

Chicago Alliance for Equity in Computer Science (CAFÉCS): Cycles of Improvement

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With President Obama's announcement of the Computer Science for All Initiative in 2016, there has been a surge in the number of districts that are newly implementing computer science (CS) courses. Since the dawn of the modern, standards-based era, this is the first time that a new subject area is gaining prominence as a core subject. Those districts at the beginning phases of implementing CS as an elective course have yet to face a variety of implementation hurdles that are typical when creating equal opportunities for all students. The Chicago Public Schools (CPS) has surmounted many of these initial hurdles by recently mandating CS as a graduation requirement for all high school students (Dettori, et al., 2018). Thus, with a single school board vote, CPS ensures that all students will *experience* at least one CS course in high school. The Chicago Alliance For Equity in Computer Science (CAFÉCS) was formalized in 2017 to ensure that CPS continues to provide schools with sufficient support and accountability so that the *quality* of this experience and resulting outcomes are equitable across the district. As a design-based researcher-practitioner partnership (RPP), CAFÉCS frames its work around the core structure of the learning sciences: cognition, design, and social contexts.

Exploring Computer Science (ECS) is the primary course that students have been using to fulfill the graduation requirement in CPS (<http://exploringcs.org>). The ECS curriculum is composed of activities that are designed to engage students in CS inquiry around meaningful projects. The pedagogy of ECS is structured around three interwoven strands: equity, inquiry, and CS concepts. The ECS professional development program is designed to prepare teachers to implement these inquiry-based activities while also guiding teachers in building a classroom culture that is culturally responsive and adapting lessons to the backgrounds and interests of the students. The design of ECS is organized around cognitive principles for how students develop computational thinking. Since 2012, more than 45,000 students have taken ECS. Recent analyses of assessment outcomes provide evidence of validation of how the ECS design is supporting cognitive development (McGee et al., 2019) for all students regardless of race or gender (McGee et al., 2018).

In this poster, we contend that it is only by attending to the social contexts of CPS that the strong cognition and design work underlying ECS can have positive impacts for students. As an RPP, CAFÉCS has developed distributed leadership practices that enable the melding of cognition and design into the social context of CPS. One such leadership practice is the CAFÉCS improvement cycle. Through weekly meetings of the CAFÉCS district and research leadership team and monthly meetings of the whole CAFÉCS district and research team, a problem of practice emerged around anecdotal reports of a high course failure rate in the first year of policy implementation. Given prior research in CPS that failure of one core class can significantly reduce the probability of graduating, this problem of practice threatened to derail the initiative. Typical of RPPs with high levels of trust (Henrick et al., 2017), the whole team brainstormed hypotheses about potential factors affecting course failure, including student, teacher, and school characteristics. The analyses of these hypotheses revealed that teacher attendance at the ECS professional development had a significant impact on reducing failure. By first engaging in research to define the problem from a learning sciences perspective, the results had an immediate impact on practice. District implementation staff put the results into practice to significantly increase motivation and attendance at the ECS workshops in the next year. In addition, the results fed directly into design work on a hybrid course to address the social context of credit recovery for those students who do fail the class.

References

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