



“I was able to give her the confidence”: Reciprocal Capacity Building in a Community-based Program for Digital Engagement

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ABSTRACT

Assets-based approaches emphasize the importance of leveraging and building upon community strengths. We describe how a community-based digital capacity building program, Community Tech Workers (CTW), addresses the goals of assets-based development by hiring local residents and students to serve as tech support personnel for underserved minority small business owners in Detroit. Through interviews and observations, we examine how reciprocal relationships between tech workers and small business owners are critical to the success and sustainability of the program. We find that tech workers and business owners mutually benefit by 1) building confidence in technology together, 2) having business owners provide reciprocal guidance in professional development, and 3) fostering mutual appreciation and commitment to community development. We conclude by introducing the concept of *reciprocal capacity building* to HCI and discussing how it provides a potentially more equitable approach to community-based interventions.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI.**

KEYWORDS

Small businesses, entrepreneurship, assets-based community development, community-based research, digital engagement, underserved, Black-owned businesses

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1 INTRODUCTION

Over the past years, human-computer interaction (HCI) research has outlined the impact digital advancements have had on the day-to-day operations of micro-entrepreneurs and small business owners [5, 24, 43, 48]. Business owners are now pressured to implement a library of digital tools, including inventory and point-of-sale systems, online ads, social media, and websites, among many others. However, the labor needed to meet these technology expectations disproportionately affects small business owners in underserved minority communities [5, 30], reflecting prior work showing that marginalized groups face significantly greater barriers when adopting digital tools [19]. People living in urban centers with readily available access to transportation, disposable income, and time have easier access to digital training, whereas small business owners in underserved areas with limited transportation and technology access must put in additional labor to become digitally engaged [5]. Yet, interventions to support digital literacy among underserved minority small business owners are still a relatively nascent area of study in HCI [30, 43]. HCI researchers have implemented programs that provide technical assistance to entrepreneurs, highlighting the value of readily available tech guidance. But, further work is needed to understand how these programs are introduced in underserved minority communities¹ where infrastructural support and financing are limited.

In order to develop inclusive digital capacity-building programs for small business owners, we learn from the long history of research on digital literacy training programs and interventions [11]. While many digital capacity-building programs have been proposed, most are implemented in a hierarchical fashion where knowledge is passed from tech workers—volunteer or hired technical personnel who are often outsiders to the community—to community residents. This hierarchical setup is often a function of “needs-based”

¹We use the description “underserved minority community” as this is how our community partner chooses to define the neighborhood’s demographics. While the community partner is proud that the program has been primarily serving Black women-owned businesses, they felt that the term “underserved minority” was a more inclusive description of who they are aiming to support—small business owners in a low-income neighborhood who also happen to be racial minorities



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approaches to community-based interventions and the core of many critiques in development literature [28, 52–54]. Researchers and practitioners have argued that “needs-based” approaches ultimately cultivate support structures that denigrate the community by highlighting problems and deficiencies of those receiving services, setting up communities to rely long-term on external help [52–54]. We offer an alternative to this top-down model by describing how an assets-based approach can foster more equitable relationships between tech workers and community residents and in turn, improve the strength and sustainability of community-based digital capacity-building programs.

Assets-based community development is considered a more ethical and sustainable approach to development that acknowledges and builds on community members’ strengths and capacities [44, 52–54]. In HCI, prior work on assets-based community development has primarily focused on the relationships between researchers and community members in terms of establishing trust, enabling care, and encouraging participatory collaboration [10, 79, 81]. Yet, few studies have examined the relationships developed within the intervention, specifically between program providers and community members. Making this distinction is critical because to sustain the program, the program providers and receivers must continue to engage long-term as the research team steps away. We study these relationships in the context of underserved minority businesses, where the program providers are community tech workers and program receivers are small business owners.

We ask, *How might an assets-based digital capacity building program foster more equitable and sustainable relationships between community tech workers and underserved minority business owners?* We study this question via a digital capacity-building program that we developed and implemented in an underserved, primarily Black neighborhood in Detroit. This program hires a mix of local residents and university students as Community Tech Workers (CTWs) who provide one-on-one support for local small business owners. The goals of this program are three-fold: 1) To strengthen the small business/entrepreneurial ecosystem of support for digital engagement by 2) introducing a community-based intervention that scaffolds digital engagement for business owners, which in turn 3) provides employment and career pathways in technology-based jobs for tech workers. The program being studied was introduced as an alternative model to existing digital training approaches by building the digital capacities of business owners as well as the professional capacities of novice tech workers, such as skills needed for careers in technology and/or entrepreneurship. Unlike other digital literacy programs that employ established technology professionals, this model, called Community Tech Workers (CTW), hired young adults (Ages 18-21) who had limited employment experience.

The program was launched in August 2022 and has since served 178 business owners with various technical goals, such as how to build a website, adopt search engine optimization, and manage social media. While this intervention addresses the higher-level goal of building digital capacity among local business owners as described in prior work [31], in this study, we take an intimate look at the relationships established between business owners and the tech workers through interviews and observations of their interactions. Our data highlights the reciprocal nature of support between local business owners and tech workers, which in turn shapes the growth

and success of the program and community overall. Specifically, we find that tech workers and business owners help each other grow by 1) building confidence in technology together, 2) having business owners provide reciprocal support in professional development, and 3) fostering mutual appreciation and commitment to community development.

Our work offers several contributions to advancing scholarship in HCI and computer-supported cooperative work (CSCW). First, we contribute empirical results from our analyses of interviews and observations of tech workers and community members. These results exemplify reciprocal capacity building in the context of tech support for local businesses. Second, we extend how prior HCI and CSCW researchers frame care—moving from a commitment to well-being to include mentorship and subsequently fostering new skills and strengths development. Third, we present a case study of how the CTW program employs local young adults in an official role of tech support where they are paid for their labor, providing opportunities for them to advance their careers, thus responding to calls for alternative economic models within communities [16, 42, 78]. The CTW program also challenges traditional teaching models associated with hierarchies of expertise and lays a foundation for community members to adopt and sustain the program themselves in a train-the-trainer approach.

2 RELATED WORK

2.1 Approaches to Digital Capacity Building

As digital technologies become increasingly embedded in everyday life, digital capacity-building programs are more necessary than ever to reduce the socio-technical gaps that inhibit underserved populations from accessing critical resources and opportunities. The use of digital tools regulates access to healthcare (e.g., scheduling appointments), education (e.g., completing assignments), and employment (e.g., applying to jobs), among many other necessary day-to-day tasks. In turn, digital capacity-building programs have been studied in a variety of contexts [11], including in health informatics [56] and libraries sciences [14, 39], and among older adults [50], returning citizens [61], and in the Global South [40, 59, 65]. Research in these areas highlights that while digital advances could improve constituents’ lives, technological access and digital literacy barriers further widen socio-economic gaps. For instance, some researchers studying health digital literacy see the use of technologies as an opportunity for more equitable delivery of care [6], while others point out that those with limited digital literacy will have an even more difficult time making appointments and communicating with health professionals [23]. Researchers studying educational technologies in the Global South initially heralded technological interventions, like the One Laptop Per Child initiative, as more equitable approaches to technology access, only to realize that these interventions rarely succeed without parallel infrastructural investments and community buy-in [30, 76]. These examples highlight that providing new digital tools is not enough to bridge socio-technical gaps in digital access and use. Instead, additional supports like digital capacity training programs are also needed.

Researchers studying digital capacity-building programs have outlined three aspects central to training programs: (1) the learning

environment in which the training occurs, (2) the program components, which include the specific activities and courses, and (3) the learning outcomes, which involve the changes in attitudes and abilities [14]. Whether an external or internal entity in the community provides instruction, meeting these requirements remains challenging for program sustainability. For instance, many digital capacity-building programs in the development literature have been criticized for relying primarily on externally provided interventions [54]. Yet, other programs embedded within communities also face their own challenges with long-term staff commitment and funding [39].

In this study, we focus on the first component of the learning environment in terms of who is involved in providing the instruction and their relationship with the learners. Recently, HCI researchers studying digital capacity building in underserved contexts highlighted the importance of relationship development between learners to motivate engagement with digital training and build confidence in their abilities [4, 49]. For instance, Lee et al. describe how learning digital skills with peers experiencing similar life difficulties helped them access social support, such as keeping up with online lessons when dealing with personal issues like family health and evictions. While this prior work investigates relationships between learners, our study advances scholarship by exploring relationships between the learners and those leading digital support (i.e., community tech workers).

2.1.1 Digital capacity building for small businesses. While prior work has analyzed digital capacity-building programs for general day-to-day activities (e.g., email, scheduling doctor appointments [4]), few researchers have studied or implemented digital training programs for small businesses. Community informatics researchers have pointed out the digital engagement of entrepreneurs as a potentially rich area of investigation, given its opportunity to support community economic development [71]. Prior work in HCI has focused primarily on how small businesses or micro-entrepreneurs use digital tools to sell products [38], coordinate customers [33], and access social support [32, 37]. More recently, HCI researchers have taken a more action research approach to enable digital engagement among small businesses. For instance, Kotturi et al. set up a Tech Help Desk in a local co-working space to provide one-on-one digital support to entrepreneurial residents [43]. These programs outlined the long tail of computing challenges and the need to better understand how to facilitate one-on-one technical guidance for business owners.

2.2 Assets-based Approaches to Community Development

Researchers in the field of Human-Computer Interaction (HCI) have been advocating for strategies that emphasize a community's strengths to enhance digital engagement. In contrast to "needs-based" interventions, assets-based approaches leverage a community's existing capacities to ensure the sustainability of proposed interventions [2, 10, 21, 34, 41, 49, 62, 79–81]. Assets-based approaches do not necessarily mean ignoring a community's needs, but instead, advocate for starting projects by acknowledging existing strengths and leveraging local assets to address issues. Assets-based approaches overlap with other community-based approaches,

like community-based participatory research (CBPR), which highlights equitable community engagement throughout the project process [27, 35], and care-based approaches, which emphasize a relationship of care when engaging with community partners [41, 55].

Recently, researchers in HCI have applied these approaches to study the social aspect of who is involved in technology learning environments, which is the focus of our study. For instance, Karusala et al. describe how taking a care-based approach to instruction helps develop a greater sense of ownership, interdependence, and community in technology-enhanced learning environments [41]. In this case, instructors showed care by taking time out of the classroom to engage with parents and check student progress, which built trust and commitment to the learning program. Another example involves identifying the assets of human trafficking survivors and leveraging their strong interpersonal connections to develop technologies that promote mutual learning and interconnectedness [81]. Similarly, researchers performing community-based research have highlighted the importance of developing trust between researchers and community members [47] and community members and intermediaries like community organizations [15, 17, 36]. While assets-based approaches highlight the importance of building community members' strengths, little research has *also* explored the capacity building of program providers.

3 METHODS

3.1 Context

This study takes place in the East Jefferson district² in Detroit encompassing over 500 micro-enterprises distributed among five historic neighborhoods, most of which are accessible by foot. These enterprises are predominantly Black-owned and span industries such as restaurants, retail, and, increasingly, e-commerce. Many of these businesses have expressed the desire to adopt digital tools [31] but face barriers to integrating technology into their operations, leading to reduced profitability. Furthermore, local business organizations are keen on sponsoring programs that support digital engagement but have yet to implement programs to meet this demand [31]. According to U.S. Census data [9], 45% of the residents live below the poverty line, 52% of people of working age are unemployed, 29% of the residents drive more than 25 miles to their main jobs, and residents, on average earn less than \$1,250 a month—highlighting opportunities for local businesses to fill employment gaps and bring income into the community. Yet, prior research notes how resources and capital for business funding are less often provided to neighborhoods outside the city center [66]. Given the interest of local business owners and neighborhood organizations to engage in digital inclusion efforts, this particular area posed as a promising location to initiate the CTW program.

3.2 Community Tech Worker Model

The Community Tech Worker (CTW) program builds on prior initiatives to enhance digital infrastructure for small enterprises and underserved communities [43, 49]. Our inspiration for the CTW program stemmed from the well-established Community Health

²Despite being called a "district" officially, we use the term "neighborhood" for the remainder of the paper as this is the language used by the community partner.

Worker (CHW) model, in which community members act as intermediaries between healthcare consumers and providers, thereby promoting health within groups that historically faced limited healthcare access [51]. These CHWs usually share cultural background, socioeconomic status, life experiences, and language with the communities they serve. The CHW framework has successfully enhanced health outcomes and diminished health disparities among underserved populations [25, 73, 77]. Our Community Tech Worker initiative adheres to these foundational principles by engaging tech workers, some hailing from the local neighborhood and others from the broader metro area of the city. These individuals undergo training to provide culturally sensitive assistance, aligning with the community-oriented ethos of the original CHW model. Inspired by CHWs, the CTWs model was carried out by enlisting, educating, and deploying dedicated tech workers within a community development organization. Their primary role was to evaluate the technological requirements of local businesses and offer personalized one-on-one assistance.

3.3 Project Team and Implementation

The project team consisted of three main entities: 1) two leaders from a university-based entrepreneurship program (the University of Michigan Detroit Neighborhood Entrepreneurs Project), 2) three university researchers, and 3) a community partner (Director of Neighborhood Resilience, Safety & Business District Services at Jefferson East, Inc.). The university entrepreneurship program has been serving Detroit small businesses for seven years by providing free accounting, legal, marketing, business strategy, and design services. They set this project in motion by reaching out to university researchers who proposed the idea of creating a technology support program for small businesses. The community partner was chosen based on their interest in the program and existing resources (i.e., a neighborhood tech hub) that could support the implementation of the program locally.

Together, the team followed principles from community-based participatory research [27, 35] and asset-based design and development [44, 52–54]. These approaches built the foundation for establishing the community-university partnership that focused on early expectation setting, shared responsibilities, and mutual effort throughout. For example, the team identified which team members would be involved in program design and implementations vs. data collection or both (early expectation setting); team members would step in for each other when one was unavailable to lead program management (shared responsibilities); and all committed to meeting weekly or biweekly for the duration of the program (mutual effort). During the early stages of ideation, the project team held various conversations with community organizations throughout the city to understand interests in business tech engagement and establishing a tech support program. While the university team members proposed the initial program idea of hiring local residents and students to serve as tech support, the early collaboration with the community partner established the details of how this program would be carried out.

The community partner worked closely with the university team members to identify and hire tech workers as well as develop and implement the training curriculum, which we plan to evaluate in

future work. The initial round of training was developed and implemented by the community partner, the university entrepreneurship program, and the first author researcher. The two other university researchers attended some training sessions and participated in weekly meetings. After the tech workers were trained and started working with business owners, the first author university researcher stepped back from program implementation and worked with the university researchers to focus on data collection and analysis. The community partner and university entrepreneurship program are currently sustaining the day-to-day operations of the CTW program. Another research assistant was added later to help with data collection and analysis.

3.3.1 Positionality of Project Team. Our approach has been deeply shaped by the team's collective experience working with small businesses and general residents in the study area. The community partner representative grew up in a neighboring area where this study took place and has been working in the neighborhood organization for five years. Another member of the university team has led a university program for seven years that provides free practical and tangible services to business owners in the city. The remaining researchers on the university team have at least six years (collectively 46 years) of experience performing research with underserved minority residents in the Midwest city. While all team members are invested in the economic development of underserved areas of the city, we align ourselves with assets-based development values that emphasize the importance of steady and purposeful growth that prioritizes local assets over quick economic advancement. These values are represented in the choice to hire and train local residents rather than rely on external volunteer or professional support, as other tech capacity-building programs have done [14, 43]. Furthermore, we acknowledge that our prior work and cultural experiences have shaped the direction of the program design as well as how we analyze the data.

3.4 Participants and Data Collection

3.4.1 Community Tech Workers. There were a total of seven (5 women and 2 men) tech workers hired during the program. Two tech workers with the longest tenure in the CTW program (1.5 years) are local residents of the neighborhood, but not university students. Another tech worker who has worked for 14 months until present is also a local resident as well as a university student. The remaining four tech workers are university students, two from the greater Detroit metro area and two from out of state. These four tech workers worked for the program between two and seven months (an average of 4.5 months). Tech workers from the neighborhood were recruited through public job postings on community organization listservs. Two of the tech workers from the neighborhood were referred to the CTW program by a local youth program leader. Tech workers from the university were recruited by public job postings on university listservs. Fifteen candidates applied, and seven were hired over the course of the program. One person was hired from the neighborhood early on, but dropped out two weeks later to pursue another full-time job. The tech workers were ages 18 to 21 (average 20 years old) when they started the CTW position and identified as only Black/African American (n=3), only White/Caucasian (n=1), Hispanic or Latino/a/x and White/Caucasian (n=1), only Southeast

Asian (n=1), and one preferred not to say. None of the tech workers had held a full-time in-person job prior to starting the CTW position. We also were open to recruiting any age for the CTW positions, but all the applicants were young adults.

The university researchers interviewed six tech workers to understand their experiences being trained, engaging with business owners, and working with each other. Data from questions about business owner engagement were most relevant to the research questions in this study. Example interview questions included, “What has been most challenging about working with business owners?” and “How has the program changed how you see yourself as a professional?” Interviews lasted 30 minutes to 1 hour. Four tech workers were interviewed twice, given their tenure in the program, while two tech workers were interviewed once. We refrained from interviewing one tech worker who only worked two months (due to academic scheduling conflicts) as she spent most of this time training and had limited interactions with business owners. In addition to interviews, we observed client meetings between tech workers and business owners throughout the 1.5 years of the program. Client meetings between tech workers and business owners lasted about one hour and took place in person, on Zoom, or on the phone. We primarily observed the in-person meetings, which took place in the community partner organization space. We took notes throughout these observations, distilling key takeaways to inform the eventual data analysis.

3.4.2 Business owners. We interviewed 12 small business owners served by CTWs (11 women, 1 man) based in Detroit’s Eastside. We reached out to the 178 business owners served by CTWs by phone and email for an interview, but only eight responded. Another four agreed to be interviewed by the community partner for public panels (one participant overlapped). The majority of businesses served were women-owned, explaining the skew in interviewee genders. We expected a low interview request response rate as business owners are a particularly busy population with limited time. We also only reached out to business owners twice for interviews to limit bombarding them with requests. The interviews reached saturation in terms of themes relevant to the research questions, especially in combination with data from observations of client sessions. Of the business owners who agreed to share their demographic information (n=59), ages ranged from 29 to 74 years old (average of 52 years old). They identified as only Black/African American except for two who identified as White and Black/African American, three as White, one as Hispanic, Latino/a/x, or Spanish Origin, and two as some other race, ethnicity, or origin. Business owners represented a variety of industries, including Accommodation, Food Services, Agriculture, Arts, Entertainment, and Recreation, among many others.

Business owners were asked about their experience working with the CTW staff, particularly what they sought help with, how tech workers made them feel, and whether they benefited from the interactions. For example, questions included, “Could you walk us through a scenario working with a tech worker?” and “What unique skills or personality traits did the tech worker exhibit, and how?” Interviews lasted 30-60 minutes and were performed by phone or in person. All business owners interviewed were compensated \$20 for their time. This study was approved by the university IRB board.

3.5 Analysis

In order to answer our research question, *How might an assets-based digital capacity building program foster more equitable and sustainable relationships between tech workers and community residents?*, we performed a mix of open and provisional coding [69] of interviews and observation notes. Two authors performed the data analysis in which they reviewed interview transcripts and observation notes and developed a codebook together. The initial codebook categorized data inductively according to interview question topics. For tech workers, we created a list of codes including general topics like “Motivation to join program,” “Challenges with providing tech support,” and “Relationship with technology.” For business owners, initial codes included “Relationship with technology,” “CTW expectations,” and “Experiences with troubleshooting,” among others. We then performed a second round of coding, analyzing the data through the lens of assets-based development. Specifically, we coded the data for instances where tech workers and business owners expressed building skills and confidence as a result of engaging in the program. For instance, within the existing “Relationship with technology” codes, we identified instances where this relationship was shaped or changed through engagement between tech workers and business owners. Through this second round of coding emerged the final themes of how tech workers and business owners built confidence in technology together, engaged in reciprocal support for professional development, and established stronger connections and commitment to the community overall.

4 FINDINGS

Since the program’s start in 2022, the CTW program has served 178 small businesses in the Jefferson East neighborhood of Detroit. In seeking to understand how a digital capacity-building program could foster more equitable and sustainable relationships between tech workers and community residents, we found that examples of reciprocal support that uplifted each others’ confidence and skills were critical in fostering these relationships. First, we found that tech workers and business owners built confidence in technology together, which helped establish mutual empathy and the foundation for reciprocal capacity building. Second, we describe how business owners were enthusiastic about reciprocating support to tech workers by providing professional guidance and encouragement. Finally, we found that these relationships and experiences through the CTW program helped establish greater awareness of and commitment to building community assets overall. For anonymity, pseudonyms for business owners were chosen through a random name generator.

4.1 Building confidence in technology together

We found that the mutual experience of learning about technology increased empathy between tech workers and business owners, which motivated greater patience and empathy on both sides. Even though tech workers were relatively comfortable using general digital tools (e.g. using social media), they still spent significant time learning digital skills relevant to small businesses, such as scheduling online posts, using search engine optimization, and setting up point-of-sale systems. In many ways, both tech workers and business owners were relatively new users of these systems. Some business owners reflected on their age as a weakness, expressing

how they did not grow up in the digital era. Conversely, as we will see later, others saw their age as a strength because they could offer mentorship. One business owner expressed being surrounded by younger people who could easily help her with technology needs but felt hesitant about asking them for help.

Sometimes I don't know what to ask. It's back to not knowing what you don't know... My upbringing was very different. So to even show me how to get on my Zoom or how to do different things, add effects to pictures, filters, all that kind of stuff, I learned from kids. I know they don't naturally know it. But it just feels that way because they were born into this technology age that I wasn't born into. I kind of like grew into it. -Kay (food business owner)

Kay found that comparing herself to the younger generation introduced feelings of inadequacy. While tech workers expressed the value of growing up using digital tools, they also experienced fears of being inadequately skilled to address business tech questions. Business owners did not want to appear out of touch with technology and were hesitant to expose their lack of tech knowledge, while tech workers were concerned that they would not meet the business owners' expectations. For instance, one tech supporter initially expressed,

I was worried that I wouldn't have all the tech skills to help every single business with their individual needs. I want to have every single qualification that's listed before I apply to something. -Patrick (CTW)

But, once he gained experience working with businesses, he realized that they valued his desire to problem solve and persevere just as much, if not more than, his initial tech skills:

Now that I'm here, knowing that every single business I work with is going to require learning something new and reaching out to people who can help me, **I know that like I don't need to know everything. I just know I need to know how to find out all this information.** -Patrick (CTW)

Through this program, both tech workers and business owners realized the importance of self-directed learning in order to build digital skills. For the business owners, this meant reaching out to the program, acknowledging gaps in knowledge, and stating technology goals. For tech workers, this meant sometimes admitting to not knowing the answer but then committing to troubleshooting the issue for the client. By expressing to each other their limitations and commitment to growth, they could engage in social learning, which has been shown to be critical for building confidence in technology, especially in underserved communities [49].

In other digital support services, experts are hired from companies (e.g., Geek Squad³), or professionals are brought in as consultants. For instance, one of the business owners was nominated by a large corporation as an up-and-coming business in the area and was provided free website building services from a graphic design company. These are examples of more "top-down" services where

there is a clear distinction between someone who provides expertise and someone who receives help. While the CTW program served as tech support for small businesses, it was proposed as a more "community-based" approach to providing digital support with the dual goal of 1) providing business owners with tech support and 2) training tech workers for careers in technology fields. However, it also served as an approach to learning more about community and economic development. The hired tech workers for the program were novices, and in most cases, this was their first full-time job.

Experiencing the challenge of learning how to provide tech support helped build empathy with business owners, thus motivating greater care and compassion when engaging with clients who felt inadequate when learning new tools. All tech workers called out the importance of patience and encouraging business owners in their capacity to learn digital skills as critical to developing trusting relationships. For example, this was exemplified in the relationships between one business owner (Kishana) and her tech supporter Rosie. Kishana developed a phone application that helps people organize their closets and suggest outfits. Despite the clearly technical nature of this application, she did not feel like she had sufficient digital skills to create and manage her social media content. She explained that only after working with tech workers did she become truly excited about the creative process of using digital tools.

The way Rosie and I worked together to present the idea, [she] helped me, like, mix the audio. **I felt like I was in the lab like I was in the studio. There's this confidence I have now.** Guess what? I'm a creative... I've tapped into this side of me that I have always boasted on saying I'm not. -Kishana (fashion business owner)

Rosie explained that when starting the position, she was also not confident in her technology skills or her ability to engage with clients. She shared, "I was just the shy kind of person. I don't like public speaking." Since starting as a CTW, she has worked with over 60 businesses and has built confidence in her tech abilities as well as how her identity as a local resident supports her in being a successful tech worker:

I'm a member of this community. So it's like, when I see a business around here, I probably already walked into their business, you know, supporting things. So when I talk to them, **I talk to them more like just as a person instead of a business owner, that kind of gives us that connection.** -Rosie (CTW)

Business owners repeatedly point out that connection she refers to as a critical asset to the CTW program. While not all tech workers are local residents, business owners expressed knowing that the tech workers were learning alongside them and troubleshooting with them, which made them feel more comfortable in their own journey to becoming more digitally engaged. Overall, we found that having the business owners and tech workers build confidence in technology together is an asset in overall community capacity building and mutual empathy.

³A Best Buy subsidiary that offers on-site tech support [1]. Best Buy is a consumer electronics corporation based in the United States and Canada.

4.2 Reciprocal Support through Professional Development

While CTWs provided digital guidance to business owners, business owners, in turn, supported tech workers in their professional development. These relationships highlight how an assets-based intervention instills in program recipients (business owners) a sense of responsibility and pride in giving back to the program providers (tech workers). This sense of responsibility on the business owners' side to provide reciprocal support is the core of our findings and an exchange rarely observed in digital training literature.

In many ways, the tech workers were learning just as much from the experience as the business owners. Even though business owners were receiving free tech support, the relationship they developed with tech workers helped them commit to showing up to follow-up meetings in which business owners and tech workers mutually benefited. For instance, one business owner described how they served as “mentors”:

They [the business owner] will be kind of more like mentors. So, they will challenge [the tech workers], you know, to develop their coaching skills, because that's what they're doing. They are coaching even though it might be their first job. You [tech supporter] are in a position of coaching a business owner, and that business owner may be a quite an experienced business, it might be a mature person who might be old enough to be your mom or dad.
-Velonda (food business owner)

While many business owners blamed their age for the limited technology skills (as described in the section before), others saw their age as an asset in the CTW ecosystem. They knew their skills lay in the years of experience running a business, and even though they needed to learn new digital skills, they felt that they could reciprocate by providing guidance on how to be a “professional.” When asked how they supported tech workers, business owners lit up during interviews, expressing pride in how their expertise as a business owner was beneficial for the tech worker whom they saw as up-and-coming young adults. For example, one business owner who runs an entertainment business described,

I really liked that this program is utilizing the local people. So I'm happy to work with them and to let the young people use their experience and their skills and get this professional development... I feel like **my professionalism and my approach to managing people and helping people has given the [tech workers] a model of being professional as well as inspiring them.** -Edith (entertainment business owner)

Similarly, another business owner expressed that “the true sign of education is really not all the big words you use. It's how you can get a person who doesn't understand a complex concept.” By signing up for the program services, they knew upfront that the tech workers were not (yet) experienced service providers. Rather than dismissing the program, business owners saw this as an opportunity to educate the next generation in exchange for free technology support. Other business owners described how participating in the

program helped tech workers learn to “deal with an array of people.” The tech supporters were highly cognizant of this generational gap and expressed their own fears about providing digital training to those much older than them. One tech worker who grew up in the neighborhood expressed his initial concerns,

With us being young and a lot of these business owners are on the older side. They've had these businesses for 10, 20, 30 plus years. **They don't always want to feel like someone is coming into their business, trying to change things, trying to make them feel like they're inferior,** or they can't do certain things. So that was a big worry. -James (CTW)

The business owners picked up on the hesitancy of the tech workers to advise older adults and jumped at the opportunity to encourage them. During client meetings, we observed various instances where business owners praised tech workers for their friendly demeanor and technology skills. For instance, in the middle of a session with James, who expressed the concern above, the business owner paused to compliment him:

Nailah (business owner): How old are you? Child. What degree are you doing in school?

James (tech supporter): [shrugs] I'm not in school.

Nailah (business owner): **You should be doing a degree in this!**

-[later at the end of the session]-

Nailah (business owner): I really appreciate this. You don't even know! The way you just zoomed through this, it was googly gosh. You're so young! **Somebody raised you right. Did your grandma raise you? You have a bright future.**

This business owner, whose business is a professional stylist company, had five meetings with CTWs in which she learned how to update her website and share social media posts. In each of these meetings, she continued to encourage the tech worker about his character and capacity as an IT professional and praised how well he interacted with older adults. Similarly, another business owner who runs a fashion company described her role in instilling confidence in Rosie, a tech supporter local to the neighborhood.

That was an exchange that I saw—the confidence in her face when I share how impactful it was, that confidence that she got knowing that she helped me, the consistency of me (we had weekly conversations), and the end result knowing that I benefited from it. That's confidence that she wouldn't have otherwise had. 'I helped enhance a small business in the Jefferson East area. I helped to grow a business for a black woman-owned startup,' like, it goes further. So I hope in turn that **I was able to give her the confidence,** add to her resume, and challenge her to want to grow as well.
-Kishana (fashion business owner)

Before her CTW role, Rosie was working part-time jobs in the local manufacturing plant, to which she expressed, “I hated it. It was hot. They treated people like dogs.” A local youth group leader recommended her for the tech support position, and she has worked full-time for CTW in the past year and a half. She has since reflected

on how working with business owners has influenced her own career development:

I see myself thinking about the future more, which is something I didn't really think about. I was more of a one-day-at-a-time kind of person. It's changed me for the better, honestly, like, I'm always thinking about jobs. Like, even though I have a job, you know, it's just, it's best to stay financially afloat. And that's something that I didn't really think about, I didn't think it was important. So **this job has just made me self reflect a whole lot.** -Rosie (CTW)

She goes on to express that for "somebody coming from where I've come from" being employed in this program "kind of gives you not even just a chance but also hope. Like you don't have to be a product of your environment." This self-reflection highlights how being an employed Neighborhood Tech Supporter and engaging with business owners has helped Rosie start to plan her finances strategically and think about her long-term career goals, something she did not do before. In various interviews, tech workers expressed how working with business owners has introduced new ideas of what is possible career-wise and a better understanding of the dedication it takes to achieve these goals. For instance, James, another local resident, described how working as a CTW has pushed him to consider careers in IT. Even though he was already interested in working with technology, like making videos, he never considered applying these interests to a job:

I changed how I see myself as a professional, because now it makes me want to do different things, such as open a portfolio and kind of like, make my own website where I can put my resume...So that's a big thing that I've been thinking about since I've been working with the CTW project...I've been considering full-time IT, or software management or becoming an independent contractor that can go out to these businesses and help them with their technology needs or possibly start my own Geek Squad. That's been an idea of mine. -James (CTW)

Both Rosie and James have expressed their goal to open a business in the future. While the impact on career ideas appeared in all interviews, we specifically highlight the growth with Rosie and James given their position as local residents without the institutional support of being university students. The impact of the program has featured most prominently in their reflections, skill development, and tenure as tech workers. Other tech workers described learning new skills by engaging with business owners, including what is needed to run a small business to how to communicate and build trust with clients. Here, we see how the reciprocal relationships of support between business owners and tech workers were at least one major influence on tech worker professional development.

4.3 Fostering greater appreciation and commitment to the community

Both business owners and tech workers further recognized community strengths and capacities through CTW engagement. Small business owners felt supported and respected in client meetings,

which motivated them to further advertise the program. Tech workers also came to appreciate local assets, which in turn strengthened their commitment to the program and the neighborhood overall. James describes how despite living in the neighborhood his entire life, he paid little attention to the economic ecosystem of the community. Since engaging with business owners as a digital trainer, he has built a greater awareness of local stores and restaurants:

I didn't realize it was so many businesses in [the neighborhood]. I didn't realize how big [the neighborhood] was...Now when I want to get something to eat, I have different restaurants I could go to in my community and **they already know me.** -James (CTW)

James refers to how he feels more aware and comfortable visiting these businesses, given his experience working one-on-one with them as a tech supporter. In turn, small business owners have also taken extra steps to help sustain the program. For some, this included spreading the word about the CTW services to their personal network. Participating in this research via interviews was also cited as an example of commitment. They expressed that despite being very busy, they wanted to share their story in hopes that it would help publicize the project. One business owner even donated her services to a business event organized by the Community Tech Worker program by providing free ice cream to anyone who attended in hopes that it would attract more awareness.

Rosie, James, and Daisy expressed how the desire to help their local neighborhood was what initially attracted them to the position and why they are committed to staying in this role in the near future. The program not only provides them with practical skills but also ignites a deeper sense of identity as a community member:

Every time I walk past a business I'm like hm I wonder if they have a website, **it's just kind of in me now. I see the impact that it's actually making.** So that makes me want to thrive more, just do as much as I can. Because businesses really do need our help. And if we don't then who's gonna help them, **who's gonna help our community rise?** -Rosie (CTW)

In contrast, what initially attracted non-resident tech workers to the position varied from wanting to build technology skills to supporting in community-based projects. Even though they did not stay in the position as long as tech workers local to the community, they expressed how they developed a newfound awareness and commitment to the neighborhood they were serving.

This is like my first time going to Detroit and I feel like I had like a mix of opinions coming in... But, finding out more about the [neighborhood] and finding out what this community used to be in its historical significance...I think that gives you context to how much the community's improved and where it's going. **It gives you context to the work we're doing, and it helps you understand what we're doing is important.** -Patrick (CTW)

Negative perceptions of the city continue to shape how visitors perceive neighborhoods like the ones served in this program. When asked about the program's impact on the community, business owners expressed that such services were necessary to offset

the historical exclusions this neighborhood has experienced. They mentioned “years of divestment and underappreciation for the folks here” that can be “traced back to systemic issues” (Paul - agriculture business owner). Research in Urban Planning has described how resources have been disproportionately invested into businesses in the city center with little funding or support provided to businesses in the surrounding neighborhoods that house greater minority and low-income populations [66]. While this is slowly changing, programs like CTW take a grassroots approach by providing a model for business service organizations to emulate and invest in.

By just recruiting students from an outside university, we would have fallen into the same mistakes of top-down needs-based approaches criticized in recent development literature. Rather, having tech workers from the neighborhood work alongside others from the university helped them learn from each other and united them in the greater goal of supporting business owners. One tech supporter described how meeting business owners in person helped her develop empathy, strengthening her commitment to the program.

When you actually meet them [business owners], and you learn about what they’re doing, and how passionate they are about it, I don’t know, **it just becomes more personal and you’re like, I don’t want to mess anything up.** I’m like, this is actually really impactful. So **I wanted to do the best job I can.**”
-Alex (CTW)

Commitment to the community was a running theme in motivating engagement among tech workers and small business owners. For tech workers who were local residents, building up the community was a major motivation for joining the program in the first place. In contrast, most tech workers from the university came in with little awareness of the neighborhood but developed a commitment to its growth over time. Business owners saw the program as a way to offset the historical systemic issues faced by minority neighborhoods on the outskirts of the city.

5 DISCUSSION

Prior capacity-building programs have been critiqued for framing interventions around community deficits, which are both detrimental to how observers view the community and how the community sees themselves [52–54]. Yet, we note that assets-based approaches do not necessarily suggest ignoring the needs of communities but rather starting the project by considering the strengths to address self-determined goals. We began this study by asking, *How might an assets-based digital capacity-building program foster more equitable and sustainable relationships between tech workers and learners?* We found that these two stakeholders shared complementary strengths—small businesses could learn from tech workers how to use digital technology, while tech workers members could learn a range of professional skills from small business owners. We reflect on how these relationships fostered what we call “reciprocal capacity building” and further suggest opportunities for intergenerational technology support.

5.1 Reciprocal Capacity Building as a More Culturally Conscious Approach to Community Development

Building on prior work emphasizing the importance of culturally conscious digital capacity building [31], we propose *reciprocal capacity building* as an example of a culturally conscious approach to community development as it emphasizes the importance of caring for, empathizing with, and learning from each other. The term reciprocal capacity building has been briefly mentioned in community-based participatory research (CBPR) [27, 35], which emphasizes the importance of mutual growth in community-based research. In an ideal setting, communities benefit from the outcomes of research, which could be in the form of programs that uplift local capacities or interests (e.g., [30, 43]), data that advance community goals [13, 63], as well as learning opportunities to participate in the research process itself [8]. In turn, researchers benefit by learning from community members about local practices and capacities that inform their personal growth and the research process [57, 74]. What we describe in this study is similar, in that both program providers and receivers benefit from the project process. But, unlike how CBPR informs exchanges between researchers and community residents, we examine reciprocal capacity building between small business owners and those who implement the program on the ground (tech workers) who, in our case, are separate from the research team. We focus on this relationship because the program providers (tech workers) must develop trust with program receivers (small business owners) to sustain the program long-term as the research team steps away. This process of capacity building allows community members to adopt the program while future tech workers are introduced in a train-the-trainer approach. Thus, reciprocal capacity building provides a culturally conscious approach to digital engagement as the intervention draws from and strengthens community assets and capacities.

To further understand how reciprocal care supports a culturally conscious approach, we take inspiration from literature on culturally responsive pedagogy [75], which highlights the importance of engaging with student background and culture in fostering learning success [22, 45, 46, 60]. Culturally responsive pedagogy highlights the importance of *care* and *empathy* in connecting with marginalized students to reduce achievement gaps [45, 46] First, care involves ongoing interactions that promote individual and collective wellbeing [70]. Prior work in HCI has emphasized relationships of care when engaging with community partners [41, 55] and the role of care in fostering inclusive environments for learning and technology adoption [15, 72]. However, much of this work has focused on care typically provided from teacher to student or researcher to community. Researchers in education studying *reciprocal* care [7, 20, 29] describe how teachers and students engage with feminist pedagogies by increasing transparency and decentering authority [29], two themes that emerged in our research as well. For instance, in our study, both business owners and tech workers were honest about what they knew (and did not know) and how they both wanted to grow skill-wise and professionally. These findings confirm education research, which encourages learners to be active participants in the learning environment by acknowledging and reacting to the capacities and challenges of their instructional

environment [29, 68]. Similarly, reciprocal care is mentioned in workplace literature, which describes how care shared between managers and workers supports a climate of psychological safety, which in turn fosters greater innovation. In our study, some business owners expressed how creating social media and web content was a creative outlet separate from the day-to-day management of managing inventory and customers.

Second, culturally responsive pedagogy highlights the importance of empathy, which is defined as the combination of perspective taking—“the tendency to spontaneously adopt the psychological point of view of others”—and empathetic concern—“the tendency to experience feelings of sympathy and compassion for unfortunate others” [12, p. 57]. In our study context, we saw examples of mutual empathy where tech workers learned to understand the day-to-day stresses of running a business, while business owners empathized with the tech workers as developing professionals. Taking each others’ perspectives informed how the two stakeholders approached capacity building through patience and flexibility. Expressing empathy as a mechanism of culturally responsive pedagogy also supports psychological safety as learners feel more comfortable sharing what they are struggling with [60]. We saw this demonstrated in our data as tech workers felt comfortable seeking professional guidance from business owners, whereas business owners felt comfortable sharing their technology questions with the tech workers—even though they both felt self-conscious doing so. While culturally responsive pedagogy has primarily been studied in classroom contexts, we found that these lessons applied to our more informal learning contexts as demonstrating an appreciation of the neighborhood culture was one reason small business owners came to trust the tech workers.

Our findings further describe actions of reciprocity that go beyond traditional framings of care and empathy. Individuals in this study also provided training and mentorship to each other to foster new skills and strengths development. While these activities could also be considered part of caring behavior, we highlight the process of skill building as unique to this context. In this study, reciprocal capacity building occurred as small business owners developed digital technology capacities (e.g., how to manage social media and create a website), while tech workers learned instructional and professional capabilities (e.g., how to explain concepts clearly and patiently to learners, how to communicate with clients). We emphasize that these capacities were built through reciprocal actions—small business owners and tech workers fostered these skills in each other rather than gaining them independently. These examples of reciprocal capacity building go hand-in-hand with care and empathy as both sides provide emotional support and encouragement to each other, which are critical for capacity building to occur.

Thus, adding to existing capacity building definitions [18], we define *reciprocal capacity building* as *when two or more stakeholders leverage care and empathy to support the mutual building of skills and strengths together*. Reciprocal capacity building is particularly beneficial in underserved communities that have typically been framed as lacking resources and capacities for addressing their own goals. Here, we demonstrate how reciprocal capacity building encourages the sharing of strengths from different stakeholders

to overcome local challenges. Thus, our example of reciprocal capacity building describes a unique demonstration of assets-based community development where community members are paired together to exchange skills and knowledge. Our data provide one case study showing initial promise for how starting with and building on community strengths (leveraging local knowledge, hiring locally) can lead to greater program sustainability. Small business owners were motivated to publicize the program and even donate services to CTW events to promote the program and community center. Tech workers who were also local residents continue to work in the program, despite opportunities to find more lucrative employment given their growing tech skills. These examples highlight the importance of fostering reciprocal relationships in sustaining capacity-building programs that take an assets-based approach.

5.1.1 Reflections on Fostering Reciprocal Capacity Building. Despite the benefits of reciprocal capacity building, these exchanges did not occur organically without significant training and trust development. First, the project team required tech workers to participate in various forms of cultural competency training before engaging with business owners. We plan to complete a full analysis of this training in future work, but in summary, cultural competency was taught through the following activities: We invited local business owners and business support organization staff as guest speakers to share their experiences and advice for effectively building trust with business owners. The community partner, an urban planner, led a neighborhood tour during which he shared information about local businesses. We hired a local historian to provide information about key historical events that have shaped current Detroit. In pairs, the tech workers canvassed local neighborhoods on foot and recorded the location of neighborhood businesses into ArcGIS, an online mapping software. The canvassing was critical in that it allowed tech workers to familiarize themselves with the spacial layout of the community, to observe how many local businesses did not have a digital footprint, and to introduce themselves to business owners and learn more about business’ technology needs while doing a non-threatening, non-sales activity (mapping business density). Finally, the project team, Detroit-based university staff, and some visiting speakers guided tech workers through respectful mock client interactions.

Second, the community partner leveraged his social capital with business owners to set realistic expectations leading up to the program launch. Because the program was free and hired young adults with limited professional experience, business owners understood that tech support personnel were also using this program as a professional development experience. In addition to the 1:1 client meetings, tech workers gave public presentations about the program and the services they offer at meetings of other Detroit-based business service organizations, which facilitated trust development with business owners. While our data demonstrate the value of reciprocal capacity building, simply pairing tech supporters and business owners together is not enough.

We believe this study provides insight into how to facilitate these relationships in future community-based research projects. This research confirms prior work, which notes that business owners want to witness a program’s in-person commitment to the neighborhood before trusting program personnel [31]. The literature argues

that assets-based approaches are more likely to create pathways to more sustainable programs and interventions. Thus, engendering reciprocal capacity building influences people's commitment to and engagement with the program and community overall.

5.2 Implications for Intergenerational Tech Support

While fostering intergenerational technology support was not a program goal, it emerged as a facet of how reciprocal capacity building was enacted. The average age of business owners supported in this study was 52 years old, while tech workers were, on average, 20 years old. We did not limit the age of who could apply to be tech workers other than requiring applicants to be at least 18 years old. However, those who did apply happened to be young adults. In effect, our data provided multiple examples of how business owners felt a personal responsibility to uplift the tech workers, seeing them as the next generation. For instance, as described in the findings, one business owner stated, "I was able to give her the confidence," while another business owner exclaimed to the tech workers, "Somebody raised you right. . . you have a bright future!" This desire to uplift seemed to motivate much of the reciprocal capacity building activity we observed.

These observations connect with prior work on digital capacity building within family units, describing how children are instrumental in supporting older adults with day-to-day digital tasks like online search, particularly in immigrant communities with language barriers [26, 64, 82]. While these studies highlight the value of intergenerational digital support of receiving tech support from someone trusted, they also outline the burden placed on children to play the role of digital navigator for their families. For instance, researchers have found that children who feel that their family significantly relies on them for support (like technology guidance) are more likely to be stressed and suffer academically [58, 82]. Our program provides a model for employing local young adults in an official role of tech support where they are paid for their labor, providing opportunities for them to advance their careers through these tech support efforts while also providing older adults an alternative avenue of support to ask for tech guidance outside of their immediate familial networks. Future work could further explore the topic of intergenerational tech support as an approach to fostering greater diversity in technology careers considering research in engineering education argues for more social justice-oriented pedagogy as a way to recruit and retain a diverse STEM workforce [67].

Overall, our program demonstrates an approach that breaks with hierarchies of expertise [3], especially within age divides. Thus, the program addresses calls in HCI literature seeking alternative economic models (to harmful capitalistic ones) within local communities in response to economic crises such as the global recession and the Coronavirus disease (COVID-19) pandemic [16, 42, 78].

6 CONCLUSION, LIMITATIONS, AND FUTURE WORK

We describe how the Community Tech Worker (CTW) program, which we designed and implemented, provides an assets-based approach to community digital capacity building for underserved

minority small business owners. While prior capacity-building programs describe more top-down approaches to tech training, we present reciprocal capacity building as an alternative avenue to building more sustainable relationships between tech workers and small business owners. Specifically, reciprocal capacity building was instantiated through 1) building confidence in technology together, 2) having business owners provide reciprocal guidance in professional development, and 3) fostering mutual appreciation and commitment to the community and economic development.

While this study was carried out in the context of digital capacity building for underserved minority small business owners in the Jefferson East neighborhood of Detroit, we believe the takeaways can be generalizable to community-based capacity-building programs more broadly. Further work could be done to examine how reciprocal capacity building is instantiated in other programs or how to foster these relationships intentionally. For instance, as our data shows, additional research could also be performed on the intentional design of intergenerational tech support programs and how these differ from other models. We have also yet to examine the effect of formal training in the CTW program despite it playing a key role in preparing tech workers. We have reserved this analysis for future work, in which we plan to take a learning sciences and education lens, combined with community development, to understand the data.

Finally, because of the size of the program, we have yet to describe and analyze other aspects of the CTW model, specifically, relationships between tech workers and the project team via training and the community partner and university team. We hope that focusing on each of these relationships in depth will provide a more comprehensive understanding of how the CTW model functions over time.

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