

Introduction to the Special Issue on Justice-Centered Computing Education, Part 2

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This introduction welcomes readers to the second volume of an *ACM TOCE* special issue on justice-centered computing education. Here we reflect on the ways both the first volume and this current volume expand our notions of justice. More specifically, the first volume explored topics such as intersectionality, transformational justice, intercultural computing, ethnocomputing, translanguaging, socially responsible computing, and institutional theory. This volume continues the conversation with its focus on decolonization, racial literacy with white computing educators, youth agency and voice in computing and media production, learning pathways focused on justice issues for a rural Mexican American youth, and Universal Design for Learning in CS education. We end with discussing the important issues, topics, and voices that are missing from these two volumes, and potential future directions for dialogue in our community.

CCS Concepts: • **Social and professional topics** → **Computing education**;

Additional Key Words and Phrases: Computer science education, justice-centered computing, broadening participation, equity

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1 INTRODUCTION

As we write this introduction, our world is entering into the third year of a global pandemic. Many of us have reached our breaking points emotionally, professionally, economically, and physically, as we juggle the stressors of survival in an increasingly screen-centric, violent, and politically polarized world. It is within this context that many of us have been asking why we should be focused on computer science education at all, when communities are losing family members, housing, jobs, and any sense of stability. Shouldn't we be focused on the issues that have created these terrible conditions? What about a focus on fighting institutional racism and sexism? Or countering the oppressive censorship of race-focused and LGBTQ+ related literature in conservative school districts? Or helping students and their families find access to a safe place to sleep at night?

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We know that many readers are doing exactly that in their own ways in their respective communities. And our appreciation for your activism is boundless. We thus believe the time is more urgent than ever to address this question of “why computing education?” specifically because of the ways technology is implicated—as both a cause for some problems, and solutions for others—in our world’s current situation. And we believe the answer to this question lies in considerations of how to ensure “justice” sits at the center of “computing education.”

This collection of research articles makes up the second of two volumes of the ACM Transactions on Computing Education’s special issue on “Justice-centered Computing Education.” In the introduction to our first volume, we shared that our goal has not been to create a specific, singular definition for justice-centered computing education [see Lachney, Ryoo, & Santo 2021]. Instead, we hope that these special issue volumes provide support for dialogue around what it means to move beyond arguments focused on “broadening participation in computing” for the sake of filling jobs or pushing the “fail fast” tech corporate agenda to create things that maybe shouldn’t be created, and instead deeply engage with the complexities of how computing intersects with systems of oppression that we must directly confront.

Of course, we do not believe that programs focused on broadening participation in computing have the wrong goals—addressing the historical disenfranchisement of so many minoritized identities and groups in computing is a critical issue to address. But rather, in the spirit of praxis and authentic inquiry, we ask why the dominant computing education conversation has focused on “broadening participation” specifically? Is there somehow safety in using this frame for increasing access to computing education for “all” students? Have and will funders forever shy away from other frames, and goals, related to advancing justice in computing, such as the various constructs featured in these special issue volumes? Why do we focus on broadening participation and not institutional racism? Why broadening participation and not advancing the power of youth to shape computing-focused education institutions? Why broadening participation and not advancing environmental justice through computing education? Why broadening participation and not critiques of capitalism?

In our first volume introduction, we explored these questions by raising issues of: (1) technological inevitability and determinism, (2) computing education in support of nationalism and capitalism, (3) the impacts of White supremacy and patriarchy on computing, (4) the reproduction of systems of oppression in schools through computing education, and (5) how to work in solidarity with communities inside and outside of CS education. We situated the beginning of this conversation in five key areas: (1) historical contexts, (2) power, (3) techno-social politics, (4) coalition building, and (5) continuous change.

The articles in the first volume expanded our notions of justice by addressing: (1) systemic oppression against Black women in computer science education [Rankin, Thomas, & Erete 2021]; (2) transformative justice approaches to develop “counter-structures” directly addressing harms toward Black and Brown youth through a decade of work in the Digital Youth Divas initiative [Erete, Thomas, Nacu, Dickinson, Thompson, and Pinkard 2021]; the importance of supporting multilingual students through critical translanguaging computing education [Vogel 2021]; explorations of culture and power in computing education through “counter-hegemonic computing” [Eglash, Bennett, Cooke, Babbitt, and Lachney 2021]; examinations of “intercultural computing” toward understanding and solidarity between people of different backgrounds [Arawjo and Mogos 2021]; applications and purposes of teaching about ethics and socially responsible computing in computing classrooms to support student engagement and agency [Ryoo, Morris, and Margolis 2021]; and how youth leadership can support institutional systems change around computing education [Phelps and Santo 2021]. In this second volume, you will have the opportunity to examine some of

these issues in a new light and be introduced to others that speak to the diversity of justice-issues that might be considered within computing education.

2 OVERVIEW OF THE ARTICLES FEATURED IN THIS SECOND VOLUME

In the first paper, Roldan, Lee, Nguyen, Berhe, and Yip [2022] confront hegemonic systems of pedagogy that materially and discursively structure adults as active creators of computing education for passive youth of color. They argue that this relationship not only limits whose goals, interests, and attitudes shape computing education but, even more provocatively, that this relationship reproduces educational legacies of U.S. settler colonialism; e.g., assuming youth must assimilate to adults' cultural, social, and epistemic expectations. Thus, they turn toward the concept of decolonization as a theoretical guide for reimagining and restructuring young people as active co-designers and co-teachers of an informal intergenerational computing education library program called *KidsTeam Libraries*. Their qualitative findings show how teens worked with educators and researchers to sustain local community relationships and disrupt hegemonic power dynamics but that the obduracy of these dynamics were nonetheless still apparent throughout the program and research.

The next paper by Veeragoudar and Sullivan [2022] explores how to support racial literacy development for White elementary school teachers in the context of equity-based professional development on CS education. Their focus on working with teachers from one school district where the majority of students are youth of color and the majority of teachers are White functions as a microcosm for racial disparities in the U.S. teaching workforce more generally, and common dynamics found in computer science classrooms more specifically. While acknowledging the need to put additional resources and energy into recruiting more teachers of color, they argue that given these current racialized conditions there is a need for supporting White teachers' racial literacy development. They bring together literature on racial literacies and Critical Whiteness Studies to help analyze qualitative data from teachers who participated in a five part professional development program where they explored racially charged situations that surfaced from CS classrooms in the district. While they analyze these data as fitting along a continuum from being racially liberal (e.g., color-avoidant) to racially literate (e.g., race-conscious), their findings reveal that teachers may occupy multiple and even contradictory positions on the continuum. They stress viewing racial literacy development as non-static and the importance of teachers moving toward being racially literate as potential leaders within anti-racist computing education.

The third paper in this issue by Lee, Gobir, Gurn, and Soep [2022] details how cohorts of youth journalists and artists from the YR Media network combined journalism with poetry, digital design, multimedia storytelling, computer programming, and data analysis to demystify **artificial intelligence (AI)** by investigating autocomplete text platforms, music rating algorithms, facial recognition software, and surveillance technologies. Using participant observation to focus on three ethics-centered AI projects, the authors found that young people's questions and uncertainties about AI can be foundations for creative expressions with digital tools that they were already familiar with. These creative processes became a way to not only uncover the socio-technical politics and moral dilemmas that emerge around AI development and implementation, but also for active engagement with CS and computational thinking. Situated within the context of youth journalism, their research provides a path for CS education where youth are media and technology producers who can publicly diffuse information about the social impacts of computing that is relevant to themselves and their own community.

The next paper by Alvero, Tena-Meza, and Suzara [2022] also focuses on the topic of AI but is centered on the normative claim that CS education should prioritize the negative consequences of AI and computing technologies more generally by being inclusive of local topics and issues,

specifically those related to social class, ethnoracial identity, and gender. With a combination of case study and autoethnography methodologies, the authors use the learning sciences concept of *learning pathways* to explore one Mexican-American high school student's (who is also a co-author of the paper) exploration of AI as both a tool and topic of inquiry, and the attendant development of socio-political commitments related to the role of computing in society as she engaged across multiple settings and institutions. Her inquiry is motivated by the environmental injustices faced by the rural California agricultural community where she and her family live. More specifically, in applying knowledge of AI to the local problem of water pollution the authors explain the student's learning pathway as a model for how CS education can be enriched by involving local communities, centering issues of justice/injustice, framing students as agents of social change, and prioritizing contexts where students' can safely and authentically represent their own identities.

Finally, Israel, Kester, Williams, and Ray [2022] employ a mixed-method research design to report on a five-month CS instructional coaching study with US elementary school teachers that aimed to advance teachers confidence in supporting students with disabilities, specifically in relationship to a **Universal Design for Learning (UDL)** framework for CS education. The scope of their study uniquely focuses on both the teachers who received the intervention and the CS instructional coaches who carried it out. While their findings suggest that teachers did feel more confident about teaching CS and meeting the needs of students with disabilities, the same cannot be said for UDL. Indeed, their findings show that there is much more work to be done to enrich teachers' understanding and coaches' incorporation of UDL into CS education for students with disabilities. They set up the CS education community to not only engage more deeply at the intersections of disability, justice-centered computing, and UDL, but also to focus more on collaborating with and studying instructional coaches.

3 VOICES AND ISSUES MISSING IN THIS VOLUME – CONSIDERATIONS FOR FUTURE DIALOGUE

While the questions of justice-centered computing education explored through these two volumes speaks to a wide range of justice issues, many other topics, issues, and voices are not raised, ones that are necessary to address within this broader project.

Notably, the vast majority of papers included are centered on the Global North, and the United States specifically, while global inequalities in computing education persist and are even more profound within the Global South [Arawjo and Mogos 2021, in the first volume, includes cross-national perspectives]. Additional global as well as domestic justice concerns around computing increasingly intersect with questions of environmental justice, which were touched on by Alvero et al. [in this special issue] in their study, but have many more educational implications. These include to what extent and how computing education opportunities focus on issues like the material impacts of computing hardware on the environment [Taffel 2012] and war [Boluda, Patitsas, & McMahan 2021], global carbon emissions related to both legacy computing uses as well as emerging cryptocurrency technologies [Foteinis 2018], to name just some. Within the United States, Indigenous communities, who have seen profound historical disenfranchisement broadly, experience some of the lowest levels of access and participation in computing education specifically. Critical questions persist about what constitutes justice around computational cultures for Indigenous communities and how indigenous knowledge might contribute towards more just forms of computing [Moreno Sandoval 2017]. The nature of the political economy of both computing generally and computing education specifically is an additional area with important implications for justice-centered projects in computing, with scholars recently exploring the role of the corporate sector in shaping the federal computing education agenda [Marshall & Grooms 2022]. Relatedly, questions of economic justice as it relates to computing education abound - these include both more rigorous

interrogations of the discourse of economic mobility through computing careers, as well as explorations of how and whether computing education is able to support economic development in rural communities that are subject to economic disenfranchisement.

All of this is to say that the studies and perspectives included in these issues are the start of a larger project and conversation, rather than an end point, one that must be expanded in order to meet its aspirations. We believe that through collective focus across research and practice addressing these questions is not only possible, but necessary in order for computing education to actively advance possibilities for a more just world.

DEDICATION

We would like to dedicate this second volume of the special issue to Florence Sullivan. She was an incredibly generous and loving human being, thoughtful educational researcher, and a critical scholar who lived by the justice-oriented values she wrote and spoke about. We miss her very much.

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