Four Models for Including Community Colleges in Broadening Participation: A Call to Action

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1. SUMMARY

While computer science (CS) jobs are growing rapidly, universities are not producing enough CS graduates to fill a projected shortage of almost a million workers by 2020 [1]. To add to this problem, there is a striking lack of diversity in the graduates of CS programs nationwide [2]. Of the degrees awarded, the overwhelming number - 80% - were awarded to males, while only 5% went to African-Americans, 18% to Asians, and 9% to Hispanics [3, 2]. Bringing community colleges (CCs) into the fold will enable us to confront this projected workforce shortage [2]. More importantly, it will enable us to diversify one of the most important fields of our time, computer and information sciences. Over half of community college (CC) students are non-white, and more than half of all Hispanic and Black undergraduates start at community college [4].

Given that community colleges enroll minorities and women in larger numbers than four-year institutions, it is imperative for both CCs and four-year institutions to engage in collaborative efforts to broaden the participation of diverse peoples into computing and facilitate unobstructed pathways from the two-year to four-year educational programs. While CCs are rich in diversity, their students face an inordinate number of obstacles transferring to a bachelor's degree, particularly in CS.

The complexities of the CC landscape require that experts from various backgrounds come together to share knowledge and experiences to contribute to a better understanding of the role CCs can play with four-year institutions in broadening participation efforts in CS and information technology (IT). Lyon & Denner [5] argue that “we are at an inflection point where community colleges will be a vital and viable pathway for the many women and racial/ethnic minority students who are

already engaged at their institutions to consider CS and successfully transfer to complete a bachelor's degree in the field.”

2. CONTEXT

Funded by a National Science Foundation (NSF) grant, a workshop was held at the Google headquarters in Mountain View, CA, in 2018. Stakeholders invited to this workshop were: researchers, educators and administrators from CCs and research universities, and members of think tanks. The overarching goal of this workshop was to provide a forum for sharing experiences and for brainstorming strategies/models that will empower CCs to become an integral part of the conversation on Broadening Participation in Computing (BPC) in CS and information technology (IT). The attendees at this workshop collectively identified the following models for the intentional inclusion of CCs in BPC:

CS Principles Plus (CSP+) Course: The group recommended a college and career-aligned CSP course that could be a part of the general core for existing community college students with credit earned through dual enrollment for high school students.

Changing Perceptions: The group recommended this model as a way to change perceptions about the students and faculty in, and the rigor of, community college CS coursework and also confront the negative bias about CCs in general.

Structured Pathways: This strategy examines the barriers transfer students face both in the form of coursework that will not transfer and advising structures that do not guide students or advise them into computing programs. The CSP+ course could be an integral component of this structured pathway.

National CC BPC Alliance: This model was recommended as a long-term strategy for addressing BPC. Once again the CSP+ course would be the most immediate and impactful step towards establishing this model.

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SIGCSE'19, February 27-March 2, 2019, Minneapolis, MN, USA.

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ACM ISBN 978-1-4503-5890-3/19/02

DOI: <https://doi.org/10.1145/3287324.3287338>

3. FORMAT

In this interactive panel, the panelists will: Describe the problem and explain the goal of the workshop; Introduce each of the 4 models/strategies; Recount what has been done to move each of the models forward (this could be examples from our work, things we know others are doing, or if no progress so far, then soliciting ideas for next steps). The panelists and audience will break up into 5 groups and ask people to share what they are doing that is related to each model and/or contribute to a plan for each model.

4. PRESENTERS

This panel is comprised of organizers of this workshop. They are part of a larger group of seven educators from various levels of institutions – community colleges, research universities, and education research institutions – and researchers.

4.1 AMARDEEP KAHLOH (MODERATOR) is a Professor of Computer Science and director of Fast Track to Success at Austin Community College. Compared to a four-year school, the community college population is very diverse, not just in ethnicity, race, age, and gender but also in levels of educational attainment. I have a deep understanding of the challenges and obstacles faced by community college students as they attempt transfers to a four-year school. While there are many challenges, there are also many opportunities to build pathways and bridges for these students. As director of Texas Affordable Baccalaureate Expansion grant, I have worked to create coursework, support services and an articulation agreement for a 100% online, competency-based, and affordable bachelor's degree. I have worked with colleges and universities around Texas to create accelerated pathways for students in computer science and information technology. It is imperative for community colleges and four-year schools to work together to remove the barriers to transfers thereby increasing the diversity and the numbers of CS/IT graduates.

4.2 DEBORAH BOISVERT is Director of the BATEC Center for Computing and IT at University of Massachusetts Boston focusing on professional development for K-12 educators and designing coursework and developing computing pathways from high school to community college in several urban settings. As an urban laboratory, this work has utilized shared resources (across industry, academia, and community), subject matter expertise (curricular guidance and best practices for student engagement) and financial resources (materials, supplies and funds for participant support). I believe that a holistic system of problem-based coursework and multiple touchpoints in an upward trajectory must interweave awareness, preparation and advancement throughout the academic and work-based learning components to increase the success of minority students. This belief has accentuated the need for community colleges as an integral part of the Broadening the Participation conversation.

4.3 LOUISE ANN ("LOU ANN") LYON is a Senior Research Associate at ETR and brings industry experience in the software engineering workplace as well as research knowledge from Learning Sciences and Feminist Studies to her work on diversifying technology at postsecondary institutions and in the

workplace. She was Principal Investigator on a research project studying underrepresented student perspectives on transferring and completing bachelor's degrees in CS [5], and was the principal author of an upcoming ACM Community College Transfer Pathway report. Her experiences attending community colleges and talking with underrepresented students at CCs in California have convinced her of the critical role that CCs play in the postsecondary education landscape in the U.S., particularly regarding BPC.

4.4 MELANIE WILLIAMSON is Assistant Dean and Professor of Computer & Information Technologies. She is passionate about women in computing and is co-leader of the Community College Involvement Project Team at NCWIT. She has chaired and organized the Kentucky Community College Women in Computing ACM-W Celebration, the first community college centered regional women in computing conference. She believes that involvement of community colleges in broadening the participation of minority and underrepresented populations in the field of computing is important, as the CC population tends to be varied in gender, ethnicity, and age. By including community colleges you increase pathways and may create new paths that may better fit a diverse population.

4.5 WENDY DUBOW is the director of evaluation and a senior research scientist at the National Center for Women & Information Technology (NCWIT). NCWIT exists to provide members and other stakeholders with research- and evidence-based practices for increasing the meaningful participation of all girls and women in computing disciplines. She has been a Principal Investigator on two NSF grants focused on broadening participation in computing at the community college level. From these interventions, working with the NCWIT Academic Alliance community college representatives, and from her research findings, she has concluded that there is as much work to be done to recruit and retain women and other historically under-represented minorities in community college computing as at 4-year post-secondary institutions. She can share the challenges and opportunities she and her team have identified.

5. REFERENCES

- [1] American Association for Community Colleges (AACC): Students at community colleges, 2016.
- [2] Data USA: Computer Science - Diversity. 2015. Retrieved March 05, 2018, from <https://datausa.io/profile/cip/110701/#demographic>
- [3] Jaggars, S. S., Fink, J., & Fletcher, J. (2016). A Longitudinal Analysis of Community College Pathways to Computer Science Bachelor's Degrees (Rep.). Mountainview, CA: Google.
- [4] Kalil, O., & Jahanian, F. (2013, December 11). Computer Science is for Everyone! [Web log post]. Retrieved March 5, 2018, from <https://obamawhitehouse.archives.gov/blog/2013/12/11/computer-science-everyone>
- [5] Lyon, L. A. & Denner, J. (2016). Student Perspectives of Community College Pathways to Computer Science Bachelor's Degrees. Mountain View, CA: Google.