Examining the Intersections of Race, Religion & Community Technologies: A Photovoice Study

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ABSTRACT

Churches have historically played an important role in Black American communities, catalyzing the pursuit of aims such as social justice, community organization, and health promotion. However, researchers have rarely examined how technology can support an assets-based approach to these efforts, nor the implications of race, traditions, and history when creating such systems. Addressing this gap, we conducted research with two predominantly Black churches to explore health promotion design opportunities. We used photovoice, a research method where participants led their own data collection and analysis. Participants provided nuanced descriptions of the racial and ethnic identities of their communities, and how church history and aspirations for the future impacted these identities. Our findings characterize tensions between tradition and 'modernization,' implications for technology design, and the need for a temporal approach to understanding communities. We conclude with broader implications for studying the intersection of race and religion in community technology design.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; **Collaborative content creation**.

KEYWORDS

HCI, Community HCI, technospiritual practices, race, religion, photovoice, assets-based approach

1 INTRODUCTION

HCI as a field has long been interested in the study of communities [34]. A subset of this work has focused on geographically defined communities [26, 73, 83]. However, prior HCI research on communities has been less focused on the topic of race. Race is a socially constructed concept in which people are grouped based on physical traits (e.g., skin color and hair textures) [20, 90]. Importantly, racial classifications themselves are only one part of understanding race and its implications. As a social construct, race reflects how societies have interpreted and defined the meanings of these people groupings, and in turn, shaped experiences and access to resources and power [88, 89]. Conceptualizations of race and definitions of racial categories have evolved over time, and differ across the globe. For example, some countries use the term "race," others "ethnicity," and yet others use both [58]. This gap in race-focused HCI research exists despite the cultural, political, and socioeconomic implications of these groupings [90]. Across the globe, race plays a role in how communities form and evolve, are defined by themselves and others, as well as the types of resources available within communities, their cultural heritage (e.g, traditions and values), and how they interact with other communities. In the United States (U.S.) in particular, the history of de jure racial segregation along with continued modern segregation reproduces numerous social inequities. While the U.S. has become more racially and ethnically diverse [27], its communities remain segregated, subjecting them to inequitable access to basic human rights (e.g., health care, education, housing, employment opportunities) [40]. In addition to segregation, gentrification has led to the displacement of communities of color, further exacerbating these inequities [18]. Work in U.S. communities has demonstrated how racial heterogeneity in neighborhoods impacts trust [54], as well as how race and racialized experiences shape neighborhood social ties and patterns of neighbor interactions [60]. This prior work has overwhelmingly demonstrated the central place that research on race must have in the study of communities, and this includes research focused on technology. Indeed, researchers have demonstrated how inattention to race when developing technology has led to numerous unintentional consequences for different racial

minorities (e.g., infrared sensors unresponsive to darker skin tones, policing software that predicts criminal recidivism using racially-biased data sets) [5, 35]. Indeed, even well-intentioned designs can lead to racist socio-technical systems.

Recently, there has been a call to engage critically with race when designing, developing, and evaluating socio-technical systems [61]. Such engagement requires the use of methods which seek to democratize the design process [38]. Researchers are encouraged to critically reflect on issues of race at all stages of the development process, and seek out opportunities to amplify and center voices of color [81]. In this paper, we present a case study of such critical reflection on and engagement with the concept of race in community-focused HCI research. Specifically, we report on our work designing a faith-based mobile health (mHealth) intervention with predominantly Black churches.

In the United States, churches play a central role within the Black community, fostering social action and community mobilization efforts for systemic social and political efforts [12, 66, 79]. These community organizations are a source of a variety of resources and social support for both members and non-members [79]. Churches have been integral in addressing race-based health inequities, serving as sites for various community-based health promotion events and interventions [66]. Additional affordances of community spaces, health ministry initiatives, local community-based resources, and regular access to priority populations have made churches an essential resource in establishing health promotion programs [12]. While church-based health promotion programs in the Black community have shown promise, racial health disparities persist. These programs are limited by church capacity (e.g., volunteer hours and funding), and are often only accessible to church members who are able to currently and regularly attend church and who live locally [7]. Within HCI, a growing body of literature has shown the potential of mobile applications to promote health and well-being, including among racial and ethnic minority groups [46, 77]. Indeed, the proliferation of information communication technology (ICT) use by churches [4] and smartphone ownership among racial and ethnic minority groups [14] provides an opportunity for technology mediated health promotion. Despite the promise of mHealth, little work has explored how such technology can augment the affordances of the church context to promote health and well-being in these communities.

In our work, we examine this intersection of race, religion, and community as we explore how technology can promote well-being in churches with historically Black memberships. We report on results from four sessions (two focus groups, one affinity diagramming session, and one photovoice session) conducted in our formative work. Our findings help to answer the questions: a) how do we characterize and untangle the intricacies of racial identity in community organizations? b) how can we address the tension between "innovation" and maintaining the integrity of historical community spaces? c) how do we design for multicultural church communities? The contribution of our work is both topical and methodological. Our work provides a case study of how HCI can approach the study of race in a community context, and will help to further catalyze research in the HCI focal areas of technospiritual design, race, and community technologies. In addition, we include a reflection on our method and recommendations for future HCI

researchers exploring how racial and ethnic identity may influence technology design.

1.1 Reflexivity Statement

Recently, HCI researchers have highlighted how authors' identities and backgrounds can shape their interpretations of their work, and that to embark upon social justice research requires a commitment to reflexivity [23, 74]. The composition of racial, ethnic, and religious identities of our research team provides critical context to our findings, and may help members of the research community interpret our work [74]. The authors of this paper come from a range of faith backgrounds. Multiple authors grew up and two continue to attend various Protestant churches. Two authors are religiously observant Jews. One author is African American and the remainder are White. The first and second author facilitated participant activities and led the qualitative data analysis. Both identify as White women. The first author was raised attending a Catholic Church. She currently attends a multicultural Unitarian Universalist Church. The second author was raised attending a predominantly White, Congregationalist church. She currently does not attend church.

We share our backgrounds to acknowledge that, while the authors of this paper shared some religious vocabulary with church members, there could be nuances unique to the participants' religious communities that we potentially missed. In addition, we had a longstanding research relationship with participants prior to the photovoice sessions; however, we acknowledge that discussing issues of race with the first and second authors may have potentially limited the experiences participants felt comfortable exploring. As a result, our identities may have shaped this work, including our analysis of our findings.

2 RELATED WORK

Our work characterizes community members' perceptions of how race impacts their experiences within their community organization, in this case, two protestant faith communities. Furthermore, our findings explore how racial and ethnic identities should be incorporated, celebrated, and amplified, from member perspectives, when developing community-based health technology systems. We focus on race and religion in place-based communities.

2.1 Community Based Organizations (CBOs) and HCI

Within HCI, there's been an increasing focus on the domain of Community Informatics (CI), in which ICTs are leveraged to "enable and empower community processes" [34]. A subset of this work has examined the context of geographically focused communities, and in particular, community-based organizations (CBOs). CBOs are often trusted entities within their communities, and can serve as an entry-point for reaching priority populations [57]; however, CBOs pose additional design challenges when balancing the values and practices of multiple stakeholders [82]. CI research in the context of CBOs has explored a broad range of topics, including increasing volunteer capacity [83, 84], increasing civic engagement [26, 43, 47], and supporting activists [42]. In addition, a relatively small number of HCI studies have anchored the design of health technologies—such as mHealth tools—in the context of a CBO [77]. Most of this

work has focused on schools [6, 48, 51, 55, 68], public housing [52], and community centers [65, 72].

However, despite the many public health interventions that have been designed for churches, little work has explored how technology can support and augment health promotion efforts within church communities [45, 78]. And yet, such communities represent promising contexts for technology-enabled well-being initiatives. Kaziunas et al. have argued for the important healthcare services and resources that churches provide to their populations in need, including those most vulnerable and socially marginalized [45]. Despite the care they provide, churches are often excluded from technology-enabled community health record systems, creating a disconnect from a broader network of community care [45]. They contend that churches provide meaningful and critical care to marginalized communities, and thus should be included when developing sociotechnical community systems. We expand upon this work by exploring churches as important CBOs in which to ground technologies that promote well-being, and through our specific focus on the cultural context of predominantly Black churches. Furthermore, we contribute more broadly to community-focused HCI, as to date, little focus has been placed on race and racial identity in community technology design [61].

2.2 Technospirital Work in Communities

Examining how technology is used to engage in spiritual and religious practices, defined as technospiritual practices, is a burgeoning field of study. This work aims to understand how technology can enrich religious and spiritual expression and participation without disrupting core values, beliefs, and traditions [4]. This body of work largely explores how technology can support personal spiritual practices [91], enhance spiritual experiences [4], and through its integration into religious services, can transform experiences of worship [93, 94].

Various technologies have been designed to support religious practices and spiritual experiences. These systems support participation in religious activities such as Islamic pilgrimages [53], individual activities such as Muslim and Christian prayer [4, 92], prayer exchanges between those in the same religious community [11], spiritual education [11], viewing sermons or religious teachings of prominent religious leaders [11], and everday mindfulness practices of Pentocostal users [91]. Researchers have explored how technology can be used to connect members to their faith communities even when geographically separated [76]. In a study of protestant church communities, Stowell et al. found that church members were motivated to provide computer-mediated spiritual support to other members of their community by participating in a variety of crowdsourcing tasks [78]. These works have shown that, even in social contexts where technology adoption may seem antithetical to traditional religious expression and activities, technology can enhance everyday spiritual practices and may even be welcomed when participants are centered in the design process.

Integration of technology into church services has demonstrably grown in recent years; however, churches have incorporated technology to varying degrees [93]. Wyche et al., characterized the technology use in mega church services, and found that the prevalence of technology, such as digital displays in sanctuaries and personal computing devices, is constrained by church resources, infrastructural capacity, and preferences of church community members [93, 94]. Her work identifies tensions between remaining 'reverant' of sanctuary halls while also finding ways to embody relevance through technology integration [93]. Wyche et al.'s work calls attention to the need for identifying the unique social factors, variation in technology attitudes of members and leaders, and distinct infrastructures that could promote or impede technology integration [93, 94].

While research in technospiritual design has grown, it still remains an understudied area in HCI research [11]. Our work extends that of Wyche and other technospiritual HCI researchers by exploring current tensions in technology integration using a historical and future oriented approach. By understanding a church's present mission and ministerial focus, as well as their future trajectories, we better contextualize current member attitudes toward technology. Church communities are not static organizations. They change leadership, adapt to current societal factors, respond to the needs of old and new members, and have rich histories, all which impacts the integration of technology in their community. We question how and when technology should be used within religious communities. Our work highlights the tension between embracing new technologies and questioning whether technology integration is, in fact, progress in certain contexts. We expand upon prior work on technospiritual practices through our focus on racial identities within a church community and the implications of these intersectional identities on technology design. Furthermore, we call attention to the need for research to critically examine the impact of race on technology design for faith communities to better understand how we can respond to differences in temporal changes, priorities, and goals.

2.3 Dialectical Model of the Black Church

Historically, social scientists have characterized the Black Church, a term that refers to seven major Protestant denominations that serve predominantly Black members [64], using various models that overemphasize social deprivation as an explanation for the power of the institution and religious participation in the Black Church [59]. Such models hypothesize that continued religious participation from constituents stems from a history of systemic oppression that has denied Black Americans access to social resources. Taylor et al. state such models lead to oversimplified characterizations of the Black Church, with a lack of attention to social context and variations between these communities [79]. Instead, researchers propose a dialectical model of the Black Church [59], which examines the historical origins, immediate circumstances, and adaptations to larger societal conditions [79]. This theoretical model provides a series of dialectical dimensions which demonstrate tensions that exist within and between church communities with predominantly Black membership [49, 59, 79]. Such contrasting dimensions more thoroughly explain church identities, missions, and the resources they provide [2, 79]. This model affords researchers better ways to identify assets (e.g., community member skills, physical resources, community relationships [15]) and current conditions when developing sociotechnical systems for predominantly Black church communities.

We draw on the dialectic model of the Black Church in our analysis [59]. This model explores six tensions that, in combination, provide a holistic approach in examining the orientation and religious expression of a Black church community [79]. Defining all six tensions is outside the scope of this paper; however, the first dialectical tension that describes the orientation of a church's mission, priestly or prophetic, is particularly useful when designing sociotechnical systems. Priestly functions include those organizational activities that promote and facilitate the spiritual worship and connection of church members within the institution (e.g., focus on spiritual growth, social gatherings), whereas prophetic functions extend beyond priestly to emphasize activities that focus on change, temporal needs, and social action [2, 59]. While churches may incorporate both sets of functions, most emphasize one or the other [2]. Identifying the orientation of a church's mission may help identify and prioritize the functions required of a technology system. We use this model to examine the intersection of racial/ethnic identity and religion in this work.

2.4 Community-Engagement through Photovoice

In our work designing technology for church communities, we acknowledge that systems of power that impact racial inequity create an imbalance in the research process and require engagement from the community at all phases [44]. In an attempt to disrupt this imbalance, we used a photo-elicitation method called Photovoice. Photovoice has a long history as a qualitative method used in civic engagement in a variety of public health pursuits to inform housing opportunities [67], health promotion [39], and understand the lived experiences of chronic illnesses [39, 80]. Photovoice is a flexible and accessible method that requires only that participants use a camera to explore matters of relevance [33, 39, 85]. Through photovoice, community members capture authentic and genuine reflections of their communities [85]. Using community member photos to drive subsequent interviews, participants are not passive but active catalysts in identifying and addressing their most pressing concerns, as well as celebrating their community's strengths [13, 85–87]. Importantly, these representations are captured by participants instead of the researcher. In leading the data collection, participants can communicate subtle but significant details that may, in researcher-led data collection, be ultimately missed [85]. Based on feminist theory, photovoice celebrates local expertise in favor of researchers' observations, and encourages community member participation throughout the analysis process [10, 67].

Photovoice is particularly useful when members of the research team are not members of the community and can disrupt the power imbalance between participant and researcher [3, 69]. Photovoice is an assets-based, affirming research method where participants engage in critical dialogue with both researchers and community stakeholders [10, 86]. In recent years, HCI researchers have made a similar call to incorporate assets-based approaches into the design of technology, and have used similar approaches of selecting affirming workshop activities that address goals held by participants, and celebrate strengths [15, 21, 24, 38].

Photovoice has been helpful in understanding the implications of self-identified racial identity on providing culturally sensitive and competent care [71]. It has been used in examining spirituality as a protective factor in low-income Black adolescents [36]. In our examination of the impact of race on technology design for faith communities, we understood that explicitly talking about race can be sensitive, especially in a focus group context with members of the research team who are White. Photo elicitation activities have been useful in facilitating conversations that may be difficult [3]. Through these photovoice activities, participants were able to process and explore questions about race as they relate to their faith communities. Their photographs helped to anchor this dialogue by allowing participants to reflect on situations, events, and experiences together using a new subjective lens, as well as stimulate latent memories that otherwise could be forgotten during traditional interview methods [37, 39].

3 METHOD

This work is part of the formative first year of a four year project to design, develop, and evaluate an mHealth intervention in churches with predominantly Black membership. The focus of our first year was to work directly with church members using an assets-based approach to identify community strengths, and to engage church members in the design of the mHealth application. In this paper, we report on four sessions: two focus group sessions that provided researchers with context on the church community and technologies used, an affinity diagram session, and a photo elicitation activity called photovoice.

3.1 Participant Recruitment

We partnered with an organization that provides resources to over a hundred faith-based organizations (e.g., churches) with ethnically-diverse members near our city in the Northeast U.S.. In this paper, we refer to this organization as the 'partner organization.' This organization identified two churches to support the formative year of the project.

We worked closely with health ministry leaders from both churches to identify members of each community who could provide different perspectives and expertise regarding the strengths and needs of their respective church communities. Participants were eligible to participate in the formative work if they were 18 years or older, self-identified as a member of one of the two churches, were English-speaking, and owned a smartphone. We actively sought out participants with various levels of "embeddedness" in the church community to represent a cross section of experiences reflected in the church laity. Participants were consented at the start of formative work by a project member.

Prior to engaging the participants in discussions of racial and ethnic identity through photovoice, participants had each taken part in seven focus groups of 2-3 hours each. The first four focus groups explored various dimensions of participant experiences in their church communities (e.g., religious practices, social support, health priorities, and technology use), helping us gain important context about the church communities before exploring concepts for technology-based interventions. The 5th focus group engaged participants in the design of preliminary concepts for a health app, allowing us to examine opportunities for app-based support as well as feature requirements important to the participants [62].

The sixth and seventh focus groups explored opportunities for crowdsourcing to promote health in faith communities [78]. Given that the smartphone application will be implemented within the faith community, greater characterization and contextualization of the community was necessary.

3.2 Sessions 1 & 2: Focus Groups

3.2.1 Session 1: Understanding Church Community. We conducted a two-hour facilitated discussion wherein we asked participants to describe their Church community from their perspective. Participants were encouraged to describe the activities they engage in, who they engage in those activities with, an overview of the church's history, as well as their perceptions of church leaders. We ended the session by asking participants to reflect on the role their church has played in their life. The aim of this session was to learn about the participants' church communities.

3.2.2 Session 2: Current Technology Practices. During this two hour facilitated discussion, we asked participants to describe their current use of technology and its potential benefits and constraints. Inspiration cards were created to help participants brainstorm on the range of technologies that they may or may not use. In addition, we asked specifically how their use of technology has supported their spiritual practices, religious expression, and health. We ended the session asking participants to describe what technology (if any) is used in their church, including both technology to enhance church services and programs, and communication technology.

Both sessions provided us with critical background on the church communities, and motivated a more explicit discussion about race.

3.3 Session 3: Photovoice Introduction

To begin the session, we asked participants to define the racial and ethinc makeup of their community to guide the terminology we then used in the subsequent design activity. While this project focuses on churches with predominantly Black membership, previous sessions had made it clear that participants used a range of descriptors to label the racial and ethnic identity of their church, while others did not. We felt it necessary that participants define terminology that we would use later in the focus group to engage in a dialogue about race and their Church communities.

3.3.1 Affinity Diagram: The aim of the affinity diagram activity was to scaffold a participant-led exploration of the intersection of race, church, health, and technology. Given the positionality of our research team and our focus on race, we felt it critical to use methods that disrupt the traditional power differential between researcher and participant. Participants individually generated five to six words or concepts related to each of the following prompts: 1) How race relates to your church experience? 2) How your [focus group selected ethnic identity] church experience relates to health? 3) How your [focus group selected ethnic identity] church experience relates to technology? If asked to explain the prompts further, we provided two additional secondary prompts. 1) How your [focus group selected ethnic identity] church experience impacts/promotes/impedes health? 2) How does your [focus group selected ethnic identity] church experience

impacts/promotes/impedes technology use? Post-its were then displayed on the wall for all participants to review. As a group, participants then clustered post-its with similar concepts, and labeled each cluster. The resulting categories (formed from groupings) were used as inspiration for participant data collection.

3.3.2 Introduction to Photovoice: A research assistant then provided a brief description of the photovoice method. Participants were instructed to take photos in their daily lives at any point in the subsequent three weeks. Participants were provided with a list of the categories created in the affinity diagram activity, and were asked to take at least one photo per category and to write a title and caption for each photograph. A research assistant then discussed 'ground rules' for photovoice [87], including maintaining personal safety when taking photographs (e.g.,don't take photographs while driving, don't take photos of illicit activities) and asking for informed verbal consent before taking a photograph of another person. The first session was two and half hours long.

3.3.3 Between Sessions: Participants took photographs during the three weeks between sessions, and sent them, along with title and caption, through email or SMS to a member of the research team. Some participants elected to write longer paragraphs. Others submitted the image only.

3.4 Session 4: Photovoice Discussion

In the second session, we displayed all photographs grouped into their respective categories (Figure 1). The photos were not labeled by participant ID. If participants wished to identify themselves as the photographer they could during the focus group. Participants viewed only the photographs from their respective churches. As participants showed up to the focus group, they were invited to view all the photographs. After 15 minutes, we asked participants for their overall impressions of the photographs. For both church focus groups, these discussions lasted about 20 minutes.

Next, Participants were instructed to pick one photograph that they felt was most important and most representative of something they would like us to know about their church community or church experience. After selecting one photo, participants completed a worksheet answering questions about the specific photo. The following are the work sheet questions: 1) What important persons, places, or objects are in this photograph? 2) What moment did you capture? OR What do you want to say about it? 3) How does this photograph relate to your community's lives? Why is it important? 4) Why does this strength, situation, or problem exist? 5) What do we need to keep in mind when developing this health application?

These questions were adapted from the SHOWeD photovoice methodology [39]. Wording was changed to reflect project goals and aims. Participants were then assigned to participant dyads where they spent 25 minutes interviewing each other guided by the following prompts: 1) What picture (or pictures) represents something that is most important for us to know about your church? 2) What photo(s) best shows what we need to keep in mind when we are developing the application? 3) What photos did you want to take but couldn't? Dyads then reported back their findings to
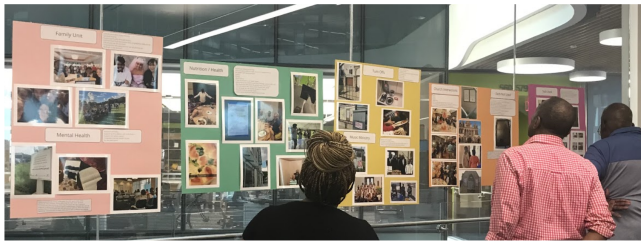
Figure 1: Participants viewing their photos.

the full group, including commonalities and differences in the photos. Finally, participants provided feedback (reflections) on their experiences with the photovoice method. The session lasted two hours.

One participant from Church 2 was unable to attend the focus group session. As a result, they were invited to a one-on-one interview with one of the authors. During the interview, the participant followed the same protocol. This participant also viewed the images taken by her church's focus group members. Her overall impressions of her church's photovoice images were recorded.

For their participation in all four sessions, participants were compensated $24 per hour, for a total of $204 for the complete eight and a half hours. The Institutional Review Board at our university approved the study protocol.

3.5 Analysis

Interviews and focus groups were audio recorded and transcribed, resulting in a total of 14 hours and 20 minutes of audio files and 696 pages of transcription used. In line with Lopez et al., we conducted a constructivist thematic analysis of focus group content guided by our research questions with the aim of identifying design insights [50]. In our analysis, we used elements of grounded theory analysis, including initial coding, constant comparisons, axial and selective coding, and memo writing [19]. Using NVivo 12.5.0 software, two researchers inductively coded transcripts separately, labeling emergent phenomena in the data to arrive at a codebook. Two researchers then independently applied the codebook to focus group and interview transcripts, 83 Photos (37 Church A. 46 Church B), and 9 worksheets. We met regularly during the analysis process to discuss discrepancies in the applications of the codes, reexamine the codebook, and reflect on contradictory data.

3.6 Participant Overview

Ten church members participated in the first photovoice introduction session, and photovoice follow-up session, 4 from Church A and 6 from Church B. One member of Church B could not attend the follow-up focus group, and instead participated in an interview.

Demographics: All church-members self-identified as Black. 7 were female and 3 were male. Participant ages ranged from 33 to 73. One participant had completed some high school, 1 completed a GED, 2 had some college, 3 had a BS/BA, and 3 had advanced degrees.

Church Engagement: Participants from Church A have been members for an average of 12 years (SD = 11.5, Range: 2-27), whereas participants from Church B have been members for an average of

4.5 years (SD = 2.4, Range: 2-7). They range from no involvement in any church affiliated group or ministries to serving multiple roles in the church. These roles include attendee, ministry team leader, choir member, and trustee.

4 FINDINGS

Through photographs and facilitated discussion, church members from two churches provided nuanced characterizations of the racial and ethnic makeup of their respective church communities. These characterizations led to in-depth discussions regarding the intricacies of community organization identity and temporal considerations. In combination, these factors represent important insights into designing race-informed technology that not only responds to the temporal needs of community organizations, but also celebrates their strengths and augments their organizational capacity.

4.1 Understanding CBO Identity

4.1.1 Defining the Racial and Ethnic Identity of the CBO. Traditional models used to understand Black religious participation and expression have focused on a limited set of characteristics in defining the Black Church [79]. Instead, an assets-based approach dispels monolithic perceptions of the Black Church, and examines the unique histories, legacies, and missions of these community organizations. Through our work with two different predominantly Black church communities within the same geographic region, we saw an opportunity to further explore distinctions between these organizations and the resulting implications for design.

Throughout Sessions 1 & 2, participants used various terms to refer to their church communities. In some cases, this included racial and ethnic descriptors. To center race during our photovoice discussion, we felt it important that church members select terminology that most represented their church community from their perspectives. Defining the racial and ethnic makeup of the church could not be accomplished with a single term, and instead, participants described the within group variability, and the multicultural makeup of their church communities.

Participants hesitated to label the cultural makeup of their church for numerous reasons. P5 communicated his concern with labeling the church:

> "Well, how our race relates to your church experience, and…Uh, you know, that's, you also have to think about…Who I am, and what I represent as a Black man. And how I perceive church and White expectations of Black church. You know, from the stereotypes…Like you have every, you have to dress a certain way to be accepted. You have to, um, act a certain way for acceptance."

P5 felt that his church lacked characteristics of a 'stereotypical' Black church that we, as White researchers, might expect, and that the label would lead to incorrect, and potentially harmful, assumptions about the organization. Participants then pointed to other nearby churches that they described as examples of "Black churches". P1 assisted P5's comparison, adding, "*if I was describing [neighboring church] to somebody- I'd be like, "that's a black church!", you know what I mean? [P5 & P3 laughter].*" With further probing from researchers, participants enumerated various characteristics

that come with the label 'the Black church' such as a "fire and brimstone preacher" and certain formal attire. Participants tied this hesitancy around labeling their church to potential concerns of their broader community when interacting with academic research institutions. Given the history of abuse of BIPOC by researchers in the United States, as well as current practices of broad brush assumptions based on race (e.g., not all minority communities are low-income), participants reminded researchers that other church members may be wary of any technology system we designed. P7 characterized this sentiment, "*people tend to lump us into a certain category.*" Participants further expressed disillusionment with a corrective approach that emphasizes deficits within their community. As P1 stated, "*a lot of time, organizations approach Black and Brown communities always with an under-served approach. Or low income, or low, you know what I mean.*" P1 goes on to state that as long as, "*[grants for 'underserved' groups] that's what gets people to develop for the community, fine. But it can't be all about that.*" While P1 recognizes that the 'underserved' label may come from funding opportunities, she speaks to the importance of recognizing strengths and variation within each community.

Members of Church B examined their own variability in socioeconomic status, and characterized Church B as upper/middle class with members who occupy a range of professional positions (e.g., doctors, lawyers, therapists). P10 described the makeup of the church,

> "I think probably in the community we probably have a reputation of being sort of middle class or upper middle class, in general …and also educated, given our pastor's education. I think it recruits …we seem to have a disproportionate number of people that are doctors or other professionals."

Church B is described by participants as resource-rich; however, members described feeling excluded. P6 stated, "*[I've] felt like, oh maybe Church B isn't for me because I don't have my Master's [degree]…I don't feel like I belong.*" Throughout the session, P6 reflected on difficulties she had connecting to other members of the church when she first joined. To address this challenge, the church had started smaller, more conveniently located Bible study groups to form closer relationships. Participants explored the benefits of these Bible study groups, "*I thought that was a great way of getting to know each other and connecting with each other. So at least when you're at church you, you know someone that you have a connection with.*" However, these Bible study groups were short-lived due to limited capacity and high burden of coordination. Designing technology to connect church members would help achieve goals of fostering connections within the community.

Due to the multicultural makeup of their churches, participants grappled with labelling their church community, and they did so through conversation with one another. Participants avoided a particular racial or ethnic label that made others in the community feel unwelcome, and asked each other about their response to various terms. For example, participants explored the nuances of the terms 'Black,' a broad descriptor, and 'African American,' a descriptor that emphasizes the United States as a person's country of birth [1]. In search of an inclusive term, participants asked P4, a participant who was born outside the United States, if she identified as Black or African American.

> "P10: But if somebody said, oh, you go to an African American church, would you feel excluded or -
> P4: No, not necessarily. No, not at all."
> P6: Would you prefer us to refer to Church B as a Black church or an African American church? Based on all the Jamaicans–
> P4: I think it should be a Black church."

Throughout these conversations, it was clear that participants strongly believed that the label used to describe the racial and ethnic identity of their community should be broad enough to celebrate diversity within the Black community and promote inclusivity of people from other racial and ethnic backgrounds. P9 described the importance of inclusivity at Church B:

> "Even though they say it's a Black church, it's not all Black. We have a mixture. The ministers are Black…But we welcome everybody. It's an open-arm church. The community is welcome. Strangers are welcome. And I think that's one of the core things about the church. That we love everybody. And it's up to you."

Engaging new members is exceedingly important to both churches.

By explicitly focusing on race, members were able to share specific technology requirements and design ideas. In a previous focus group session, participants were introduced to a variety of technologies (e.g., smart speakers, embodied conversational agents, instant messaging technologies, smart watches) as potential interaction modalities for the mHealth application. During the photovoice session, participants emphasized the importance of including representations of the cultural diversity of their church. P8 affirmed, "*I should be hearing different voices and accents, I also want to see different people of color, White people.*" Participants further stated that genuine representations of their multicultural churches reflected in the mHealth application would create an atmosphere of acceptance much like that of their churches. It was important for participants to see themselves and their values within the mHealth application. Participants looked for demonstrations honoring the racial and ethnic identities of their church community.

During the focus group, church members from each community came to a consensus. In Church A, participants agreed that the label "predominantly Black Church" was authentic and representative of their church community's diversity, while Church B chose to label their community as a "Multicultural Church seated in the African American tradition." At Church B, participants examined the multifaceted racial and ethnic identities within their church communities and used terminology to both reflect their diversity and represent their history.

> "P7: We have other races there besides Caribbean, we have West Indian and all the other. We also have Spanish and Chinese.
> P8: Church [B] is a multicultural church seated in the African American tradition.
> P6: Yeah, let's leave it like that. She's the educator here!
> P7: I will go with that one.

P6: Very eloquently put.
P7: I think that's perfect."

Both groups favored the term Black when describing the racial identity of most of the church members.

In defining the racial and ethnic makeup of the congregation, church members engaged researchers in a much deeper conversation, which included understanding the history of the institution. Research on the management of social identity suggests labels are symbolic devices used to supplement surface level attributes and to communicate social identity [31]. In this case, the Black church is a symbol which embodies a list of attributes regarding the organization's identity; however, as participants suggest, labels may help establish identity and communicate history, but are merely a placeholder for a more detailed and rich set of qualities based on autobiographical information. In subsequent sections, we provide a detailed history of both church communities, their current technology use, and changes to their immediate circumstances. Having these conversations was foundationally important for our work. At a practical level, to work with communities, you have to understand how to refer to them. Language and words are the core to establishing rapport and facilitating effective communication between the research team and participants. Beyond the words themselves, these discussions helped us to better understand how community members frame their racial identity as an organization. This exercise demonstrated nuances between organizations, as our members did not select the same terminology. These perspectives on identity have direct implications for their expectations from technology, such as the expectation that these technologies reflect the diversity of the communities.

4.1.2 Legacy of Church A. When working with CBOs, sociotechnologists should understand the history of the organization as part of their exploratory analysis. This process not only assists in building rapport between researchers and community members [12], but it further defines current perspectives and goals of the organization. As we will demonstrate, understanding the past helps us design technology that leverages the assets of the organization and reflects the current attitudes and beliefs of users. In addition, a temporal approach to studying the community's values, adaptations to immediate circumstances, and future goals creates opportunities to design technologies aligned with the organization's future.

Church A is an American Baptist Church. Members describe Church A as "*traditional*", wherein participants define traditional as slow adaptation to changes in how church business is conducted. In discussing how they would describe their church to others, participants from Church A felt strongly that their historic church would be well known to others in their state. In talking about their church to local friends or colleagues, they would see no need to label the racial and ethnic make-up of the community. P1 explained, "*I would just kind of assume if they're from [State] they at least have heard of it.*" However when describing her church to friends from out of state, P1 provided additional context, "*it's like one of the first Black churches in [the State].*" P1 demonstrated how the history of the church, as an icon of the Black community, is still relevant to its current identity.

Inside the walls of the church, members enjoy the benefits of preservation efforts that have maintained their historic worship

Figure 2: Priestly Mission: Functions Specifically for Members.

hall. Fewer than five pastors have led this church community in its history, creating a continuity in leadership. The current pastor led the church for over 40 years. P3 described the powerful influence the current pastor has:

"Well, I'll say again, people follow the pastor's [lead]. We don't really have that young people mentality, and I'm big on stuff like that [technology], but I look at what we do [have] and then…what a lot of churches have…Anyway, we can use a lot more of that, that we don't do. A LOT more of it."

Participants routinely stated that the Pastor's length of service, his emphasis on tradition, the conventional practices of their church, and the aging congregation all simultaneously impact the traditional mindset and feel of Church A. When asking participants to describe the various ministries that serve current church members, otherwise known as 'inreach' ministries, we were impressed by the number. In response to our surprise one member exclaimed, "*well, the church has been there for [200+] years,*" further emphasizing the influence of history and longevity on church culture. This focus on 'inreach' is indicative of Church A's priestly function (e.g., defined by activities to support the spiritual growth and development of the church members directly). The mission statement of Church A emphasizes the importance of maintaining the spiritual life of members through Scripture and church worship in the Black religious tradition. In selecting a photo that depicted an important aspect of his church experience (Figure 2), P3 described, "*During this meeting seniors meet to pray and discuss everyday concerns.*" Church A focuses on nurturing the spiritual growth of their congregation by engaging members in various events and worship activities; however as Barnes et al. suggest, churches with an emphasis on church member spiritual growth are just as likely as churches with a social justice focus to offer instrumental support when serving the broader community [2]. In the case of Church A, participants spoke not only to the importance of bringing new people into the church in order to share in religious expression (e.g., community dinners, Bible study, and worship activities), but also in providing tangible support including but not limited to back to school drives, clothing drives, and food drives.

Figure 3: Technology Use in the Churches. A) Church A - rare use of screen. B) Church B.

4.1.3 Technology Use in Church A. Church A focus group members emphasized the implications of how church legacy inhibits the integration of technology within the walls of the church. Technologies commonly found in some sanctuary halls are nonexistent in Church A [93]. There are no digital displays, and instead of a video live stream, Church A opted to air their service using radio. This provides access to services for those who cannot attend, while minimizing technologies in the sanctuary. The only display technology used on the church campus is an overhead projector system (Figure 3). This system is used exclusively for Bible study, and is located in a newer, adjoining building not bound by the same historical preservation efforts.

During worship, church members opt for physical Bibles and Hymnals. Use of the Bible application during services is met with mixed reactions. P1 explained, "*people may think you're doing something else [on your smartphone]…*" P5 demonstrates how community norms discourage technology use, "*see, and then you're like [using Bible app]…Oh, but they're just like, "What are they really doing? they should be listening to this pastor instead of being on their phones. People think they're on their…playing games and texting.*" P5 further explained a drawback of the Bible app from his point of view, "*if a person cannot pick up a hard copy of the Bible and go straight to scripture, then they don't really know the Bible.*" Ability to locate Scripture within the Bible serves as a public demonstration of familiarity with the Bible and its teachings. Such prowess is not only a highly valued skill within the community, but a social expectation that members have of both themselves and others. Despite this expectation, multiple participants reported using electronic Bible applications and faith applications (e.g., electronic devotionals) when privately practicing their faith in other locations (e.g., home, work, school). P1 described how using the Bible app positively impacted her own Bible study practices:

> "I can go to the Bible app, like, Oh, what was that verse? Like I don't have to be like [gestures with hands frantically flipping through the entire Bible]. You know, in the Bible,…I-, to be honest, I don't know it from front to back. Like it would take me a really long time to find."

Bible apps ease the burden of locating Scripture, thus allowing users to practice their faith even when short on time. This sits in tension with values and spiritual expectations of others within the community, and thus has implications for designing technology that looks to ameliorate such tensions.

Outside of the physical Church, leaders communicate with members largely by phone. P3 stated, "*A lot of our people don't even have email, okay?*" At the start of our work, Church A had a public facing website and Facebook group; however, some of the participants were notably surprised to find this out, exclaiming, "*There's a website?!*" Other members of the focus group were aware of the website to the extent that information had not been updated in over a year. When asked how people learn about events, P2 responded:

> "I think it's a lot of word of mouth. If you're in the church, there's a section in the book [church bulletin] that has all the events going on. They do have a Facebook page. It gets a little bit of traffic. Yeah, they don't really update it as much as they should, as frequently as they should."

Perhaps most indicative of participant perceptions of technology in Church A is that photographs representing the category 'Technology Used' did not depict technology used within the Church. Instead, participants took photographs of their personal technologies. In lieu of a photo, P3 submitted a paragraph describing his frustration with the lack of current technology practices within the church. Participants viewed technology use as "*modernizing,*" and as a way to reach new members. P1 described being active in the church she grew up in, and partly attributed this to a smartphone app that the church used to deliver church-related content (e..g, calendar of events, recorded sermons). By sharing the app with others, P1 introduced other participants to possible functions technology could provide to members. After looking through the app, P5 shared:

> "It's a very modern thing, they, the, the screen app blew me away. Everything with screen app and all that stuff. So the technology was kind of a forefront. [Church A] is not there yet, it's very traditional. I

would think to [Church A] as a traditional Black, historical Black church. You know, with the, with some of the, some of the, rules and uh, mission statements. Just they kept, keeping things traditional"

In describing her photograph (Figure 4), P1 further explored the types of "*traditional*" thinking could constrain technology implementation:

> "this reminds me of old school or traditional ideals [points to sign in Figure 4] that are stuck in Black or Brown communities. This type of ideology [Sign reads: Jesus Christ is Lord of All. And he's coming back any minute. Get ready.] could be a hindrance to introducing new technology. Some people will be excited. Some people will view technology as the devil."

For P1, the tone and message of the sign was judgemental and threatening. Her sentiment demonstrates how mindsets towards technology can vary within any CBO. In the case of Church A, the participant felt that congregants would react to technology in a variety of ways, ranging from enthusiasm to judgement and skepticism. Understanding how ideologies may vary within an organization is crucial when implementing technology interventions.

Our participants were enthusiastic about the potential for future technology integration within their Church; however, our findings illuminate that Church A's incorporation of technology has been slow, and in some cases even deliberately restricted. Members of the Church emphasize that the goal of engaging new younger members sits in tension with current Church A technology practices in part to preserve the worship hall of Church A as a historic landmark within the Black community. As P3 stated, " *We move [progress], with the pastor who's somewhat senior… you know what I mean? We, we, we, we just need… We need someone to take that, what exists in the realm of Facebook, and run with it.*" While P3 used Facebook as an example, the sentiment of adding contemporary technology to enhance worship and church services was expressed as a goal of our focus group participants. We will now describe the legacy and technology use of Church B to further our discussion.
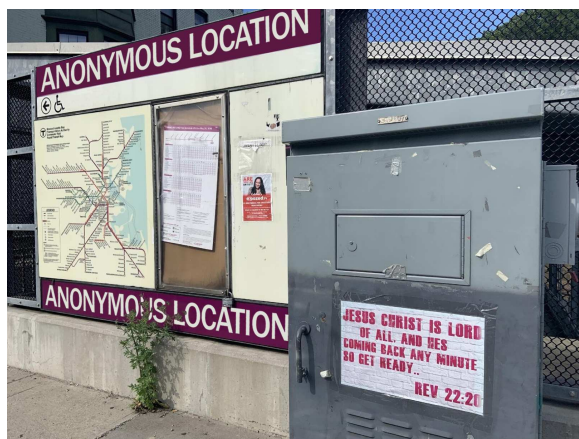

Figure 4: Old World Thinking.

4.1.4 Legacy of Church B. In contrast, Church B was established less than 40 years ago and has grown considerably. Church B is an African-Methodist Episcopal (AME) church, a denomination with a rich history of engagement in social and political action. Church B is led by two co-pastors. When they founded Church B, they incorporated technology rapidly. Established in the homes of the pastors, the church grew from just a few members to over 500 and now offers two services per Sunday to accommodate their membership. Participants describe the arc of this growth as starting from a table, to gymnasium, to auditorium, with its latest growth culminating in the transformation of the church campus through the addition of a school. In its most recent construction, the worship hall of Church B included specifications for technology (Figure 3B).

The mission statement of Church B describes collaborations with public, nonprofit educational, community, governmental, and interfaith partners to initiate programs that serve thousands of people both locally and worldwide. While Church B certainly celebrates Scripture and nurtures the spiritual growth of its members, the mission statement clearly indicates Church B's focus on outreach and social justice. Indeed, the AME church was born out of a response to racial injustice; this Protestant denomination was founded by Black churchgoers in 1787 in response to the racial discrimination they were subjected to (e.g., restrictions in where they were allowed to pray in church) [22]. In the civil war and reconstruction era, AME leaders ministered to freed Black slaves and welcomed them into the denomination. This led to the largest period of denominational growth [17]. The mission statement of the AME church today, "is to minister to the social, spiritual, and physical development of all people" [16]. In keeping with this denominational tradition, Church B's conceptualization of community is not constrained to a particular neighborhood, town, or even country. P8 passionately described her church's mission to serve all people by saying:

> "I appreciate the fact that they both said that [Church B] has a connection to the community. It's not just about… ministry at [Church B] is not just about the members of the [Church B] congregation. It's about how do we extend ourselves to heal and to help people outside of our immediate faith community? How do we serve as a witness to other people for what faith and belief in God and trust in God should be about? How do we help people overseas who are looking to build ministry and connect people to God. It's all of those things I think, that makes it kinda special."

Church B and its members are committed to addressing societal issues through community engagement and partnership with other social-justice oriented organizations. P7 explained, "*I think social action and social justice is a big part of our identity as a church.*" P10 took this another step further, when describing one of her photographs (Figure 5):

> "This photograph is important because social justice is a significant part of our responsibility and our reputation at Church B. [The photo] also emphasizes the importance of collaboration and connection to other congregations. The group exists to better understand the needs of the community."
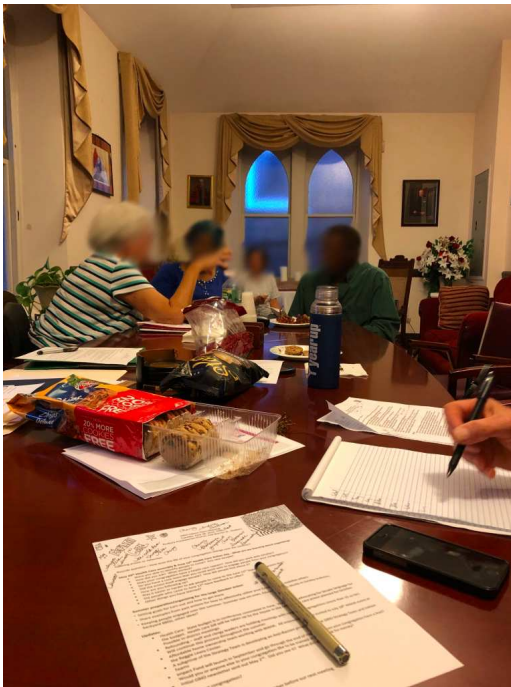
Figure 5: Prophetic Mission: Interfaith Meeting for Social Justice.

Indeed, this photograph (Figure 5) depicts one of many active ministries at Church B that address various issues of social justice. Of note, these ministries are sustained entirely by the efforts of volunteers. When asked directly how technology could augment their Church mission, Church B participants were interested in using technology to support the work of these ministries. P10 asked our team, "*How can the [mHealth] app improve access or identify gaps in potential healthcare availability?*" P10 felt that the application should expand current social justice efforts of the ministries by assisting in the collection of data on racial health inequities in the broader community. Additionally, participants saw potential for technologies to support the current functions of church member volunteers. P6 revealed:

> "you have to have people that are dedicated enough to it that, that's like almost like a part-time job in order to keep it going. And um sometimes when that happens, people get overburdened and overtaxed and burnt out. And um, which is unfortunate but then like people don't wanna do, once they other folks getting burned out- they're like, that's not gonna be me."

Given the denominational mission of social justice work present within Church B, technologies should be designed to relieve volunteer burden while simultaneously augmenting the institution's organizational mission and capacity.

4.1.5 Technology Use in Church B. During the introduction to photovoice session, Church B created two technology categories 'Technology Integration' and 'Technology Outreach.' They returned to our follow up session with many images of types of technology that their church fully embraced.

Worship Technology. In contrast to Church A, Church B uses a number of technologies during church services. These technologies include digital displays to project scripture, worship lyrics, and multimedia auxiliary materials such as images or video to support the message of the sermon. P10 explained, *"sometimes whoever is preaching will, most especially our pastor, will integrate something from a modern video, music video or a movie or something else and you can project that on the screen which enhances the sermon."* To increase engagement and appeal to younger audiences, Church B uses a pre-recorded cartoonish digital avatar to deliver announcements (Figure 3 Bottom). Unlike Church A, personal use technology is widely accepted during worship. P8 stated, "*I use the Bible app, yeah. Everybody seem to go on their phone on Sunday's now. You see the phones, and iPads coming up on Sunday morning.*" It is assumed that church members on their personal devices, including both phones and tablets, are using the Bible app in coordination with service.

Church members who are unable to attend a church due to illness or disability can view a livestream of the sermon on the church website. While this option increases access to the service, participants quickly point out that the option to view from home may reduce the number of people who attend in person. P8 explained:

> "[Points to photograph of greeting during Worship. Figure 6 Left] This one kind of speaks to what can happen…what happens when you are in fellowship together. And this [Points to photograph of camera used to capture services. Figure 6 Right] facilitates, um, people having access to worship but not fellowship."

These juxtaposing images demonstrate the importance of relationship building to church members, and that simply streaming church services does not address that core relational value. P8 further explains the importance of fellowship:

> "It's when you get out and interact with others that you begin to get a sense for where there are areas where you need to grow and, and develop. And it's in fellowship with others who care for you that you actually do begin to grow and develop. It's not simply that they point out how you might develop. How you might grow is that they facilitate and help your [spiritual] growth and [spiritual] development."

Only six of the 83 photographs collected during photovoice were of challenges within their communities. Whereas 34 illustrated various facets of in-person interactions and fellowship. Participants spoke of the power of people and the desire for further connection. Participants from both Church A and B mention wanting opportunities to deepen social connectedness and bridge cultural boundaries, in a way recognizing the necessity of these connections in increasing social capital.

Communication and Coordination of Events. Church B's website includes an updated calendar of events, as well as a number of church-wide announcements (e.g., prayer concerns, birth announcements, and pastor messages). In addition, Church B uses various social network platforms such as Facebook, Instagram, and Twitter

Figure 6: Church B - Left) Fellowship Right) Livestreaming the sermon.

to communicate with current church members. Use of public facing technologies supports Church B's social justice orientation by extending their reach to members outside of the organization. Members of these ministries coordinate events and communicate using platforms such as Slack and YouTube. P7 described the numerous ways the dance ministry used technology:

> "They post YouTube videos. They post instructional videos. They post, um, inspirational words, scriptures. Like when we're going to minister on a particular Sunday, you don't have time to rehearse collectively, So they will create a video and send it out so that we can do it at home. When I say ministering, I mean like dancing. So the movements along with the instruction behind it."

P7 further described how prayer ministry used their Slack channel, "*Putting up our prayer requests, that's [Slack] a pretty big hub for prayer group.*" Even with these communication technologies, participants from Church B point to the potential to improve communication in their church. This includes coordination between the various ministries, communication about ongoing activities of ministries, and church bulletin emails going to spam.

Technology-hosted activities. Prior to the Covid-19 pandemic, the only interactive and synchronous activity that Church B hosted virtually were regular evening and early morning conference calls colloquially known as 'prayer lines.' Such calls were coordinated to facilitate group prayer and meditation. These offerings create opportunities for group activities that otherwise would be missed if limited to events that occur only in person.

4.1.6 Summary of Technology for Church A & B. Church A was founded nearly two centuries before Church B. Our findings show how considerations for types of technology integrated within Church A must honor its historical significance and legacy, as well its attempts to grow its membership. In contrast, Church B has a shorter history and more modern building with a focus on rapid technology integration, as well as plans to increase technology capacity to improve the quality of broadcasted services. Here we see the

importance of resisting deficit-based models of technological literacy in predominantly Black communities and instead encourage understanding the organization's positionality [8]. Differences in institutional cultural and political capital impacts not only how Church A uses financial resources (e.g., money for preservation efforts versus technology integration in the worship hall)—it also impacts the normative digital practices of church members. We may have otherwise wrongly assumed that technological literacy causes these differences in digital practices when comparing both churches. Integration of personal technology into services at Church B (e.g., Bible apps) mirrors personal technology use of many of its church members when outside the church, whereas in Church A, "tradition" and social expectations cause younger members from our focus group to limit technology use during worship.

4.2 Adapting to Societal Forces and Present Challenges

Understanding the origins of both CBOs contextualizes how the organizations adapt to environmental factors and thus gives insight into the current needs. In the case of Church A, the congregation has shifted from the majority of members living locally, to most members commuting to the organization by car for Sunday worship. This is partially due to changes in the neighborhood, including changes caused by our own university. P5 explained:

> "I- in the past I would consider [Church A] a Black church, 'cause I lived in the neighborhood for 30 years - before I moved. But now since the...the...the neighborhood, the neighborhood has re-gentrified I would just call it a community church."

P5 identified these shifts as gentrification due to a predominantly White student population that had since moved into the neighborhood. P5 explained:

> "And that's why I think, when you said, "What is a Black church", because the communities changed so much-.. I don't think that should be the headliner, if they're going to grow the church- because the neighborhoods changin- so you have to be inclusive. You have to think, you know who, that's who will come to your church, is mostly the neighborhoods...history came from, like you said, one of the first Black churches in [State], but you know it's changed, you know, it's all...I would think to be all inclusive you kind of erase that."

This further demonstrates the tensions experienced by church members responding to not only current changes from within the local community, but also a desire to honor the legacy of the church. This tension impacts the ways in which the organization identifies itself. Church A's history as a longstanding CBO within a place defined neighborhood demonstrates the potential challenges organizations may face adapting to external societal forces.

Members of Church A explored further changes to local neighborhood composition, including an influx of immigrant Latinx community members. Several members noted the desire to serve the local Latinx community by inviting them into church. P3 expressed this aspiration when he stated, "*I would hope that we would focus*

Table 1: Summarizing Technology Use in Church A and Church B

	Church A	**Church B**
During Church Service	No Digital Displays in sanctuary	Digital Displays in sanctuary - multimedia content (e.g., videos, pre-recorded announcements with avatar, worship lyrics, images)
Personal Devices In Sanctuary	Limited use	Pervasive Use
Private Worship outside of Sanctuary	Bible App	Bible App; Daily Bread; Daily Devotionals
Communication between Church Members	Primarily Phone Calls	E-mail; Slack; Facebook; Twitter; Church Website
Church Service Broadcast	Synchronous Radio Streams	Synchronous Live Streams

more on being a predominantly minority church, that's uh, that's predominantly Black...we've got Spanish people in the area who, who can't come in the church and have a discussion with anybody." P3 further in conversation defined a minority church as a church with both Latinx and Black community members. P5 added that the religious services and experience of worship are not limited to a single racial identity at Church A. P5 stated, "*I mean, it's predominantly Black. So it speaks to that, but that doesn't mean that it has to be exclusive to the Black person, or Black community-*" During the affinity diagram, participants clarified that "speaking' to the Black experience was important with regard to matters of health, and emphasizing Black history. In addition, music was identified as another key component of their experience of worship, and one that they associated with a Black church.

Church A participants worried about community engagement due to language barriers. P3 expressed frustration with the lack of translation services available to those who live locally to the church community, impacting their ability to come to worship at the church. P3 stated, "*we need someone on a pulpit, who basically will embrace it [speaking spanish]. We have a lot of different ministers but we have, we have no Hispanic ministers. Okay?*" This attitude towards inclusion extended to the design of the application. When describing their church community, the boundaries of community extend beyond the walls of the church and into the surrounding area. They expressed similar expectations for who would be able to access the mHealth app.

While Church A navigated challenges associated with changes in neighborhood composition, Church B struggled with membership fluidity due to annual and cyclical membership changes and rapid growth of the community. P4 described,

> "Because what's happening is, the church has grown tremendously over the years. And there's been a lot of new faces. And you see people coming and going. And part of the congregation is very fluid. You know, people will come because they're here, you know, and they're attached to a school or university or something. So they do their studies so they're at [Church B]. Someone say come to [Church B], so they come. And they're here for awhile, then they're gone."

Members agreed that shifts in community membership, coupled with rapid growth, can lead to a disjointed sense of connection in their community.

Despite Church B's extensive use of communication technology, participants stated that it was easy for people to "*fall through the cracks.*" Even with the proliferation of communication technology within Church B, members identified communication as one of their church's challenges. Participants from Church B included photographs of a meeting dedicated to exploring how to improve communication and foster a sense of community. P6 further explored the problem:

> "I've been in the church since 2002. I'm, I'm not a cliquey person. I'm, I'm not a, I'm not a joiner, you know. But there is a lot, there's a lot of cliques in the church, and I think some people sort of feel alienated, because they don't feel that- They're connected. There are different cultures in our church that tend to hang out with the culture of, um, their parents or of themselves. And, um, I think that bothers some people."

P4 further expressed, "*it's not a congregation that's inclusive, and I think, I think they're trying to change that. I think it's gonna be a uphill battle, but at least they're aware of it and making an effort to do something about it.*" Participants identified this issue as one that the technology system could solve by connecting people in the church community using member identified commonalities (e.g., style of prayer, age).

5 DISCUSSION

Despite calls from the CHI community to address race in HCI [61, 75], we found limited options for paper keywords when uploading this paper into the conference submission system. For example, 'race' was not a keyword option. Similarly problematic, 'faith' and 'religion' were also missing. Inadvertent acts such as this further demonstrate the work our community needs to do to center race, religion, and faith as core areas of study in HCI.

Upon beginning the project, we acknowledged the history of exploitation and abuse of communities, especially communities of color, by academic research institutions [28]. Indeed, the success of a research project is often measured in "knowledge gained" and technology created, with far less emphasis on participant experience in the process or benefit to the community [26]. Mistrust in the research process is even more prescient when designing technology systems. Recent works have enumerated the many ways in which technologies can reinforce racial bias and deepen social inequity [5]. "Color-blind" systems and systems developed with the intention of helping reduce disparities in healthcare, the legal system, and education have been found to unintentionally reinforce racism and discriminatory practices [5]. Understanding these

nuances helps to address community member concerns throughout the project. Given this context, we need ways of centering race in community-engaged HCI.

We have embraced the call to engage critically with race when conducting research and when developing technology [61], and the call for the inclusion of faith organizations in community informatics inquiry [45]. First, we offer a reflection on our process in engaging with race in community-engaged design. We then present design opportunities to support current missions and future goals among churches with predominantly Black membership.

5.1 Reflections on Community-Engaged methods for HCI

5.1.1 Promote community self-identification. The first and second author began the photovoice introduction session explicitly acknowledging their outsider status in terms of both church membership and racial identity. We emphasized that our aim in describing the racial identity of their church was to avoid mischaracterizing their community. In the end, we found that the term "Black Church", while historically meaningful, did not feel totally accurate to our participants. In re-labeling their communities, there was a much richer conversation to be had about the implications of history, and future-oriented missions to promote inclusivity within their communities. Both history and future missions impact not only the label by which church members refer to their communities, but also technology design overall.

Recommendation: We encourage researchers working with communities, especially communities that are already racially labeled, to reject the urge to characterize the community without their input. Our findings emphasize the importance of community self-identification.

5.1.2 Discuss race earlier in the research process. Establishing trust and building rapport between members of the research team and stakeholders in the community is essential to creating sustainable interventions that leverage community resources [12, 44, 65, 82]. From our very first interactions with our partner organization, community liaisons, and potential participants, we fielded questions about personal data use, ownership of resulting technology, and goals of the mHealth application. We informally gauged rapport with participants as they began to ask questions of us, including questions about our own religious background and church experiences. Prior to conducting the photovoice sessions, we had worked with participants directly for seven months building trust and rapport before engaging with race directly. While the topic of race had come up in previous focus groups, it had not been the explicit focus of our discussions. On one hand, having an already established rapport to discuss a sensitive topic helped participants feel more comfortable and talk more openly; however, we acknowledge that having this conversation sooner could potentially have benefited the project overall. Thus, as a community, we must identify additional methods for authentically addressing race at various stages of the research process.

Recommendation: Researchers should critically reflect on ways to approach the discussion of race earlier when conducting community-engaged work. For example, we encourage further design work that focuses on creating innovative methods to spur conversations about race at various stages of the user-centered design process. Such methods and accompanying tool kits would catalyze and make race-focused conversations more commonplace in HCI.

Recommendation: Research teams should consider how to adapt their methods to provide participants with the opportunity to discuss potentially sensitive topics (e.g., the intersection of race and their church experience) with another BIPOC and in a variety of ways. In our work, we adapted the photovoice method by engaging participants in full group discussion, participant pair discussion, and written communication (e.g., worksheets). Including community liaisons as co-facilitators during such design workshops may be especially beneficial.

Recommendation: In addition, research teams should consider volunteering with the community organization outside of their research capacity. Pei & Nardi volunteered to teach 42 two hours of English classes at a Literacy Center, while simultaneously engaging participants in their assets-based work [65]. Similarly, Irani et al. volunteered at a refugee resettlement non-profit organization prior to engaging clients served in the research process [41]. Volunteering signals a greater commitment to the community organization, provides an opportunity to learn more about the organization, and can aid in building rapport.

5.1.3 Take an assets-based approach to community-engaged research. We selected a well-established photo-elicitation method proven to be beneficial as a tool in identifying strengths and assets in community-engaged projects. Indeed, of 83 photos that participants contributed, 63 depicted community strengths (e.g., social connectedness, connections to other faith-based organizations, church-led events, access to professional resources).

Recommendation: Our findings echo those of recent community-engaged HCI [15], and call for a focus on leveraging community assets by incorporating an assets-based approach to design [65].

5.1.4 Choose flexible methods that promote assets-identification. Photovoice is highly adaptable to the community context, and instructions for photovoice can be flexible depending on the goal of the project [39]. In their work with trafficking survivors, Guatam, et al. treated all photos as communal to reduce the burden on individuals to speak about sensitive topics [29]. Similarly, Fox & Le Dantec coupled a photo-elicitation method with a workshop in which cameras were assembled from a kit [26]. Within the context of our project, we adapted the method in a few ways. First, we purposefully kept our prompts flexible and encouraged participants to use the prompts however they interpreted them. For example, two participants interpreted "church community" as extending beyond their home church, and submitted photos of these additional churches as a strength of their community. These photos represented an interconnectedness between local church resources, an asset that we otherwise may have missed.

Recommendation: When conducting assets-based community-engaged research provide participants with open-ended and unstructured methods.

5.1.5 Photovoice method reflections: choose photographic technology commensurate with project goals. For our photovoice activity, participants used their smartphones for data collection. As a result, participants could edit and curate their photographs beyond

what would be possible with the traditional cameras often used in this method. We believe this is a benefit, as it increases participant control over their data collection. Participants submitted photos, screenshots, videos, photos directly from the church website, and historical photographs reaching back up to 15 years. For some research questions, a set time frame or particular format may be preferable; however, we appreciated the temporal approach participants took with their data collection. Submission of photographs outside of the present day provided us with more robust information regarding their church communities, including the impact of significant past events and church members.

Recommendation: Researchers should consider what range of time is preferable for their project and choose a method accordingly. If interested in uncurated photographs of the present day, researchers should provide participants with film cameras. All of our participants had access to a smartphone. As a result, they were able to take screenshots, photos of physical photographs, and submit photos already in their digital camera roll. Thus, if researchers are interested in collecting photographs from a range of time outside of the photovoice data collection period, smartphones equipped with cameras would be an appropriate choice.

5.1.6 Photovoice method reflections: consider a pre-training photovoice session. At the end of the final photovoice session, we asked participants to reflect on their experiences with the photovoice method. Participants endorsed the activity, and enjoyed discussing differences and similarities between their photographs with other members from their church. Having gained familiarity with the research method, participants remarked that they wished they could perform the activity again, and ended our session brainstorming additional photographs that would be helpful in describing their church experience.

Recommendation: If possible, conduct a pre-training session to help participants gain familiarity with the entire photovoice process prior to the larger photovoice activity. In their work, community historians, Fox & Le Dantec reframed their pre-training as a camera-building workshop activity that immediately benefited community members [26]. All of our participants had access to a smartphone and most were comfortable taking photos, videos, screenshots, and submitting photos from their digital camera roll; however, researchers should consider training participants on these methods. Doing so would ensure that participants begin the photovoice project with baseline comfort with and knowledge of the multitude of ways that they could use the technology. Thus, A pre-training session could facilitate skill development in both photography and narrative storytelling, and enhance participant experiences of the session.

5.1.7 Photovoice method reflections: reduce participant burden. In our effort to anchor the photovoice sessions, we encouraged participants to take photographs of all the categories that were generated (8 categories for Church A; 9 categories for Church B). Some participants reported that they would have preferred fewer categories. We realize that this approach may have made the design activity less democratized by potentially burdening some participants.

Recommendation: In future work, researchers should consider how to reduce participant burdens, including that of data collection and of storytelling. To reduce the burden of data collection, we

could have emphasized that not all categories or prompts must be captured, limited the number of categories created, or spread out categories over multiple sessions. To reduce the burden of storytelling on an individual, Gautam et al. asked participants to annotate their photo submissions as a group during a design workshop [29]. Alternatively, with improved technological capacity, researchers could use an online platform for group photo submission. Doing so could provide flexibility by encouraging full photographic representation of all categories while simultaneously decreasing the number of categories each individual would have to contribute. Participants could post their photo submissions in real-time for other group members to see, respond to, and curate prior to an in-person focus group.

5.2 Church Missions & Future Trajectories

5.2.1 Identity v. Inclusion. In our work, we focus on the development of an mHealth technology system for Black Christian communities; however, there are many other types of faith communities, including different denominational practices, congregations, and faith-based organizations. We contribute to HCI research on technospiritual design and on race by examining the intersection of these two domains of inquiry. Specifically, our work represents a case study of the nuances inherent in designing for the intersectional identities of race and religion. Our larger research project focuses on two churches with predominantly Black membership located in the same major city and within the same partner organization, and yet we see incredible diversity in technospiritual practices between and within each organization. This contrast demonstrates challenges for designing technologies for organizations that, from an outside perspective, appear quite similar in race and in core beliefs. Both churches are known to the public as 'Black Churches'; however an assumption of across the board similarity would be misinformed.

The importance of Church A's legacy as being one of the first Black churches in the state reflects an intersectional identity of religion and race. Similarly, members of Church B reflected the importance of maintaining a connection to Black identity and African American religious tradition throughout our conversations. In our findings, we demonstrate that participants in both churches have a desire to embrace other cultures, while still honoring their legacy and preserving Black History. In Church A, addressing language barriers to serve the local community, a mission integral to the history of their organization, is a priority. Thus, a technological representation of the atmosphere both churches aim to create would include Black History while simultaneously welcoming other cultural identities. As such, for this church, a misinformed design might be an mHealth application that celebrated Black History and Black Culture, but did so in absence of any other cultural identities.

Our findings point to shifts in the racial and ethnic identities of church communities. Church B has had success in rapidly growing their membership. Since the early days of the church, they have incorporated technology, and they continue to foster a synergy between technospiritual personal use both within and outside the Church walls. Even with the pervasive use of communication technologies, Church B members shared feelings of exclusion due to socioeconomic status, as well as an influx of new members.

These findings demonstrate a need for sociotechnical interventions designed to nurture a sense of belonging in a CBO. Fully offline solutions, such as local Bible study groups, dissolved due to lack of community capacity; however, fellowship opportunities hosted entirely online are still likely to fail due to the value placed on in-person fellowship. Thus, future work should explore how hybrid online and offline sociotechnical solutions can support CBO values by fostering a sense of belonging and deepening a sense of social connectedness in religious communities. Such work would extend existing research on social computing in place-based communities [32, 63] by demonstrating the particular challenges and affordances raised when studying the intersection of racial identities and religious communities.

5.2.2   "Innovation" vs. Sacred Spaces. Engaging younger church members is a secondary goal of the church, and our participants posit that technology may be an answer for recruiting younger families and young adults. However, concern remains that technology integration could sit in tension with tradition. Utilizing technology to address such a challenge requires great sensitivity to values central to this particular organization. The extensive preservation efforts in Church A may speak to the value that the community places on not only a traditional space for worship, but also a physical symbol and catalyst for social action within the Black community. Gaver et al. considered the importance of both materiality (e.g., aesthetics, cultural significance) and functionality when designing a device to support prayer among closiderted nuns [30]. Their design team was careful to understand the cultural significance of the space and of the religious practice (e.g., need for ambience in both physical form and sound). Their formative work led them to create an unobtrusive artifact that respects the core values of the population (e.g., their physical prayer space) while simultaneously adding meaningful functionality to their spiritual practices. Similarly, recommendations to embed technology in sacred church spaces may not be desirable for all predominantly Black church communities, and may not address some of their most valued and prescient missions. There instead is a need to understand these historic buildings as assets despite the potential constraints they may place on technospiritual innovation.

As mentioned in our findings, we uncovered a tension between church members using technology for spiritual practices outside of Church A, but limiting their use inside the sanctuary. In comparison, Church B members used technology both inside and outside the church walls. Our findings suggest that for Church A, relying on physical Bibles and Hymnals allows church members to reflect their own cultural positionality on the value of knowledge of the Bible as a physical text. Buchannan et al. detailed a similar phenomenon of signaling literary cultural knowledge among bookshop customers. They observed the social benefits that customers experienced when demonstrating their knowledge to bookshop owners. They posit that such social practices could be lost if fully replaced by digital services [9]. Similarly, with the installation of digital projectors to display Scripture, the church may lose both their traditional worship environment and the ability to express their cultural knowledge of the Bible.

Perspectives on the role of technology in sacred spaces and in private and public worship varied between churches and among members of the same church. These distinct perspectives demonstrate how churches attempt to work through the tension between "innovation" and preserving the integrity of their buildings. There is a need for design methods that help churches explore the tensions of innovation and sacred space. These methods could help church communities move toward consensus on the role of technology in the church, as well as provide a better sense of the implications of such technological integration. Such methods would expand upon recent work at the intersection of architecture, culture, faith, and information and communication technologies [56].

5.2.3   Supporting Church Mission and Social Activism. In HCI, there has been both a growing interest in the design of technologies that address issues of social justice [23, 25], as well as calls to center voices from traditionally marginalized populations within design processes [70]. The Black Church is an important site for both past and present social justice efforts [79]. In examining the core missions and identities of both church communities, it became clear that Church B's identity was rooted firmly in social justice and social action activities. While not all churches with predominantly Black memberships have a social action orientation, those that do may be potential sites for the development of civic technology innovations that amplify social justice efforts paramount to the specific community. Such efforts require the design of flexible tools to assist in the identification of community resources, and in building community capacity. As with many CBOs, the mission work of the church is accomplished almost entirely through volunteer efforts. HCI researchers should examine how technology is already being used to support the goals held in the context of churches with predominantly Black membership and potential challenges of technology integration. Tools to support social justice should connect members within their church community, while also building connections to a broader network of organizations with complimentary capacities. We recommend that future work explore this potential design space.

6   CONCLUSION

Through our photovoice study, we investigated the intersection of racial identity and religion in the context of designing technology for two community based organizations. Our findings speak to the intricacies of community identity, namely how members balance honoring legacy with current culture and future goals, and the implications for designing sociotechnical systems embedded within community organizations. We provide reflections on our method of engaging with racial identity in community-engaged HCI, and discuss design opportunities for technology to augment church community missions and future aspirations. Our work contributes to research on how to design technology that is both for and meant to augment multicultural community organizations.

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