ISTE Computer Science Network

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Featured article of the month:

RUTGERS Center for Effective School Practices

Partnership and Progress

The Computer Science Teaching & Learning Collaboratory

Dr. Cynthia Blitz and David Amiel

Persistent inequities in computer science education have long plagued the educational community. As schools struggle to recruit and retain diverse learners into computer science classes at the K-12 level, we see these disparities reflected in the computing workforce.

To tackle these disparities, through the Rutgers University Center for Effective School Practices, a unit of the Graduate School of Education, we have established the Computer Science Teaching and Learning Collaboratory (CS-TLC), a research-practice partnership dedicated to addressing issues of participation and performance inequities in high school computer science education. This organization is funded by the National Science Foundation through a CS for All grant and represents over 15 school districts from across New Jersey and Pennsylvania with over 50 individual members. Our districts reflect the diverse landscape of the area, including rural and urban districts, districts that serve high minority populations, and districts receiving Title I funds. Their computer science programs vary greatly as well, including some well-established departments in addition to schools with only one teacher that are looking to develop a program.

No matter what position the district is in, we recognize that computer science teachers are in a unique spot; they often lack departments to support larger initiatives and colleagues to collaborate with regularly. This partnership aims to leverage the expertise of its members, along with researched best-practices, to foster diverse, inclusive computer science education programs and reduce such isolation. To do so, we seek to include the perspectives of both educators and administrators in our work; each districts' team includes at least one computer science teacher and one school administrator, and we invite guidance counselors and other teachers to participate as well. Our project puts collaboration first, allowing us to initiate an iterative cycle of improvement; that is, our collaboratory builds capacity and effectiveness, as we consistently make improvements to the way we work based on data.

Key activities of the CS-TLC include (1) an annual, 5-day Summer Institute, where educators and administrators convene on the Rutgers University campus to engage in conversation, sharing, and professional learning opportunities in areas such as equity in computer science, classroom best-practices, school culture, course sequencing, and community outreach; (2) monthly virtual professional development modules that focus on the CSTA concepts of computer science; and (3) monthly researcher-practitioner meetings for administrators and teachers that focus on issues of equity and participation such as targeted communications, cross- and extra-curricular engagement, 8th grade outreach, and involving all community stakeholders.

We understand the CS-TLC is a large project that is not replicable for many school districts; however, we have compiled some key, replicable takeaways that we believe can be implemented by any school district looking to increase its capacity to provide high-quality, rigorous, and inclusive computer science education to students:

Bring administrators to the table. One of the key insights from our partnership is the importance of involving district administrators in the collaboratory. Having administrators on board with computer science affords educators personalized support mechanisms from within their district. Approval processes are expedited, and computer science initiatives are given a priority they might otherwise not see. Additionally, involving administrators increases accountability for district teams and keeps everyone on track for success. *Include your school's admins in your work, they're valuable, and often underutilized, tools and in a unique position to help.*

Be curriculum agnostic. There are tons of curriculum providers out there for high school computer science. Although we appreciate the opportunity to work with schools to find and implement the one that will best suit their needs, all our professional development and learning opportunities are completely curriculum nonspecific. This means that the strategies and activities that we develop and share as part of our work can work in every classroom, no matter what provider a district might use. This ensures that all our teachers can benefit from every discussion. *Don't create restrictive learning experiences for teachers, computational thinking is universal, and your preparation opportunities can be as well.*

PD at your own pace. When we first began our project, we envisioned virtual, monthly professional development sessions for our teachers. However, we found that scheduling sessions with teachers from a variety of different districts, each with their own school schedules, meant that finding a time that worked for the majority of our teachers would be a fruitless task. Teachers want professional learning opportunities, and providers need to match that demand on terms that work for educators. We decided to move our professional development to online modules, which we publish monthly. These modules feature a pre-recorded video from a content-area expert, a discussion space, a short comprehension-check, and (as always) an option for feedback. *Bring quality professional development to your teachers, rather than the other way around; doing so ensures they have the time to fully explore the relevant ideas*.

Empower every voice. We didn't name our project a collaboratory because it sounds cool (or did we?), we did so because every aspect of our project is underpinned with ongoing, open communication. We arm each member of our group with a voice and allow that voice to be heard and we make sure to listen. Doing so creates an open culture of knowledge transfer that snowballs good ideas into great ones, quickly generates innovative answers to unique problems, and fosters that inclusive, diverse cultures around computer science education we strive to create in our schools. *Give every person on your team, no matter their role or position, a voice; listen to each other and be amazed at the power of your network.*

From this project, we believe that we have established a model of a collaborative structure that can be replicated in other locations and subject areas. We have found that ongoing opportunities for open and honest collaboration (which we host through a Mobilize community) aid school districts in implementing impactful changes while undertaking meaningful projects. At the Center for Effective School Practices, we

believe progress is made through partnership, and when educators and researchers join forces with a common goal, we are unstoppable.

Interested? Rutgers CESP is creating an online Mobilize group dedicated to the dissemination of ideas and resources from our project. If you're interested in being among the first members, sign up here. Additionally, you can find similar projects at the CSforALL RPP directory.

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David Amiel

Mr. Amiel is a Research Assistant and Teaching Fellow at CESP, where he enthusiastically works to co-create programs, learning experiences, and methodologically rigorous research and evaluation projects with the aim of improving learning for all people, both big and small. His education in biomathematics, computer science, and cognitive sciences allows him to engage fully in the work of CESP across content areas and learning institutions.

Table of Contents: