



Minoritized Students' Engagement, Identity, and Agency in Computer Science: Listening to the Students Themselves

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ABSTRACT

This panel focuses on the voices of computer science (CS) high school students who come from communities historically underrepresented in CS. Our UCLA team worked in research-practice partnership with teachers and students from the Los Angeles Unified School District (LAUSD) to understand how youth engagement, agency, and identity are being impacted, if at all, by efforts to broaden participation in computing. Going beyond a “numbers” approach, we define equity as attending to the cultural wealth, funds of knowledge, and perspectives youth bring to their CS learning experiences, amplifying minoritized youth’s visions of what CS education should be in the CS for All movement. This panel begins by sharing findings from our year-long qualitative study in four CS classrooms, followed by hearing from the students themselves about what impacts their motivation to learn CS. Student panelists will explain how and why they choose to engage in CS learning toward empowering themselves and their communities, as well as how they are developing CS identities. Together, we will explore what it takes for youth to acquire a sense of “rightful presence” [1] in a field dominated by people who do not look like them or come from their communities.

CCS CONCEPTS

• Computing education • Computer Science Education

KEYWORDS

Equity, K-12 Education, CS Education

[†]Students coming to SIGCSE 2020 in-person may include: Axel T., Bellamy W., Aylin F., and others.

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1 Summary

The CS for All movement has captured the interest of school districts, nonprofits, industry, and government leaders across the US, in recognition of the role Computer Science (CS) plays in our youth’s future academic and career pathways. Yet as CS for All programs—such as Exploring Computer Science or Advanced Placement Computer Science Principles—scale nationwide, we must ensure that the movement does not unwittingly reinscribe current inequities in public education that have resulted in differential access to quality educators, curricula, academic expectations, etc. for our females, youth of color, immigrants, and rural students [2, 3].

In order to keep equity at the center, our project brings together university researchers, public high school CS teachers, and students to understand how youth engagement, agency, and identity are being impacted, if at all, by efforts to broaden their participation in CS. Going beyond a “numbers” approach, we attend to the funds of knowledge and perspectives youth bring to their CS learning experiences, amplifying historically underrepresented youth’s visions of what CS education can and should be.

Our panel of students will explain how and why they choose to engage in CS learning, ways they are using CS to empower themselves and their communities, and how they are building a sense of identity as computer scientists toward challenging deficit notions that minoritized youth are “not interested” or “not good at” CS. This panel will provide an opportunity for us to learn from the voices of today’s youth.

2 Panel Structure

This panel will begin with a brief (5 minute) overview of our project’s approach to prioritizing student voices through research-practice partnership (RPP) and qualitative research. We will share findings from our first year of research with CS teachers and students in the Los Angeles Unified School District (LAUSD) regarding the ways youth engagement, identity, and agency can come to life in CS classrooms (10 minutes). This will

be followed by approximately 20 minutes during which LA high school CS students will describe how they engage with CS by linking their learning to issues that are important to their lives, positively impacting their communities and/or resisting inequitable schooling practices with the projects they create and the visions they have for their futures. While three student presenters have committed to joining the conference (Axel, Aylin, and Bellamy), their availability may shift depending on changing exam schedules, AP commitments, extracurricular commitments, grades, etc. Any students who are unable to attend in-person will join via video conferencing. While our researcher perspective can share the themes of what was common across different classrooms and students, we believe hearing directly from individual students will be an important way to better understand their experiences in CS education. Furthermore, we believe that the next fifty years of SIGCSE should create more opportunities for students to participate in the conversations that shape their schooling experiences.

Following panel presentations, the moderator will lead a 20-minute Q&A session during which audience members can ask questions directly of the student panelists or the research team. The remaining 15 minutes will be spent discussing how the ideas shared by researchers and students can be applied to CS curricula, teacher professional development, and encouraging CS to truly be “for All.” These ideas will inform how our SIGCSE community envisions the next 50 years of CS education at large, as we seek to ensure that all youth have access to high-quality and rigorous CS education.

3 Panelists

Our research team worked closely with LAUSD teachers and students to understand what makes a critical difference in students' engagement with CS (i.e., their degree of attention, curiosity, interest, and passion with learning CS), their sense of identity in CS (i.e., how students feel that their prior knowledge, experiences, culture, values and passions can connect to CS learning), and agency with CS (i.e., the degree to which youth feel they can use CS knowledge to actively investigate and take action on issues and interests that are important to them). Since 1994, Margolis's work has focused on the underrepresentation of females and students of color in computer science education with the publication of two award-winning books: *Unlocking the Clubhouse: Women in Computing* [4] and *Stuck in the Shallow End: Education, race, and computing* [3]. Ryoo and Margolis have been working together since 2008 to support a long-lasting partnership with LAUSD, the second largest school district in the country, toward implementing equity-oriented CS education in public high schools [5, 6]. In collaboration with the University of Oregon, Ryoo and Margolis supported and conducted research in Exploring Computer Science [7] classrooms and PD, which has now spread to 25 states and the 7 largest school districts in the

nation [see, for example, 8, 9, 10, 11]. Tanksley's research focuses on the ways Black girls intersect with and are intersected by media and technology systems through the K-16 pipeline. Estrada is a doctoral student focused on equity issues impacting students of color in their college access and choice. Morris is a math teacher who has worked in public education for 19 years and teaching computer science for 8. She is also a fashion teacher who brings together computing and design in the classroom.

Student panelists represent different ECS and APCSP classrooms from three different LAUSD schools that mirror the majority-minority/low-income demographics and average test scores of the district; all students belong to communities underrepresented in CS. Student panelists have had little prior CS learning experiences before the 2018-19 school year during which our research took place. Their perspectives offer an important guiding light to the ways we can ensure that the future of CS reflects the broader interests, talents, needs, and dreams of *all* our students.

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