VIRTUAL LEADERSHIP SUMMIT DESIGN AND IMPACT: ADVANCING K-12 COMPUTER SCIENCE EDUCATION

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Abstract

Although the importance of computer science education (CSE) in K-12 is well-known, the most effective and efficient ways to incorporate computer science into the fabric of schools are still being explored. One element that we know is central to the provision of high-quality, articulated, and cohesive district-wide CSE pathways is the support and buy-in of school and district leaders. This paper provides an in-depth analysis of a virtual Computer Science District Leadership Summit, focusing on its design, implementation, and efficacy. The central objective of the summit was to engage school and district leaders in the advancement of K-12 Computer Science Education (CSE), with a specific emphasis on promoting inclusive CSE practices and developing strategies to navigate educational disruptions through targeted leadership engagement and collaborative learning best practices. To optimize virtual participation, the summit leveraged Zoom for interactive sessions and strategically organized breakout rooms tailored to district size and CSE development stage. It featured keynote presentations, exemplar district case studies, and structured networking opportunities. The summit's overarching goals were to furnish leaders with current information on CSE policies, facilitate engagement and reflection on CSE efforts during a period of disruption, share actionable resources, and leverage learning standards. Structured networking sessions were designed to catalyze collaboration among leaders from diverse educational settings, fostering organic discussions to enhance shared learning and community building. Post-event assessments, derived from participant surveys and follow-up interviews, underscored the value of peer-to-peer learning and model practices shared by districts. Drawing from these insights, this paper explores implications for future CSE leadership summits and similar supports, accentuating participant agency, hybrid event models, collaborative learning, and practical implementation strategies as pivotal components for driving enduring educational change. By leveraging collaborative learning and associated platforms, such endeavors can effectively support educational leaders amidst shifting educational priorities, ensuring a more inclusive and resilient approach to CSE and its ongoing enhancement.

Keywords: Computer science education, district leadership, virtual summit, educational leadership, K-12, professional learning communities, educational disruptions, inclusive practices, collaborative learning, peer-to-peer learning.

1 INTRODUCTION

After several years of engaging school leaders in CSE through both formal (e.g., research practice partnerships (RPPs), professional learning communities (PLCs), and research alliances (RAs)) and informal (e.g., individual district partnerships and holding informal CSE gatherings) avenues, our work has shown that the buy-in and ongoing support of school and district leaders is a key contributor to a successful, clearly articulated CSE program in a district [1]. Having administrators on board with computer science allows for the flow of needed resources and focus (i.e., approval processes are expedited, and computer science initiatives are given a priority they might otherwise not see) and affords educators personalized support mechanisms from within their district. As can be expected, today's administrators, schools, and districts may find themselves amidst shifting educational priorities, presenting need to be nimble and resilient. The COVID pandemic dramatically uprooted our education systems and district-level priorities rightfully shifted. The need for Implementing CSE, as a relatively new priority, was set aside (by some) and brought about novel and demanding constraints on districts, schools, educators, and students. Post-pandemic CSE had begun to re-establish itself through advocacy groups, professional learning and development (PLD) providers, and the ratification of student learning standards to be implemented in K-8 spaces. To us, this presented a critical window of opportunity to reach leaders as they began to reprioritize. Teachers were the primary audience of many of these efforts, and because of our understanding of the benefits of administrator support, the Rutgers University Center for Effective School Practices (RU-CESP) looked for a way to re-secure the support of school and district administration alongside the efforts to engage individual educators. It was this

window that led us to plan and host the Computer Science District Leadership Summit, a virtual gathering of school and district leaders as a means to (re)engage district leadership with CSE as a district priority.

2   SUMMIT GOALS & DEVELOPMENT

In planning this virtual event, we wanted to ensure that as educational leaders were beginning to re-prioritize those foci (understandably) set aside during the pandemic, CSE was reintroduced in a way that was appropriate: concise, relevant, and digestible. We wanted to delve into a level of detail that gave administrators the information they needed to move forward without potentially overwhelming them to the point of inaction.

In articulating the goals for the event, we also relied on understood practices that work well in virtual engagement and administrator professional learning. The main goals for the District Leadership Summit were defined to be:

   a.   Provide district leadership with up-to-date information on state and national policies governing CSE, and clearly define the timeline for any requirements
   b.   Provide district leadership with a structured opportunity to engage (or reengage) with the priority of advancing CSE
   c.   Equip leaders with the needed resources and knowledge to take the immediate next steps in integrating computer science and computational thinking into K12, no matter where they currently stood
   d.   Form and strengthen connections among administrators committed to high-quality, inclusive CSE, and provide them with a model to sustain and grow such collaborations beyond the event

Ultimately, the summit was conducted as a Zoom meeting running from 8:30am through 12:30pm. During this time, there were several opportunities for sharing and networking, a keynote from a district superintendent, a presentation by a state CSE advocacy group, and the opportunity to hear from two unique exemplar districts on their work with computer science. Following the scheduled program, attendees were invited to remain online for the afternoon and were given the freedom to use the time they had in a way they saw fit. However, we knew that *structured* collaboration and intentional interactions were important to nurture these connections into lasting, productive relationships; to encourage these practices, guiding questions and structured resources were made available during this flextime.

3   SUMMIT HIGHLIGHTS

Information about the summit, including a link to register, was circulated online via the RU-CESP webpage, Twitter/X account, and email to our network of administrators. To attract registrants, we presented the event as an opportunity to (re)connect with colleagues and noted the upcoming deadline to implement computer science learning standards in NJ as one impetus to join. Nearly 20 individuals, representing eight unique districts, attended the morning session; half of the attendees remained for at least part of the afternoon session, with six staying for the entire day.

3.1   Keynote; A Superintendent's Perspective

It was important that the keynote motivated the work we wanted to stem from the summit and frame the path forward. Therefore, we sought a leader that was not only well versed in CSE but also understood facilitators and barriers to bringing strategic initiatives to fruition. Our previous work has shown that much of the progress in CSE is made by individual champions, often working alone or with a small group. This presentation offered administrators in attendance a model of district-level support that can enhance, ease, and amplify the work of individual educators.

The presentation opened with an appeal to the unique priorities of educators, especially as they relate to the often-changing education landscape. CSE was presented as an opportunity for innovation that contributes to new technology, new pedagogies, and the creation of new learning spaces. In doing so, we hoped that administrators would understand that CSE is not an isolated initiative; in fact, the reality is quite the opposite. The speaker explored (a) the ways that the integration of computer science builds upon the successes of project-based learning (PBL) in terms of learner outcomes and engagement; (b) the ways that CSE relates to several other frameworks, such as Future Ready Schools; (c) the policies

and expectations for CSE set at the state level, and; (d) the common misconceptions that exist surrounding CSE, especially in distinguishing what computer science is and is not, which seemed especially important given many have thought that we have improved our CSE during the pandemic simply because we utilized more technology. A sample implementation model was also shared that included numerous pathways through computer science with varied entry points that started in the early grade levels. To close, the presenter offered administrators a curated sample of resources to explore to move forward, divided for use based on the work that had already been done in their districts (and schools).

3.2 Exemplar District Presentations

One of the most important aspects of professional learning for educational leaders is the exchange of current practices, successes, and lessons learned. We have experienced this first-hand through our involvement with RAs and RPPs over the years, where every participant evaluation survey we have collected specifically calls out the sharing of implementation practices and experiences as a valued component of the time spent together.

Our summit featured presentations from teams representing two exemplar districts from within the state. These districts were selected because they were at two different stages in the development of district-wide CSE initiatives, with different student population sizes, and different approaches to CSE in lower grade levels. The first presentation was from a larger district that has been offering computer science for several years. Their program at the high school level includes several elective options and both AP CS courses. In recent years, the district has developed and implemented courses at the middle school level that are taken by all students as part of a cycle rotation. In the K-5 spaces, the district is currently exploring adding computer science as an addition to, or as a replacement of, the keyboarding special. The district team also shared challenges they are facing in the CSE realm, including limited opportunities to hire full-time computer science teachers, difficult decisions about selecting pre-made curricula, and the scheduling changes that were needed to accommodate CSE courses. This district, like many others, is currently exploring the role of their media center specialists, rethinking the role of both the library itself and the role that these educators might play in delivering computer science instruction.

The second presentation was from a smaller district with fewer available resources and funding allocated to CSE. A key difference that was highlighted in this district's presentation was the more integrative approach to CSE; rather than developing stand-alone courses, much of this district's work has been in revising existing curriculum to incorporate computational thinking and address the learning standards. A key challenge shared by this district was that in order to successfully integrate CSE topics into the classroom, *all* teachers need to be trained to implement the new curriculum, rather than a select few. The district is currently working on PLD frameworks to support their plan.

In reality, we understand that the best approach to district-wide articulation of CSE is a combination of both the development of CS classes and electives as independent course options and the integration of CSE topics into other subject areas. However, the exemplar districts were selected intentionally to draw attention to the differences, benefits, and challenges associated with each approach. Importantly, we note that the adaptation of any approach to a specific circumstance/district is of vital importance.

3.3 Sharing and Networking Components

Because such an important part of the summit was to (re)establish working relationships among school leaders that can be sustained beyond the event, networking and collaboration time were built into the summit in several places and in varying ways. Notably, each opportunity included a clearly stated objective, often in the form of a broad guiding question. Most of these leveraged breakout rooms to facilitate more manageable, authentic discussions. Wherever possible, we divided leaders into breakout rooms strategically so that conversations would be most relevant to those involved (for instance, rooms were grouped by district size, stage of CSE development, restrictions on resources or personnel, etc.).

A preliminary networking session was conducted at the very beginning of the summit, immediately following the opening remarks. In this "flash networking" session, participants, presenters, and facilitators split into small groups to introduce themselves and discuss how they currently identify CSE needs, address those needs, provide professional learning, and engage schools, teachers, and students. In engaging in small group discussions with not only other attendees, but also with speakers, we set the expectation that the event was to be a collaborative experience and set the tone for the remainder of the summit. We were appreciative that this 'flash networking' session translated well from previous in-person events to this virtual format.

A second networking opportunity was conducted following the presentations by exemplar districts. During this session, several breakout rooms were created, and attendees were able to move among them throughout the allotted time. The two teams of presenters from exemplar districts each held a breakout session for individuals to ask clarifying questions or otherwise engage those presenters, and 2 additional rooms – one for strategic planning (the "Collab" room) and another for relationship building (the "Connect" room) – were available as well. We believe this strategy was successful in that it freed up time by eliminating the need to hold a Q&A period following presentations and provided flexibility to ensure the available time was used in a way that was useful. During the allotted time, almost all attendees dropped in at least one of the exemplar districts' rooms, and the attendance in the collaboration and connect rooms were quite evenly split.

Lastly, following the scheduled morning program, attendees were invited to remain online where they were given the freedom to go into one of the open breakout rooms (one each for exemplar district) or to work together and with the other presenters on specific plans and ideas for their individual circumstances.

4 REFLECTIONS

Immediately following the event, a post-session survey was sent via email to all attendees. The purpose of this survey was to better understand the participant takeaways from the summit and to think about the next steps in engaging this audience. Thirteen total participants completed the post-survey (with 7 of them being from the group that remained for at least a portion of the afternoon working session), representing a 68% response rate. Figure 1 illustrates the reasons that attendees cited for attending the event; note that respondents were able to select more than one answer choice.
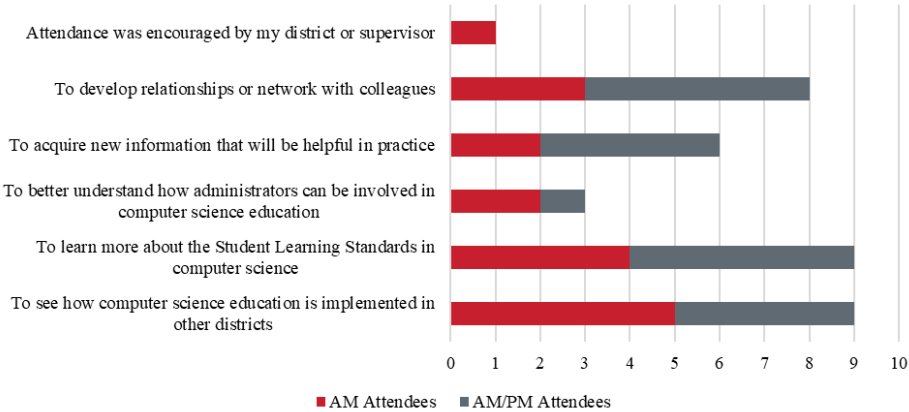

Figure 1. Attendees' Motivation for Attending Summit.

We see that, once again, the opportunity to connect with colleagues through the sharing of practice remains a key motivator for educational leaders, even for this virtual event. Given the current CSE environment in which this summit was held, it is not surprising that the student learning standards also played a large role in attracting administrators to this event. These standards not only contributed to our identification of the critical window of opportunity but played a large role in our marketing campaign. It is also worth noting that although the variability between respondents who did and did not attend the afternoon session, those who stayed for the afternoon were slightly more likely to respond that they were looking for information that would be helpful in practice and to develop relationships with colleagues. In addition, we conducted semi-structured interviews several months after the summit with four of the summit attendees. These interviews were primarily focused on: (a) identifying the themes from the summit that endured since the event; (b) determining whether the collaborations set up at the summit have remained active, and; (c) understanding what professional learning providers can be doing now to support administrators at the school and district level as time is once again allocated for CSE initiatives. Each interview was recorded, transcribed, and analyzed for emergent themes and sentiments. Table 1 presents the most frequently cited ideas across all interviews and provides representative quotes to illustrate how the topics were brought up.

Table 1. Illustrative Remarks for Recurring Themes in Follow-Up Interviews.

Theme	Selected Remarks
Integrative & Standalone Approaches to CSE	"I think it sounded like [integrating CS in K-5] might be not as effective as we had thought because you're really training so many different teachers… and then really, people are implementing things at their capacity."
	"Even though that feels like an isolated way to approach it, it might be better because we're learning that we can work with just a smaller group of teachers…
	We're looking at library media teachers and really redesigning what that role is what that space is."
Importance of Exemplars, Sharing of Model Practice	"I also think what [administrators are] really looking for things [they] can use and implement and do… it's actually great to know what works and what doesn't because then it's not necessary to reinvent the wheel all the time."
	"I think the other thing is picking up and learning from exemplars… it's most valuable because not only are you hearing from other practitioners, but when you get back to your district you can say 'hey, I saw this, check it out.' They're taking the connections from a conference and extending them back in their own districts."
Implementation of New Standards in CSE	"Some of the new standards, computer science standards, just any like science, social studies, health and PE, at one point were all due to be implemented in September 2021. And then the state pushed that implementation back. Thank God because we wouldn't have been ready at all."
	"I think a lot of schools will get it done, and others will throw their hands up and say, 'we just weren't able to get this done, but we'll do it for September of 2023.' So we need to support folks all throughout this fall and into the following fall."
Effectively Engaging School and District Leadership	"It's up to the individual to appreciate the role of networking… you have to first admit that you need help of others or that you benefit from collaboration with others."
	"Some virtual networking will remain because people only have so many hours in the day… I think that's a real positive thing that extends from the pandemic."

4.1 Implications for Future Work

Although we learned much from the design and implementation of this summit, we want to highlight a few key takeaways with regards to the central design elements. First, it is important to stress the role that participant agency plays with the potential for engagement; in particular, when we offered attendees opportunities to not only choose how their time was spent, but also to decide the length of time spent at the event altogether, we found a high-level of active participation and engagement. Secondly, providing the opportunity to hear from colleagues conducting similar work and learning about their successes and challenges are a true benefit and encourage engagement and help administrators to think through initiatives in a deeper, more grounded, way. Exemplars and model practices help attendees understand they have the needed ability and visualize the actual steps needed to make change. Along these lines, the potential benefits of using a hybrid model (when possible) to share exemplars virtually via short (possibly staggered) presentations that are recorded and made accessible to those unable to attend warrant further investigations. Lastly, we believe that connecting leaders (or anyone else) around a shared commitment is a powerful step towards progress; in this uncertain time, with less time available than we would ideally have to spend at events like these, it is paramount that facilitators set up connections that will last and continue to be productive. This is an area we are particularly enthusiastic to explore, and this event was a step forward in this larger effort.

REFERENCES

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