

Asking "CS4What?" as a Basis for CS4All

Workshop Tools to Support Sustainable K-12 CS Implementations

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CCS CONCEPTS

• **Applied computing** → **Education**

KEYWORDS

CS for All, computing education purposes, K-12, professional development, policy implementation, coherent instructional systems

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SUMMARY

The rapid expansion of the Computer Science for All (CSforAll) movement in the United States has catalyzed promising policies, tools, and pedagogies for K-12 universal CS education. It has also created significant challenges for schools and districts, namely, decision-making around the programs, curricula, and professional development that will best align to their communities' broader visions and goals around equitable computing education for all.

In this session, participants will be introduced to a set of research-based workshop tools designed to support schools and districts to surface their visions for CS education and make implementation decisions aligned with those visions. The tools do not presume the use of specific curricula or languages, rather our activities support stakeholders to first articulate what their visions are for CS education implementations - the projected individual and societal impacts - that can then inform choices around CS curriculum, pedagogies, assessments and the broader instructional infrastructures they sit within.

Participants from a range of settings will be able to take these activities back to their own institutions for local use. The target audience includes stakeholders working in K-12 CSforAll implementation at all levels, including district and school leaders and educators, as well as researchers and CS

education faculty who are studying and supporting CS for All efforts in local schools and districts. In addition, given that the workshop will provide practical tools for supporting vision-setting and decision-making around CS curriculum and pedagogy, this session will also benefit course designers and professors at postsecondary institutions who may be redesigning CS coursework or adding new programs to expand the kinds of purposes that CS courses might meet (for example, data science, cyber-security, or ethics in computing).

OVERALL OBJECTIVES

In this special session, participants will engage in a series of hands-on activities that first have them consider their rationales for bringing CS education to students using the "CSed Visions" framework, ([6]). They will consider the extent to which their priorities tend towards various projected impacts, including: (1) economic and workforce development, (2) equity and social justice, (3) competencies and literacies, (4) citizenship and civic engagement, (5) technological, social and scientific innovation, (6) school reform and improvement and (7) personal agency, joy, and fulfillment.

Participants will then evaluate professional development and curricular resources, considering how those materials may or may not be aligned with their particular visions. The session will be interactive and discussion-based, with time built in for participants to ask questions and provide feedback to the presenters.

BACKGROUND

The Computer Science for All (CSforAll) movement in the United States is in a pivotal moment. While there are many promising policies, curricula, and practices for K-12 universal CS education, there are daunting challenges for school districts, especially those without CS education specialists. The curricular options available to schools and teachers have outpaced the supports necessary for districts to thoughtfully develop their local visions for CS4All implementations, and select CS education partners aligned with those visions to facilitate teacher professional development and curricular implementation. Selection of CS education partners requires an understanding of how to coordinate vision, implementation, and curriculum to plan an approach that is sustainable, adaptive to the unique needs of each local setting and provides all students with a sequence of learning opportunities through their school years. Education policy implementation research asserts that visioning and

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implementing are non-trivial processes that will be the key to successful and sustainable adoption of CSforAll programs (see [2]; [3]; [4]).

To address this problem of practice regarding how schools and districts set, implement, and sustain visions for CS for All in their localities, the researchers who will be presenting this session developed a series of activities they call the CS Visions, Implementation, and Enactment Workshops (CS VIEWS). They worked alongside practitioners within the context of research practice partnerships (RPPs) and participatory knowledge building activities [5] to create them. In an initial pilot project, they engaged 53 New York City-based formal and informal CS educators, school leaders, and tool designers in a participatory knowledge building process with the goal of surfacing diverse rationales for CS education. The process resulted in the creation of the "CSed Visions" framework for understanding a range of arguments for and projected impacts of computer science education [6].

This framework was then drawn upon during a more extensive research-practice partnership, between researchers at New York University and the CSforAll Consortium – a body which connects content providers, researchers, and funders of CS education with education associations such as school districts, regional education agencies, and state departments of education [1]. The CS VIEWS emerged from the joint work of the Consortium and university researchers during the process of supporting school districts. Specifically, the CS-VIEWS were implemented in partnership with one small town and 7 rural school districts in New York State together with the Education Service Cooperative (BOCES) that works with those districts. The workshops were developed to support district leaders, school principals, educators, library media specialists and technologists in bringing CSforAll to their localities through rooting implementation plans in a set of core visions for CS education that can form the basis of coherent instructional plans ([4]). Feedback from those sessions has helped the RPP refine the workshops' goals and activities.

OUTLINE OF THE SESSION

This session is structured as a condensed version of the CS VIEWS facilitated workshops:

Introduction (10 mins): Participants will hear from researchers involved with the development of the CS Ed visions framework and the research practice partnerships that led to the development of the CS VIEWS (workshops).

Part 1 - Surfacing Visions (20 min): Participants will have the opportunity to test out a card game-style activity which helps stakeholders in CS education at schools and districts gain exposure to a range of arguments for computer science education – including some they may not yet be familiar with. They will come away having prioritized some of their commitments around the impacts they project for CS for All in their localities in the form of a "heat map." They will compare and contrast their visions to those of other participants in the room, and discuss their rationale for selecting particular vision statements.

Part 2 - Visions in Action (20 min): Participants will engage

with a series of curricular examples and CS pedagogical approaches using a rubric to assess the ways in which their own visions are or are not aligned with those pedagogies. Through this process, they will be able to experience how vision-setting can inform the process of making pedagogical choices within CS education implementations.

Part 3 - Discussion and Feedback (10 min): Participants and facilitators will engage in discussions about how such activities might be used in their relevant contexts, where they might require adaptation, and how they might be improved.

Part 4 - Q and A (15 minutes)

SUITABILITY FOR SPECIALSESSION

This presentation is most suitable for a special session format because the activities we will present are designed to spark reflection through interaction, hands-on activities and conversation. By making connections between CS education visions and practice, stakeholders will promote more coherent and ultimately, more equitable instructional systems.

FACILITATORS

The four authors listed will be co-facilitating the session. Each of them have facilitated many versions of these activities with CS educational stakeholders.

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