UC Irvine
The PERI Institute

Computer Science Transfer Pathways Conference

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Introduction

Research in equity and broadening participation in computer science (CS) has highlighted the importance of examining the experiences of women of color, who remain significantly underrepresented in computing (Pivotal Ventures & McKinsey & Company, 2018). Women of color comprise less than 10% of bachelor's degrees in computing (McAlear et al., 2018; Pivotal Ventures & McKinsey & Company, 2018). A disproportionate number of women of color access postsecondary education through community colleges (Cohen et al., 2014); however, research examining women of color computing students who transfer from community colleges to four-year institutions remains limited, despite transfer pathways representing a promising avenue for broadening participation in computing (Bahr et al., 2017). Given the large number of women of color enrolled in community colleges, it is important to examine their experiences across both two-year and four-year institutions in order to better understand how institutions can support and broaden their participation in computing.

Among the institutional factors shaping transfer outcomes is the articulation agreement process between community colleges and universities (Gonzales Canché & Zhang, 2025). Articulation agreements are intended to clarify transferable coursework and streamline transfer pathways; however, many agreements are difficult to navigate, inaccessible to students, and inconsistent across institutions (Taylor, 2019). In computer science specifically, complex prerequisite sequences and unclear transfer requirements can delay transfer, increase time to degree, and discourage persistence among students already navigating systemic inequities. Since women of color are disproportionately represented among community college students and transfer students from historically marginalized backgrounds, inaccessible articulation systems may function as an additional structural barrier limiting their access to and success in computer science pathways.

In response to these persistent transfer barriers, an intersegmental convening was organized that brought together stakeholders from California Community Colleges, the California State University system, and the University of California system to examine challenges in computer science transfer pathways and identify opportunities for improved alignment. The convening was designed to identify actionable strategies for improving articulation alignment, transfer preparation, and equitable access to computer science pathways through cross-sector collaboration among faculty, administrators, researchers, and transfer professionals. Particular attention was given to the experiences of women of color and other historically underrepresented students in computing, whose educational trajectories are often shaped by inconsistent transfer requirements, unclear prerequisite pathways, and limited institutional coordination across segments.

The convening created space for participants to discuss barriers related to articulation agreements, curriculum sequencing, transfer preparation, and student support systems while collaboratively identifying strategies to improve pathway transparency and transfer efficiency.

By fostering dialogue across educational segments, the convening sought to address systemic misalignment that can contribute to delayed transfer, excess credit accumulation, and attrition among community college students pursuing computing degrees.

Methods

To examine challenges and opportunities related to computer science transfer pathways, a two-day intersegmental convening was organized, sponsored by Reboot Representation, that brought together stakeholders from California Community Colleges (CCC), the California State University (CSU) system, and the University of California (UC) system. The convening aimed to facilitate cross-sector dialogue around articulation alignment, equitable transfer pathways, and institutional practices impacting students pursuing computer science degrees, particularly women of color and other historically underrepresented students in computing. Participants were recruited through institutional partnerships, professional networks, and outreach to individuals engaged in transfer support, articulation, and computer science education. The convening included representatives from 10 California Community Colleges, 4 CSU campuses, and 6 UC campuses. Attendees included faculty, counselors, articulation officers, administrators, researchers, and transfer professionals involved in curriculum development, transfer policy, and student support services.

The convening was intentionally structured to combine research, practitioner expertise, student experiences, and collaborative planning activities. Day one began with a keynote presentation by Sharnnia Artis focused on designing equitable computer science transfer pathways and the experiences of students underrepresented in the computing pipeline. This was followed by a student voices panel that centered transfer students' lived experiences navigating computer science pathways between community colleges and four-year institutions. Afternoon sessions focused on collaborative pathway mapping discussions in which participants examined existing articulation structures, prerequisite sequencing, transfer preparation, and institutional coordination across campuses. Participants worked together to identify areas of misalignment, barriers within current transfer systems, and opportunities to improve pathway clarity and transfer efficiency. The first day concluded with a report-out session and discussion of next steps for continued collaboration.

The second day centered on technology and systems-level approaches to improving transfer navigation. A keynote presentation by Kathy Kanemoto explored the role of artificial intelligence in supporting the student transfer journey. Participants then engaged with the Program Pathways Mapper tool and continued collaborative pathway mapping activities to further examine transfer structures and articulation alignment across institutions. Notes, observations, and recurring themes from discussions and working sessions were synthesized to identify common challenges, institutional gaps, and recommendations for strengthening equitable computer science transfer pathways across California's higher education systems.

Data Collection

Data collection for the convening consisted of an exit survey administered to all participants at the conclusion of the two-day event. The survey aimed to assess participant experiences, evaluate the effectiveness of the convening, and identify future needs related to improving computer science transfer pathways across California's higher education systems.

The survey included both quantitative and qualitative questions. Participants were asked to evaluate the convening on a five-point scale ranging from poor to excellent. To assess the convening's impact on professional relationship-building, participants were also asked to report how many individuals they considered part of their academic network before attending the conference and how many they considered part of their academic network after the conference.

Additional open-ended questions focused on future collaboration and institutional alignment efforts. Participants were asked what additional information or resources they needed to continue working with intersegmental partners to strengthen computer science transfer pathways. The survey also asked whether participants or their institutions identified action items related to improving articulation and alignment moving forward.

To inform future convenings and ongoing collaboration, participants were asked whether there should be a follow-up conference and what goals or focus areas should guide future events. A final open-ended question invited participants to share additional reflections or feedback regarding the convening experience.

A total of 24 participants completed the exit survey out of approximately 40 convening attendees. Survey responses were analyzed to identify patterns related to participant satisfaction, intersegmental network development, institutional action planning, and recommendations for future collaboration. Findings from the survey provide insight into the convening's immediate impact and highlight opportunities for strengthening computer science transfer alignment across California's higher education systems.

Results

Findings from the exit survey demonstrate strong participant interest in continued intersegmental collaboration to improve computer science transfer pathways across California's higher education systems. Responses highlighted several recurring themes related to articulation alignment, transfer degree development, institutional coordination, and the need for ongoing statewide collaboration.

Strengthening Articulation and Course Alignment

Participants identified articulation and course alignment as a primary area for future collaboration. Multiple respondents described plans to follow up on incomplete articulation

agreements, review existing course articulations, and coordinate with partner institutions to improve alignment of introductory computer science classes and prerequisite coursework.

Respondents also emphasized the importance of establishing clearer and more consistent articulation practices across institutions. Several participants advocated for broader statewide standardization efforts, including the possibility of common course numbering systems, language-agnostic articulations that prioritize learning outcomes over specific programming languages, and uniform standards for major preparation in computer science transfer pathways.

Transfer Degree Development and Pathway Expansion

Survey responses indicated interest in developing and expanding Associate Degrees for Transfer (ADTs) and related transfer pathways in computer science and data science. Participants described ongoing and planned conversations between Community Colleges and UCs regarding ADT development and transfer alignment. Respondents also identified the need for greater clarity regarding whether ADTs would be recognized within UC transfer pathways and how transfer preparation expectations could be more clearly communicated to community college students.

Institutional Collaboration and Networking

The convening fostered meaningful relationship-building across institutions. Many respondents discussed plans to maintain communication with partners they met during the convening, continue articulation discussions, and attend future collaborative events. Several participants emphasized the importance of creating more structured opportunities for intersegmental collaboration, including recurring meetings, shorter working sessions throughout the year, and collaborative “working-group” formats focused on establishing new agreements between CCC, CSU, and UC partners.

Participants additionally highlighted the value of cross-functional engagement between faculty, counselors, articulation officers, administrators, and researchers. Respondents noted that bringing together both academic and administrative stakeholders created opportunities to better align educational goals with institutional processes.

Recommendations for Future Convenings

Participants overwhelmingly supported the idea of a follow-up conference and suggested that future convenings occur annually or biennially to sustain momentum and collaboration. Respondents emphasized that future events should focus on statewide coordination, standardized transfer preparation, articulation reform, and continued development of equitable transfer pathways in computer science.

Recommendations for improving future convenings included increasing time for small group collaboration, facilitating more direct intersegmental dialogue, and creating additional opportunities for one-on-one institutional meetings. Participants recommended increasing engagement with institutions with which they have weaker existing ties in order to strengthen transfer pathways. Providing foundational articulation training, more detailed guidance regarding UC computer science transfer requirements, and examples of successful collaborative articulation work was also suggested.

Suggestions for improving participant engagement included pre-conference networking tools, icebreakers, and mechanisms for documenting future collaboration ideas.

Emerging Action Items and Institutional Commitments

Survey responses demonstrated that many participants left the convening with concrete institutional action items. Planned next steps included developing new courses aligned with transfer needs, revising articulation agreements, improving syllabus transparency, expanding data science pathways, and creating more accessible repositories of course learning outcomes and articulation information.

Other institutions described plans to publish clearer four-year and 2+2 transfer pathways, strengthen outreach to regional articulation officers, request transfer outcome data, and continue collaborative discussions with institutional partners regarding computer science and data science transfer preparation.

Overall Participant Reflections

Overall feedback regarding the convening was highly positive. Participants described the event as thoughtful, productive, and valuable for fostering collaboration across institutional segments. Respondents specifically identified the keynote presentations and student panel discussions as impactful components of the convening, noting that these sessions grounded conversations in student experiences and highlighted the importance of equitable transfer reform.

Participants also emphasized that providing the conference free of charge increased accessibility and enabled participation from staff and faculty who may otherwise have faced institutional budget constraints. While overall satisfaction was high, some respondents noted that future convenings could benefit from clearer communication regarding conference goals, expectations, and intended outcomes prior to the event.

Discussion

The findings from this convening highlight how computer science transfer pathways are shaped not only by curricular requirements, but also by broader institutional structures that influence students' ability to successfully navigate transfer systems. Across discussions and survey responses, participants identified articulation misalignment, inconsistent transfer expectations, limited institutional coordination, and lack of transparency as significant barriers within California's computing transfer ecosystem. Collectively, these findings suggest that improving transfer outcomes for women of color and other historically underrepresented students in computing requires systemic and intersegmental approaches to transfer reform.

Articulation Misalignment as a Structural Barrier. One of the clearest themes emerging from the convening was the extent to which inconsistent articulation agreements and varying prerequisite expectations create structural barriers for students pursuing computer science degrees. Variability in introductory course sequences, course equivalencies, and transfer preparation expectations can complicate students' educational trajectories and contribute to delayed transfer timelines, excess credit accumulation, and barriers to degree completion. These findings reinforce existing research demonstrating that articulation complexity can negatively shape transfer efficiency and persistence among computing students.

Importantly, these barriers may disproportionately affect women of color and other historically marginalized students who are more likely to begin their educational pathways at community colleges. Considering transfer students often navigate institutional systems with unequal access to advising, institutional knowledge, and academic resources, inconsistent articulation structures may reproduce inequities within computing pathways rather than broaden participation. In this context, articulation processes should be understood not simply as administrative mechanisms, but as equity issues that directly shape access to computing education.

Need for Standardization and Transparency. The convening also highlighted a strong need for greater standardization and transparency across California's computer science transfer ecosystem. Calls for clearer articulation expectations, universal standards for major preparation, and stronger coordination between community colleges, CSU campuses, and UC campuses suggest that transfer preparation in computing remains highly decentralized across institutions.

Recommendations such as common course numbering systems, language-agnostic articulations, and expanded Associate Degrees for Transfer (ADTs) reflected broader efforts to reduce institutional variation and simplify transfer navigation for students. At the same time, requests for centralized repositories of articulation information, clearer course learning outcomes, and more accessible transfer guidance indicate that many students and practitioners continue to encounter difficulty interpreting and navigating existing transfer systems.

Taken together, these findings suggest that transparency itself may function as an important equity-focused intervention. When transfer expectations are unclear or inconsistently communicated, students with limited institutional capital may face additional barriers in accessing and completing computing pathways. Improving clarity and accessibility within articulation systems may therefore help reduce inequities embedded within transfer processes.

Intersegmental Collaboration as Transfer Reform. Another major finding from the convening was the importance of sustained intersegmental collaboration in addressing transfer barriers. The convening demonstrated that challenges within computer science transfer pathways are not solely technical or curricular in nature, but are also relational and organizational. Limited communication across institutional segments can contribute to misalignment in course expectations, transfer preparation, and articulation practices.

Bringing together faculty, articulation officers, counselors, administrators, and researchers created opportunities for institutions to collaboratively identify gaps within existing transfer systems and explore more coordinated approaches to pathway development. Participants' strong interest in continued collaboration and recurring convenings further suggests that transfer reform requires ongoing institutional dialogue rather than isolated or one-time interventions.

These findings position intersegmental convenings as potentially valuable mechanisms for strengthening institutional coordination and fostering collaborative approaches to transfer reform. Sustained cross-sector engagement may help institutions better align expectations, streamline transfer pathways, and respond more effectively to the needs of transfer students pursuing computing degrees.

Centering Student Experiences in Transfer Reform. The convening additionally reinforced the importance of centering student experiences within conversations about transfer reform. Participants identified the keynote presentations and student panel discussions as especially impactful because they grounded institutional conversations in the lived realities of students navigating computer science transfer pathways.

Centering the experiences of women of color and other underrepresented students in computing encouraged participants to consider how transfer systems may unintentionally disadvantage students already navigating systemic inequities related to race, gender, and socioeconomic status. These discussions shifted transfer reform beyond questions of administrative efficiency and toward broader considerations of equity, belonging, and institutional support.

This emphasis on student experiences highlights the importance of incorporating student perspectives into future transfer pathway development and articulation reform efforts. Without attention to how students experience transfer systems in practice, institutional reforms may overlook the ways structural barriers operate across educational segments.

Conclusion

Collectively, the findings from this convening suggest that strengthening computer science transfer pathways requires coordinated efforts focused on articulation alignment, institutional transparency, sustained intersegmental collaboration, and student-centered transfer reform. The convening demonstrated substantial institutional interest in collaborative transfer reform efforts and identified concrete opportunities for improving transfer systems across California's higher education sectors.

Findings should be interpreted within the context of the convening's scope and participant pool. The survey reflects the perspectives of 24 respondents representing institutions that participated in the convening and is intended to identify emerging themes and collaborative opportunities rather than provide generalizable conclusions across all California institutions.

References

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