

Computing for Communities: An Ethnographic Examination of a Culturally Responsive Computer Science Program

Despite recent efforts to increase diversity, female and racially minoritized¹ youth continue to be underrepresented in science, technology, engineering, and math (STEM). Our pilot study utilizes culturally responsive frameworks to address the underrepresentation of minoritized youth in computer science (CS) by supporting youth at a local Boys & Girls Club as they develop a sense of competence and belonging in the CS field. Culturally responsive frameworks shape our work with students and inform our research process. This paper examines the context of our pilot study and the positionality of our research team, which includes university researchers and community partners. It also provides a reflexive analysis of our community inquiry process and how it has influenced the development and adaptation of our CS programming.

Purpose & Theoretical Framework

Females and racially minoritized youth continue to be severely underrepresented in CS, a field which remains predominantly white and male (Cuny, 2012). CS careers offer economic opportunities and our society continues to rely heavily on technology, making it increasingly important to broaden participation in CS (Blikstein, 2018). Community-based organizations and after-school programs play an important role in supporting formal school efforts and providing resources unavailable in K-12 classrooms (Kumasi, 2010).

Our study takes a culturally responsive approach to CS that utilizes culturally relevant pedagogy (Ladson-Billings, 1995) and culturally sustaining pedagogy (Paris, 2012) in order to create programs that serve minoritized youth. Knowledge of the community is a foundational element in developing a culturally relevant CS program, specifically knowledge of the youth who participate in CS activities at our partner locations. In our work, we follow four distinct strategies aligned with culturally responsive frameworks: (1) research-based CS practices for teaching and engaging a diverse population of youth; (2) practices that build on the knowledge and assets of communities; (3) undergraduate CS students as facilitators and near-peer mentors; and (4) culturally responsive interactions between facilitators and underrepresented youth (Pollock, 2008). Our culturally responsive approach extends beyond our work with students by also informing our methodology and roles as researchers.

As qualitative researchers, we must acknowledge that we are positioned in our work by factors such as age, race, gender, and lived experiences (Hastrup, 1992). While researchers are

¹ The use of the term ‘minoritized’ considers that majority or minority status of certain groups does not always match numerical representation. It reflects a concern with capturing actions and process through which certain racial/ethnic groups are subordinated or denied equitable opportunities (Shields, Bishop, & Mazawi, 2005).

traditionally considered outsiders, the multiplicity of ways in which they relate to research participants causes them to shift between insider and outsider status throughout the research process (Merriam et al., 2001). In order to gain insight and cultural knowledge about themselves and their community, researchers engage in reflexivity, which England (1994) describes as the “self-critical sympathetic introspection and the self-conscious analytical scrutiny of the self as researcher” (p. 244). The positionality of our research team warrants scrutiny because community affiliations, organizational roles, and personal identities influence the process and outcomes of our culturally responsive and community-based research (Ladson-Billings, 2000; Milner, 2007). In this paper, our reflexive analysis is shaped by the following research questions:

1. How does our outsider positionality as researchers and the insider positionality of our community partners impact the process of planning and implementing our pilot study?
2. How do the challenges and opportunities of community-based research inform our process of designing and adapting informal CS programming?

Our project embodies this year’s forum theme, *The Future of Ethnography and Education: Methodologies, Equity, and Ethics*, because it provides a reflexive analysis of a project deeply concerned with equity in CS education. We examine some of the challenges of using ethnographic methods while simultaneously engaging in community-based programming and research with minoritized youth. Knowledge gained using ethnographic research methods have greatly informed our continuing efforts to broaden participation in CS.

Context, Participants & Methods

This study was conducted at the River City Boys & Girls Club (RCBGC), which is located along a busy highway in a walkable urban neighborhood. According to their website, RCBGC hopes to provide (1) a safe place to learn and grow, (2) ongoing relationships with caring, adult professionals, (3) life-enhancing programs and character development experiences, and (4) hope and opportunity. Our ongoing partnership with RCBGC aims to join them in accomplishing these goals by providing culturally responsive after-school CS programming.

This reflexive study focuses primarily on our project team, which consists of our community partners at RCBGC and our university researchers (Figure 1). Each organization brings different expertise and complementary resources, and thus plays a unique role in the project. Other participants include the youth who participated in our CS programming and the undergraduate CS students who served as program facilitators.

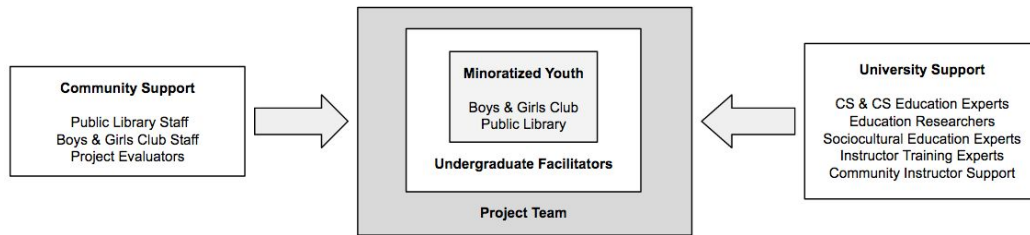


Figure 1. Project Team

Data were collected by graduate research assistants and undergraduate facilitators during years one and two of a larger NSF-funded three-year study, with a focus on the development of community partnerships and knowledge of the community context. Data sources include ethnographic fieldnotes from program observations, undergraduate facilitator reflections following each program session, notes from partnership meetings, and student CS artifacts. Data were analyzed with a focus on understanding the impact of positionality and context on our community inquiry. Data were coded based on emergent themes and categories, using an approach inspired by Grounded Theory (Glaser and Strauss, 1967).

Findings

Several themes emerged during preliminary² data analysis, suggesting that the context of our partnership and the positionality of our project team members greatly impact our methodologies and programming. The themes fell into three overarching categories: developing trust, gaining insight, and improving collaboration.

Developing Trust

Past experiences between the staff and students at RCBGC remain influential. Staff were left feeling skeptical after several failed attempts to integrate structured and rigorous STEM curriculum into their programming. By relying on the input of our community partners, we were able to address these past challenges with insider input and guidance. While RCBGC was happy to have outside help for STEM programming, it took time to develop trust. During our first semester of implementation, we focused on demystifying CS and facilitating successful technology engagement. Facilitators focused on building positive relationships, utilizing CS artifacts as a way to get to know their students. Students created several biographical CS projects to highlight parts of their identity, specifically focusing on race, gender, and culture. By providing engaging programming, we were able to build trust with the students and staff at RCBGC.

² This project is a “work in progress” and our pilot study will continue to be implemented during the fall 2018 semester. More detailed information will be available after implementation which will be completed prior to the Forum presentation in February of 2019.

Gaining Insight

We spent a great deal of time getting to know the context and culture. As outsiders, we quickly saw challenges to programming at RCBGC, such as their limited technology, chaotic after-school atmosphere, and staffing turnover. It took more time to understand and appreciate the skills and knowledge of our community partners. With the help of their insider knowledge, we adapted our programming³ to better align with the context, youth, and staff at RCBGC. We developed curriculum that reflected student interests and strengths, such as a unit in which students applied their love of music and performing to designing math poetry CS programs. Facilitators adapted to the informal learning environment: “You have to be constantly entertaining and you have to be patient with the kids if they don't understand something . . . there were a couple students that were a little bit loose and just trying to have fun, which I don't blame them because they should be having fun and learning” (Kevin, *program facilitator*). With the invaluable input of our community partners, we are in a constant process of reflecting on and adapting our roles and programming.

Improving Collaboration

The need for better collaboration continues to arise during our reflexive process. Although we have spent nearly two years working collaboratively with our partner organizations, in many ways we remain outsiders to the community. In order to create a culture of collaboration, we face the challenge of balancing our roles as experts in education and CS, while also taking a supplicant role to prioritize our community partners as experts with important cultural capital in their community and organization. Together, our research team continues to address issues of culturally responsive curriculum, behavior management, and staff training. It is only through this ongoing process of collaboration that we can achieve sustainable CS programming and leave a lasting impact at RCBGC.

Discussion

This pilot study hopes to create a foundation for culturally relevant CS and to lay the groundwork for making CS relevant to youth from underrepresented communities. This paper contributes by providing a reflexive analysis of our culturally responsive methodologies and inquiry process. By reflecting on our positionality and context during community-based research and culturally responsive programming, we hope to contribute to the development of a culturally responsive community inquiry process.

References

³ Currently in progress.

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