Supporting the Integration of Social Justice topics within K-12 Computing Education

Gayithri Jayathirtha (Moderator)
gayithri@uoregon.edu
University of Oregon
Eugene, OR, USA

Joanna Goode
goodej@uoregon.edu
University of Oregon
Eugene, OR, USA

Nicki Washington
nicki@cs.duke.edu
Duke University
Durham, NC, USA

Shana V. White
shana.white@kaporcenter.org
Kapor Center
Oakland, CA, USA

Aman Yadav
ayadav@msu.edu
Michigan State University
East Lansing, MI, USA

Cecilé Sadler
csadler@mit.edu
MIT Media Lab
Cambridge, MA, USA

ABSTRACT

Computing has been historically taught as neutral and devoid of any connection with societies. But more recently, technical tools are taking center stage at societal problem solving, influencing policies and practices around issues such as surveillance, privacy, and algorithmic bias. In this sociopolitical moment, people across different efforts within K-12 computing education are calling for integration of computing with social sciences to center implications of technologies on peoples, communities, and societies. There are multiple facets to these efforts: studying K-12 student engagement with critical content to preparing K-12 educators and ecosystems, developing pedagogical frameworks, and redesigning existing high school computing program to center justice. This panel will present a broad range of efforts towards critical introduction of computing within K-12 settings. While briefly introducing themselves and their work, each panelist will answer the questions: (a) How does your work and experiences address critical computing education? (b) What are some barriers that you have encountered? And (c) How have you addressed these concerns within your designs? Overall, the panel will open the space for discussing, highlighting, and learning from this set of diverse and synergetic critical computing efforts within K-12 computing education.

CCS CONCEPTS

• **Social and professional topics → K-12 education**.

KEYWORDS

Justice-centered computing education, critical computing education, sociotechnical integration

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1 SUMMARY

From loan approvals to prison sentencing, computing technologies shape societal interactions (e.g., [1]). Such tools disproportionately impact peoples, communities, and societies at margins. Computing education should urgently go beyond teaching technical concepts in isolation to integrate social dimensions of technological tools, particularly the relationship between these tools and social justice issues along race, gender, class, to mention a few. While an array of efforts has emerged within post-secondary computing education, comparable efforts within K-12 computing education are recent [2]. With computing rapidly expanding in K-12 settings [4], attempts to include justice-centered computing education has taken a few different directions. In this panel, we will bring a group of scholars within K-12 computing education to highlight, in their work, how they have attended to social justice within computing education. Experts from curriculum designers (Goode, Yadav), computing teacher professional development (Goode, Yadav, Washington), pedagogical framework development (White) and critical computing student engagement and learning (Sadler) will engage the audience in thinking about the different dimensions of justice-centered computing education and how one can integrate it in their practice.

The panel will start with an overview of the need for the integration of social justice issues with computing followed by short remarks from each panelist (5 min each). The audience will be invited to discuss in small groups to generate and refine questions for the panel (5 min). The moderator will take questions and comments that surface form small group discussions to facilitate discussions between the panelists and the audience (40 min).

2 POSITION STATEMENTS

2.1 Joanna Goode

Animated by the inequities within access to computing programs within high school classrooms, Exploring Computer Science (ECS) program was designed to support teachers to broaden participation within their computing classrooms. However, the recent increase in technological tools within societies has necessitated a redesign of

ECS to center justice and social issues around computing. During this panel, I will share more about our ongoing efforts to revise our curricular and professional development materials by co-designing with experienced ECS teachers. Importantly, I will discuss how we integrated social justice issues across curricular units and lessons, and how we envisioned and prepared teacher learning materials to take the redesigned ECS program into their classrooms.

Joanna Goode is the Sommerville Knight Professor of Education at the University of Oregon. She co-developed Exploring Computer Science program and co-authored Stuck in the Shallow End: Education, Race, and Computing (2008/2017). Her research examines how high school teachers learn within professional development programs and how curricular materials can support their learning.

2.2 Nicki Washington

Interventions targeting students from historically underrepresented groups (based on race, ethnicity, gender, sexuality, class, ability, and their intersections) often ignore the people (educators, staff, and students), policies, and practices that directly impact their ability to successfully pursue and complete computing courses and programs. Creating systemic change in CS education requires decentering students who are often marginalized (yet targeted for interventions via deficit-based approaches) and instead focusing on addressing the non-technical factors impacting their ability to successfully pursue and complete computing courses and, ultimately, degrees. On this panel, I will discuss the Alliance for Identity-Inclusive Computing Education (AiiCE) work, including various K-12 efforts and how they reflect at the postsecondary level to ensure that students are fully supported throughout their academic experience.

Dr. Nicki Washington is a professor of the practice of computer science and gender, sexuality, & feminist studies at Duke University. She is also the director of the Alliance for Identity-Inclusive Computing Education (AiiCE), an NSF-funded INCLUDES alliance.

2.3 Shana V. White

I believe in purposeful disruption of the status quo and encourage teachers to exercise autonomy and humanize schools for students. At the Kapor Center I lead, advocate for, and support local and national level work around culturally responsive-sustaining computer science pedagogy, teacher professional development, K-12 CS curricula, racial justice in K-12 computer science education, and equitable K-12 computer science school/district partnerships. During this panel, I will discuss my latest work around culturally responsive-sustaining computer science pedagogical framework.

Shana V. White is the Senior Associate for CS Equity and Justice Initiatives at the Kapor Center. Shana is a passionate educator who works as an advocate for marginalized groups in education and has an unwavering commitment to providing opportunities for historically marginalized students to engage in relevant learning experiences.

2.4 Aman Yadav

My work focuses on supporting high school computing teachers to use equitable practices to ensure students' lived experiences, families, and community is represented in their CS instruction. During the panel, I will discuss how to address information asymmetry [3] in K-12 computing curricula to support teachers to center students and their communities in computing instruction rather than just focusing on technical aspects. In addition, I will also discuss the need to ensure all CS students learn to think critically about the role of computer science in perpetuating and amplifying racialized inequalities and algorithmic biases that disproportionately harm individuals from marginalized group.

Dr. Yadav is the Lappan-Phillips Professor of Computing Education in the College of Education and College of Natural Science at Michigan State University. His research focuses on educating teachers to integrate computational thinking and computer science learning experiences into their core instruction.

2.5 Cecilé Sadler

We are at a unique crossroads in computing education. As we expand access to K-12 computing education, it is increasingly imperative to bring a critical approach to ensure that the future of computing does not continue to perpetuate the harms and disparities that have historically existed. Critical computing education will not only serve to further expand opportunities for inclusion and equity by inviting more learners with diverse identities and interests into the space, but it will also promote self-determination in young people. Engaging with computer science as a tool for social justice, self-expression, and reflection has promises to improve retention of non-dominant youth in computer science by allowing students to take steps in activism and advocacy for the issues they care about. The effort to integrate social justice into K-12 computing education must be intentional about not only changing the curricular content but also reflecting on and restructuring the pedagogical practices and perspectives that currently exist in computer science culture and learning settings. During this panel, I will discuss our holistic approach to incorporating criticality that involves increasing the knowledge and efficacy of both students and educators in an engaging way that inspires action towards transformation.

Cecilé Sadler is a graduate student at the MIT Media Lab with the Lifelong Kindergarten research group where she studies the intersection of computing and education to design equitable learning environments. Her research investigates how critical theory can be leveraged to facilitate playful experiences for Black and Brown youth to learn computing that simultaneously foster purposeful opportunities to develop critical consciousness and cultural identity.

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