

Begin Again: Why CS Education Must be Reimagined

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Abstract— This paper calls for the CS education community to join together behind a vision for computing education that: 1) develops students’ critical consciousness and ability to interrogate the social and ethical implications of technology; 2) prioritizes the development of youth agency, empowerment, and voice; 3) acknowledges and addresses sociopolitical and historical contexts of racism and inequality within which computer science is situated; and 4) engages in specific actions to dismantle structural racial barriers within CS education.

Keywords— computer science education, student agency, critical consciousness, liberatory education, systemic inequality and racism

I. DEFINING A VISION FOR CS EDUCATION

As researchers and advocates for CS education, we feel a sense of urgency to reimagine CS education, its purpose and its direction. We are at a critical inflection point where we must ask ourselves: who do we want to be as a nation? A nation that centers racial justice and equity, or one that sustains white supremacy, and what role does CS education play? In this position paper we stand in solidarity with our community’s Black women scholars and their June 2020 Call to Action for the ACM [1], build upon the scholarship of leading researchers, and amplify the ideas of our brilliant CS student/teacher partners and colleagues, to reimagine CS education with the following vision:

1) CS education must prepare youth not only with the computing literacies to be creators of technology, but also the critical consciousness necessary to examine the social consequences of technology, explore opportunities to utilize technology to counter dehumanization and oppression, and ensure that computing education is a liberatory practice for justice; 2) CS education must prioritize the development of youth agency, empowerment, and voice while centering the expertise of young people—specifically those who have been traditionally underrepresented in the field—in the process of creating equitable CS education and co-creating a more equitable world; 3) CS education must not be approached as an apolitical endeavor, but must acknowledge the historical and sociopolitical contexts within which CS teaching and learning is situated, including structural inequality and racism in our educational system and across all institutions in our society; 4) Toward these ends, for CS to truly be “for all,” the CS education community must engage in intentional practices to dismantle structural and racial barriers, including standing in solidarity against systemic racism and inequality.

II. THE TIMES WE ARE IN

The new vision we present comes at a pivotal moment in history when we must act with intention. Within the past year, we have suffered through a pandemic claiming over 600,000 lives, a summer of protests against racism and the police killings of Black Americans, a polarizing presidential election, a white supremacist-led insurrection at the US Capitol, and exponentially increasing hate crimes against Asian Americans. These events have renewed focus on our country’s history, the origins of systemic racism and inequality, and the current disparities across all sectors. We now have an opportunity to develop a more equitable path forward. Importantly, computing—the field of our attention—has played a key role in all that we have seen come to pass, and will play a critical role in how our society moves forward. Now more than ever, computing directly influences every aspect of our lives and shapes how we communicate, learn, teach, think, develop belief systems and values, and discern fact from fiction.

Many scholars have illuminated the ways that computing plays a dangerous role in exacerbating inequalities and political polarization in what Dr. Ruha Benjamin coined the “New Jim Code”—“new technologies that reflect and reproduce existing inequities but that are promoted and perceived as more objective or progressive than the discriminatory systems of a previous era” [2, p. 5-6]. Recent examples include algorithms determining things like job candidacy or healthcare access based on race, gender, or class instead of actual merit or need [3, 4], racist/sexist Google search algorithms [5], and Artificial Intelligence (AI) facial recognition systems resulting in false arrests of people of color [e.g., 6, 7].

No longer can CS be taught as “neutral” and apolitical. Issues of power and ethics cannot remain separate from CS teaching and learning. The CS education community must take action on issues of racial and social justice both inside and outside computing classrooms. They are all intertwined.

A. *Intersecting Issues: The Firing of Dr. Timnit Gebru*

Unsurprisingly, biases built into computing systems and their negative impact on communities of color are directly related to the computing sector’s lack of diversity. These issues intersected in December 2020, when Dr. Timnit Gebru—a world-renowned researcher on AI bias and ethics as well as one of very few Black women AI researchers—was fired from Google after highlighting the risks and harms of AI and vocally challenging Google’s racist and sexist hiring practices [8, 9].

The case of Dr. Gebru represents the intersection of four central issues: 1) the underrepresentation of Black women and other people of color in the tech industry due to practices and policies that promote racism and sexism; 2) the climate and culture of disrespect, bias, and hostility experienced by people of color in CS; 3) the importance of building up, not tearing down, research on issues of racial bias in tech; and 4) the importance of challenging the silencing of critiques of institutional racism [10]. We believe that taking a stand in support of Dr. Gebru also more broadly represents taking a stand for CS education to examine and address these issues of systemic inequality and racism, ethics, and social responsibility.

Dr. Gebru's experience and key scholars focused on ethics, power, and CS [see for example 11, 12, 13, 14, etc.] raise these questions for CS education: When we prepare youth to become the next generation of computer scientists, are we also preparing them to critically analyze how computing perpetuates or influences racist, sexist, homophobic, or ableist agendas? Are youth encouraged to study the relationship between computing and society, questioning both positive and negative impacts? Are students taught about the ethical implications of computing, and why their voices are important in the field? Do students understand how CS is power and intricately connected to our political and economic system of inequality and racism? Do students have the space, language, and support in their education to critically wrestle with these issues?

III. THE NEED FOR LIBERATORY & ABOLITIONIST EDUCATION

How do we get to a place where CS education meaningfully connects to the lived realities, experiences, cultural practices, and values of our students while preparing them to challenge systemic inequality and racism in which computing resides? Scott, Sheridan, and Clarke [15] make clear when defining the tenets of culturally responsive computing (CRC) that curricula and pedagogy must directly improve students' understandings of society and self in the world while examining who creates, for whom, and to what ends. As Dr. Gloria Ladson-Billings [16], author of culturally responsive pedagogy, reminds us: "the teacher's role is not merely to help kids fit into an unfair system, but rather to give them the skills, the knowledge, and the dispositions to change the inequity" [par. 13].

This is exactly what Dr. Danny Martin [17], leading scholar of math education for Black youth, emphasized when analyzing the Mathematics for All movement that came before us: "Ensuring that marginalized students gain access to quality curriculum and teaching, experience equitable treatment, and achieve at high levels should mark the *beginning* of equity efforts, not the end. **If these students are not able to use mathematics knowledge in liberatory ways to change and improve the conditions of their lives outside of school, they will continue to be marginalized even while mathematics educators and policy makers claim small victories like *Mathematics for All.***" [17, p. 13, bold font added for emphasis]

Dr. Bettina Love [18] describes how this can be achieved through "abolitionist teaching" that values students fully and "protected my humanity, my dignity, and not only told me I was powerful but taught me how to be powerful" [p. 68]. Love defines "abolitionist" teaching as not only building on community cultural wealth, but also supporting relationships

where people matter to each other, fight together, and build the kind of world that feels like home. Our CS education community has much to learn from liberatory and abolitionist education.

IV. SUMMARY

In the book *Begin Again: James Baldwin's America and Its Urgent Lessons for Our Own*, Glaude [19] discusses why Baldwin believed that "beginning again or doing one's first works over" was a critical response to historical events [p. 200]. Baldwin believed that with the hindsight of history, specifically with regards to issues of race, that old beliefs must be shed and new ideas must come into focus. We believe that the last few years contextualized in the whole history of our country have been a testament to this. It is time when we must reimagine education. Computer science education is no exception.

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