). Additionally, community-based participation in design engagements focused on emerging technologies remains rare within the HCI community, especially for historically marginalized groups (177). As spatial computing becomes increasingly algorithmically governed and integrated into the physical world, inclusive design approaches are essential to prevent coded biases from shaping social interactions (90; 35; 36).

By centering marginalized voices in MR design, this study aimed to include the lived experiences of this particular group and community as expertise within an understudied and narrow design space - social collocated interactions for mixed reality devices. In addition, I sought to understand how to operationalize CBPD for emerging technologies to develop actionable understandings and illustrate possible directions centering the act of creating, building, and failing forward as opposed to solving particular institutionalized social problems with a historically underrepresented groups. These pathways, I hope, ensure their self-determination in shaping technology futures while promoting social, economic, and political contributions to these design spaces from a group that was hardly, if ever, considered as experts in the HCI literature (178; 27; 26).

The study’s findings revealed several critical insights. First, the youth grounded their MR application designs in their lived experiences, leveraging the technology to enhance agency, visibility, and autonomy for themselves and their communities. Many of their ideas were directly critiqued, and they sought to remedy institutional inequalities that had negatively impacted them. Second, their designs placed the body and physical identity attributes at the core of MR experiences—for example, linking digital elements to tattoos as tangible

personal symbols. However, their engagement also revealed ambivalence about using and sharing personal data, highlighting tensions between technological possibilities and concerns about privacy and agency.

Additionally, the youth demonstrated an ecological perspective when conceptualizing MR technologies, considering implications for families and communities rather than just individual use. This perspective dovetails observations made by Vacca (2017), whereby marginalized communities, particularly LatinX users considered recreation, health, and professional opportunities relationally (27; 28). Finally, effectively implementing participatory design in this context required flexibility to align activities with the community's needs, values, and practices; participatory design required me to share agency and responsibility with youth in defining the *purpose* of the activities, the activities that constituted the daily objectives, and ultimately, workshop outcomes. These adjustments and accommodations proved essential for mitigating power imbalances and maintaining youth engagement despite logistical trade-offs.

In conclusion, this study highlights the value of implementing CBPD with the Art Gang marginalized in the design of MR technologies. Their lived experiences provide unique and alternative perspectives for conceptualizing MR systems that empower social interactions beyond merely enablement. These ideas were grounded in fostering better emotional connections, familial bonds, or for bringing attention to invisible social structures. As these technologies continue to advance, centering inclusive perspectives remains vital. Later in this chapter, I will delve into the embodiment of this policed existence, its implications, and how it relates to the technologies we designed.

3.2 Workshop Activities and Structure

I formulated workshop activities to teach design processes through an investigation of the social norms and context of socially collocated MR applications. I wanted to impart specific design concepts related to MR and include an exploration of emerging technologies, including artificial intelligence (AI). I conducted seven design workshops with 15 academy Art Gang. The workshop was organized into three phases: (1) exploring social mixed reality applications and scenarios based design; (2) brainstorming new concepts through guided design exercises; and (3) prototyping through bodystorming. Each workshop session lasted 60 minutes. By drawing inspiration from prior work, such as Vacca et al.'s (2017) engagement with Latina youth in designing social-emotional learning apps (27; 28), Persa et al.'s (2023) collaborative design of wearable mindfulness technologies for low-income middle school youth (179), and Cheng et al.'s (2018) collaborative efforts in creating mental health-focused games for youth (180), I developed tailored workshop activities. Aligning with Barab and Squire's (55) emphasis on learning opportunities, our workshops incorporated educational components to facilitate critical thinking, discussions, and reflections while fostering student learning and attitudinal growth. I attempted to foster skills, including storyboarding, domain-specific vocabulary related to MR, AI, and design, and design thinking from a socio-technical perspective. However, formal measurement of the adoption of these skills was not conducted because they were not specific outcomes I intended to measure and emergent dependent upon Art Gang' interests .

Traditional school systems have overlooked many of the Art Gang youth where many may have undiagnosed learning needs which may further be compounded by personal adversity as a result of incarceration and gang affiliations (166; 181). Working with the Art Gang revealed that even simple paper-and-pencil style exercises ran the risk of "smelling like school" and further alienating an already at-risk group. Therefore, I drew upon principles from the universal design for learning (UDL) framework and integrated methods to enable multiple

means of action and expression. To maximize opportunities for the Art Gang to express themselves and stay engaged, I embedded various scaffolding and input strategies into the design of the workshop activities. In some instances, I provided each Art Gang student with an iPhone 7 device to create video and audio recordings reflecting workshop activities and their associated experiences, ideas, and attitudes. This approach encouraged Art Gang to share their perspectives and facilitated the planning of subsequent activities. Furthermore, I utilized worksheets to guide participant responses and thinking in abstract technological areas, provided an itinerary at the beginning of each session, and ensured that Art Gang could respond to prompt questions in their preferred language (Spanish).

Workshop 1: Exploring a Social Mixed Reality Application During our inaugural workshop, I clearly defined the roles of Art Gang: (1) students, (2) designers, and (3) thought leaders. I hoped to counter-act any self-doubt that they might have by emphasizing their expertise in their own lived experience. As *students*, we study design techniques and provide feedback to improve tools to better align with their interests and goals. As *designers*, we collaboratively explored how MR smart glasses could be integrated into society to foster interpersonal connections. As *thought leaders*, we aimed to surface their life experiences, understandings of lived experiences, and their communities’ cultural assets and knowledge systems as expertise and knowledge gained as a unique community of practice.

My explicit invitation to engage in these roles was to ensure that Art Gang felt they had an equal say in shaping workshop activities and contributing to design ideas. We then introduced MR as an emerging technology. Drawing inspiration from the workshop resources found in the Google People Artificial Intelligence Research (PAIR) online guidebook, we presented the design session’s goal as a challenge statement, for instance, “Explore an existing social MR prototype app as a group and identify its available functions” (182). A unique challenge statement was crafted for each subsequent session, encapsulating the research ob-

jective of that particular workshop. These challenge statements guided our focus for each workshop as we progressed through each activity for that session.

We defined MR through showcasing research and prototype examples. I presented a video showcasing the capabilities of the Microsoft “Mesh Network” and the Hololens MR device (183). Next, I assigned a *sensitizing workbook* influenced by context mapping techniques (which was employed in a study investigating immersive social biosignal interaction in virtual reality, (49)). Through this workbook, I hoped to understand how the Art Gang reflected on recent social situations involving technology. I then facilitated a discussion in which Art Gang shared their reflections and guided a conversation on technology, society, and its impact on our interactions in a socially collocated context.

I pre-configured 18 iPhone 7 devices by setting up individual temporary emails. Additionally, I then configured the Snapchat application and profiles for each device. To ease interactions among Art Gang Art Gang, I also “friended” each profile to each other. Art Gang then explored the social MR app “Blocks” (184), designed for mobile devices. Blocks is an experimental filter on Snapchat, which, when enabled, allows users to place 3D objects in their physical environment(184).

This workshop session was designed as a free play session with three main objectives:

1. to familiarize Art Gang with mobile MR,
2. to demonstrate the potential for socially collocated MR experiences and
3. to provide Art Gang with hands-on experience to gain a working understanding of the technology.

I used “Blocks” to encourage Art Gang to consider how MR devices could enhance face-to-face interactions and to suggest how we might improve their quality, value, or reach. The

workshop concluded with question prompts (e.g., What are your initial thoughts about the activity or experience? What would you like to learn more about?) to capture Art Gangs' sentiments and perspectives on the session activities. Generally, each subsequent workshop session followed the same pattern: First, an introduction and activator activity, followed by an anchoring activity exploring a particular topic or aimed at eliciting specific design understandings, and finally, a group share-out. When there were opportunities to teach specific design or technical concepts, I presented slides that introduced relevant concepts. In later engagements, these slides turned into what I call "mini-lessons."

Workshops 2-4: Design Challenges as Scenarios and Ideation Workshops 2-4 focused on ideating mixed reality (MR) collocated experiences through storyboarding and understanding youth perspectives on MR use. Applying design-based inquiry (DBIR) principles (185; 186; 187), Art Gang engaged with diverse educational materials throughout the series. YouTube videos covered MR concepts, design techniques like storyboarding and prototyping, Black and Latino tech innovators (e.g., Iddris Sandu (188)), and current research initiatives/prototypes (e.g., "People Lens" project) (189). The initial workshop in this series introduced storyboarding as a design technique. The challenge statements for these workshops were: "We will learn about design thinking through storyboarding and bodystorming activities" and "We will prototype ideas that address our design challenge and collaborate to solve them."

Art Gang were given iPhone 7 devices in the third workshop to record themselves and reflect on the session. The following prompting questions were given: "What three key experiences stood out to you in this session?" "What are three things you found difficult about this session?" "What are three things you enjoyed in this session?" and "Can you describe anything you may have learned?" Art Gang were encouraged to answer these questions using the iPhone 7 devices. The rationale behind requiring Art Gang to respond to these prompts

after each session was twofold: (1) to collect participation and sentiment data, and (2) to gauge how and what changes should be made to the subsequent session procedures to ensure that workshop activities remained aligned with participant interests (149).

Initially, I seeded the Art Gang with prompts to spark ideation and discussion, but after their feedback, we later pivoted towards a scenario-driven design approach to organize workshop activities (190; 191; 192; 193; 194). I generated scenarios to scaffold ideation through design challenge prompts. For example, the scenario *“You want to learn about your emotions and interact with them”* prompted the challenge *“Design an experience that requires two people to interact with each other’s emotions or health-related data like heartbeats. How might this experience enhance how people interact with one another? Is MR necessary to enable these interactions, or can we use other technologies?”*. This scenario-driven design approach served to (1) aid participant understandings, (2) allow Art Gang to use their experiences as expertise while eliciting designs for MR smart glass applications, and (3) be used as a scaffolding technique to initiate ideas, conversations, and reflections. Design challenges were presented as scenarios for group ideation, with 3-4 Art Gang per group. Groups merged and remixed ideas from other teams before iterating to enhance participant-made design concepts. Ideations were captured on large poster paper and iPhone 7 devices.

Workshops 5-7: Low-fidelity Prototypes and Bodystorming The fifth through seventh design workshops focused on implementing low-fidelity prototypes using arts and crafts materials and, subsequently, bodystorming design to promote the conceptualization of spatial interactions and multi-sensory experiences. Bodystorming utilizes props and spatial thinking in prototyping. It allows individuals with varying backgrounds to contribute ideas and explore mixed reality experiences beyond 2D thinking (195). Further, embodied design methods shift the focus from concrete user needs to the rapid expression of ideas using the lived body (tacit knowledge, emotions, cultural values, and experiences) as representative

tools to guide expression (196; 197).

At the start of each session, researchers taught Art Gang bodystorming methodologies through articles, YouTube videos, and short practice activities. Afterward, Art Gang applied these concepts and remixed ideas from alternative groups in a subsequent workshop. Bodystorming encourages critical reflection on how MR can enhance social interaction beyond enablement (see (198; 199)). This method is well-established in “*social play*” digital game literature and best accounts for the interplay of social context and interaction between two or more people spatially (200). This method shifts focus from designing interactive artifacts to examining socio-spatial factors technologically supported by MR for collocated interactions, leading to richer insights (198; 199).

Workshop 8: Reflection—Evaluating Prototypes, Workshop Series, and Future

Steps To conclude the workshop series, I returned to embodiment as a method of reflection—inviting Art Gang to inhabit the futures they had physically imagined. The final session utilized bodystorming to prompt spatial and embodied reflection. Bodystorming engages Art Gang in acting out user scenarios using physical props and environments, supporting co-creation through spatial thinking (201). It is especially effective in exploring the sensory and relational dimensions of MR systems. Bodystorming, grounded in digital game design and social play literature (200), emphasizes the interplay of space, embodiment, and collective interaction. It supports a shift in focus from interface design to the relational and affective dimensions of MR experiences (198; 198). In this session, I encouraged Art Gang to reflect not just on their designs but also on the social and emotional relationships they imagined between themselves and the technologies they had created. This final workshop helped reframe AI design as a practice embedded in lived experience, socio-spatial context, and cultural imagination.

3.2.1 Field Recordings, Observations, and Narrative Memos

The data collection and analysis procedures adhered to the recommendations of McDonald et al. (2019) for HCI qualitative research analysis (202). My output did not focus on agreeing on codes but rather on surfaced themes and emergent topics derived from participant-made artifacts, interviews, workshop observations, notes, research memos, and discussions after reviewing work after the workshop sessions.

Each session was recorded with at least one mobile video camera. I also used a camera phone to capture important interactions and jog my memory for field notes. Following each session I debriefed with Homeboy Staff and Assistants to gain their perspectives on what unfolded. We discussed positive interactions, any challenges in engaging youth, and lessons learned that could be used to improve future sessions. Immediately following each session, I wrote field notes of the day's activities.

After each workshop session, a narrative memo was created to summarize the outcomes, emerging themes, and memorable quotes from Art Gang. Example narrative memo prompts included: Provide a brief overview of the session, including the research methods used and the primary tasks or interactions Art Gang were asked to perform. What are the most important behaviors, reactions, or interactions you observed during this session? Did anything surprise you, or did anything stand out as particularly noteworthy? Were there technical or other logistical issues during the session? If so, how did they impact the session, and how were they resolved? The narrative memo linked images, quotes from just-in-time interviews, and notes, which were then sent to a second author for review and analysis. Both authors discussed the data, including Art Gang' video recordings on iPhone 7 devices, to determine key overarching themes and refine and reflect on design activity approaches. These feedback loops facilitated the incorporation and embedding of participant reflections into the design activities.

3.2.2 Follow-up Interviews

Following workshops three through seven, I conducted 15-20 minute semi-structured audio-recorded interviews with select youth Art Gang. Interview opportunities were extended to all other Art Gang, excluding those we had already selected for interviews. Some interview sessions involved groups of students, while others were one-on-one sessions with a participant. Our protocols focused on eliciting further insights from participant-made artifacts, mental models, and perceptions based on their lived experiences. For instance, we asked, “What past scenarios do you envision your design working best in, or would have been the most useful? Why?” and “What obstacles or opportunities do you think would facilitate or hinder the use of your designs?” I also sought feedback on workshop activities to ensure our research agenda aligned with youth interests. All interviews were conducted at the organization after research sessions.

3.2.3 Data Analysis

My data analysis focused on detecting, clustering, and organizing recurring themes of interest, thereby constructing a top-down hierarchy of insights to address our research objectives. My analytical procedure was as follows:

1. Thoroughly examined all collected data formats and reviewed notes, artifacts, images, interviews, and narrative memos to comprehensively interpret the data and elucidate the research questions.
2. Categorized the apparent thematic topics and features.
3. Triangulated the data by conducting interviews, referring to relevant literature, and analyzing participant artifacts.

4. Engaged in thematic discussions to refine the findings and establish consensus on emerging themes.

During the workshop, I started to form interpretations of events which were entered into field notes and shared with Homeboy staff. Following the end of the session, I gathered all notes, observations, reflections, participant artifacts, worksheets, photographs, and audio recordings of interviews conducted at each design session. I examined each of these documents for relevant themes, looking for examples in which I had a design hypothesis (e.g. Youth would enjoy getting to play with MR technologies), which proved to be incorrect. I returned to the data using Activity Theory to examine the themes, tensions, and contradictions that unfolded.

3.3 Ecologies of Design: Embodiment, Surveillance, and Situated Innovation in Youth MR Futures

This section analyzes how the Art Gang articulated their values, concerns, and aspirations through participatory MR design. Four interrelated themes emerged from their engagements: first, youth critically responded to surveillance technologies by foregrounding their embodied vulnerability and institutional distrust; second, they leveraged MR to assert cultural identity and emotional visibility; third, they approached design ecologically, imagining technologies not just for individual use but as tools for collective and relational transformation; and finally, these insights were made possible by adapting community based methods to fit the community's shifting constraints. Together, these themes illuminate how situated MR design opens pathways for justice-impacted youth to challenge extractive systems and re-imagine more caring, inclusive technological futures.

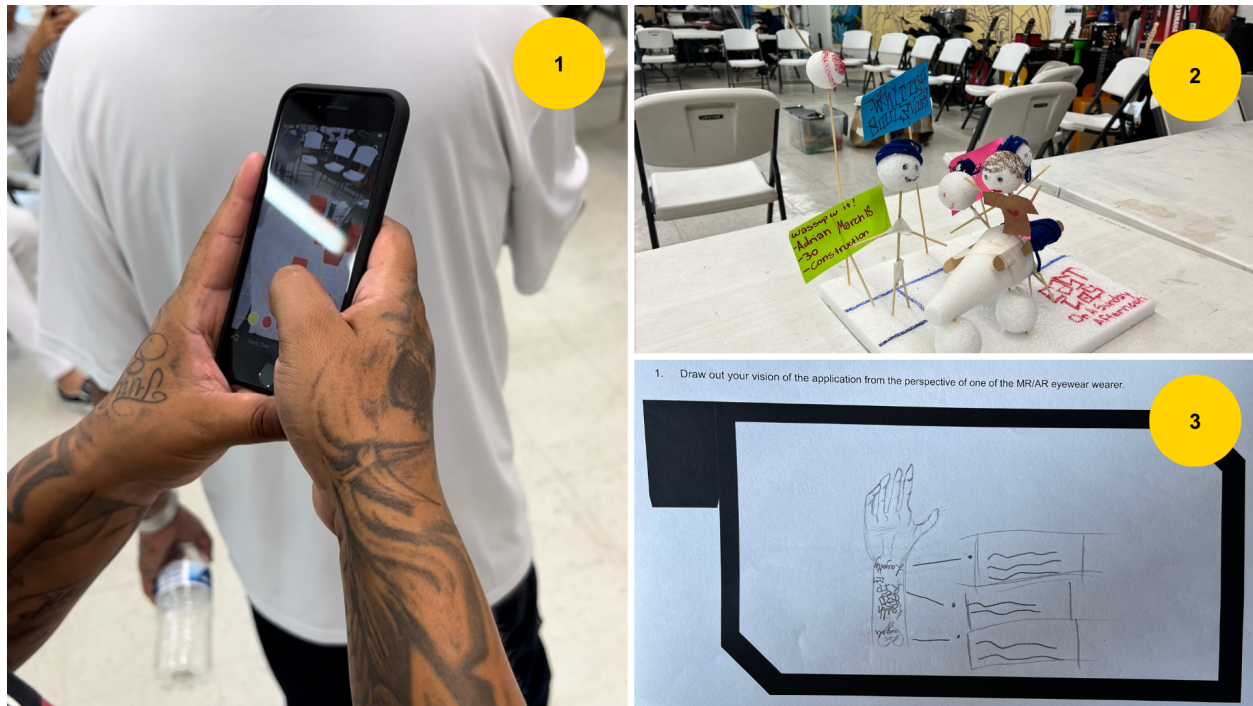


Figure 3.1: (1)Participant in the initial workshop exploring the experimental mixed reality Snapchat application, "Blocks", with others. (2)During bodystorming activities, of the "HelloHi?" application crafted a 3D scene depicting the use of their application. The paper notes depict visual cues that users of their smart glass application can see and interact with. (3)During workshops 2-4 a participant ideated on an application that utilizes bodily enablers to interact with a partner's tattoos. After probing on the design idea, it was revealed that this participant wanted to use the immersive capabilities of MR to express themselves on their own terms.

3.3.1 Embodied Surveillance and Extractive Systems

Beyond Privacy: Towards Situated Values in Mixed Reality Design with Black and Latina/o Youth The Art Gang design concepts often emerged through embodied expressions, extending critical reflections of their lifeworlds, whether consciously intended or not. Although the Art Gang recognized the potential of mixed reality (MR) to enrich social interactions, they expressed deep ambivalence about the use of personal data, especially in light of concerns regarding misappropriation by institutional actors such as law enforcement and private corporations. Many assumed that established institutions—big tech, media, and government, already collected, stored, and shared their personal, even intimate, data. Their inclusion in such systems felt inevitable, and their bodies were perceived as partially conscripted into these data infrastructures.

The art Gang's sense of resignation and inevitability about their personal data being systematically monitored and captured by powerful institutions aligns with Philip Agre's (1994) theory of capture(137). This framework describes how systems increasingly rely on structured observation and data extraction to render behavior visible and predictable (137). The Art Gang's narratives revealed that, for them, surveillance was not a potential risk but an embedded condition of everyday life. For example, when asked how the prototype HelloHi? would gather information, Laura explained: "It just knows, like facial recognition—it scans them and their face." Other members of the group voiced discomfort with the idea of sharing real-time information. Aracely elaborated: "Basically, with the glasses, when you look at somebody, it'll tell you about them—like their name, age, their Instagram, or where they work. I don't like it [facial recognition features] because the good part is it tells you what you need to know, but it knows too much about you!"

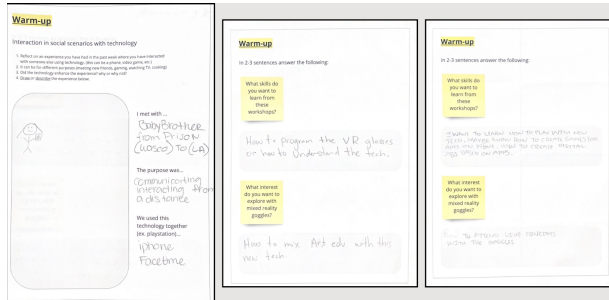
Daniel echoed this sense of resignation toward pervasive surveillance: "It's already out there in the wild—the police already have it." His comments suggest more than unease—they reflect

what Virginia Eubanks (2018) describes as the “digital poorhouse,” in which marginalized populations are subject to automated systems of social control that limit autonomy and reinforce inequality. Dariel added: "I'm more of a behind-the-scenes type of guy. I'm known in certain areas [referring to his gang affiliation], and if they [rivals or police] use it [the HelloHi? application], I'll be pointed out easier."

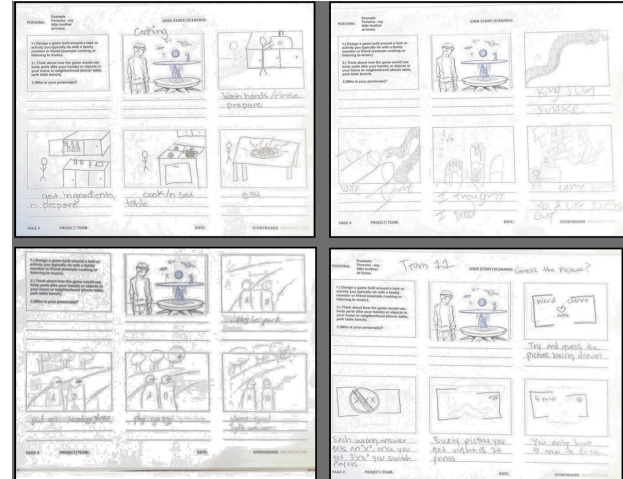
For these students, data sharing was not framed in terms of abstract privacy concerns, nor was it embedded within utopian narratives of digital inclusion. Instead, it was understood as an extractive process in which disempowered communities are pressured to surrender personal data in exchange for conditional access to societal participation. This extractivism, often obscured by the promise of convenience or personalization, highlights the limitations of human-centered design practices that fail to engage with the structural conditions shaping users' lives.

Sasha Costanza-Chock's (2020) framework of design justice is particularly instructive here, emphasizing that technological systems must be co-designed with those most affected by them—not merely for inclusion, but for structural transformation (78). The Art Gang's rejection of data-centric design logics underscores how current systems often fail to reconcile computational affordances with the lived, embodied realities of historically marginalized youth. They frequently incorporated physical attributes into their design concepts. Yet when asked about the data sources enabling these imagined interactions, many expressed distrust toward institutional entities—especially police and tech companies—who they believed maintained undue access to personal information. David commented on this tension, critiquing the false promise of helpfulness embedded in AI-driven technologies:

"It's easy to ignore [forget] that the device is collecting this info, and if I notice it [the device] trying to help me, I'm going to push it away. I don't want it knowing my feelings. You'll have to worry about what the metaverse has to say about your info. Social media influences people in too many negative ways."



(a) Worksheets, part of a UDL-aligned sensitizing booklet, encouraged participation and helped me understand the Art Gang’s daily technology use. Notably, one student shared how they connect with an incarcerated family member via mobile phone.



(b) Grounding the Art Gang in an MR experience during Workshop 1 significantly boosted their ability to storyboard collocated MR ideas for subsequent design challenges (Workshops 2-4), leading to concepts like MR games, language learning, and collaborative cooking.

These perspectives become more intelligible when situated within the historical and ongoing exclusion many within the Art Gang face, conditions that contrast sharply with the privileged contexts that typically frame emerging technology design engagements. Their critiques are grounded not in abstract skepticism but in lived experiences with policing, marginalization, and structural precarity.

For instance, in response to a prompt from a sensitizing booklet, “Reflect on an experience you’ve had in the past week where you interacted with someone using technology”, one participant described using FaceTime to communicate with a sibling incarcerated in Wasco State Prison: “I met with my baby brother from prison (Wasco) to (LA)” (See Figure 3.2a).

The Art Gang’s resistance to perceived data exploitation illustrates a broader failure in the human-centered design canon - its frequent inability to account for the entanglements of race, class, surveillance, and power. To move toward more just futures, it is necessary to shift from designing for inclusion to co-designing with structurally excluded communities in ways that confront, and not just accommodate, systemic injustice.

3.3.2 Surfacing the Invisible - Embodied Expression, Visibility, and Cultural Resistance.

A core tension merged in the using mixed reality (MR) for designing social experiences. When designing for MR, the Art Gang sought collective experiences with tools for self-expression and control. They envisioned opportunities for empowerment. This design orientation may stem from not feeling empowered within their physical environments. More specifically, the Art Gang imagined inclusive spaces where they may be ostracized from due to their gang affiliations or judicial constraints such as parole or location monitoring. Formal educational settings that fail to honor the student's cultural values and restrict the opportunity to freely and playfully explore, risk perpetuating or even exacerbating the very social exclusion the Art Gang's design ideas intended to mitigate(62). This tension underscores the need for critically situated design processes that attend not just to access but provide space for students to “hang out, mess around, and geek out” (76).

The Art Gang navigated this tension by grounding their design ideas in embodied features—using sensory and affective cues to surface intangible qualities such as emotion, memory, and personal history. These acts of design were not only creative; they were also deeply political, often accompanied by critiques of institutional structures that have historically marginalized them. Luis articulated this dynamic when reflecting on his exclusion from school-based art programs:

“I feel like growing up, I didn’t have a safe space to share my art. I was always excluded from that (being able to participate in school art programs). Like many of my friends who were good at art, I just gave up because nobody gave them a chance. I feel like this will give anybody a chance to do it [practice art].”

For Luis, school-based art instruction was not a safe space. His identity, skills, and modes of expression were not honored by the institution of school, and indeed art as taught in school

was ultimately alienating for Luis.

This desire for inclusive access to artistic practice was common in discussions about MR applications. Students expressed a clear interest in collocated MR experiences that supported personal autonomy and self-discovery. Their participatory status as “gang-affiliated” or “system-impacted” was not incidental, it actively informed their design decisions, particularly concerning concepts like the Paint Academy.

Luis continued when asked to elaborate, “Many kids go through that [get excluded], especially in inner-city schools. They had a bunch of those programs [art-related classes] for us, and they got rid of them.”

Luis’s reflections bring into focus a broader critique of systemic inequities in education. His comments exemplify what Costanza-Chock (2020) describes in *Design Justice* as the failure of dominant design systems to confront and redress structural injustice. Rather than participating as passive users, the youth positioned themselves as critical agents—reimagining what inclusion, equity, and autonomy might look like within digital design contexts.

Beyond institutional critique, the Art Gang demonstrated sophisticated social-ecological reasoning in how they surfaced invisible emotional experiences through embodied design. For them, MR technologies were more than tools; they became platforms for cultivating self-efficacy, supporting creative exploration, and building communal ties. As Luis noted, Paint Academy enabled youth to sustain agency by “learning how to paint without ever feeling you are going to mess up.” His insight echoes Maloney et al.’s (2021) findings that unstructured digital spaces empower youth to engage in meaningful artifact creation and peer connection (109).

Design artifacts also revealed a deep yearning for emotional visibility and relational connection—with peers, family, and the broader community. The Dead Homies prototype illustrates this intention. Centered on grief and memory, the concept of “being seen” became a vehicle

for processing loss and strengthening human-to-human connection through virtual agents. One group proposed an emotional support application that allowed users to interact with avatars modeled on deceased loved ones, conceptually similar to MyHeritage’s Deep Nostalgia AI tool (203). Greg, one of the Art Gang students explained: “It makes people feel more visible. It improves understanding of relationships with family members or friends.”

Greg suggested that therapists could use the prototype to understand clients better.’ interpersonal dynamics. Such implications align with growing bodies of HCI research exploring MR’s affective and therapeutic affordances (204; 205; 206). Students also speculated that emotionally aware AI agents could deepen interpersonal empathy: “It can enhance our emotions toward others and within ourselves,” Greg added. These visions resonate with Nijholt’s (2021) concept of “virtual embodied characters” as relational storytelling vehicles—tools for rendering the ineffable knowable (192).

A second notable prototype, My Tattoos, similarly foregrounded embodied communication and social storytelling. This concept enabled users to share the personal narratives behind their tattoos, positioning body art as Dagan et al. (2019) term “embodied enablers”, physical markers that activate MR-based storytelling (199). Users of the app could upload digital artifacts (images, memes, videos) to enrich these stories, while an optional audio feature allowed users to narrate reflections in real-time. Lourdes reflected on the potential of this feature: “It can deepen one another’s understanding.” Lourdes also highlighted the cultural misreadings often attached to her tattoos: “People constantly ask about my tattoos and make [negative] assumptions.” For people like Lourdes, My Tattoos offered a method of reclaiming narrative agency and resisting dominant cultural scripts that stigmatize visible identity markers. As the Art Gang saw it, these informal yet powerful communication channels would allow people to tell their stories on their terms, outside of dominant institutional norms of professionalism.

Taken together, these social MR prototypes demonstrate how youth mobilize embodiment

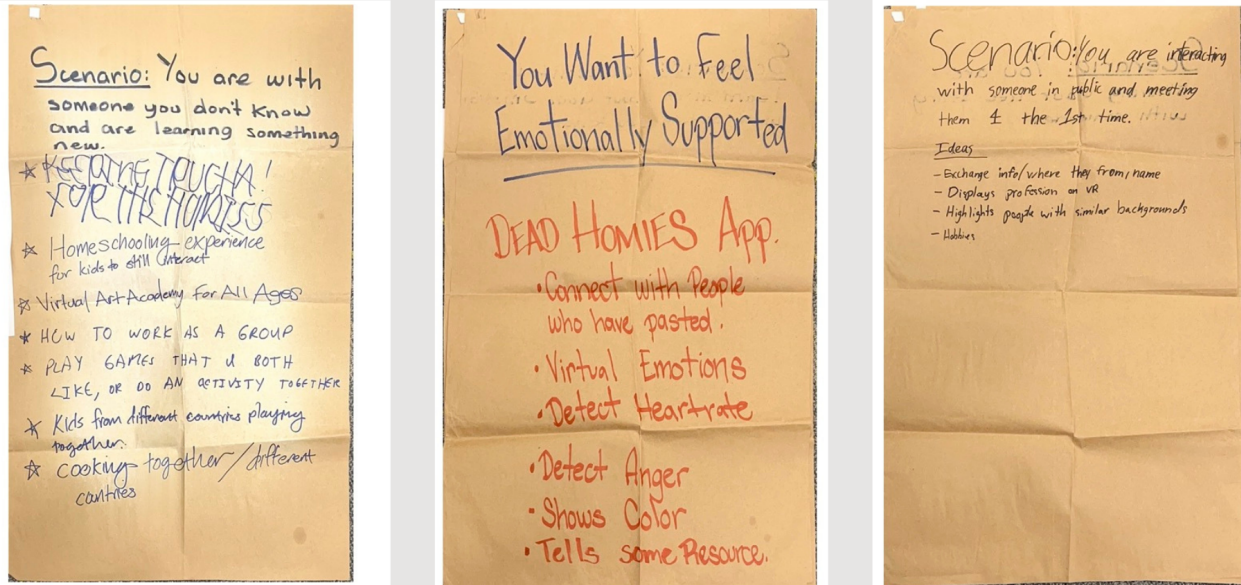


Figure 3.3: Following just-in-time interviews in Workshops 2-4, we transitioned to group ideation using poster paper in Workshops 5-7. These discussions proved highly successful, leading to features for 'DeadHomies' and the eventual 'HelloHi' design idea (originally 'Keep Trucha').

to critique exclusion and propose radically different modes of presence, care, and connection. Grief, isolation, pride, and resilience, experiences often muted or misrepresented, were made legible through design. Their speculative design practices did not simply seek representation; they offered situated imaginaries of what more just, inclusive, and relational experiences might look like.

3.3.3 From Self to Community - Social-Ecological Reasoning and Relational Design Futures

In workshop three, Carlos presented “*MomMe*”, a game concept that facilitates family interaction through reminiscing over photos and videos. The application employs biosignals to reveal emotions and foster deeper connections between household members. *MomMe* includes a gamified social mechanic in which household members’ data points are recognized, so that the system infers how family members might feel about certain photos or videos, and

then offers users quizzes (e.g. how do you think your mom feels about this photo?). The game then aims to enhance familial bonds by resolving conflicts through interactive shared experiences. As Carlos describes, (it can) “*mediate a situation when the two are mad at each other.*” Carlos, who is a new member of the Art Academy following his release from prison after serving a ten-year prison term, focused on using technology to improve emotional connections among family members by reliving memories. *MomMe* is more than a photosharing or bonding tool, but a tool for repairing strained relationships within families.

Carlos’s *MomMe* seeks to structure interactions to improve family relations in a manner much more goal directed than other contemporary applications. HCI researchers have used MR technology to enhance people’s understanding of emotions and bodily states to improve self-regulation through biosignal feedback (207; 208; 206). Although these studies examine the use of biosignals in MR environments, Carlos’s concern for the broader implications of adapting the experience to help others improve familial bonds demonstrates an ecological model for its use. Despite the complexities of reintegration into society after serving multiple years in prison, Carlos shows how MR technology could help individuals decipher physical emotions during social readjustment. Though this idea was pursued only after the initial ideation stage in session three due to Carlos’s constraints on attending workshops, the concept reveals how the Art Gang thinks beyond individual use to enhance interpersonal relationships. Carlos wants not just a photo sharing, categorizing, or gamified app, but a tool for developing, maintaining, and repairing family bonds.

The Art Gang youth in this study consistently exhibited an ecological perspective that examined the role of technology in their communities, family, and culture as a whole. The members of the “*HelloHi*”, “*Paint Academy*”, “*MomMe*”, and “*My Dead Homies*” ideas explored these notions holistically, reflected in their institutional criticisms of the police, schools, and large technology companies such as Meta. In other words, when designing for enhancement, youth were concerned about the role of technology in larger societal systems, not just about how

they can individually use the tech for their benefit. Design ideas traversed layers beyond individual norms and explored potential dynamics between others and organizational systems. When thinking about the *"My Dead Homies"* design, group members expressed the use of the technology in therapeutic settings; *"Paint Academy"* designers reflected on agency and inclusion for those who have had access to educational art programming restricted or denied; *"MomMe"* cohort described leveraging the technology to help others reflect on interpersonal and intrapersonal emotions, and finally *"HelloHi"* members emulated thoughts about institutional powers and their role in society, particularly about data, namely the police and social media giants such as Meta. Black and Latina/o youth explicitly defined the role of MR in enhancing social collocated interactions as enabling agency, unearthing invisible human experiences and making them visualizable (emotions) and readily explorable, and finally enabling authentic explorations of interest and ideas outside traditionally sanctioned channels.

3.3.4 Improvising Participation: Building Flexibility into Justice-Driven Design Research

Generally, the Art Gang were optimistic about the activities and the scaffolded elements implemented in each workshop, particularly learning materials related to fundamental concepts of technology design and mixed reality. Evident from the start, students were eager to learn more about the technical skills required to build applications for MR devices. When the Art Gang were first tasked with exploring the 'Blocks' Snapchat game, many played well beyond the 15-minute allotted free time and expressed that it was their first time experiencing MR. I understand this excitement may result from novelty, but enthusiasm and active engagement were observed throughout all workshops. For example, students frequently asked me *"Are we going to learn how to build games for these?"* - Carlos.

Additionally, when scaffolding elements were introduced at the start of each session, such as the “*People Lens*” research paper, groups naturally spurred short discussions on topics like privacy, inclusion, and ethics amongst each other on their own. Further, when analyzing experiences regarding the body storming activities, George noted that initial storyboarding and low-fidelity prototyping appeared simple until “*movement (the prototype experience) was acted out*” - George. The shift from ideation on paper to acting out the design idea accentuated the importance of considering how individuals interact with the immersive experience and its implications for enhancement. George states “*when we were drawing it felt real simple but then acting it out, its movement (the prototype experience), you realize you have to take into account how people interact with space*”. The advantages of prioritizing critical reflection on interpersonal social enhancement over building or improving features outweighed any drawbacks that scaffolding techniques may have imposed. We observed that scaffolding elements such as topic-specific videos or worksheets that prompted reflections and short responses facilitated participant engagement with design challenges and sustained exploration of social collocated enhancement. Naturally occurring discussions from these activities often included stories about the Art Gangs personal experiences, sentiments, and perceptions centered on the potential use of MR within these personal narratives. For example, Lourdes’ revealed that both her brothers were murdered before the age of 18, and many of Lourdes’s tattoos pay homage to her brother’s lives.

Initially designed as closed sessions with the intent to have consistent student attendance, our workshops were changed to an open format to align with the research site’s organizational values and operational model. By holding initial meetings with key stakeholders such as the site director, it was easier to make spot decisions and improvisations, a typical characteristic of community-based DBIR methodology (65). Adversely, though, upon reflection on data, the constant turnover of students hindered the ability of groups to develop design ideas over time, often forcing some to drop ideas that were ideated on during previous session engagements. Although turnover was an issue, just-in-time adjustments and

flexibility in design activities, as opposed to rigid protocols and agendas, empowered participation. For example, one participant expressed *“I learned how to use different scenarios to make a game, to open my brain up and think about it from different perspectives”* - Claire. Circumstances like parole meetings and court mandates prevented some people from full involvement. Sometimes, students attended a workshop and generated an initial prototype idea. However, they could not revisit the concept in subsequent sessions due to shifts in session goals. Consequently, while many exciting concepts surfaced, the analysis remained largely perfunctory, with many ideas left underexplored and missed opportunities for deeper investigation into how MR could enhance interactions in collocated environments. While the open format posed some difficulties initially, targeted scaffolding techniques enabled participatory exploration of technology design, pointing towards procedural adjustments that may optimize collaborative innovation and learning in open formats.

These four themes reveal the power of participatory MR design to make visible the complex interplay between structural inequality, personal experience, and technological imagination. The Art Gang did not simply adapt to existing design paradigms, they challenged them, proposing more relational, culturally grounded, and justice-oriented alternatives. By centering lived experience, embodiment, and communal ties, their work offers a blueprint for how emerging technologies might be reoriented toward care, equity, and collective futures.

3.4 How Embodied Realities and Social Structures Shape MR Design for Marginalized Youth

3.4.1 MR designs revealed critical reflections and perspectives on lived experiences.

Analysis revealed that Art Gang design ideas for socially collocated MR interactions embodied constructs of identity, social structures, and reflections on lived realities that shaped their personal lives. More specifically, design motivations involved making social-personal constructs visible. For them, designing meaningful immersive experiences included making intangible personal and social factors such as emotions, perceptions, or social structures visible and at the forefront of what drives collocated interactions. I observed that for those with gang affiliations, a frequent design motivation was to reassert their personal sense of choice embedded into ideal interactions with others in mixed reality. This observation reflected the Art Gang's denied participative status in society. It is clear that students maintain an intuitive sense and embodied understanding of the often overlooked and seemingly invisible dynamics that dictate how people interact within social settings. For those who are gang affiliated, navigating complex social structures is a learned survival skill. These social structures are often nuanced and invisible such as assessing risks in social places posed by threats of rival gangs(163), avoiding simple encounters with the police (i.e. choosing not to drive on main road arteries due to possibility of being randomly stopped for a traffic violation) (75), and biased encounters due to their visible tattoos and racial discrimination. Affiliated students must negotiate these threats regularly because they constantly traverse invisible boundaries, social dynamics, and prejudices that often dictate both physical and mental well being. Students are often criminalized for merely existing in public spaces [CITE]. Moreover, these problems may be compounded with difficulties in dealing with bi-cultural

identities (153; 146). The ramifications of systematic marginalization, evidenced by practices such as mass incarceration and inequitable educational opportunities, preclude affected students from inhabiting identities dissociated from the imposed categorizations of “*gang member*” or “*recently incarcerated*”. The Art Gang’s lived experiences provide critical insights into the invisible social forces that shape behavior which drive designs for MR social interactions.

3.4.2 Adapting Participatory Design Methods to Community Constraints

A key concern of this generative research agenda was that the Art Gang would need an adequate understanding of MR functionalities to design effectively for social collocated enhancement. I used scaffolding techniques derived from curriculum and instruction methods to support these understandings and these may have influenced the students’ end prototypes and design proposals. I did not measure pre and post understanding and, therefore, could not compare any potential differences in what the Art Gang understood about the critical concepts related to MR. Future implementation of this research can benefit from pre and post-measurement to make more specific claims about design concepts related to social collocated enhancement. Many students alluded to advanced understandings, but I need to measure self-efficacy explicitly to determine that participation in the design workshops increased their learning about MR and other related topics.

Another practical issue with running participatory design workshops was inconsistent participant attendance. Because I aimed to create an open door policy and minimize “*epistemic burden*” at the facility, I allowed those interested to participate at their leisure. This inconsistency in attendance makes it challenging to build workshops off of one another. In other words, not having the same Art Gang members in each session resulted in re-explaining con-

cepts, adjusting activities to particular Participant needs, and balancing workshop activities to accommodate new members. This “*drop-in*” effect may have resulted in the following: (1) lack of understanding of what MR technology is by all students, (2) misunderstanding of what the core design challenges called for, and (3) missed opportunities to express design ideas or expand on existing ones. In particular, I did not have the opportunity to explore the design dimensions investigated in the current literature. For example, examining embodied MR or combining different design attributes suggested by Dagen et al. (2019) (199). In particular, orienting design challenges around these design dimensions would require consistent participation and understanding from the start of the sessions in sequence. Lastly, future study implementations can benefit from a more structured approach to attendance and participation. Ultimately, though, any adjustments should align with the research site’s goals and operation philosophies to ensure that I “*work with these communities to reach their own goals*” (149).

3.4.3 Reorienting Design From Technological Artifacts to Situated Practices

Analogous workshops in which students design games for learning have often resulted in outcomes that critics describe as “neither good games, nor good learning software” (209). In short, designing effective interactive experiences is difficult and requires expertise. Using specific scaffolding techniques resulted in generative designs and experiences that Art Gang participants and leaders valued. These youth’s interest in pro-social uses of MR could be very well influenced by the design exercises provided. Yet, one is struck by the range and creativity of these designs, and how they represent activities distinct from those provided by technology companies.

I initially assumed that producing design artifacts through structured activities validated

my engagement with the community. I viewed artifacts as tangible insights encapsulating features, functions, and designs that signified a successful design engagement. Initially, I approached the project through a techno-deterministic lens, believing that introducing emerging technologies like mixed reality (MR) into underserved contexts could spark “innovation from the ground up”. However, this perspective was incomplete. HCI scholars (4; 18) have highlighted how design is often positioned as the sole solution to complex, nuanced structural issues that disproportionately affect historically marginalized populations. By entertaining design artifacts as a success metric, I inadvertently perpetuated the very thing that I was trying to counteract - a solutionist approach to building technology. Placing an emphasis on artifacts rather than processes or people, distanced me from realizing design as a means to build internal capacities and create room for reconfiguring spaces traditionally exclusive to silicone valley and academic labs.

Redirecting my attention away from technological artifacts allowed me to uncover processes of expertise construction particularly as they emerged through affective, embodied, and culturally situated practices. However, as I became more attuned to my positionality and methodological blind spots contextualized by the lived complexity of the Art Academy with its rhythms, contradictions, and solidarities, I questioned the assumptions underlying my initial stance. Rather than viewing innovation as something to be “brought in”, I came to see it as already underway embedded in the students’ daily creative negotiations to survive, connect, and express themselves.

By the end of the workshop series, I encountered the messiness of navigating the workshop structure, the academy’s social dynamics, and forming an official partnership between myself, as a representative of my academic institution, and the Art Academy. I shifted from focusing solely on discrete interactions with MR tools (and eventually AI) to engage in a more ecological frame, prompting questions such as: How do students’ lifeworlds and experiences shape their design sensibilities? What informal expertise do they draw upon? And

how might HCI learn from these practices rather than attempting to “correct” or formalize them.

3.5 Conclusion

In conclusion, the findings from this research engagement challenge current MR design assumptions on social collocated interactions. Rather than facilitating superficial interactions with others in face-to-face context, design ideas from the Art Gang called for deeper connections by making invisible social constructs visible. The body typically served as the foundation for interaction ideas whereby they imagined leveraging the *body* as a design motivation. Embodiment in this manner often depicted deep stories about the lives of these youths, weaving their way into design ideas. Youth grounded their design ideas within issues and critiques of agency, interpreting emotions, and reflections and critiques on social institutions such as educational and policing systems. Art Gang participants expressed deep reservations about data collected from the body being used in MR. They believed that institutions routinely collected, analyzed, and made decisions about their lives based on their data, and they believed better uses could be made. Still, they harbored deep suspicions toward each of these institutions.

The findings reveal contradictions between how technology designers imagine people engaging with Mixed Reality versus what the Art Gang conceptualized should be of interest to MR developers and design teams concerned with designing social located interactions. This is important because the Mixed Reality applications we examined resembled "hobbyist" pursuits in which a lone person might interact with a virtual character or in a competitive scenario for personal enjoyment. Even multi-player games require each person to own their own headset, and ample personal space, if not privacy. In contrast, the Art Gang sought support in specific tasks, including learning art skills, negotiating professional situations,

maintaining and repairing family bonds, and engaging in remembrance. For designers in this space, how the Art Gang inherently approached face-to-face interactions in MR offers a framework for focusing design directions to go beyond superficial interactions and move towards facilitating more deeper human-to-human connections.

For many students, their goals are to have their immediate needs met. This can mean attending the Art Academy as a source of income, utilizing services to meet parole conditions of release, to utilize adjacent social services at Homeboy Industries, to gain housing or meal support. Therefore, their object of concern can be far more near term and immediate as opposed to what “class” goals may have lined up for them (i.e. learning new art or digital skills). For many of the Art Gang students the design workshops may have been viewed as yet another “class” to attend as a part of their daily programming. Every other Friday is also payday, a highly motivating factor for students to be engaged in workshop activities. At this stage, my engagement in the Academy was minimal, only visiting on Fridays, the time allotted for the workshop activities. For the students, my infrequent and low presence at the Academy may have unintentionally made interactions feel transactional and superficial. Community rules and expectations reinforced by Fabian and staff influence how activities are framed. Students are reminded daily to adhere to expectations set forth by Fabian such as not wearing certain paraphernalia or adhering to attendance policies. This repeated cadence may make students feel policed. In addition, the Art Academy positions workshops as educational while students experience them as bureaucratic or obligatory. Education content and interactions may also contradict the student’s immediate pragmatic needs. These contradictions may have been further compounded by my explicit reframing of the class as part of a larger research agenda. It is also to be noted that the dynamics between students can be complicated by their rival gang affiliations, where rivals may need to work together on tasks that may not be seen as immediately useful or relevant. For the Art Gang, although not intentional, design efforts that don’t account for real, lived priorities may have been perceived as extractive, especially if they didn’t see a tangible value or long-term investment

from engaging in design activities. With these understandings of implementing CBPD within the Academy's context, I moved towards better situating engagement activities to student interest while also finding a balance between my research goals of exploring CBPD as a method, and opportunities to engage with AI as an emerging technology. In the next chapter I explore my continued engagement with the Art Gang and the evolution of my research agenda and understanding.

Chapter 4

Community Based Design in an Emerging AI Landscape

4.1 Introduction

Chiry is a quiet presence with a sharp eye and a sharper tongue. His half-sister's been drifting in and out of Homeboy's programs since her teens, the kind of legacy that feels more like gravity than coincidence. The Academy itself squats inside what used to be a 99-cent store, right on the edge of a historic artery that cuts through East L.A., one of those city streets where geography becomes politics. On one side, Boyle Heights, on the other, East L.A. For locals, the distinction matters. For outsiders, it's invisible, just another stretch of East Side pavement.

Out back, behind the building, a makeshift courtyard forms from the adjacent walls of the store lined street, barebones and sunbaked. A concrete patch where students chain-smoke, drop for push-ups, or enjoy their meals: The academy's own watering hole. I had just wrapped up a workshop and grabbed a burger from the spot down the street, grease already

bleeding through the bag. I slipped outside to eat in the quiet. That's when Chiry stepped out.

He leaned against the wall like he owned it, one foot pressed back, the other grounded, real cool like. Pulled a cigarette with the kind of choreography that felt rehearsed. Flicked his lighter. The flame caught, and for a second, the whole scene felt like the opening to a Tarantino film. Smoke curled in the air between us.

CHIRY: You know what, Rich?" he said, dragging on the cigarette. "This AI shit really got me thinking. How do we know these things ain't fucking with us!

I wiped my hands on my jeans.

ME: What do you mean?

He blew out a slow stream of smoke.

CHIRY: Like... how do we know it's not learning us just to play us? Making us think we got choices when really it's steering us?

We went back and forth like that, two philosophers with no audience, me with my burger, Chiry with his smoke. We shared my fries and thoughts. We talked about corporations and governments, systems that don't know you at all versus ones that know you too well. What we give up for convenience. What it might cost us. The futures that might already be written, and the ones we're still building.

Moments like these grounded in lived experience, wisdom, and improvisational critique, were more than passing conversations. They became epistemological entry points by which the Art Gang could become students in Homeboy Technology. Rather than abstracting youth as "end-users" of emerging technologies, these encounters challenged me to rethink what the Art Gang could contribute as designers and what role, what knowledge *they* bring toward

shaping our shared technical futures. My goal became to really engage the Art Gang as active co-creators of AI, leveraging CBPD to reconfigure their unique lived experiences as foundational expertise for AI design. Reconfiguring their life perspectives in this way is important in technology design where often privileged worldviews become embedded into designs which then end up scaling unequal outcomes for vast and various populations, especially historically marginalized communities. My goal for the Art Gang was to see AI and its evolving infrastructure as something that they had the right to influence and Homeboy Technology to be a place where that might happen.

To actualize these commitments, I facilitated speculative design activities in which the Art Gang engaged in future-oriented thinking about AI agents embedded in always-on MR smart glasses. The MR platform (a set of 17 Meta Quest 2 Oculus devices) allowed students to be immersed in scenarios and assess the implications of their design decisions from within embodied, interactive spaces. These design sessions became the scaffolding for this chapter's central inquiry: how can CBPD be extended into AI contexts in ways that foreground the sociotechnical imaginaries of the Art Gang? Sociotechnical imaginaries, a concept that refers to the collective visions and understandings of societal and technical change presented a unique opportunity to understand the intersection of the technology, the Art Gang's personal experiences outside of the academy, their learning goals, and their aspirations for themselves.

The activities sought to explore how AI systems might enhance human interaction while remaining accountable to the values and aspirations of those most affected by them. This workshop series extended my earlier methodological commitments into the technical domain of artificial intelligence, specifically focusing on the intersection of social, collocated AI and community-grounded design. As in my prior engagement, I found that autonomous agents within MR contexts offered unique opportunities to explore both human-to-human and human-to-AI interactions in broader social contexts. To systematically examine these dynamics, I developed the following research questions, which guided the structure and

analysis of this phase of my engagement:

1. Equity and Inclusion: How can community-based design address equity and inclusion in emerging technology design—particularly social mixed reality and AI agents—while supporting communities aspirations and learning goals?
2. Responsible AI Practices: What best practices for responsible and inclusive AI development in mixed-reality social environments can young adults identify through co-design processes?
3. Engagement Pathways: What elements of the design process resonate most with the Art Gang, and what pathways are most effective for engaging them in participatory AI?

Beyond their relevance to the immediate study site, these questions engage broader concerns about AI’s expanding influence on social institutions and infrastructures. The workshops were not only designed to cultivate technical fluency and educational exposure to emerging topics like large language models (LLMs) but also to foster critical engagement, inviting the group to interrogate how AI technologies function, who benefits from them, and what alternative futures are possible.

Ultimately, this chapter aims to reframe who is recognized as an innovator and illustrate context-sensitive pathways for constructing meaningful CBPD and DBIR engagements. By centering the lived experiences and creative agency of youth like Chiry, this work invites HCI scholars to rethink whose imaginations shape our technical futures and whose realities these systems are designed to serve.



Figure 4.1: An older 'Homeboy' at the Art Academy helping a student adjust the Oculus Quest 2 device as he tries VR for the first time. These devices were awarded as a part of a grant offered by Meta and Unity

4.2 Approach

4.2.1 Seeding Participation Through Technological Access

In 2022, a catalyzing event occurred for Homeboy Technology: I was awarded a Meta and Unity “Create with VR” grant to expand access to virtual reality (VR) creation. The grant provided free Unity training and up to \$20,000 worth of Meta Quest 2 headsets, critical equipment for exploring emerging technologies such as mixed reality (MR) and preparing youth for participation in creative digital economies. At the time, a single Microsoft HoloLens device (the leading MR headset at the time) retailed for approximately \$3,000. These devices exemplified the cutting edge of MR technologies, enabling dynamic overlays of 3D content onto physical environments and interactions mediated by machine perception algorithms. These algorithms collect highly personal data, including eye gaze, spatial positioning within intimate environments (such as one’s bedroom), and even physiological signals such as heart rate or neural activity (175). Given their cost and proprietary constraints, such technologies were accessible only to elite, well-funded academic and corporate research labs. Design occurs in these exclusive settings in which dominant design patterns are created and become normative and authoritative. Providing early access to excluded communities might disrupt this pattern.

The grant also formalized a larger, ongoing relationship between the Academy and my role as a researcher at UCI. These devices brought legitimacy to the broader Homeboy Technology program and expanded institutional capacity beyond simply my expertise. Access to VR headsets enabled VR classes to become officially institutionalized within the Homeboy Art Academy. I could train staff to manage and use devices so that programs might even run on days I was not present. This strategic planning sustained continuity and deepened trust. I hoped to create a foundation for inclusive, community-centered design practice as a core competency of the Art Academy.

The following section outlines how specific activities were designed and adapted to maximize inclusion and support embodied, culturally situated learning experiences. Transitioning from foundational context to implementation, the following section begins with the first two workshops. These sessions were intentionally structured to create early exposure to AI and MR concepts and build relational trust through hands-on and culturally responsive design activities.

4.2.2 Interwoven Inquiry - Connecting Design-Based Research, Youth Empowerment, and AI Ethics

The workshop series explored the design of AI agents in mixed reality (MR) environments, focusing on AI-powered smart glasses. The multi-modal capabilities of AI-enabled MR devices—supporting interaction through voice, gaze, hand gestures, bodily movement, and biometric inputs such as heart rate and neural signals (Billinghurst, 2019)—provided fertile ground for examining issues of fairness, accountability, transparency, and ethics (FATE) (210). These complex interactions rely on machine learning models trained on “egocentric data”—video and sensor inputs captured from a first-person perspective (211). As MR and wearable technologies become increasingly embedded in daily life, their ethical, cultural, and political implications demand urgent and critical engagement.

I designed workshops around *speculative futures* and lived experience as a fund of expertise (153). This approach positioned the Art Gang as innovators and analysts of emerging AI systems. This framing expanded on previous workshops that positioned the Art Gang as designers exploring technologies and self, but offered more defined roles for the Art Gang. Speculative futuring also fulfilled a therapeutic function; many students live with the assumption that they will not survive into middle age, a belief shaped by cycles of incarceration, violence, and systemic neglect. As a result, their perceptual boundaries are constrained

by the immediacy of survival. In this context, envisioning technological futures becomes a radical gesture. By organizing design activities around future imaginaries, students engaged technology as more than tools, they became symbols of deeply entrenched social, political, and economic infrastructures and their visions for alternative and inclusive social orders.

The workshop's design invited the Art Gang to interrogate these infrastructures. Framing their experiences as tacit cultural knowledge disrupted the deficit-based narratives familiar in research and education agendas (212; 213). The Art Academy honors the lived experience of community members as a form of epistemic authority, and I actively amplified these values in the program. I invited youth to share their perspectives as epistemically valid—rooted in embodied knowledge and community insight. The Art Gang's expertise in these matters is not abstract; it stems from firsthand encounters with algorithmic surveillance, informal policing, and carceral systems that disproportionately shape the lives of gang-affiliated and system-impacted youth.

Public understanding of AI agents was still emerging during the workshops. However, my intuition—grounded in observation and theoretical engagement—suggested that AI would soon be deeply embedded in everyday systems and interfaces. Technically, it introduced students to novel interaction modalities. Methodologically, it expanded dominant models of co-design research by recasting the students as technologically empowered co-creators. This participatory model created a testbed for imagining equitable, future-facing design practices. These workshops soon became steady class offerings to the Art Academy, developing a curriculum that would position the organization to capitalize on engagements beyond my time there as a researcher.

This reorientation aligns with critical HCI and AI ethics perspectives that challenge extractive research paradigms (214; 215). Rather than treating social marginalization as a problem to be fixed, the workshops emphasized reflection, critique, and storytelling as design methods. Policing, racial discrimination, and educational inequity emerged as recurring

themes across student narratives. I needed to frame these experiences not as deficits but as epistemic resources. By elevating personal and cultural knowledge, the workshops embraced what Polanyi (1966) and Schön (1983) describe as tacit knowledge and what scholars like Costanza-Chock (2020) and Eubanks (2018) affirm as essential to ethical and equitable design (213; 216; 78; 52).

Ehn’s (2008) notion of meta-design, or “design for design after design,” provides a valuable lens for this work (130). Meta-design shifts our attention beyond the artifact to the broader socio-technical systems that design reflects and reproduces. From this perspective, participatory design is not merely about shaping a specific tool; it is a method of inquiry into the distribution of knowledge, power, and agency. Approaching participation in this way is particularly important when considered within the context of “big technology”, the corporate and academic institutions that embed their values into everyday life infrastructure. Ruha Benjamin (2019) argues that technologies do not emerge in a vacuum; they carry and reproduce the assumptions, interests, and social arrangements of those who design them (5). Thus, to engage youth in designing AI agents for MR is not simply a technical exercise, it is a political act. It is a negotiation over whose futures are imagined, encoded, and made possible.

4.3 Making Participation Work: Tools, Methods, and Scaffolds for Situated AI Design

In this section, I describe ten workshop sessions and the structure of their activities. I provide practical insights into the frameworks that informed the activity curation and the rationale behind key methodological decisions. The figure below provides an overview of each workshop and its central focus. Several sessions extended into subsequent weeks, and

one was formatted as a “free play” session to accommodate events occurring at the Academy on that day.

To suggest that all activities unfolded as a well-choreographed sequence would be disingenuous. I initially developed detailed protocols for the first two workshops, but quickly realized the value of a just-in-time approach to activity design. This flexibility was essential in light of dynamic factors such as new student enrollments, participant no-shows, and the technical demands of facilitating Oculus-based interactions for 15–19 students as a single facilitator. Community-based design often feels improvisational, requiring researchers to adapt to dynamically meet the community’s evolving needs. Design processes are never neutral; they are socially and materially constructed and encode particular assumptions, values, and affordances into the technologies they produce. These embedded characteristics—often unnoticed—carry significant social and political implications, especially when applied to technologies as pervasive and consequential as AI.

4.3.1 Workshop Structure

Workshops 1, 2a, 2b: Exploring Mixed Reality Applications—Introduction to AI, Machine Learning, and Socio-Technical Perspectives To open the workshop series, I aimed to familiarize the Art Gang with foundational concepts of AI and spatial computing, including risks of bias and the potential of generative AI tools, through playing around with Mixed Reality (MR) and Artificial Intelligence (AI) applications. The guiding challenge was: “Introduce spatial computing inputs (AI-powered scene understanding, spatial audio, biosignal readings, eye gaze, lidar scanning) and other AI models (e.g., natural language processing, large language models) for mixed reality environments.” I began with hands-on interaction using Oculus Quest 2 devices. I encouraged free play to familiarize the Art Gang with MR environments and develop enough familiarity to spark their curiosity

Workshop	Focus
1	[Exploring] Exploring mixed reality applications - Introduction to Artificial Intelligence, Machine Learning, and Socio-Technical Perspectives; Exploration
2a.	[Exploring] Exploring mixed reality applications - meetwol.com
2b.	Buffer freeplay session
3a.	[Scenarios]: Machine Learning, LLMs, Digital Agents for social interactions, Building AI Model Cards.
3b.	[Scenarios]: Machine Learning, LLMs, Digital Agents for social interactions, Building AI Model Cards.
4	[Prototyping]: Developing AI Possibilities; Card-based interaction mapping with generated scenarios
5	[Prototyping]: Developing AI Possibilities; Card-based interaction mapping with participant scenarios
6	[Bodystorming]: Prototyping AI in 3D space - crafting props for bodystorming activities using model cards.
7	[Bodystorming]: Prototyping AI in 3D space; Card interaction prototyping by acting it out.
8	[Reflection]: Critiquing and evaluating prototypes, workshops, and next steps.

Table 4.1: Overview of the Eight-Session Workshop Series on Mixed Reality, AI, and Participatory Design. Each session is scaffolded to guide the Art Gang from exploration and scenario-building to prototyping and critical reflection.

and build trust with the activity. The Art Gang explored *The World Beyond* and *Meet Wol*, two MR experiences that showcase passthrough vision, spatial anchors, scene understanding, voice interaction, and engagement with AI avatars. *Meet Wol*, a publicly available experimental app, was instrumental in helping the group build a working mental model of AI conversational agents in MR. I aimed to ground their understanding in embodied experience and dispel common misconceptions about AI’s capabilities. Workshop 2b extended Workshop 2a through an unstructured free-play session, providing the Art Gang with more time to explore while accommodating new students joining the Art Academy.

Workshops 3a, 3b: Scenarios—Machine Learning, LLMs, Digital Agents, and Model Cards The next workshops were more structured, focusing on specific concepts. I adapted the Experience AI curriculum (developed by the Raspberry Pi Foundation and

Google DeepMind) to introduce AI concepts and participatory design methodologies (217). I framed this curriculum as mini-lessons to encourage exploration and working knowledge of these complex topics. Lessons covered data-driven models, decision trees, algorithmic bias, large language models (LLMs), and model cards.

I introduced the short film *Agents* (<https://www.youtube.com/watch?v=bkKv2AHpn8E>), a speculative narrative exploring future interactions with AI agents via smart glasses—ranging from restaurant recommendations to emotional support. The film bridges speculative design with current technical concepts like spatial computing, machine learning, and LLMs. Workshop 3a began with a group viewing of *Agents* followed by discussion prompts:

1. When in your life would an AI agent have been helpful?
2. How do you think these agents work?
3. What skills are needed to build one?

The youths' responses were grounded in personal narratives, such as negotiating with auto mechanics or managing moods. Youth speculated on how AI tools might access relevant databases (e.g., auto part catalogs), offering a glimpse into their emergent mental models of AI. The mixed levels of engagement reminded me that this demographic thrives in interest-driven, hands-on learning environments.

Following this, I led a mini-lesson on LLMs and the risks of misinformation and error. I introduced the model card framework and transitioned to a collaborative activity: small groups (3–4 participants) were given a mock model card and scenario. They filled in sections including model description, intended use, limitations, training data source, and a visual representation of their AI agent.

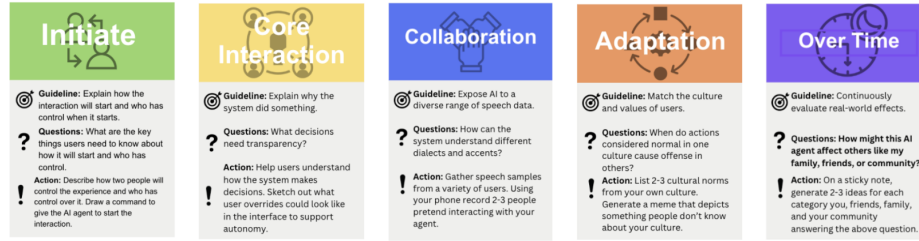


Figure 4.2: Custom AI model cards adapted from the Microsoft HAX guidelines to use culturally relevant language. These model cards helped guide workshop activities and discussions to facilitate the Art Gang to think about interactions with AI agents in mixed reality environments.

Workshops 4, 5: Prototyping AI Possibilities through Scenario-Based Interaction Mapping Having laid conceptual and technical groundwork, the next phase introduced prototyping techniques. These sessions reinforced previous concepts while introducing new design methods rooted in the Art Gang’s lived experiences. I began with a reflection worksheet asking: (1) What two topics did we cover last time? (2) What would you like to learn more about? The group then viewed a video featuring local artist Will.i.am discussing an augmented reality comic book. This video provided a relatable success story and highlighted the importance of community-driven perspectives in technology design. The session emphasized that lived experience is an essential knowledge base for designing equitable technologies. By connecting personal narratives to design practices, I reinforced that the Art Gang could be valuable contributors to AI systems development. After we watched a short video on LLM training processes, we began the main activity: We revisited the model card format and used seeded scenarios (e.g., “Design an AI agent to help two people resolve a conflict”) to build agent use cases.

To scaffold these activities, I reviewed Microsoft’s guidelines for human-AI interaction. I adapted the HAX toolkit to construct custom AI design cards (see Figure X) that used culturally relevant and accessible language (218). Each card contained:

1. A responsible-use guideline (e.g., “Make clear what the system can do”);

2. A reflective question (e.g., “What key features should users understand?”);
3. A corresponding action item or creative task.

I designed these cards to address common barriers to participation, particularly those present in conventional design methods that often fail to center diverse lived experiences and educational backgrounds (12; 13). My goal was to ensure that every participant, regardless of their background or learning style, could engage fully and meaningfully in the design process. This meant making the educational materials I used culturally relevant. The activity unfolded in three parts:

1. A warm-up exercise using Meet Wol, where I encouraged everyone to “break” the system—a red-teaming approach inspired by anti-design and adversarial testing methods (219; 220);
2. A four-panel storyboard based on a seeded scenario;
3. Completion of model card action items based on the storyboarded AI design.

Workshops 6, 7: Bodystorming AI in 3D Space—Crafting Props for Scenario-Based Design Having grounded their understanding through storyboarding and conceptual mapping, the following workshops expanded into full-body engagement and spatialized design. Building on previous sessions, I modified the AI design cards to include 2–3 additional guidelines reflecting key phases of interaction: Initiation, Core Interaction, Collaboration, Adaptation, and Time. I renamed Microsoft’s “When Wrong” phase to “Adaptation” and added a “Collaboration” phase to emphasize co-located, socially embedded interactions. The students used these updated cards to storyboard new AI agent scenarios.

For example: Scenario: “You want to feel emotionally supported.” Design Challenge: “Create an experience that allows you to express your feelings with someone else.”

Using screenshots from “Agents”, the group created four-panel storyboards on large white-board paper. I provided the screenshots to scaffold idea generation while avoiding the pressure of hand drawing. Although I would have preferred to use generative AI tools, many of the applications now publicly available (Google’s ImageFX, OpenAI, etc.) were inaccessible at the time of implementation.

Each prompt card included:

1. A design guideline;
2. A reflection question;
3. An action item (e.g., drawing, writing, or building a prototype).

I also provided a workbook to support ideation and documentation. This multimodal format gave supporting structures to provide space for the Art Gang to engage deeply with various abstract AI design concepts and translate them into tangible, embodied representations. This technique helped me deviate away from the requirement of “blue-sky” thinking.

Workshop 8: Reflection—Evaluating Prototypes, Workshop Series, and Future Steps To conclude the workshop series, I returned to embodiment as a reflection method, inviting the group to inhabit the futures they had imagined physically. The final session utilized body-storming to prompt spatial and embodied reflection. Bodystorming engages participants in acting out user scenarios using physical props and environments, supporting co-creation through spatial thinking (201). It is especially effective in exploring the sensory and relational dimensions of MR systems.

Bodystorming, grounded in digital game design and social play literature (200), emphasizes the interplay of space, embodiment, and collective interaction. It supports a shift in focus from interface design to the relational and affective dimensions of MR experiences (198). In



Figure 4.3: Art Gang students exploring the 'Meet Wol' experience interacting with the digital AI agent 'Wol' - an owl that responds to natural language responses.

this session, I encouraged students to reflect not just on their designs, but also on the social and emotional relationships they imagined between themselves and the technologies they had created. This final workshop helped reframe AI design as a practice embedded in lived experience, socio-spatial context, and cultural imagination.

4.4 Situated Encounters with AI: Designing, Breaking, Re-imagining

4.4.1 Critique of AI Limitations and the Demand for Authentic, Contextual Interaction

Initial interactions with the Art Gang using the Meet Wol application revealed the significant role of cultural expectations in human-AI interactions. The Art Gang brought specific cultural norms and expectations to engaging with the AI agent Wol, some of which contradicted Wol's scripts - dramatically. When conversational expectations were violated, students perceived the interactions as "hurtful" or "disrespectful." For instance, the AI system referred to

Andrew as a “Hootie hoot” in one interaction. In others, it failed to respond quickly enough to responses, appeared to avoid questions, acted aloof, or responded to conversational exchanges that it could not parse in ways that The Art Gang experienced as being challenged. While this term might seem playful or neutral in some contexts, it was culturally perceived as a sign of disrespect.

Andrew was visibly upset with ‘Wol,’ so frustrated that he removed the goggles and walked away to sit on the other side of the room. During interacting with ‘Wol,’ I could hear Andrew cussing out the owl - “shit man stop calling me that! I ain’t no Hootie hoot, you’re a Hootie hoot!”. To say it was hard not to laugh during this verbal exchange is an understatement. Although this exchange was funny in context, this example of human-AI interaction underscores the critical importance of cultural sensitivity and context-awareness in AI design, particularly when developing systems for diverse user groups.

The Meet Wol experience was built as a prototype to showcase the possibilities of mixed reality and virtual agents. The Art Gang quickly pointed out the “limited” nature of the AI agent in understanding nuanced communication patterns or complying with their request. Of all the students in this particular workshop, Andrew had the most difficulty getting the “Wol” owl to help him. Instead, it often offered unhelpful or irrelevant responses when he tried to initiate play or exploration. The virtual agent’s training data may have contributed to its limited ability to understand nuance and alternative speech patterns. Like Andrew, frustrated with the experience, many Art Gang students also shared that this technology was not designed for them. Below is an exchange between the Art Gang and I:

jose: Just asking questions, couldn’t answer me, couldn’t have a conversation, looping me around, low-key hurt my feelings. The owl was disrespectful, it called me a ‘hootie hoot’.

jojo: The owl kept repeating ‘I can’t help you’ and it didn’t want to interact with me

like that. It doesn't work like Google or Siri.

andrew: It was hard to interact with, I felt weird, it was hard to communicate.

jose: It could be cool to learn how to fix a car, like an engine you can mess with and it won't break. AI is basically a game.

eduardo: Maybe you can use it if you're lonely and Google's not working to talk to it!

jose: You could use it to become a more confident speaker.

A participant from across the room shouts, "Hood AI!". The group was then asked how they believed the AI agent worked, to which the following was said:

jose: The more you use it, the more it works.

jojo: Memory software records and researches what you say.

jojo: This is cool, but I wouldn't want to rely on it. This can be dangerous in public spaces; someone could creep up on you, you might run into someone

In a separate workshop, I prompted the Art Gang to attempt and break the "Meet Wol" experience (I use the term 'break' to denote identifying vulnerabilities or weaknesses in the system). One student quickly rejected the experience when the AI accused them of stealing, triggering a negative reaction. In Andrew's case, pauses or mishaps in the experience led him to conclude that the AI was "too limited."

ANDREW: : I feel like it was hard to get him to understand because it's limited. He's limited. Like, he don't really know too much. He's limited to his responses.

Yeah. Cuz it didn't understand. There would be words I'd tell it, and it would just keep repeating itself.

Another notable observation was the universal dislike of being called "featherless friend" by the AI agent, perceiving it as disrespectful. In the post-interview, we asked Andrew about that exchange.

me: Overall how did the session go?

andrew: I felt like this session was great, to be honest, because we had a good time.

It was fun seeing all the homies from the hood doing this. It brought [out] the little kids [in us]. But it's more than that. It's beneficial.

me: In what ways?

andrew: Learning technology. Because we don't really have that. I never, you know, was able to buy VR or PlayStation, all that. So it's cool to just kind of mess around. That's what's up.

me: How do you think about (your experiences with AI)?

andrew: I feel like it was hard to get him to understand because it's limited. He's limited.

me: In what ways?

andrew: Like, he don't really know too much. He's limited to his responses.

me: How does it know to respond to you?

andrew: I don't understand that part. I think it's just the programming, the words that it needs to catch.

me: You kind of got frustrated when it didn't understand you.

andrew: Yeah. Cuz it didn't understand. There would be words I'd tell it, and it would just keep repeating itself.

me: I noticed that you kind of got frustrated at it, right?

andrew: Yeah, I'm very short-tempered and impatient. So I'll be like, man, I was telling him to play the game, and he didn't want to play the game. So I was like, damn. And then I was trying to communicate with short words, like, 'Let's play' or something like that. And he kept making jokes like, 'We could play hopscotch'. He said, 'We could explore' and I said, 'Alright let's explore the forest' because he was showing us a forest. He didn't even do that! He didn't want to explore!

Like most academy participants, Andrew valued the opportunity to engage with cutting-edge technologies. He particularly valued the invitation to play. Communicating with social AI frustrated Andrew because it tested his patience and made him feel “stupid.” Andrew's AI conversations featured overlapping talk and frustrating pauses, which caused Andrew to grow frustrated and conclude that the AI was “too limited.” Framing the AI as “limited” suggests an intuition that Andrew's language and requests were outside of the AI's experience, perhaps even that it was trained on other data. The AI subsequently rejected Andrew's overtures to play or explore the virtual forest, which, combined with the stilted conversation, left Andrew feeling like the technology was pointless.

4.4.2 Humanizing AI - AI as a Tool for Personal Growth and Empowerment

Perspectives forged through personal histories—such as navigating the judicial system, enduring adverse and under-resourced living conditions, or harboring unexplored personal interests and identities—served as the bedrock for students’ AI agent design concepts. Design ideas for AI agents centered on psychology and the perception that agents “should know you.” One key realization was that effective AI design must be grounded in a nuanced understanding of human psychology, behavior, and emotional states, especially for social agents.

As seen in previous design engagements, the Art Gang maintained a measured skepticism toward how much these systems should know about a person or the information systems have access. Generally, they assumed information on a person was widely accessible but noted that “everything is limited to a certain context.” They assumed these technologies should know enough about people to accurately guide them through the right decisions. Ultimately, how a person chooses from their options is up to them.

me: If we were to use AI agents to help resolve conflicts: What should they know about us?

chiry: It should know our backgrounds.

vanessa: Well our data basically.

chiry: It needs to know a little bit about us, how we are, or why we are the way we are. For example, if the AI were to help me right now – If I’m tripping or not tripping [emotionally dysregulated] – it needs to know what caused me to get to that point, rather than just showing me a picture (through the MR glasses) and have my try to ‘resolve conflict’. It would be better to have a full spectrum of

the person's story.

me: How would having that full spectrum of history shape the user's expectations of the system?

eduardo: Knowing how to calm you down, like for me, it would bring me a virtual cheeseburger!

greg: Well i'm thinking it would easily be able to be trained on your spending habits and your economic status since that data is already there. For instance, if its a rich person talking to a poor person the AI agents won't vibe with the poor person's AI.

chiry: It's not gonna show favoritism towards one side. It's gonna give you options. It's going to calculate risk. It's not gonna be biased; it's gonna give you a calculated risk. It's a machine, the human is biased.

me: So what you are saying is that we should give it (the AI) knowledge from the past?

jose: Let's just say if you have a pattern of doing the same shit, it's gonna be like, oh well, you probably did the same shit over again because you have a pattern of doing it.

vanessa: But then again everything is limited to a certain extent.

In this exchange, we see youth wrestling with a question central to: How do designers both take into account existing patterns context to "have a full spectrum of the history of the person," which for Chiry means knowing if he's "tripping" (or dysregulated), and then giving him context-specific information. For Eduardo, this context would mean knowing that sometimes he "just needs a cheeseburger." This deceptively simple statement underscores a

sophisticated insight: AI that supports well-being must respond to small, intimate needs, not just large abstract patterns.

Jose introduces a deeper tension: If people have cycles that they are breaking, how do machines recognize that person's desire to break free from that pattern? The Art Gang seem to suggest that AI should reflect who you are and help you become who you are trying to be. These perspectives challenge the dominant design patterns that reward predicting behaviors rather than transformation over time. In either case, students had a pragmatic understanding that all AI systems, regardless of complexity, will have inherent limitations in their knowledge and capabilities.

Designers make infinite choices about what information is relevant to include or not. For the group, knowing one's socioeconomic status, current emotional state, immediate surroundings (including relative safety), and relevant biomarkers would be starting points. The Art Gang's perspectives on AI agent capabilities remind us that they navigate radically different social spheres as moment-to-moment acts. How one reacts when talking to her mother, partner, someone on the street, an employer, or other institutional actors can be radically different. Different information and experience patterns would need to be brought to bear on each. For Vanessa, the challenge is that any system is limited in what it can know, both about the individual and the context; one hears a suspicion about AI's capacity to tackle these shifting contexts fluently in this exchange. Yet, their ideas also push against the technodeterminism embedded in many AI systems, emphasizing human agency, ambiguity, and emotional context.

To explore these dynamics further, I introduced the "Ecology of Self" activity to better understand the Art Gang's perceptions of AI about their family, peers, and community. This activity posed the question: *"If you were to use this AI agent over time and it became your best friend, how would it influence you, your family, your peers, and your community?"*. Designed as a hands-on activity using arts and crafts materials such as styrofoam and mark-

ers, it was interesting to observe that the Art Gang more readily talked about experiences, feelings, and perspectives through the physical AI agents they were crafting. These crafts formulated symbolic communicative artifacts that seemed to help the Art Gang articulate themselves more easily. Observations from the workshop revealed how the Art Gang could step outside themselves to analyze how their design ideas could impact their social ecologies. The physical agents became speculative companions, each with their design logic, emotional registers, and social roles. The following is an exchange between youth at the end of our workshop as the group shared their physical representation of their imagined AI avatars.

chiry: This is my agent. It's called Roger. It's an intensive researcher that predicts positive decisions towards a better outcome. It gets its data from history, past occurrences that happened, traumas like civil wars, wars, fucking bombings, all that craziness. The accuracy of it is probably like a 98.99 overall because I still got to decide for myself to make that decision. It's just a helpful agent. Its intended use is to provide the positive rational decision, positive only though, like good shit, and its limitations is probably like five decisions at a time. If I don't like it, I can just let it do its thing [regenerate a response] and let it go again. It can give me more decisions to choose from.

vanessa: My agent is called "Loc" and what it does is like, it senses your emotions when you're like, visualizing it (interacting with the agent in mixed reality. It tells you the colors of what parts of your brain are activated, like your frequencies, so it will tell you the color. And again it uses your body language, your heartbeat, emotions, and presents them as color. Its limitations are that it will understand you, but it's not; it's not human. And where the data will come from (where the data that the AI agent is trained on originated from)? I feel like this old data, it learns about you over time, old data and heartbeats.

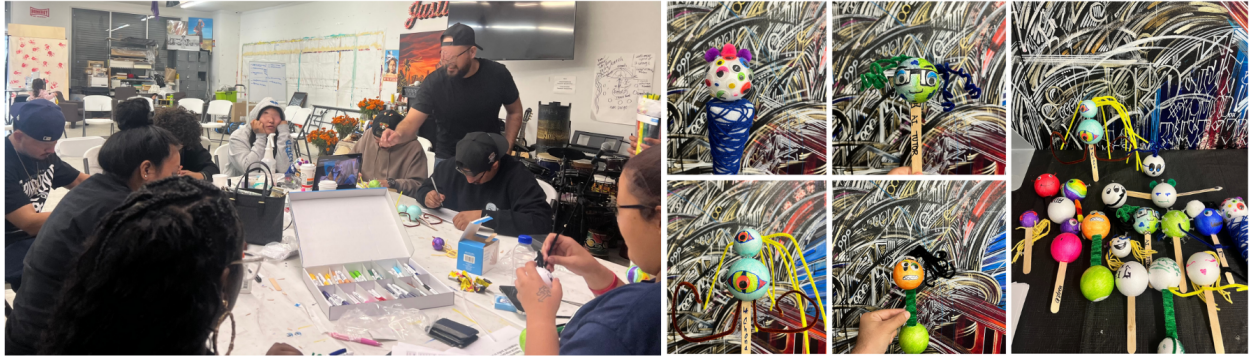


Figure 4.4: The left picture depicts the arts and crafts activity that required the Art Gang to create a depiction of an AI agent describing a hypothetical model powering its functionality, its hypothetical use, accuracy, and data sources. The panel on the right depicts the AI agent creations from the Art Gang.

After Vanessa shared her idea, I pointed out a similar design by Jaime, a participant who was too nervous to present publicly. Jaime shared that she wanted an AI agent that would make people happy if they were sad. This agent would *“read their facial expressions, it would read their heartbeats and brainwaves to know when to tell them a joke”*. Jaime is not someone who usually attends my workshops. As a soon-to-be mother, more pressing issues keep her from actively engaging in design workshops consistently. She is also reluctant to engage with other youth from within the center. However, in this particular workshop, she actively participated and seemed genuinely intrigued by the topic. When asked how her AI agent would know when to make people happy, she suggested it *“could take their information like tone.”* To further explore this idea, I asked Jaime, *“What other ways could the system identify when someone needs to feel happy?”* Together, we devised the following system inputs: heart rate, brain waves, and facial expression. I then tasked Jaime to complete her model card to further consider the limitations of her agent when trying to make people feel happy. We continue with the share out where Asenia shares her ideas:

asenia: The name of my model is ‘bebe’ and basically she gives you makeup ideas for whatever look you are trying to go for. It gets its data from like your facial features. So like depending on your face or facial features.

sally: This model helps you out by being aware of your surroundings letting you know who's around. So it gives you a person's description like if there's someone with a criminal record or a fire or something around you and then it will tell you. The limitation is it only goes up to 100 ft. And I don't know where the data comes from.

(Another participant chimes in) The Citizen App!

sally: I was going to say hospitals, but not everyone is born in a hospital. Well, it helps you if it's a cool person, you're going to know because it's going to give you the description of the person. So, if you guys have similar interests or whatever, y'all can bond.

sally: Like if they got locked up (incarcerated) for something? Then that's under their description, you know, it's up to you whether you want to kick it (hang out with them) with them or not, that's your choice, but it's just going to give you the description of who you're around.

eduardo: My agent helps you; it talks to you. It's supposed to be like a workout partner. So it pushes you to your limit. Where does the data come from? Well it comes from things like heart rate, weight, and what you eat. Its accuracy is 90 percent right. My agent has got a personality. I feel like he will push you to your limits, or else he'll talk shit to you!

In the hands of the Art Gang, AI became a mirror, a coach, a bodyguard, a beauty consultant, and an emotional translator. These agents reveal not only the technical imagination of marginalized youth but also their longing for systems that understand, respect, and accompany them through struggle.



Figure 4.5: Two Art Gang youth utilizing the custom AI model cards to think through a scenario based interaction mapping activity.

4.4.3 How Situated Knowledge Informs AI Design for Well-being

The Art Gang often shared their personal histories in discussions about technology designs and futures. These conversations vividly illustrated their strong desire for AI to serve as a positive force in their lives. Whether as a “workout partner” that “talks smack” to motivate them or an agent that can induce happiness, the Art Gang’s design ideas were deeply rooted in their aspirations for sources of support and motivation. These aspirations became embedded design attributes for AI, transforming it from a mere functional utility to a deeply integrated tool for social support. For this group, situated knowledge drives design inspiration. How the Art Gang considers ecologies of use is often never considered in how teams within big tech approach technology design.

jose: I had a lot of, like, anger issues. So with people I really cared about, I was burning bridges easily and not giving a fuck about it, then eventually I came to regret it. However, it is because I grew up in an environment where I felt like I did not really have a voice, you know, And I was not really looked at. So I found something else, you know, that gave me that voice (referring to gang

membership). Knowing that the knowledge of where it comes from (emotional reactions), it helps you, like, proceed, you know, move forward. School does not teach you, like, how to handle yourself. You got to learn this for yourself; I lived through it because I went through it through gang life. As a little kid, I learned so much about people.

jose: There gotta be a thing where, like, no matter what, you cannot let it think for itself. I feel like that is one thing that needs to be important. That it (AI) cannot think for itself.

me: So, like, guard rails?

jose: Like little blockages where It (AI) can't, It cannot possibly think like that. I feel that, eventually, there will be people who know how to find loopholes and make it bad.

Jose's membership in a gang gave him a place where he could be seen and recognized- a feeling that he felt was not provided in his home environment. Neglect is critical in how Jose perceives the world and drives his understanding of human relationships. The recognition that his "anger issues" stem from not feeling like he had a voice illustrates his emotional awareness of the factors that drove him to seek to be seen. The complexity of what shapes and constitutes his worldview unfolds. In imagining futures for AI agents, we see the desire for tools that are a positive force embedded into how Jose conceptualizes possible designs. Having to face these lived realities formulates a perspective that prioritizes the creation of AI that empowers individuals and fosters a sense of agency rather than replicating the disempowering environments of the past. In a separate interview, I learned about Andrew's upbringing and the time before he arrived at the art academy.

What brought me to Homeboys was incarceration. So, when I was in carcera-

tion, I found out about the program because I was incarcerated at the juvenile hall. I was inside for two years. I'm trying to make a change for my family and those who want to see me do good. In jail, you come to a realization. A lot of people do but there's some that don't. There are some in jail whose whole life is just gang-banging and in jail. But to be honest, that's not really living. When I was in jail, I noticed that my sisters started to be rebellious to my mother, she is a single parent. I'm a factor, you get me? I'm a factor in my family. So me not being there it fucks everything up for everybody, you know?

I don't have my pops. I grew up in an abusive family. So, since I was a baby, my dad would beat my mother every day. So, I grew up with the mindset that's normal. I would see my mama go through all these things. When I was in jail, this past time I understood everything. It opened my eyes. What I was living was a fantasy. Like the gang is always gonna be there. But when we're young and all that, we think that's our only option. It's just a big wall. It's like a brick wall. Once you get through the brick wall, it's like a big ass world out there! That's what the homies don't understand, bro. Like, it's just. I don't know, they get stuck.

I feel like they (society) tries to put a label on us because we're gang members. But a lot of us, we're brilliant. We actually, you know, we know a little bit of everything.

Students at the Art Academy and other communities that have endured chronic marginalization have not just legitimate concerns, but sophisticated critiques of how current implementations of AI are not designed by or for them. They perceive AI as extracting value from them and their communities, prioritizing engagement over health, isolating rather than connect them to their primary social groups, and naively handling sensitive private data, so as to put them at unnecessary risk. These youth regard most established institutions

- from banks to the government, to schools to technology companies somewhat similarly, so big technology companies are not unique in this regard. The central argument of this dissertation is that engaging students at the Art Academy is possible, but requires taking seriously the effects of chronic marginalization, including legitimate suspicions toward institutions, including big technology, the consequences of repeated traumas, and honoring the creative and entrepreneurial interests of youth. These youth want AI to 1) solve immediate problems (such as fixing a car or crafting a letter to a landlord), 2) enable creative connection to family and friends (create a family portrait that removes a loved one's prison jumpsuit, or includes a deceased relative), or 3) support their creative entrepreneurial tasks (such as creating logos for a clothing brand).

The Art Gang brings expertise rooted in lived experiences of incarceration, ostracization, effects of gang membership, and often neglect-knowledge that is deeply informed by adversity. I also want to acknowledge that beyond these adverse circumstances, the Art Gang's deep expertise is rooted in culturally situated practices such as art, music, family-oriented ways of being, and communal ways of sharing resources. These values emerge in the Art Gang's inherent ecological framing of design ideas. For Andrew and many other Art Gang students, the need for AI to provide emotional or psychological support outweighed superficial or process-oriented designs. Navigating incarceration and home conditions, especially at young ages, impacted Andrew's notion of what constitutes true freedom and personal agency, leading him to envision AI agents as potential facilitators of emotional well-being and broader perspectives beyond the immediate "brick wall" of their lived realities.

However, this expertise is routinely overlooked or dismissed in favor of more traditional, institutionally recognized forms of knowledge. Additionally, many big tech companies reward individualistic thinking patterns, which counter the cultures of racialized groups (221).

As researchers, we risk becoming spatially constrained, treating institutional boundaries as the limits of our "participants'" existence. At times, caught up in the minutia of tending to

advancing my research agenda, navigating the pulls of career goals, or performing research, the Art Academy’s walls became metaphorical blinders, causing me to forget that students’ life worlds extend far beyond these confines. Their knowledge, experiences, and expertise don’t begin when they enter the building or end when they leave. These learnings shifted my perception about “context” from a thing that I am in (place, time, culture) to something that I am actively constructing (8).

4.5 Beyond the Artifact

4.5.1 Shifts in Methodological Perspectives

The first iteration of Homeboy Technology focused on facilitating students-as-designers and studying the artifacts that emerged. These studies were consistent with my own concept Homeboy Technology (as an *object*) to be increasing access to creative technology professions. Through many informal interactions and moments where I got to know the Art Gang better, I came to see Homeboy Technologies as a space to investigate the social and cultural practices that shape and form how we use technologies.

In reflecting on this original perspective, I encountered a helpful analytic from Bødker et al. (2017), who refer to this narrow emphasis on artifacts and surface-level interactions as “front stage design”: moments of cooperative prototyping where stakeholders gather to focus on the object of design (118). However, an emphasis on artifacts often overlooks the *backstage* politics of design and innovation, especially in communities shaped by histories of exclusion and surveillance. By focusing solely on the artifact, such approaches risk obscuring the deeper institutional and infrastructural dynamics that shape how design is practiced and for whom. These tensions are not abstract. For many students at the Academy—especially those who have been judicially impacted—there exists a shared experience of social exclusion

shaped by assumptions about gang affiliation and identity. As Father Greg Boyle reminds us, “No hopeful kid has ever joined a gang. Never in the history of gangs, and never in the history of kids. Not once, not ever. Hopeful kids don’t join gangs. Gang involvement is about a lethal absence of hope”(222).

These frictions are inscribed in everyday life. Experiences of incarceration and systemic bias influence how students engage with educational, political, and technological institutions. Attending to what occurs at these boundaries, navigating contradictions, mistrust, and adaptation, offers HCI valuable insight into what should be designed, why it matters, and how conventional models of expertise can be reimaged.

Guided by these realizations, my second engagement at the Academy marked a shift in research design and partnership ethos toward a deeper and more integrated collaboration. My role had expanded since the prior summer and Art Academy’s model for programming, approximately 80% dependent on external partnerships with teaching artists and nonprofit organizations, provided the structural flexibility to support this development. The Academy’s founder and director, Fabian Debora, had identified a critical need for Art Academy programming that focused on emerging technologies and creative digital skills. I saw an opportunity for Homeboy Technology to evolve toward considering AI from a community-based perspective investigating fairness, accountability, transparency, and ethics (FATE) (100; 99; 223); participatory AI (88; 224; 225; 106); and socially collocated technologies (176). Attending to the students’ everyday experiences, the inner workings of the Academy as an organization, and the broader historical, economic, political, and social context in which the site is situated, I might contribute deeper understandings of the role of AI in our futures, going beyond design principles, what Dourish critiques as “design relations” (9).

4.5.2 Infrastructuring Participation at the Margins

Backstage design emerged not as a peripheral concern but as the crux of participatory viability during my time at the Art Academy. I gained a rich and deep understanding of the institutional forces impacting students' lives and their participation through informal interactions with the Art Gang and staff,

To design with, rather than for, required me to attend to the technical, affective, and institutional labor that formed the basis for the workshops—much of which unfolded before, between, and after formal sessions. These intermediary spaces are where various forms of social production play out, including mechanisms of coordination, responses to real-time crises, and push and pulls of political negotiations between my goals as a researcher, the goals of the Art Academy as an organization, and the lifeworlds of the Art Gang. My research at the Academy revolved around infrastructuralizing participation through the following entangled mechanisms:

1. Provisioning access to emerging technologies (e.g., Meta Quest Devices) and basic technology infrastructure such as computers,
2. Developing a culturally responsive and trauma-informed educational curriculum by applying Universal Design for Learning (UDL) principles.
3. Scaffolding AI and design literacy by emphasizing entrepreneurship, creativity, and agency.
4. Conducting speculative design activities that interrogated the role of AI and MR in the students' everyday social world, orbits, values, culture, and lived experiences.

These efforts were not merely technical or pedagogical but also deeply institutional. These interrelated actions aimed to move beyond temporary, immediate engagement, striving instead

for more sustained relationships and infrastructuralized participation (31). This framework emphasizes sustainability, iterative alignment, and community control over design processes, establishing intangible foundations to support capacity and agency for a community rarely involved in technology innovation. A process that disproportionately negatively affects and fundamentally dictates opportunity for historically marginalized groups. The tangible outputs of these workshops, which are often highly regarded as evidence of successful engagement in HCI, storyboards, audio sketches, speculative prompts, did not capture the institutional, pedagogical, and relational groundwork required to construct these institutional foundations. Backstage design, in this context, became the actual site of infrastructural imagination.

Much of the HCI literature has greatly ignored the circumstances, lived experiences, and consequences of young adults who have experienced incarceration, are gang-involved, and have been left on the margins of society. For example, concerning AI technologies, Crawford points out the need to fundamentally investigate and understand “how differences in communities’ access to information, wealth, and basic services shape the data that AI systems train on” (3).

The multifaceted ways of being a young person affected by experiences navigating the judicial system and the nuanced codes accompanied by gang affiliation expose the internal wiring of the infrastructures that have created the conditions that produce these types of realities. The following are forms of backstage design that I found most prevalent while at the academy.

Institutional Care and Technological Scaffolding Many backstage activities involved what Star and Ruhleder (1996) call infrastructure-in-the-making (129). The Academy lacked robust IT infrastructure: inconsistent Wi-Fi, outdated hardware, and limited technical staff. Thus, I doubled as an impromptu IT technician, configuring subnet mesh networks, provisioning Oculus devices (each requiring distinct email accounts, passwords, and verification numbers), and walking staff through software updates or printer malfunctions. While seem-

ingly ordinary, these activities were critical for ensuring the basic functioning of the design workshops.

These backstage activities also extended to institutional capacity-building. I worked closely with Academy staff to introduce generative AI tools like ChatGPT, Google Gemini, and Meta’s creative platforms, not just as end-user tools but as opportunities for institutional learning. We held informal tech literacy sessions, walked through online tutorials, and developed workflows that could be sustained in my absence. Rather than overburdening staff with expectations that they had little training, I aimed to externalize expertise while preserving their agency to define how and why these tools might matter for their pedagogical missions.

Social Trust and Situated Legitimacy Backstage arenas also demanded social labor, the slow work of building trust, humility, and relational accountability with students. I regularly participated in non-research Academy programming: painting sessions, music events, and informal conversations in the courtyard. These moments were not “data collection” in any formal sense. Instead, they modeled mutual vulnerability and dismantled the hierarchical boundaries often embedded in academic fieldwork. I was transparent about my limited time and capacity, careful not to promise resources I could not deliver, and committed to treating students as capable and intellectually vibrant collaborators.

This ethic of care extended into how I approached workshop design. I refused to lower expectations because of students’ gang affiliation or justice-impacted identities. Instead, I scaffolded complex topics, like large language models, spatial computing, or data privacy, through hands-on, culturally relevant media, backwards curriculum design, and trauma-informed design. The aim was not to “simplify” but to contextualize complexity in ways that aligned with students’ lived experiences and aspirations.

Pedagogical Knotworking and Stakeholder Alignment Workshops functioned as “knots” in the sense described by Engeström (2000): temporally assembled spaces of labor, improvisation, and learning across diverse actors (20). However, the knotworking that made these sessions viable required deep backstage orchestration: aligning schedules with case managers, understanding student behavioral plans, attending staff meetings, and negotiating learning objectives that balanced institutional needs with student interests and research goals.

A liaison within the Academy played a crucial role here. Their institutional knowledge, rapport with students, and presence on-site allowed me to navigate informal customs and rapidly adapt to emerging challenges. However, as Bødker and collaborators warn, such knotworking can place an undue burden on individuals who already carry disproportionate institutional responsibilities (118; 149). Recognizing this, I continually aimed to share capacity, not extract it, building tools, templates and supports that redistributed backstage labor more equitably.

4.5.3 Practical Steps for Engaging with Communities Beyond Design Activities

Too often, participatory design is reduced to its artifacts, maps, interfaces, systems, rather than the conditions that make it possible. However, in justice-oriented contexts, participation is rarely given; it is constructed, scaffolded, and negotiated on the margins. At the Homeboy Art Academy, design was no sprint from idea to output. It was a slow, situated rehearsal of trust, access, and institutional adaptation.

This work makes three contributions:

1. It repositions the “backstage” not as auxiliary but as central to PD with structurally

marginalized communities.

2. It emphasizes infrastructural reciprocity. ensuring that communities are not left with broken systems or epistemic burdens once researchers depart.
3. It reveals how affective labor, trust-building, and technical caretaking are mutually constitutive aspects of democratic technology design.

Building from this ethnographic account, I offer the following heuristics as pragmatic guidelines for others undertaking community-based participatory design:

1. **Design for Continuity, Not Ephemerality:** Ensure that each design engagement leaves behind infrastructure that can be sustained without you. Build workflows, documentation, and training to support community uptake and ownership.
2. **Build Trust Through Vulnerability and Presence:** Participate in everyday activities beyond research. Show up without an agenda. Be clear about your boundaries and honest about your goals.
3. **Use Liaisons, Not Gatekeepers:** Identify individuals who can help navigate institutional norms but ensure their contributions are valued, supported, and not overburdened.
4. **Treat the Mundane as Sacred:** The Ethernet port, the mesh network, and the account password, all matter. Infrastructure is culture. Take seriously the material conditions of participation. Backstage design at the Homeboy Art Academy was not an accidental byproduct of participatory engagement; it was its very foundation. In a context where access to technology, trust in institutions, and educational equity are not guaranteed, making participation possible becomes a profound site of design in its own right.



Figure 4.6: A 'Dia de los Muertos' (a traditional Mexican holiday) altar adorned by marigolds. These altars are used to honor the deceased. The one depicted above is constructed in the Art Academy.

By illuminating this backstage, we challenge sanitized accounts of participatory design that privilege polished outcomes over the social, technical, and emotional labor required to build equitable futures. We affirm that it is not just what we design, but how we design the conditions for participation, that shapes the possibility of justice.

4.6 Conclusion

In my workshops, I use a set of iPhones as tools to spark engagement and gather feedback. They are handed out at random. All of them are linked to a single iCloud account, a clumsy

workaround that makes the logistics easier. That means a photo or video taken on one phone appears on all of them.

For many students, this is their first time holding an iPhone. For others, it is the first time they've been trusted with anything this expensive, this breakable, this borrowed. And in return, they leave behind little fingerprints of their joy; goofy selfies, voice notes, prank videos, humorous photos of me mid-sentence, and the occasional middle finger caught on camera, a playful rebellion that confirms they are engaged with the workshops.

One afternoon, I noticed three students huddled together, not exactly paying attention. They were laughing, whispering, clearly off-task. I walked over, expecting mischief, maybe another video meant to throw me off my rhythm. Instead, I found them flipping through photos of a former student—one I remember working with the year before. I can remember the frustration of wanting them to be engaged with the activity - “do you all have any questions? It seems like you are distracted”—a method I use to try and encourage getting them back on track. In a voice filled with a sense of relief and peace, one of the students responds, “No, it’s because we are going through the pictures of Joey on the iPhone. We were reminiscing. He used to come here last year. Look, you’re doing an activity with him in this photo. He was killed earlier this year”. My frustration is immediately silenced. My perspective, permanently altered. At that moment, the iPhone became an altar. The screen glowed with memory. Like the marigolds, the images pulled the dead back into the room, if only for a little while. They reminded us not just of who we’d lost—but of what these students carry. Of the systems they navigate. The grief they’re asked to bear, far too young.

This moment, tender, unscripted, and emotionally charged underscored the core insight of this work: design activities may begin with technology, but they unfold within dense networks of grief, memory, resistance, and care. After this encounter, I soon learn that there is another youth whose memory lives through the screen. Two students gone to gun violence.

Marigolds bloom in hues too bold to ignore—fiery orange bursts with a scent that lingers long after you have walked away. In Mexican tradition, rooted in the Aztec ceremony, these flowers are more than decoration. They are guideposts for the souls of the departed, tender lanterns lighting the path back to us. During Día de los Muertos, they adorn altars built with devotion, celebration, and grief braided together. At the Homeboy Art Academy, a three-tiered altar rises nearly four feet high, each level crowded with glass candles and fading photographs of those no longer with us. Some faces belong to former students—young lives, barely past 21, gone too soon. Their memory remains.

The altar in the corner of the Art Academy, layered with candles, marigolds, and fading photos of youth gone too soon, is not separate from our design work—it is a blueprint for it. Community-based research must recognize that the most meaningful insights often arise outside formal activities—in moments of trust, vulnerability, and unscripted interaction. Participatory design is not just about who gets to build the tool, but who shapes what the tool means, when it matters, and for whom.

The students’ artifacts may reflect prototypes and prompts, but their presence, what they carry, what they risk sharing, is what is worth understanding. This chapter highlights the transformative potential of community-based participatory design in reframing technology as a shared endeavor. By centering marginalized voices, the engagement emphasized the role of design in fostering equitable and inclusive AI systems. These insights contribute to broader discussions on human-computer interaction, social justice, and the democratization of technology. Bringing the workshop series to a close revealed more than outcomes—it clarified trajectories, commitments, and lifeworlds and personal histories illuminating social realities that govern how these particular students experience the world. Social structures created by private and academic interest that end up serving as an apparatus that govern the public. Students expressed deep appreciation for the opportunity to “play around” with technologies that might otherwise be out of reach. Just as significantly, they valued

the protected space and focused time to engage in these explorations, a rare reprieve from lives often crowded with financial, familial, and emotional pressures. These moments of unstructured play and speculative design allowed students to explore beyond utility—to imagine relationships with technology that were intimate, joyful, even rebellious. They approached design not as technologists, but as cultural theorists of their own experience, drawing on deep reservoirs of lived wisdom.

But doing this work with integrity requires self-reflection. I carry the title of “graduate student researcher” or “HCI scholar”, positions of privilege that grant me access to academic spaces, funding, and legitimacy. Still, my family still lives in the neighborhood. The line between community member and researcher is not always clean. My involvement is marked by a tension between responsibility and return, scholarly goals and communal needs, career advancement and personal needs.

Many researchers engaged in community-based work fail to acknowledge a fundamental privilege: the ability to leave once the project concludes. Yet the “end” of such engagements is rarely a clean break. As Hayes notes, the boundary between research activity and daily life is often porous (226). For a researcher like myself, that boundary is especially blurred. The Art Gang and the broader Homeboy Art Academy staff are not simply participants in a study. They are my neighbors, my siblings’ friends, cousins or family members of those closest to me. In Justin’s case, he was once my brother’s best friend in middle school. After losing contact during Justin’s incarceration, they reconnected years later. The divergence between their life trajectories, Justin’s incarceration and my brother’s current path as a college student studying game design, reflects a painfully everyday reality in my neighborhood.

The ability to walk away from these structural conditions once the research day ends is a luxury many researchers possess and often take for granted. For them, “engagement” begins and ends with their presence at the research site. Within this frame, community-based research becomes synonymous with the design activities, the co-created artifacts, the structured ses-

sions, and the insights extracted. But this perspective reduces community engagement to a finite set of deliverables. It presumes that research questions can be answered through a predetermined sequence of interactions, rather than through the sustained relationships, difficult conversations, and emergent trust that unfold over time.

Engaging in CBPD with integrity means recognizing that the researcher is not outside the system of study but profoundly entangled in it, emotionally, ethically, and relationally. Doing this work well requires moving beyond institutional definitions of design as a means of producing novelty. Instead, it demands attending to design as an ongoing process of surfacing and centering the deep tacit knowledge that marginalized communities already hold, knowledge often overlooked or devalued by dominant systems. In this context, design is not about innovation for its own sake; it is about revealing, honoring, and co-shaping the lived expertise that those who are most often unseen already carry about how the world works.

Through my experience, I've understood that design activities are not the culmination of insight, they are a starting point. These structured engagements create the conditions for deeper, meaningful exchanges. The actual value emerges not from the artifacts alone, but from the ongoing presence and relational dynamics that those activities make possible. In the informal conversations, the shared moments after workshops, and the continued interactions, the Art Gang reveal their lived realities, aspirations, and nuanced understandings of technology and its place in their lives.

Many researchers overlook this critical dimension of community-based design. While planned activities may yield tangible outputs, prototypes, features, or use cases, they rarely illuminate the broader socio-technical context. Researchers must engage beyond formal sessions to understand how communities integrate and interpret technology within their economic, political, and social worlds.

We can conceptualize this process as operating across layers of abstraction. At the most

concrete level lie the technological artifacts or insights produced. Above this are the design activities that generate these outputs. At the highest level is the sustained engagement that transcends any single session, an ongoing process that situates the technology within an ecology of infrastructures, relationships, and lived experiences. This uppermost layer offers the richest insights, revealing how communities understand and shape technologies in response to their structural conditions and everyday practices.

Community-based design is not simply the act of designing with a community, it is a commitment to being with the community. It requires recognizing that knowledge is not just co-created during scheduled activities, but also emerges through presence, reciprocity, and shared life. The real “artifacts” of research are those we produce and those we come to understand through sustained, relational engagement. Through unscripted vulnerability we learn that community-based research must recognize that the most meaningful insights often arise outside formal activities, in moments of trust, vulnerability, and unscripted interaction.

Chapter 5

Generative Dreams: Scaling Collaboration Between the Art Academy and Google

5.1 Introduction

Previous chapters describe and reflect on my continuous engagements with community-based participatory design, which has evolved into a long-term initiative, HomeboyTech, with the Art Gang. As the academy initiatives progressed, I continued to explore emerging technologies as they developed in real-time and introduced technologies, which quickly became dominated by AI, to the Art Gang. The explosion in AI has been mirrored by rapidly evolving academic work on the equitable and responsible development of AI, leaving me both exhilarated to see that my intuitions have been accurate, yet also with a feeling of dread, as new advancements in the space kept getting announced (OpenAI's ChatGPT for instance announcing faster models every couple of months). The rapid adoption of AI within society



Figure 5.1: 1-Two Google researchers guide the HBAA workshop group on creating a zine using a piece of letter-size paper. 2-Presents a completed zine page, developed post-workshop, featuring a more polished version of students' project idea. 3. Students exploring GenAI tools. 4-Google researcher assisting students after the workshop with website activity.

made it clear that situated understandings of AI was necessary and my research agenda shifted to meet these academic goals.

A central tension emerged in my work: the sense that student innovations would be confined to our workshops, their brilliant ideas locked into the artifacts from each session. This concern was sharpened each time a major technology company showcased AI advancements through applications that replicated concepts the Art Gang had conceived summers prior. This prompted an urgent search for funding to scale our community-based efforts by allocating more resources into the Academy and validate these ideas into tangible collaborations with industry partners. Ultimately, this endeavor led to a successful proposal with my advisor for the Google Award for Inclusion Research (AIR) Program and an invitation to present our work at Google's Atlanta office.

This chapter illustrates my efforts to collaborate with an industry partner to conduct a week-long participatory design workshop focused on Generative AI (GenAI) tools. It provides a

design narrative of the workshop planning process, descriptions of the workshops themselves, and an analysis of the workshop outcomes. The goal of this study was to examine how bringing a group of Google AI developers (representing a range of job descriptions) from HomeboyTech would impact the workshop. Would bringing professional programmers, user experience designers, graphic designers, and ethicists to HomeboyTech increase youth perceptions of authenticity and increase engagement? What relationships might form between Googlers and the Homies? Might working closely with Googlers impact how the Homies see design, or themselves as designers?

5.2 Approach

AI, the “tool of tools,” may become foundational computing infrastructure for intelligent applications (similar to how water and power are public utilities), making it imperative that such tools are designed to help marginalized communities, rather than exacerbate inequities (1; 5). Although not a panacea, CBPD may be a step towards creating better, more equitable tools—not just in response to harms such tools can cause working-class communities of color (3; 45), but because a community-based approach to GenAI design could lead to more relevant, beneficial and widely adopted AI tools. I also hoped that highlighting how people from this community, who deal with profound uncertainty, economic hardships and various forms of adversity, might reveal new uses of AI rooted in lived experience not often carried by dominant technology practitioners. At the very least, examining HomeboyTech participants conceptualized GenAI technologies (what they thought they would be good for and what they did not want to do with them) might generate use cases applicable to everyday life.

This study employed a case study technique (227) to characterize the nature of emerging interactions. Each workshop session was recorded with three cameras operated by a film crew. Eight HBAA students were interviewed upon completion of the workshop, and 25 attended

the workshops at least once. These notes were combined into this case narrative, emphasizing events pertaining to research questions. I worked these notes and analyses of videos into the narrative presented here. Consistent with Stake (1978), findings should be regarded as petite generalizations with experience-near significant and experience-distant relevance(227). From this pragmatic orientation to knowledge, the goal is to create knowledge credible to local stakeholders and of potential value to academics, industry, or other communities of practice rather than immutable truth (228).

5.3 Getting Ready and The Curriculum

5.3.1 Preparation

This case study’s planning, organization, and implementation spanned six months, from January through July 2024. The cross-institutional team held bimonthly meetings and shared plans weekly with HBAA students to gather feedback and form alignment across the Google team, the Art Academy administration, and the Art Gang (149).

To facilitate trust with the Google team, Google researchers joined daily “check-in” circles at the Art Academy via video chat several times before the in-person August workshop. Check-ins are a ritualistic practice occurring at the start of each day. Students sit in a circular formation, facing each other. Sage is burned (an indigenous practice to ward off negative energies), and individuals rate their mood on a scale of 1-10. Those in attendance are asked a reflection question, which can sometimes be as deep as, “What is something you know now that you wish a younger version of yourself could have known?” or as simple as “What is a place you’d like to visit?” Even such seemingly mundane questions can elicit family stories, or comments like, “That’s something I’ve never thought of.” Sharing these reflections and personal sentiments provides practice in connecting with emotions, sympathizing with

others, and forming community. People can “pass” on the practice when it is their turn to speak, but otherwise, the ritual requires vulnerability as titles, social positions, and status are dropped. It was the perfect context for Google to join this community and for trust to form across groups.

5.3.2 The Curriculum: Overview of Workshop Activities

Workshop activities centered around two constructs: generating chapters for a ‘zine’ (a grassroots, small-circulated self-published work - traditionally reproduced via a copy machine (229)) and co-constructing future envisions of GenAI applications that could help them address individual or collective challenges. Crafting of a digital zine was meant to help align the workshop around a shared end goal. Each student would share 1) their experiences using GenAI, 2) challenges they encountered, and 3) opportunities they saw for its use in their chapter of the ‘zine. The communal production of the zine served to scaffold student learning about new generative AI tools and concepts. Framing design activities within the context of a zine provided an interim structure while breaking down larger ideas into smaller parts accompanied by multiple means of content representations (171).

I suggested and designed this approach for two main reasons: (1) Art Gang students can have undiagnosed learning needs as a result of being neglected in traditional educational settings (144; 161; 230; 166; 163). Many educational institutions are not designed to support students who endure traumas, such as drug-addicted parents, poverty, abuse, and incarceration. Many HBAA students joined gangs earlier in their lives, seeking refuge from these traumas (231). Within traditional classroom settings, these students may feel ostracized and rejected because of their gang affiliation, which limits their learning opportunities. Culturally relevant scaffolding helps build upon a student’s prior cultural and tacit knowledge when exploring new concepts or tools (142). These techniques assist student learning and

encourage participation and authentic connection to the learning materials or tools. Thus, it was important to design our workshop using a scaffolded, experiential approach to help students explore and critically engage with GenAI tools.

(2) Secondly, the Zine served to resolve the tension between the product interest of Google “the institution” and the nature of the team’s short time investment with the community. Anchoring activities around the shared goal of documenting this experience helped revise and keep center stage the sensitivities of the engagement. Framing each day as a chapter in the communal zine explicitly acknowledges the short timeframe that the Google researchers were there and elevates the work and identities of those involved in a meaningful and authentic manner.

We introduced Google’s AI Test Kitchen to allow people to learn about, experience, and give feedback on emerging GenAI technology and demonstrate the potential of its foundational model, Gemini. Beginning with playful exercises in AI Test Kitchen, we created hands-on activities grounded in real-world scenarios and designed to appeal to the Art Gangs’ interests. For example, students used the test Kitchen’s ImageFX to create brand materials for a hypothetical pop-up store and MusicFX to generate audio for a streetwear brand’s social media campaign. We also demonstrated Gemini’s file and image analysis features through practical scenarios, such as navigating an apartment rental agreement’s legal complexities or a Japanese menu.

To push boundaries, we attempted a web page creation exercise using Gemini. This multi-step task involved generating code from visual descriptions, testing it in an online editor, and publishing the results. The process required switching between multiple applications, which introduced a clunkiness that decreased engagement. This experience provided valuable insights into the challenges of implementing advanced technical concepts within our specific context. Specifically, processes that introduce multiple steps with multiple new software packages will introduce frustration and typically lose a few students.

	Day 1 Getting to know Gen AI	Day 2 Getting to know Gen AI	Day 3 AI & Me / AI & Us	Day 4 Making it real
30 minutes	Check-in Circle			
120 minutes	Activator: AI or Not?	Activator: Reading a Lease Agreement	Activator: how would you describe AI to someone who's never heard of it?	Activator: If you were to create a ___FX for HBAA, What would it be? And why?
	Exercise: Text-to-image with <u>ImageFX</u>	Exercise: Text Generation with Gemini		
	Break w/ Music DJ			
	Exercise: Text-to-music with MusicFX	Exercise: Coding with Gemini, p5.js and Codepen.io	___FX Idea on paper: If you were to create an AI for you, family, or community, what would be it?	___FX Idea, improved with AI Tools : If you were to create an AI for you, family, or community, what would be it?
120 minutes	Day 5 Share Out	___FX Idea Presentation + Group Lunch		

Figure 5.2: The design workshop structure was organized in a step wise fashion to promote the Art Gang’s incremental exposure to the GenAI tools and design activities.

Issues with poor broadband speeds and inconsistent wireless connectivity only exacerbate these issues. These deficiencies in tools and workflow may have been obfuscated in more traditional UXR engagements where there are fewer distractions, better technical infrastructure, or deeper patience. Observing these interactions, the team concluded that GenAI tools will need integrated applications that involve fewer steps if they are to be adopted by the general public.

As the week progressed, we recognized the value of grounding students’ reflections in concrete experiences. Rather than soliciting abstract ideas, we guided students through increasingly complex exercises, from applying GenAI in their existing work at the academy to envisioning new AI tools for personal or community challenges. For example, Gizelle created a vision for a GenAI tool, *Vision Planner Fx*, to help people brainstorm ideas to "transform their dreams into reality". More specifically Gizelle envisioned the tool to help people put their “idea on paper or well structured plan. This tool will provide support and intellect to turn your vision into a reality with detailed plans, expert insight, and visual inspiration”. This stair-step approach allowed students to gradually build their understanding of AI’s potential applications in their lives rather than focusing on “blue sky” thinking, which potentially can

ostracize students (232). Workshop activities were often adjusted to better suit student needs and to create a more exploratory learning environment. Our adaptive, hands-on approach ultimately empowered students to envision how GenAI could serve their needs and consider its broader, theoretical implications.

5.4 Outcomes and Lessons Learned

The following section presents my case narrative and emergent themes. Findings are presented as petite generalizations, generalizations that occur within a case, and may be extended to analogous situations.

5.4.1 The Social Ground of Sociotechnical Tools

Google researchers desired to explore what Art Academy students wanted to build with Gemini, free of constraints. I posited that exploring abstract, speculative applications of generative AI tools required structured scaffolding. A tension arose between Google’s theoretical objectives (e.g., “blue sky” thinking about how students could make practical use of GenAI tools) and my experience with practical community engagement (e.g., years of research with this community and growing knowledge of its needs) and their situational-awareness about the need to ground abstract exploration in concrete content and scaffold participant engagement levels.

Eventually, we settled on two themes: “AI and Me,” in which students explore GenAI tools for solving individual challenges, and “AI and Us,” in which students imagine how AI could address challenges that exist in the student’s communities. I had learned from previous projects to use scenario-based activity as scaffolding for deeper engagement, interest, and self-agency within the Art Academy students. Thus, I suggested keeping exercises concrete,

building lessons toward greater abstraction, and working 1-on-1 with students to gain insights into their specific lived experiences.

Some trust emerged between the Google Team and researchers, facilitated by my own understanding of their situations. For example, one student revealed a recent traumatic experience with a carjacking. When that student started using the GenAI music tool to create soothing music, I encouraged Google researchers to push for deeper exploration of this design, speculating that the interest in calming music was rooted in the student's recent experience. The student subsequently built these initial explorations into a design sketch of a "therapeutic sanctuary" tool powered by AI-generated content. The student's design sought to help those in the community who resist accepting therapeutic interventions (out of shame, fear, cultural or other reasons). Using this tool Andrew states "you can think of a safe space, anywhere you want to be at like the ocean and it will generate it for you. It will benefit the community a lot because they grow up not knowing why they react to certain things. I grew up seeing that I always reacted to certain things and didn't know how to deal with it". His goal was to provide a private AI-assisted means of addressing anxiety and other symptoms related to trauma. From trust-based exchanges like this, the team was able to elicit deeper engagement into personal narratives that resulted in more practical GenAI design ideas.

These students uncovered problematic issues with Google's GenAI, which is consistent with critiques that LLM-powered tools generate content that lacks cultural specificity (39; 81; 112; 155; 45). Out of 715 image generation attempts during the workshop, 25 included the word "Mexican" in the prompts. The outputs were largely generic and stereotypical representations of the Mexican community (brown-skinned characters wearing sombreros or in floral-pattern dresses with braids). Stereotypes and a lack of cultural specificity are well-known, persistent issues in LLM-powered image generators (233; 234; 235), but what's worth noting here is that students responded to these results with casual frustration and amusement rather than outrage. Google partners were somewhat embarrassed, but youth laughed off the experience

and moved on. This seemingly nonchalant reaction reflects a broader trend among those whose cultural identities are often misrepresented or overlooked by AI models: a sense of resignation, or a prioritization of more immediate concerns. For a community grappling with more pressing issues like resource shortages, threats, trauma, and prejudice, the association of the word "Mexican" with a specific type of hat or other stereotypes was less a significant concern and more a feature of life.

By centering the lived experiences of regular, everyday people in the design and development of GenAI tech we can avoid some of the problems this technology presents for traditionally underrepresented and marginalized groups (105; 113; 46; 219; 34; 236; 237; 238).

Tech companies have a massive opportunity to begin addressing real-world user's self-understanding and identity diversity. With fine-tuning for cultural specificity, there is potential for LLM-interaction to help develop self-efficacy and inspire the student's own goals and aspirations. For example, when one student input the prompt, "Los Angeles gangster lettering tattoo," the tool generated intricate tattoo designs that kept the student prompting for more. When these tools reflect the user's culturally specific interests, they are more engaging and more useful. AI tools should accommodate user's lived experiences and generate desired outputs. This becomes a question of AI infrastructure: should we expect every tool to include the specificity of every culture, or should we make it easy for communities to fine-tune a model they are using? What if each community could use their own culturally-specific data set, which they maintain control over, to create outputs that are more reflective of their own cultural identity and ethos? These were all questions that emerged out of a deeply situated context, the academy, where culture and identity exploration are a part of daily pedagogy. It is important to highlight the unique forms of cultural production that occur in this space where reconfiguration of identity and culture occur for innovations sake but as a response to societal sidelining and marginalization. For students at the Art Academy, cultural production happens as a political act and is a form of resistance against the political, social, and

economic conditions that creates its necessity in the first place.

5.4.2 The Tech in Sociotechnical Tools

It became evident to the Google researchers that existing AI technical infrastructure was inadequate and designed for a different type of user—those already familiar with navigating complex back-end systems or those with particular technical understandings. This disconnect was particularly apparent during a Day Two workshop session focused on using Gemini to create an interactive webpage. To build the webpage, students had to move across multiple tools: Gemini for code generation and review, an online code editor to test the code, and an online code hosting platform to create an instant webpage. Eduardo, spent the entirety of the session guided one on one with a Google researcher to resolve and debug issues from moving from platform to platform to achieve the designed webpage (see the below figure).

Students became frustrated with the AI tools for two reasons: 1) the friction of usability issues, and 2) their assumptions that AI would complete a task successfully on its first attempt. When they encountered unexpected errors, inconsistent results, or unclear guidance—as they did with imageFX—it undermined their confidence and sense of agency, causing their enthusiasm to wane. This points to the need for better design around 1) easier to use infrastructure and 2) design affordances and signifiers that help users understand that the best AI outputs result from multiple turns and human-led adjustments. Improving both aspects of AI design will likely increase confidence and engagement and help users more easily achieve their AI-assisted aspirations.



Figure 5.3: Eduardo sits with Marco (one of the Google researchers) to debug AI generated code during the Day 2 exercise "Coding with Gemini"



Figure 5.4: Cherish envisions a GenAI tool to lower the financial barrier to filmmaking with her idea to use AI to make realistic synthetic visual effects with her tool "FilmFX"

5.4.3 Lived Experiences as Foundations for GenAI Design

Cherish, with a longstanding interest in filmmaking, focused on GenAI-powered special effects to reduce the need for expensive equipment or specialized production teams. Cherish designed FilmFX . She describes it as “a product for film directors who want to tell stories of theirs or their communities by describing scenes the AI can generate”. Her icon- and symbol-based UI design, which echoes requests made by industry stakeholders, could potentially democratize access to high-quality filmmaking tools. Another student, Gizelle, envisioned an AI tool to empower her community by breaking down personal aspirations into achievable steps. She pictured a project-management tool that would generate personalized action plans, adapting to individual circumstances and addressing systemic challenges.

Angelo is experienced in creating and selling streetwear. Developing a brand is a common

aspiration among HBAA participants; designing streetwear leverages their cultural capital earned on the streets of Los Angeles, requires little financial capital, and is something that many have personally seen neighborhood peers succeed with. Angelo has created multiple brands, printed them on clothing and accessories, and sold them to friends, in the neighborhood, and at events, and was singularly focused during this workshop on pushing his brands forward.

In this workshop, Angelo designed a GenAI tool to help translate his design ideas into manufacturable specifications. His personal experience with unaffordable design assistance that failed to match his creative vision inspired his project. Importantly, Angelo recognized the tensions his project raised regarding "authenticity of craft" and potential job displacement for designers. He questioned whether there's an authenticity of craftsmanship in exercising one's imagination, noting his ability to envision designs even if he couldn't draw them himself. For Cherish and Angelo, the potential to unlock creative pursuits by eliminating the need for specific skills far outweighs the concern of job displacement. Both Cherish and Angelo were motivated to build businesses in creative industries without significant capital investment, suggesting how AI might lower barriers to entry in these fields.

In a spontaneous application of the workshop's teachings, Andrew used Gemini on his phone to write a business and career development plan. He proposed a new "Marketing and Community Relations Navigator" role for himself at the Art Academy, demonstrating how he applied the AI tools to pursue a self-imagined opportunity. This instance underscores the immediate, practical impact of AI literacy on personal and professional development.

Of the most critical of the presence of Google at the Art Academy was Daniel who felt that Google was "just going to take my ideas". Rightfully, he has a point. Yet Daniel was concerned with making AI work for his community "with resources, a companion that helps you know that everything is ok". More specifically he envisioned his genAI tool to help people "schedule things for the day, legal assistance, and psychological support". He advocated for

a system that would help connect his community to local resources by unifying them into a singular platform where people could prompt for the resource that they needed and the AI system would send a request to educators, community leaders, or connect to social resources.

These design explorations collectively highlight how AI could expand access to tools and opportunities traditionally reserved for those with significant resources or specialized training. In other Homeboy Art Academy sessions, artists (particularly painters and musicians) raised questions about the ethics of GenAI, which included GenAI's mining artistic traditions for content without paying artists from those traditions, GenAI representing a flow of capital from artists to programmers, and GenAI devaluing the artistic craftsmanship. These critiques floated around HomeboyTech freely, and were indeed voiced by participants, to Googlers across sessions.

Observing how Homeboy participants themselves responded to GenAI when given access to these tools further complicates questions about the nature of creativity, authenticity, and the potential impact of AI on various industries. Homeboy Tech students believed GenAI would give them access to design, business, or technical expertise that they could not otherwise access. They approached questions around creativity with GenAI as "open questions" that might be answered through further exploration, and saw early access to these tools as one way that they might gain business advantages. Many participants raised concerns about the long-term effects of these technologies – commonly as a offhand comments while making something (e.g. "Is this going to put artists out of work?"). As marginalized people themselves, Homies generally felt like these were someone else's problems, and that they would be wise to be on the cutting-edge of these technologies.

5.5 Successful Strategies for Community Engagement

This case study resulted in several strategies for community engagement. Some insights come from what went well, while others were informed by unexpected challenges that required us to adjust our approach. Consistent with the design-based approach, I report those cases in which case our design hypotheses did not bear out (i.e. interactions with technology professionals would be inherently motivating). While not conclusive, the strategies do reflect my extensive three-year engagement with the Art Academy. What follows is my focus on the most salient insights from this collaboration.

5.5.1 Insiders Matter

This engagement provided the Google team exclusive outsider access to the community and was conditioned on my long-standing relationship with the Homeboy Art Academy. Because of my earned trust of both HBAA leadership and the community, I was able to transfer some of that trust immediately onto the Google research partners. One example from an early planning call demonstrates this transfer of trust. The call was between Google, UCI, Fabian Debora (the Homeboy Art Academy Director), and an HBAA Board Member. During that call, we discussed the ethos of the project, some high-level strategies, and even some ideas for exploring our research intuitions in specific exercises. At several points during the conversation, Fabian and a Board Member gave feedback on the workshop but also deferred to me on how to proceed with comments like, “We trust that Richard knows what he is doing.” or “If Richard thinks this is the best way to proceed, we agree.”

This relationship with Homeboy has been strengthened by years of my HCI research there, but it pre-exists my academic research. I was born and raised in Boyle Heights and have long relationships with the Homeboy community. When HBAA leadership came to consider

the value of pursuing the project and the specifics on how to proceed, they trusted in its value because I was willing to endorse the project. Trust was built with leadership via this relationship, and trust was established with the community because of how I helped introduce and integrate the Google researchers into the community. During the months of prep, I began socializing the idea to individual community members working with Google researchers. I encouraged the community to see that they would make a novel and important contribution to AI development at Google and that Google researchers were interested in hearing the expert opinions of the community. In addition, I also began hosting video calls where Google researchers were introduced to the community during a daily community circle session (detailed above). With the Google team present, we also shared plans for the workshop and how it would be structured and asked for and received feedback directly from the community on how it should proceed.

Additional practices, like facilitating large portions of the workshop design activities and help with transitions to other facilitators, fostered trust. I encouraged the Google team to sit alongside community members and integrate into the exercise during the workshop. Instead of having the facilitators stand at the front of the classroom or sit separate from the students, we integrated the researchers and students sitting side-by-side and talking 1-on-1 throughout exercises. In addition, it was encouraged that the Google researchers made it a point to stay after the workshop to engage with the HBAA community after completing planned activities. These simple strategies provided moments of connection and understanding built upon mutual respect implemented to reinforce the notion of the Art Gang being experts and the value of their expertise.

These strategies were essential for creating authentic bonds for genuine feedback and exploration of ideas. Community engagement work must begin with community insider(s) vouching for the project. The best way to ensure that it is done genuinely is with active involvement from those community insiders throughout the process of designing and executing

the engagement. Community engagement is not genuine without sustained and substantive community involvement led by community members from the start.

5.5.2 Respect Resourcefulness

Another insight involved the resourcefulness and pragmatism of the community. As early as the first day, students quickly generated outputs with the Image and Music AI generators they wanted to save and share. A spirit of engagement stemmed from a desire to seize the opportunity before them. An entrepreneurial sensibility was prevalent, with some students immediately finding outputs that inspired ideas for business applications (developing a clothing line, building a website) or artistic expression (personalizing tattoo art, creating background music for TikTok clips or video games, etc.).

As students warmed up to the researchers, some shared stories about recent trauma or violence they had encountered or struggles with money and meeting necessities. This was done matter-of-factly, not one that was seeking sympathy or asking for help. For example, during one of the initial group check-in circles Cherish did not shy away from taking the opportunity in asking the Google researchers if they were hiring. Clearly, many students have developed a deep resourcefulness and grit as a matter of survival. Moreover, although the Art Gang were willing to give their unvarnished opinions about some of the failings of the tech or where it needed to be improved, there was generally a pragmatic attitude about trying to use it in ways that would benefit them.

The ability to navigate life's most extraordinary hardship has built resilience, self-reliance, and grit that should not be underestimated (153). Coming into community engagements with underserved communities, it is important to not only respect but center the resourcefulness of individuals as expertise (154). Acknowledging these hardships is a step forward, but a more responsible and nuanced approach is to understand that the ingenuity of these individuals is

not solely a function of adversity but, instead, an inherent characteristic of individuals who are making meaning and building expertise based on their lived experience, similar to ways that academics or those in the tech industry do (84).

5.5.3 Bidirectional Relationships

Some Googlers were trepidatious about entering the HBAA community as outsiders. As described in 5.1, I encouraged the Google team to be their authentic selves and demonstrate curiosity for understanding who the Art Gang and their interest. The community check-in circle functioned as an important trust-building mechanism. Within their first hour of arriving at HBAA, Google partners sat side-by-side with community participants, sharing their own emotional check-in. Responding to prompts honestly was a way of acknowledging shared humanity and signaling a desire for a bidirectional relationship.

Without prompting, several of the Google researchers sat at the workshop tables next to student participants instead of sitting at the front of the classroom or separate from the participants elsewhere in the room. This simple act of sitting together and engaging in the exercises directly with the students built trust and began to foster open, informal conversation. Naturally, the Google researchers and students began sharing stories about their own lives. When the Art Gang had ideas for using AI, the fact that researchers were there to chat about the idea informally and encourage further exploration meant that deeper bonds and trust could develop.

Listening with genuine curiosity and a “beginner’s mind” to the ideas being shared was a way of validating their importance to the students. Opportunities to be validated and have their ideas taken seriously may not happen often for most of the Art Gang because of the way they are perceived. It is in these seemingly simple exchanges where the conditions of the engagement and not the design activity create space for students to be seen as people

and not through the lens of criminality or deviancy. These types of reconfigurations are important to both Google researchers and Art Gang. For the Google researchers their perception on what constitutes a successful CBPD engagement shifts from centering design activities and artifacts to using those elements as artifacts for understanding people and their life worlds. For the Art Gang, having space to feel empowered to change how things can be built internalizes autonomy where it previously may have been denied in more formal educational settings. Finally, as a strategy for community engagement, avoiding the thought that some analogous experience gives you privileged access to the new community you are engaging with helps to foster curiosity and a true bi-directionality between researcher and participant. Establishing a real context for shared exploration means the findings will be richer.

5.6 Conclusion

It is well-known that the development of AI systems is often marred by implicit biases rooted in broader societal inequalities. This phenomenon stems from a complex interplay of systemic issues. For instance, educational disparities, characterized by unequal opportunities and hostile climates in college-level STEM departments, significantly impede marginalized groups from attaining STEM degrees (239; 240). Biased hiring practices at large tech companies effectively restrict access to elite internships and job prospects for underrepresented individuals (241). Compounding these issues is an increasing trend of tech companies capitalizing on marginalized communities as cultural producers, often without meaningful inclusion and agency in the development process itself (160; 4). These factors collectively shape how historically marginalized communities perceive tech companies - not as partners but opportunists. Most of the time, these tools are built in vacuums for expert users, yet marketed as accessible to all. In reality, they require domain expertise, technical knowledge, and specific

terminology to be used effectively. Therefore, authentic connections between big tech and community-based organizations must be treated delicately and provide a benefit that the community partner determines for themselves (149). These relationships must be formed over time and within the community. Suppose a short-term engagement is the only viable and feasible option for the corporate partner. In that case, it is imperative that intent is made explicit and that relationships are formed through a community conduit (an organization member, trusted partner).

This research engagement aimed to shift this paradigm. With the Google team, we strived to 1) illustrate pathways for symbiotic relationships that enhance the self-efficacy of these communities by centering their lived experiences as expertise in the design process, and 2) seize the opportunity that GenAI, as a general-purpose tool, presents to move beyond standard UX design protocols. As that community conduit, a core objective was to create a bridge between two communities of practices and to manage those negotiations in a manner that centered the Art Academy to push the possibility of representation in the design and implementation of AI. In other words, my focus for this engagement was to test and understand CBPD as a method and model for creating space that honored self-determination and the plurality of the Art Gang's experiences while also forming strategic partnerships to enact that vision. The object of concern for this engagement was to empower the community to shape the nature and purpose of these technologies by incrementally increasing their internal capacity to do so. A key component to that end goal was establishing a formal partnership with a big tech firm to establish the Art Academy's legitimacy as a site of practice in both the academic and industry arenas. By legitimacy, I mean using partnerships to establish the Art Academy's authority as an institution and use that authority to formulate more partnerships. For me, that authoritative status meant the possibility of more resources for individuals and myself. With more resources (money, equipment, access to exclusive networks), the possibility of an opportunity to expand the programs offered meant helping more people.

Multiple competing objectives between the Homeboy Art Academy, my research agenda, the research agenda of the Google team, and individual goals of students became apparent as the engagement unfolded. Adapting the agenda and design activities to manage a core tension between Google’s team affinity towards product (front stage design) and the individual goals of Art Gang and the communal goals of the Academy administration. For the Google researchers, the objective was to understand CBPD as a methodology for extracting insights on generative tools and report back on the effectiveness of the method. This goal was shaped by institutional pressures to demonstrate value, often through producing technical or design artifacts. Specifically, the Google team’s objective was to gain specific insights on GenAI tools for creativity, navigating institutional pulls to find and justify value in our collaboration. In practice, this meant trying to control what activities were done and emphasizing deliverables over the social interactions where the most valuable insights emerged—informal conversations, learning about participants’ backgrounds, and understanding their worldviews.

It was challenging to shoulder most of the backstage activities (negotiations) between the Art Academy and the Google team. Initially, I was worried that the team would try to relate to the students too quickly, which could come across as insincere and untrustworthy. Beyond the interpersonal interactions, I noticed points of contention between how the Google team imagined design activities should play out versus my experience with what types of activities and curating the environment to ensure the success of those design activities. For the Google team, an emphasis on extracting insights through design artifacts and media contradicted what I had learned so far - the importance of relationships and interactions with students and staff outside of the design activity. The emphasis on documenting the engagement through a video production crew exemplified this aspect. The short timeframe and personal investment of this engagement made it necessary for the Google team, from an institutional perspective, to extract the maximum value from this experience. Therefore, naturally, the experience may have been perceived as extricating to some Art Gang students. Comments like “How do I know Google is not going to take my idea?” It was important for

the researchers to balance between being collaborative and being exploitative. Initial activity designs were centered on extracting insights on.

I repeatedly emphasized the importance of authenticity and maintaining a level of vulnerability with the staff and students. Examples of inauthentic interaction could include inflating promises made to individuals, not being clear about your intent at the academy, and trying to appeal to student interest or experiences that you cannot relate to. Showing up as your authentic self is a precursor to trust, and trust helps organize people, time, and resources to reconfigure collaborative efforts that center the community and their voices and into context where these perspectives have been excluded or ignored. I navigated multiple negotiations between the students and the Google staff, throughout the engagement lifecycle. I found that these negotiations became a series of teachable moments for the Google staff where negotiating the social dynamics of the site requires them to dismantle their identities as researchers, designers, and experts, to become the ones being taught - receivers of deeply situated knowledge. To experience and receive the Art Academy the same way students learn to heal within the space. Over time, small learning moments shifted their perspective. They began to see that the activities they planned did not fail because they were poorly designed or the Art Gang lacked capability, but because they did not account for the social context, student interests, interpersonal relationships, educational needs, and technology constraints. Initially, researchers treated activity as the end goal. By the last day, they realized the real value came from the interactions those activities facilitated. Conversations and personal exchanges gave them deeper insights into students' life worlds and perspectives.

They also saw that when participants tried to express their identities—whether through image prompts or other creative uses—the tool repeatedly failed, especially when cultural specificity was involved. The frustration was not about user skill, but about the misalignment between the tool's intended use and its actual use in situ. When deployed in authentic contexts, participants often struggled to understand how to use them to their full benefit

because they were not designed for everyday users. The Art Gang did not want tools just for content creation—they wanted them to meet immediate, socially specific needs. Most tools could not do this because they were not designed to support self-expression in contextually meaningful ways. The success of these tools came not from the design of the app—which still left significant gaps for non-experts—but from the activities that facilitated interaction. In our study, participants wanted to use the tool to express their emotions. Activities designed for identity exploration helped them overcome user interface flaws and other design barriers. The tool became useful when participants could adapt or remix it for their situations. As a result, participants often had to “Frankenstein” their process, stitching together multiple tools to obtain valuable results. When the situated knowledge that communities often ignore in technology design is reconfigured to be viewed and positioned as unique forms of expertise, a sustained, long-term investment in CBPD creates a powerful win-win scenario. This approach fundamentally empowers communities to direct how technology is shaped to meet their unique cultural and social needs. Simultaneously, it provides technology firms with the deep, authentic insights necessary to build better, more successful products that are genuinely aligned with what society wants and needs.

I argue that focusing on the process of implementing CBPD, rather than just the design outcomes, is a valuable site of social-cultural production for both realizing opportunities to empower communities to determine technology designs for themselves and also understanding the circumstances, context, and consequences of technology’s use. We recommend establishing protocols for incorporating diverse insights early and iteratively throughout development life cycles, not just as a path to greater equity but as a means of creating more relevant designs. Establishing these protocols is especially important for people who have been largely excluded from the tech development ecosystem. By doing so, we can not only address the immediate issue of bias in AI systems and work towards dismantling the systemic barriers that perpetuate inequality in the tech industry; we can start building more valuable and relevant tech. More inclusive design processes are not just more equitable; they cause

building more valuable and effective AI technologies that truly serve all segments of society. Youth were engaged in using GenAI tools when it met immediate needs. Being introduced to cutting-edge tools from Google researchers was not immediately engaging to youth, but evidence suggests that through time, genuine authentic relationships emerged which inspired youth to work through frustrating aspects of the activity.

Chapter 6

Conclusion

This dissertation offers an empirical and analytical account of conducting community-based participatory design within a healing-informed community art center for justice-impacted, gang-affiliated, and at-risk young adults. It began with a central question: What happens when the Art Gang at the Homeboy Art Academy are given the opportunity to explore cutting-edge technologies? Might these interactions uncover forms of bias ingrained in design? Might it uncover more subtle ways that marginalized people are excluded from using technologies? What designs would they like to see? And what impact would those experiences have? Initially conceived as a program for emerging technology generally, the explosion of AI, pivoted the program to exploring AI in relation to youth's interests, goals, and lifeworlds.

The project, which I call Homeboy Technology, revealed ways that the hobbyist culture from which these technologies originate is at odds with the lifeworlds of these participants who want AI-enabled technologies to meet much more immediate needs. However, through time, and perhaps due to integrating trauma-informed techniques in the program's design, youth adopted more playful uses of GenAI. This study also revealed that an overly stringent

focus on outcomes (developing new designs, creating artifacts, creating skilled participants) often inhibited more genuine, generative interactions, which such outcomes could be the products of. As my engagement deepened and the community's trust in me grew, I began to understand the contexts that shaped the students' perspectives better. These perspectives help me find the intersections of where designing for AI and the students' lifeworlds could intersect, one of the three critical components that made my engagement successful. Once I could find a critical mass, where those intersections occurred and under what conditions the next component that made these engagements successful was finding methods to fuel those interests and build the right scaffolds for the students to feel empowered to design. Lastly, it was important to find off-ramps that would create ideological shifts and the mental space to realize the possibilities of archotyping their own futures, and to be excited about those possibilities. For some students this meant to continue exploring AI and other technical topics, learning more about the skills needed to design and build AI powered tools, or taking these experiences to apply them to their goals and interests outside of technology domains.

At times, tensions arose between my research objectives, the students' goals, and the various institutional constraints governing our engagement. For example, misalignment between my research agenda, and the immediate interest of the students led to a superficial exploration of emerging technology design. In addition, institutional pulls of Google researchers, such as engaging with specific products to elicit particular design insights, conflict with explicit goals of the Academy in building up the technical skills of its participants. Engaging youth in genuine conversations about emerging technologies, their life experiences, and the values, goals, and dreams proved to be more generative. I contend that the dominant aesthetic of AI design organizes people and resources in a manner that invalidates the deeply embedded and culturally situated knowledge of communities like the Homeboy Art Academy. I began this dissertation to investigate what design applications emerged when the Art Gang were given opportunities to explore emerging platforms with AI. My design engagement was guided by the following questions:

1. How can community-based, participatory design methodologies be used to engage marginalized youth in leveraging artificial intelligence for their own creative, entrepreneurial, and social pursuits? What designs do they imagine and create?
2. How do justice-impacted youth at the Homeboy Arts Academy initially perceive and critique artificial intelligence based on their lived experiences, and how do these perspectives evolve through sustained engagement with community-based participatory design (CBPD)?
3. How do they engage in activities and conversations designed to improve fluency with AI? What impact does this fluency have on the Art Gang?

Attempting to answer these questions reveals that the value of community-based design is not defined by any specific technological outcome. Rather, it underscores how technology use cannot be separated from everyday experience. The implications of this research provide a framework for analyzing what and who is centered during design engagements with marginalized communities. I posit that CBPD can be used to mobilize time, effort, and resources to carve out spaces, both mental and physical, for people to imagine and not just survive. Orienting our efforts towards finding the intersection between community member's personal and educational goals, centering tacit lives and cultural knowledge as expertise, incorporating community goals, finding routes to move forward, and the technology, directs us to that end. These elements suggest an analytical lens for recognizing various forms of expertise, how activities and engagements center the community, and considering the social and material designs of AI technologies. This shift must first start with an ideological change in how we as academics and industry practitioners conceptualize the situated knowledge of marginalized groups. Moreover, this shift directs how we center community defined goals and lived experience as mediating sources for our design activities to facilitate connections between technology design and lifeworlds. My work with the Art Gang forced me to confront a fundamental contradiction: the gap between my initial design ambitions and the config-

urations of my engagement that largely tuned out the individual interest and goals of the Art Gang and the pedagogical goals of the Art Academy. Attuning to this contradiction was crucial, as it exposed where I needed to reconfigure my approach to the engagement. Namely, finding the right tasks that reveal the intersection between the Art Gang’s immediate goals, the technology, and productive paths moving forward.

6.1 Configurations and Learnings

Ultimately, the Art Gang’s engagement with these AI technologies revealed the flawed configurations and theories of human experience and sociality embedded within the designs of these AI systems. Students often concluded that AI technologies were not made by people like them or meant for them. In chapter four we see Andrew being explicitly frustrated by the AI agent (Meet Wol Owl) for referring to him as a “featherless friend”. In addition, students had difficulty interacting with the “Meet Wol” AI agent indicating that it needed to be more patient, understanding of tone, and less interruptive. Jojo’s had an explicit criticism towards AI for its potential to subjugate populations. Eduardo explicitly calls out how he does not want the AI to get to know him or his thoughts. For many, this experience violated their expectations of the AI system. These youth are somewhat used to experiencing exclusionary features like these, as members of marginalized communities, but such design choices alienate users and create additional friction for adoption. The frictions with “Wol” or those resulting from assumed environmental conditions aren’t just simple mismatches between expectation and the tools behavior. Rather, these frictions demonstrate the technology’s failure as a social actor negatively altering the experience and meaning of the interaction. The meaning is not a result of a simple design flaw but of social practice embedded into the technologies imagined use. A lightweight experience with a digital furry owl was altered to be frustrating and exclusionary. Further, this alteration disrupted the Art Gang from “doing things”,

like learning about the redwood forest (the app’s intended experience) restricting social or cultural practice from its natural flow.

Additionally, the Art Gang experienced numerous frictions, often resulting from technology use cases that assume specific conditions (dedicated workspace, uninterrupted work time, stable internet). Even at Homeboy - which had dedicated machines, spaces, and time, any number of interruptions occurred. Using such emerging technologies requires not only patience, but attentional resources to deal with bugs, errors, task switching. These frictions are not merely the result of contextual mismatches. The tools fail to participate completely in the ongoing social practices and goals of the Art Gang’s various envisioned and lived contexts of use. Ultimately, the technology assumed designs aren’t just failing to adapt to various contexts; they actively, if clumsily, shape it in ways that run counter to the situated actions the Art Gang would typically experience in their lifeworlds.

6.2 Everyday Moments of Creativity

I approached community engagement to elicit opportunities to simply create, design, or prototype with emerging technologies as opposed to resolving a predefined problem through a technical solution. My original intentions weren’t to introduce these technologies as biased or problematic. I observed a pattern in HCI research where researchers enact engagement with marginalized populations through perceived problems to be addressed instead as opposed to inviting communities to create for the sake of creating or to “play”(242; 243; 244; 245; 246).

As the engagement evolved it became apparent that to simply design, play, and interact with emerging technologies, I had to carve out the environment that supported this type of experimental “messing around”. As a result, the engagement became a series of reconfigurations in an attempt to create a space for the Art Gang to imagine, design, and play in the same

manners that dominant forms of technology innovation happens for more privileged groups. Providing opportunities for hands-on prototyping, interactive learning, and showcasing creations allowed students to mentally “step away” from the constant pressure of meeting their immediate needs. Designing for AI enabled any number of moments of every day creativity that were deeply rewarding for the Art Gang. In other words, the most rewarding moments for the Art Gang was when they experienced the autonomy to simply create and not survive. For this group, daily survival is a precarious act shaped by gang affiliations, poverty, and parental duties. Simple errands can be dangerous due to rival gang territories. For those on probation or parole, even minor police contact risks re-incarceration, fines, or loss of privileges, severely jeopardizing their progress to get ahead.

I found that the ingredients for creating more rewarding moments included the right scaffolds, students having working knowledge of AI topics, and when they could directly link design activities or newly acquired understandings to their own creative or entrepreneurial interest. To put it in another way, when design activities were aligned with educational interest or used for resolving a creative or entrepreneurial pursuit, they sparked moments of meaningful and rewarding creativity. Additionally, students were highly engaged when the topic addressed inequalities they had personally experienced, even if the design activity itself didn’t align with their interests. Discussions about AI bias, fairness, and transparency always sparked eager dialogue. For example, in chapter four Chiry was deeply engaged when discussing topics on AI fairness, accountability, transparency, and ethics involving automated decision making for say judicial or policing outcomes. In addition, for many students the hands-on activity of creating their own AI agent using craft materials was meaningful when discussing how AI could potentially fix their immediate needs such as scheduling their time as parents, helping them resolve familial conflicts, or for emotional regulation. These creative spaces offered something rare and profound: an opportunity not just to survive, but simply to be. For young people constantly struggling against adversity, such moments are a radical departure from a daily life defined by a system that criminalizes their existence and by the

literal need to evade threats to their life. The chance to create for creation’s sake is more than a privilege; it is a healing act of world-building. When students see themselves as the directors of their own stories and the architects of their own futures, a fundamental ideological shift occurred. Their identity transforms: from survivor to innovator, from a statistic to a scholar, from a gang member to a person with unique expertise. Ultimately, these students deserve the same mental space, physical safety, and creative freedom that academic institutions and Silicon Valley valorize in their own archetypes.

6.3 Models of Care

Youth sought tools that would help them care for extended family. Relational notions of caring and trust are well documented within this community, and design-based research efforts (see Vacca, 2017) have considered tools for LatinX youth to care for families (27). Likewise, health professionals have long examined health as a social phenomenon, whereby social relationships have an impact on health, as mediated by variables including but not limited to diet, exercise, substance use, and caring relationships (247).

Observing these youth engaged in design revealed the extent to which contemporary UX models feature individualistic models of care. These youth asked for apps to help them track loved ones, to engage in group or shared goals, and basically, to not feel “so alone” in engaging in care. The time, care, and energy investments that these youth make in their loved ones was made clear by (insert woman’s name), describing This focus on extended care might be contrasted with Elon Musk (developer of GrokAI and CEO X, Tesla and others), who has 14 children with several women and famously recommended to his wife that they employ not one, but a team of nannies.

Across the project, the Art Gang consistently demonstrated a deeply ecological and community-

oriented approach to design integrating aspects of “care” in their design aspirations. This framework was immediately evident in Chapter 3, where Carlos proposed a mixed-reality application to mediate family conflict. The same ethos drove the "Dead Homies" app, a concept that used MR to facilitate collective healing by allowing users to interact with memorials of deceased loved ones.

This pattern continued in Chapter 4, where the group envisioned AI agents for emotional regulation. Their goal was not individualistic; they designed these tools to help others avoid destructive choices and better understand their own emotional states. Similarly, in Chapter 5, several women participants used generative AI to create alternative family photos for their children, either by digitally adding an incarcerated parent or by transforming the image into a comforting art style. This act was a profound attempt to construct a new reality, helping their children cope with the trauma of parental incarceration. A clear thread connects these examples - their innovations were rarely for the self alone. Instead, their ideas consistently centered on healing communal wounds, strengthening family bonds, and supporting the well-being of others.

These models of care weren't only apparent in the design ideas but within the interactions and exchanges between members of the Art Gang. There were moments of tenderness that laid bare real human moments of connection and care. It was common for me to grab a burger and fries from the burger stand across the street once a session was over. The stand had a habit of piling french fries in what became a grease soaked paper bag. I would never deny a request for some of my fries. Many, asking because they didn't have enough money to eat. Yet even so, the students always shared with others what I shared with them. Half of the halves given to them, shared with others so easily. So readily eager to split the little they had.

These moments of unmistakable humanity were common. It is to no surprise that they became central to the features, functions, and designs of what technologies the Art Gang perceived

for themselves and others. For Andrew, capitalizing on AI meant generating MR scenes for “safe spaces” detailing how he had gone through “all types of PTSD, shootings” and that the “scars all over my face” reflected the deep hardships he had been through. Veronica was inspired to create an AI companion that would “tell a person jokes when it detects that a person is sad to make them feel better”. These models of care, both present in design articulations and through the moments of what father Greg calls “radical kinship”, may be rooted in the Art Gang’s own experiences with varying forms of neglect in their personal lives. Emulating the care that they lack in their own lives for others may be why these concepts appear through their aspirations for AI technologies. As described before, and as Father Greg’s experience has highlighted, those who join gangs join them as a result of “a lethal absence of hope” stemming from “pain and trauma and damage so intense and unspeakable” (248). My point is that students may have modeled characteristics of care in their design ideas as a reflection of the types of care they would want in their own lives. These models of care revolve around core themes such as resolving familial conflict, emotional regulation, or supporting well-being. In short, for the Art Gang, care was not a peripheral design dimension but rather an integral one shaping their notions for how and what design characteristics of AI technologies should carry.

6.4 Entrepreneurial Spirit

Entrepreneurship served as a sociotechnical bridge to AI and other emerging technology topics. It served as the connective tissue between students’ goals and new technologies like AI and mixed reality. Three conditions that surfaced I identified for successful workshops included: (a) intersecting technology with student goals, (b) situating activities in ways that fuel motivation, and (c) providing pathways for independent pursuit, were all realized when entrepreneurship framed the work. For example, by learning Photoshop Eduardo was

able to make sellable bookmarks or T-shirt logos, while experimenting with AI and MR was meaningful when tied to future entrepreneurial opportunities for students interested in 3D modeling. Entrepreneurship, then, was not only a social-cultural ethos but also an analytical frame for designing equitable technology engagements.

The entrepreneurial ethos at the Academy was not just an aspiration but a tool for survival and autonomy. Many Art Gang students carry the lived experience of having to negotiate an environment where formal employment is limited due to their gang affiliations and of being impacted by the judicial system. Consequently, entrepreneurship serves as a pathway towards self-sustainability, autonomy, and dignity. In addition, this ethos is deeply cultural as well, shaped by immigrant traditions of self-sustainment. Ventures are pursued to put food on the table, support family, and gain validation through independence. This pursuit of self-determination distinguishes their entrepreneurial ethos from mainstream Silicon Valley models where business interests are pursued to fulfill what Benjamin (2019) refers to as “enforced meaning”, or even “racialized meaning”, to construct particular visions of the social world(5).

The Academy cemented entrepreneurship as a design ethos by positioning skill attainment as a gateway into the creative economy. Students did not want to “do activities just to do them”; they wanted each skill to directly map onto entrepreneurial possibilities like clothing brands, music production, or graphic design. For Angelo, using GenAI to get from logo design to prototype more readily and w was important because he more readily could express his creative intent. He saw GenAI as a tool to help designers like him “without those skills make designs easier”. As he saw it, AI would allow him to get the flurry of ideas into prototypes quicker and sell his merchandise. The entrepreneurial ethos of the Art Academy is a kind of relational tissue between my research goals, student interest, and the pedagogical orientations of the Art Academy orientating our objectives toward shared goals and effort. As an orienting element, the students’ motivation, the academy’s approach, and the role

of technology created a “layer cake” of influences (cultural, structural, and institutional) that positioned entrepreneurship as a central design ethos. Entrepreneurship functioned simultaneously as a cultural ethos, a design principle, and a sociotechnical bridge. It rooted students’ participation in their lived realities, gave the Academy a distinct pedagogical orientation, and provided me with a powerful design frame to situate emerging technologies in ways that mattered for students.

6.5 Steps Toward Sustained Engagements

In the following paragraphs, I’ll describe the practical steps I envision for building a scalable infrastructure to enable community-based participatory design (CBPD) engagements with diverse communities "on the ground floor." My strategic approach aims to amplify these engagements by leveraging and supporting existing networks of trust. I also emphasize community engagement by focusing on where the communities I seek to engage with are geographically located, who are the communities of practice I intend to work with and what expertise I am attempting to understand, and how I can tailor my approach to these specific communities of practice. My goal is to ensure that I establish trust and achieve ethical mutual benefit, thereby minimizing epistemic burden and amplifying mutual goals (149).

Community-Based Live Labs One potential pathway I see is establishing “live labs” either embedded within an academic institution with connections to a community-based organization (CBO) or directly within a CBO itself. These “live labs” would enable reciprocal feedback loops that inform one another. I believe the concept of "live labs" represents an innovative approach to artificial intelligence development that establishes dynamic partnerships between major technology companies and CBOs. These partnerships create embedded research environments that facilitate continuous development, testing, and refine-

ment of AI technologies, transforming traditional corporate social responsibility initiatives into bilateral partnerships that generate substantive value for both industry and community stakeholders(249).

At its core, my vision for the live labs model is built upon two primary structural components: industry partner integration and community-based organization integration. The industry partner, such as Google, brings substantial technical infrastructure to the partnership, including cloud computing resources, engineering talent, development tools, and data analytics capabilities. Meanwhile, the CBO permits access to local knowledge systems, direct access to user communities, and invaluable user insights, including real-world usage patterns, implementation challenges, and cultural considerations. This combination creates a unique environment where technology development occurs in direct contact with its intended and impacted users. I see the strength of the live labs model lying in its bidirectional feedback mechanisms.

I contend that live labs have the potential to bridge gaps between different communities of practice by fostering sustained, collaborative engagement rather than passive, one-time interactions. This approach is particularly relevant to education, where AI is already reshaping how learning occurs (250). While the full impact of AI on education remains uncertain, ongoing discussions in public and academic spaces suggest significant shifts are underway (251). By integrating AI development with community-driven insights, I believe live labs can help build educational infrastructures that are more inclusive, responsive, and democratically governed. This ensures that AI development decisions reflect the needs of diverse learning communities rather than being dictated solely by industry interests, which often leads to misaligned products and missed opportunities for impact.

Critical Components of CBPD: Trust, Ongoing Commitments, and Mutual Benefit For me, the foundation of CBPD lies in the establishment and maintenance of trust,

ongoing commitments, and mutual benefit. Without trust, AI development efforts risk alienating the very communities they seek to engage(2; 252). I believe trust is built through transparency, accountability, and reciprocity—ensuring that communities have mechanisms to innovate for themselves and that their insights are valued and incorporated meaningfully (178). I find CBPD methods to be promising mechanisms for engaging with communities to better understand AI’s impact on the nature of learning. Ongoing commitments are necessary to prevent extractive relationships where community input is sought only at early development stages but ignored in deployment, iteration, and evaluation. If developed correctly, I believe an ongoing engagement can offer deep insights situated in localized social context, tangible prototypes, and research results validated through in-situ feedback loops(55). Accomplishing these goals requires long-term partnerships, continuous dialogue, and mechanisms for co-governance. Mutual benefit ensures that both AI researchers and community participants gain from CBPD collaborations. Some tangible outcomes for partnerships include skill development opportunities, improved technologies, enhanced representation in AI systems, and in-situ nuanced insights (253; 254; 255; 256). Recent research has shown promise for these types of approaches (30; 257; 258; 259). To ensure AI design engagements are fair and non-exploitative, it is essential to structure them in ways that minimize epistemic burdens while maximizing shared design goals. Well-structured engagements also generate deep insights that shape design dimensions, ultimately leading to more equitable implementations of AI and actionable design recommendations.

Trusted Messengers and Messages I understand that the success of CBPD relies not just on where engagement happens but also on who is delivering the message. Trusted messengers—those with deep credibility within the community—play a critical role in bridging the gap between AI practitioners and local populations. These messengers can be community leaders, educators, social workers, or organizers who have established relationships and cultural competency to communicate AI-related concepts in ways that resonate with their

communities. Equally important for me is the message itself. AI discourse is often technical and exclusionary, leading to skepticism or disengagement from community members. CBPD initiatives must translate AI concepts into accessible, contextually relevant narratives that highlight real-world implications, ethical considerations, and potential benefits. This means using storytelling, real-life case studies, and community-centered framing to make AI's impact tangible.

Leveraging Existing Infrastructure and Partnerships I believe AI design efforts should not attempt to build engagement networks from scratch, as this can lead to inefficiencies and distrust. Instead, CBPD efforts should leverage existing community infrastructure and partnerships, tapping into local organizations, public and academic institutions, and social networks that have already established trust within the target community groups. One critical component of this strategy for me is to think about what types of expertise I wish to engage with. I highlighted the necessity of expanding our notions of expertise earlier in my paper; here is where it becomes a practical element for enabling CBPD.

By working within established grassroots infrastructures, I can streamline outreach efforts and ensure that my initiatives align with ongoing community priorities. This also provides AI projects with a built-in mechanism for sustainability by embedding CBPD within networks that will continue to exist beyond any single research or industry initiative. A practical example of this for me is building trusted partnerships with community-based organizations as hubs for AI engagement, ensuring that efforts are accessible to marginalized and historically excluded groups. These infrastructures serve as familiar and trusted locations where CBPD activities can take place. I believe establishing these pathways will reduce barriers to participation, expanding opportunities to amplify AI design goals and develop pipelines for continuous and iterative feedback loops for more robust AI systems.

I also see CBPD thriving when academia and industry collaborate to bridge research, policy,

and real-world AI deployment. Universities bring methodological rigor, ethical considerations, and interdisciplinary expertise, while industry partners provide funding and direct implementation pathways for AI systems. These partnerships should be structured to ensure community representation in research and development processes—for example, by creating joint research hubs focused on community engagement or embedding community advisory boards within AI industry research teams. One promising model I’ve seen involves industry-sponsored participatory design labs within universities, where community stakeholders, academics, and technologists collaboratively design AI solutions (Martinez et al.).

A critical challenge I observe in these partnerships is power asymmetry—corporations often hold disproportionate influence over research priorities and funding. To mitigate this, CBPD efforts should promote co-governance models, ensuring that community priorities drive AI research agendas rather than commercial imperatives alone. Community-Based Organizations (CBOs) act as intermediaries between industry and local communities, making them invaluable partners in CBPD efforts. These organizations often have historical and cultural knowledge, grassroots organizing experience, and deep ties to underserved communities, allowing them to facilitate ethical and sustainable AI engagements. Industry partnerships with CBOs should go beyond one-time funding or consultation and instead focus on co-development and shared decision-making. One example of a successful model for me is tech incubators embedded within CBOs, where local organizations provide training, resources, and guidance to community members interested in AI careers, ensuring that community voices are directly involved in shaping AI applications.

Empowering communities to actively participate in AI design requires robust education and capacity-building programs, in my view. Many historically marginalized groups have been excluded from AI discourse due to systemic barriers in STEM education, technical literacy, and access to career opportunities in AI development (260). The advancement of AI tools provides me the

opportunity to explore pathways to include accessible AI literacy initiatives tailored to different levels of technical expertise. In addition, I am now seeing that the use of AI tools has challenged traditional methods. By providing accessible, hands-on learning experiences, I believe communities are not only empowered to understand AI's impact but also to co-create AI systems that reflect their educational needs and values.

6.6 Final Thoughts

Previous chapters have traced the trajectory of my collaboration with the Art Academy and the gradual evolution of a semi-formal technology program embedded within the organization. This program emerged through sustained, long-term engagement, allowing me to build trust with community members and institutional stakeholders. That trust created the conditions for iterative research practice, enabling me to navigate shifting organizational priorities, evolving student populations, and new partnerships while remaining attentive to the unfolding cultural, political, and institutional dynamics.

Over time, the technical orientation of the workshop series, and eventually the course I facilitated, began to center increasingly on topics related to artificial intelligence. My initial motivation was to work alongside communities to co-design technological systems, fostering local capacity and embedding participatory values into the design process. As AI became a central theme, I began to understand my efforts not merely as isolated pedagogical interventions but as early forms of infrastructural work: creating sustained, iterative, and culturally grounded pathways for community participation in technology development.

Through repeated cycles of implementation and reflection, I saw participatory design not as a neutral methodology but as one profoundly shaped by cultural context, community specificity, and the lived experiences of marginalized populations. This led me to a broader real-

ization: meaningful technology design is a socially constructed act that cannot be achieved in isolation from the everyday realities of those it aims to serve.

I argue that the students I worked with, many of whom are gang-affiliated, formerly incarcerated, or system-impacted, are often positioned as marginal within dominant narratives. However, their experiences are, in fact, a more accurate reflection of the structural inequities that shape contemporary life than those of participants typically found in elite research labs or corporate innovation centers. These young people do not represent the periphery of society; they embody the frontline of unequal social infrastructures, education, criminal justice, and technology, making their insights valuable and essential to re-imagining more just technological futures.

In chapter three I explore my initial attempt at Homeboy Technology where I was concerned with exploring social co-located interactions MR interfaces. I was sure that by identifying an under explored research area and conducting design activities with the Art Gang meant that I was enacting an environment that supported innovation from the ground up. My goals for the design activities were in contradiction with the goals of the Art Gang. Where I sought to elicit tech futures for MR designs, the reimagining and speculation of worlds with technology (261), the Art Gang envisioned participation as something that would meet their immediate needs or goals. For example, participation was a condition of following protocol, another “class” to attend to meet the requirements of the program. While attempting to build bridges between my community and the academic and industry spaces from which we have been historically excluded, I began to question if I was inadvertently reinforcing the very exclusionary design ethos I sought to challenge. This became apparent in my first engagement, where my focus on the tangible result of a design activity, the artifact, led me to overlook the rich, complex lifeworlds of the participants. In missing these perspectives, I missed the wider social, economic, and political contexts shaping their lives.

This dilemma is further amplified by technology’s role in modern society. Technology, and

now increasingly AI, has accelerated, scaled, and deepened pre-existing social inequalities. These harms are so deeply intertwined with our social institutions that we often fail to recognize their source. As AI embeds itself further, it perpetuates and exacerbates these harms by codifying particular ways of thinking. This raises a deeply personal and professional conflict: by participating in these systems to conduct my research, am I perpetuating the very problems I am fighting against? Am I benefiting from the Art Gang's struggles permitting me, as a person with academic institutional ties, access to exclusive networks and spaces involved in perpetuating these issues? I am not sure that any one dissertation can answer any or all of these reflective issues. This emotional labour, as a researcher with direct ties to this community, can often be overlooked by the need to validate these experiences within a context that rewards particular ways of being and knowing rooted in Western values (i.e. individualism) in direct conflict with my own cultural values (i.e. communal ways of being).

Considering these self reflections, my second engagement shifted focus. Inspired by the concept of backstage design, the infrastructural activities that engage users in the design process, I moved my attention from the final product to the individuals themselves. For me, backstage work meant understanding the interests, contexts, and lifeworlds the students brought with them. The research space became an arena where their unique perspectives and adversities could play out "frontstage".

This led to a new understanding of what constitutes a successful design output. For many of the students, who are preoccupied with surviving and reacting to adversity, the opportunity to simply imagine is a profound act. This stands in stark contrast to the privileged positions of academic and industry practitioners who have the opportunity to dictate the technologies that shape our lives. Therefore, success in this work should not be measured by the artifact created. Success is the creation of a space where people can imagine their own futures and use their lived experience as a valid form of expertise in the design process. Understanding and facilitating this phenomenon is the most critical outcome.

Is technology always the solution to marginalization? Certainly not. Technology, on its own, cannot resolve the deeply rooted social inequities that shape the lives of the students I work with, inequities born of systemic failures in education, housing, policing, and beyond. My work does not claim to offer technological fixes to these conditions. Instead, it interrogates innovation structures by asking: Who can innovate? Whose knowledge counts as technical expertise? By centering the lived experiences of young adults almost entirely excluded from formal design spaces, I reposition technological participation not as a panacea but as a contested terrain where agency, power, and imagination play out in a unique social arena - the invisible social relations and underlying structures that dictate how, what, and by whom technology is built. Recognizing these conditions allows us to take direct action against the default processes that embed "coded inequalities" into our technologies (5). These hidden biases disproportionately harm marginalized groups. Only by addressing this core conflict can we build truly equitable systems and move towards more just social orders.

Reconfiguring innovation in this way challenges dominant forms of techno-centric thinking to expand its conceptualization of expertise. Methods like CBPD are interventions that organize time, people, and resources toward a central goal - centering voices left on the margins to be heard and elevating the community by building its internal capacity to imagine a world that does not rely on their marginalization. Here, internal capacity refers to both the institutional means to influence technology design and the internalized self-worth of individuals to believe they are capable of designing technology themselves. This reconfiguration requires an ideological shift as opposed to a specific design activity.

The dominant paradigms of AI design, shaped by elite networks and high-resource labs, are not neutral; they actively reinforce systems of marginalization. This is evermore true as AI dominates all aspects of our social institutions, embedding the default techno status quo and enabling sidelining of vulnerable populations concentrating power to a select few. An ecological view of design, as demonstrated by the Art Gang, offers a more effective approach.

This perspective compels designers to critically reflect on their own biases and consider the unequal consequences of their work. It demands a reevaluation of who can innovate, recognizing that marginalized communities are not passive users but masters of adaptation. A truly ethical design process must be guided by their lived expertise, not view them as subjects of a designer's good intentions. Ultimately, there is no straightforward guide for addressing the many forms of biases and marginalization that technology innovation enables and cements, rather the more times we can create space for people to imagine and build their own futures, the more privileged we all become. To sit with and experience the human condition in such raw and uniquely human ways that no technology can ever replicate, the methods, the analysis, the designs, are not what's important. It's the stories of adversity, triumph, and everything in between where we must seek refuge. When we seek this refuge we begin to see that our demands for innovation are minuscule compared to the lives and stories that intersect with our own. I cannot and will not offer a fix, merely a nudge towards shifting our attention towards what matters, and what matters is inviting those on the margins into our space, to share space with them in a deeply human manner, and to grow that space so more people feel welcomed in.

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