Board 193: A Collective Action Approach to Broadening Participation in Computing

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Shaundra B. Daily is a professor of practice in Electrical and Computer Engineering & Computer Science at Duke University and Levitan Faculty Fellow, Special Assistant to the Vice Provosts. Prior to joining Duke, she was an associate professor with tenure at the University of Florida in the Department of Computer & Information Science & Engineering. She also served as an associate professor and interim co-chair in the School of Computing at Clemson University. Her research focuses on the design, implementation, and evaluation of technologies, programs, and curricula to support diversity, equity, and inclusion in STEM fields. Currently, through this work, she is the Backbone Director for the Alliance for Identity-Inclusive Computing Education as well as Education and Workforce Director for the Athena AI Institute. Having garnered over $40M in funding from public and private sources to support her collaborative research activities, Daily's work has been featured in USA Today, Forbes, National Public Radio, and the Chicago Tribune. Daily earned her B.S. and M.S. in Electrical Engineering from the Florida Agricultural and Mechanical University – Florida State University College of Engineering, and an S.M. and Ph.D. from the MIT Media Lab.

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Cecilé Sadler is a graduate student at the Massachusetts Institute of Technology in the Media Lab with the Lifelong Kindergarten group. She is studying the intersection of computing and education in an effort to design equitable learning environments that promote creativity through technology development. Her research interests focus on investigating how computing can be leveraged to create spaces for young people of color to practice agency and develop their cultural identity through playful learning experiences. Cecilé is a graduate of North Carolina State University and Duke University, earning her B.S. and M.S. in Computer Engineering. She is on the Competence in Computing (3C) Fellows Program leadership team and senior personnel on the Alliance for Identity Inclusive Computing Education (AiiCE).

A Collective Action Approach to Broadening Participation in Computing

Despite enrollment increases in U.S. undergraduate computing departments, representation of historically excluded groups remains low [1]. This lack of diversity is evident in academic and workplace cultures and manifests in biased and/or harmful technologies that negatively impact and exclude non-dominant identities [2], [3][4]–[6]. The Alliance for Identity-Inclusive Computing Education (AiiCE, pronounced "ace") aims to increase the entry, retention, and course/degree completion rates of high-school and undergraduate students from groups that are historically marginalized in computing [7], [8].

Our collective impact approach to broaden participation aims to transform high-school and postsecondary computer science (CS) education by convening national leaders in K–16 CS education including: Duke University, Bard College, Mount Holyoke College, the University of Oregon, Kapor Center, the Computer Science Teachers Association (CSTA), the Disabilities, Opportunities, Internetworking, and Technology (DO-IT) Center and the AccessComputing Alliance, the Computing Sciences Accreditation Board (CSAB), the Constellations Center for Equity in Computing, Northeastern University Center for Inclusive Computing (CIC), and Reboot Representation.

Core to our strategy is the growing area of identity-inclusive computing (IIC) research, which blends social science with CS to explore how identity impacts and is impacted by computing. IIC takes a holistic view of identity (i.e., at the intersections of race, ethnicity, gender, sexuality, class, ability, etc.) and pushes stakeholders to examine the impact of people, policies, and practices at the individual, group, classroom, and department levels [9].

In this poster, we present the results of two activities that have been implemented as a part of this work. First, we present the development of and audience reception to Byte-sized DEI-J: a project-wide, social media-based science communication initiative that introduces identity-inclusive computing topics to students, staff, educators, and administrators. This initiative, which began in January 2022, utilizes a combination of short (< 3 minutes) whiteboard-style animated videos and infographics to introduce identity related concepts. Episodes (1-7) discuss name pronunciation, computing access in high school, computing access in college, pronouns, unconscious bias, ableist language, and mental health.

Figure 1. Screenshots from whiteboard-style videos included in Byte-sized DEI-J

The videos have been shared on YouTube, Twitter, LinkedIn, and Instagram through the AiiCE accounts (@IdentityInCS). Throughout, the team has collected information on likes, shares, and other content engagement (see Table 1 below). Analytics indicate that the videos were viewed by

professors, software developers, engineers, students, project managers, founders, and business strategists.

Table 1. Analytics from Social Media Accounts

		Ep 1	Ep 2	Ep 3	Ep 4	Ep 5	Ep 6	Ep 7
YouTube	Views	130	56	45	89	133	196	21
LinkedIn	Views	812	335	303		194	700	396
	Reactions	54	16	15		4	9	10
	Shares	5	7	4		0	3	0
	Comments	3	0	0		0	0	0
Instagram	Views	107	43	33	55	46	0	41
	Likes	23	6	6	5	8	4	1
	Comments	0	0	0	0	0	0	0
	Accounts Reached	213	92	67	106	52	72	51

The second featured project presents a novel, two-year, virtual, cohort-based program that helps administrators, faculty, and staff identify and address systemic barriers impacting marginalized students in computing classes and departments. Currently on its third cohort, the Cultural Competence in Computing (3C) Fellows program aims to: (1) increase participant knowledge of identity-related topics that are rooted in social science, (2) increase participant self-efficacy leading initiatives based on an understanding of these topics, and (3) increase the number of computing undergraduates completing identity-inclusive courses, modules, and other activities. The program infuses more social sciences (uncommon in computing) into undergraduate curricula, while also addressing participation disparities, toxic cultures, and dangerous designs that are pervasive in current technology.

External evaluation conducted with eleven participants from the second cohort (faculty, post-doctoral researchers, and administrators) revealed that all participants developed a deeper understanding and awareness of systemic bias, inequities, and inequalities and their impact on computing environments, felt better equipped to identify the factors that negatively impact the experience of minoritized individuals, and were better able to identify areas for self-improvement. Evaluation also revealed specific areas where participants felt they still had room to grow. For example, although all respondents reported feeling more confident about engaging in discussions related to cultural competence, six expressed ongoing discomfort in this area, feeling they still needed more practice to feel fully equipped. Similarly, while most respondents felt that their 3C Fellows experience supported an increased understanding of the experiences of minoritized individuals, some continued to feel they could not “truly understand" these experiences.

Although AiiCE is only in its second year of implementation, the activities presented in this poster, as well as those that are a part of the larger Alliance are already shifting policies and practices in K-16 computing education. While most prior efforts to broaden participation have centered marginalized students by helping them to adapt to and survive in unwelcoming, toxic, and systemically oppressive computing environments, the aforementioned activities (and those of the greater Alliance) shift this focus to ensure that staff, educators, and administrators have the tools necessary to address and remove systemic barriers to student success in computing.

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