

# Computing for a Purpose: A K-12 Curriculum for Integrating Civic Engagement into Computer Science

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**Abstract**— *Facilitating opportunities for non-dominant youth to learn how to use technology as a tool to engage civically and create positive change in their communities is both powerful and revolutionary. This K–12 curriculum is designed to expand young people’s civic imagination, develop their civic agency, and increase their self-efficacy to enact change in their communities. Preliminary results have demonstrated that minoritized youth understand computer science as an accessible field of exploration that can be used to develop their conceptions of identity, race, and power. Our goal is to leverage computer science to support youth in developing the agency to imagine and create their own futures. This curriculum engages youth in producing computational artifacts using block-based programming tools like Scratch. Opportunities for promoting awareness and advocacy are incorporated throughout the curriculum, based on constructionist and creative learning practices. This work builds off the work of many, often unnamed, community organizers and activists in marginalized communities that continue to fight for better lives for all people—emphasizing the importance of civic engagement and creating positive change in our own communities. We apply an anti-racist framework, with the belief that everyone has the right to have access to computer science education and create spaces for themselves that reject norms that often force conformity and assimilation into existing white supremacist traditions of computer science.*

**Keywords**—*computer science education, civic engagement, social justice, belonging, identity development*

## I. INTRODUCTION

Specific communities have also been historically excluded from engaging in computer science. While anti-racist pedagogical approaches have recently become more prevalent within K–12 education [1], there is a need for discipline-specific curriculum resources that equip young people to enact civic change while rejecting white supremacist norms of computer science. Opportunities for non-dominant youth to learn how to use technology as a tool to engage civically and create positive change in their communities is both powerful and revolutionary [2]. Through this curriculum we discuss and explore activities that allow youth who have been historically marginalized to understand computer science as an accessible

field to explore understandings of identity, race, and power. This curriculum builds off the work of Seymour Papert, Mitchel Resnick, and Karen Brennan – emphasizing constructionism, creative learning, and developing computational creators [3], as well as the work of community organizers, activists, and educators who are often unnamed. This curriculum emphasizes civic imagination, civic agency, and civic participation for and with communities to create positive change while providing access to computer science education.

## II. PROJECT TYPE AND PHASE

This project is an ongoing work in progress. We have implemented the existing curriculum in a series of workshops with high school-aged youth at the Computer Clubhouse, where youth are already engaged in developing creative technology-based projects [4], as well as with educators in workshops. We are currently developing and implementing new curricular materials and studying the impact of these materials through an artifact analysis of the projects created. Our poster presents the aims of our work and showcases some of the computational artifacts that students have created through this curriculum.

## III. RELEVANCE TO RESPECT AND ENGAGEMENT GOAL

This work focuses on providing opportunities for youth with non-dominant identities to participate in computing by encouraging exploration of identity while simultaneously engaging in advocacy and activism for causes that are important to them. Our research informs practices of the RESPECT community by offering contextual and experiential approaches to promoting equity in computer science for young people who have been historically excluded from the computing curriculum.

We will engage with the RESPECT community by sharing information on a new curriculum that approaches computer science education from an equity lens. It is our hope to provide insight on the significance of designing meaningful learning experiences for non-dominant youth to engage with

programming through creative community engagement and social activism [5].

#### IV. CURRICULUM OVERVIEW

The activities in the curriculum were designed to allow young people to engage civically while simultaneously offering opportunities for exploration of identity and belonging. Activities are centered on topics that are meaningful and incorporate computing in authentic and purposeful ways. They also offer various levels of engagement and creation based on student passions, previous experience, and expertise. They are each designed and organized to provide opportunities to think, make, share, and reflect; a variation of the creative learning spiral [3].

##### A. *Stories of Your Name*

In this activity students are tasked with engaging through the stories of their name. For communities of color names can be very important holding cultural, familial, and creative significance. Students answer questions around the historical context of their name, what their relationship to their name is, and what it means to them. After thinking through these topics and discussing them with peers, students make a Scratch project to tell this story.

##### B. *My Role Models*

This activity encourages students to reflect on some of their role models and what about them is inspiring. They are invited to consider the significance that the role model plays in their life and in their community. In the making part of the activity students may choose to write a letter to this role model, animate a story about them, or interview their role model and create a representation of it in Scratch.

##### C. *Community Issues*

In this activity, students consider people and places that they care about, and create a depiction of their present situations and imagine the future they wish to see. Students make a Scratch project (game or story animation) about a community issue that they care about. They reflect on things that they love about their community and also challenges faced and how they might envision ways to change them.

##### D. *My Roots*

This activity encourages students to consider and develop their own definition of community. They reflect on what makes up their community (people, places, and norms), what they care about the most, and how the attributes of their community have helped to contribute to who they are. Students use Scratch to make a story, game, or animation to showcase their community.

#### V. PRELIMINARY RESULTS

Preliminary research has shown that youth are civically engaged online through creative expression. On the Scratch website one can find projects about climate change, LGBTQ+ rights, the Movement for Black Lives, and other subjects that impact the lives of youth [6]. Early results show that a majority of these projects are often being created at home or on their own at an after-school program where the only civic discussion that takes place is via commenting in the Scratch community. Preliminary results show that there is an interest from youth for civic engagement in their communities and there is an opportunity to design an engaging and empowering learning experience through the curriculum that will afford rich conversation with peers as well as the development of computational skills.

#### VI. CONCLUSIONS AND FUTURE WORK

This curriculum is currently being expanded for a wider audience of young people to include elementary-aged children. We are planning to implement it in an afterschool program as a series of workshops for youth to create with Scratch and other block-based programming tools under development by our research group. Additionally, we have begun looking into projects that are shared on Scratch that depict self-initiated youth civic engagement. We aim to expand this curriculum to provide insight into ways to engage youth in computer science through creative and civic-minded pedagogical approaches.

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