Title: Computational Thinking at the iSchools: Why Bother?

Organizers:
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Key Participants: All of the organizers

Abstract:
One of the challenges of the digital world is developing a workforce that is equipped and qualified for the current digital economy (Google & Gallup, 2016; OECD, 2014). In order to address this challenge, initiatives, such as *Libraries Ready to Code*, are focusing on developing computational thinking (CT) in young people. Researchers and educators from fields, such as the learning sciences, social sciences, and information sciences, are exploring how informal learning spaces such as libraries and other community spaces can be leveraged as computer science learning spaces. This Session for Interaction and Engagement will stimulate discussion on research opportunities in CT that leverage the unique strengths and interests of iSchools and roles that iSchools must play in preparing information professionals who have CT skills; resulting in concrete takeaways related to CT in iSchools such as ideas for future research, redesigned courses and curricula, and other larger initiatives.

Description:

Purpose and Intended Audience:
Many regions in the world continue to struggle to produce the qualified computer scientists and software engineers that today's digital world needs (Google & Gallup, 2016; OECD, 2014). Unfortunately, formal computer science (CS) education has failed to produce the diverse technology workforce the current digital economy requires. Therefore, researchers and educators from learning sciences, social sciences, and information sciences have begun exploring how informal learning spaces such as libraries and other community spaces can be leveraged as CS learning spaces, especially in the lives of young people. Beyond replicating coding clubs and computing classes in these informal learning environments, an emphasis on developing *computational thinking* (CT) among young people who "hang-out, mess-around, and geek-out" (Ito et al., 2009) at these spaces are the focal point of various research and educational innovations (Braun & Visser, 2017; Visser et al; 2017).

"CT is the process of breaking down complex problems into more familiar or manageable sub-problems (problem decomposition), using a sequence of steps (algorithms) to solve problems,

reviewing how the solution transfers to similar problems (abstraction), and finally determining if a computer can help efficiently solve those problems (automation)" (Visser & Hong, 2016, p. 470). While the processes in this definition of CT are derived from CS, it is a critical skillset regardless of field of interest and study. Through a partnership between The American Library Association and Google, Inc., *Libraries are Ready to Code* (RtC) was developed as a coherent initiative to foster CT skills among youth, particularly those underrepresented in the CS and technology fields. Taking a multi-stakeholder perspective, informed by theory and practices in learning and information sciences, the RtC team, faculty from education and iSchools, and a current practicing children's librarian will lead this session with a three-fold purpose: 1) to identify and develop research opportunities in CT that leverage the unique strengths of iSchools in order to further enhance the capacity of the RtC initiative 2) to refine the roles that iSchools play in preparing information professionals that have CT skills through the redesign of their programs and courses; 3) to stimulate discernment of interdisciplinary scholarly boundaries and convergences within iSchools that will result in concrete takeaways related to CT in iSchools such as ideas for future research, redesigning of coursework and curricula, as well as more comprehensive initiatives.

The intended audience is researchers (faculty, students, and industry participants) interested in research in CT. Additionally, this session is intended for all faculty whose expertise positions them to infuse CT into their courses and educational programs.

Proposed activities:
Session leaders, Subramaniam, Hong, and Visser (8-10 minutes per presenter) will initiate the discussion by informally presenting the impetus for further CT research and teaching endeavors through findings from the RtC initiative. Visser will discuss the findings from Phase 1 of the RtC report that details the landscape view of CS/CT activities/offerings/needs in public and school libraries in the United States. Subramaniam will discuss the process and impact of redesigning courses for library and information science programs that are infused with CT concepts. Hong will present broad ongoing and future areas of research and programmatic interventions in CT.

We will then break the audiences into two groups: (1) attendees who are interested in research in CT (facilitated by Subramaniam and Hong); and (2) attendees who are interested in infusing CT into courses that they currently teach to information professionals (facilitated by Visser and Long-Murphy, along with Johnston and Drouillard who are faculty that have recently redesigned their courses to infuse CT). Each group will be given prompts to reflect on through a series of sticky-noting exercises (30 minutes). For example, one prompt that group (1) will work on is: "Given the boundary-spanning nature of information schools, what are CT challenges and opportunities that you think iSchools are perfectly positioned to tackle?" For group (2), the attendees will begin discussion by responding to the following prompt: "Look through a syllabus of a course that you recently taught, and think through how you would approach/design the course differently to ensure that the students in your course develop CT skills." Using sticky-noting techniques (an approach to participatory design that is typically used in the design of technologies and programs (Guha, Druin & Fails, 2013)), each group will respond to prompts by writing each idea/thought on separate sticky notes. As the notes accumulate, the facilitators will gather and stick them on a large wall space. One facilitator from each group will group the sticky notes into themes that emerge within the discussion (such as methods, eliminating biases, etc.).

All attendees will come together at the end of this sticky-noting session to share and discuss the themes that emerged and next steps, facilitated by the moderators (30 minutes).

The organizers will publish a blog post through District Dispatch (the blog for ALA) that summarizes the themes/ideas and share it with the entire information community through various social media channels.

Relevance to the Conference/Significance to the Field:
iSchools have faculty that span information sciences, computer sciences, learning sciences, psychology, communications, journalism, library sciences, humanities, education, human computer interaction, public health, and many more. While the CT conversation has been primarily confined to the CS field, there are many untapped areas for CT research in iSchools given the interdisciplinary nature that is reflected by our rich theoretical backgrounds and methodologies. Given the depth of expertise within the iSchool community and its reach through the breadth of its graduates, CT research and teaching innovations that originate from iSchools will have the power to introduce these concepts to youth who otherwise might never be exposed to CT. In alignment with the conference theme of transforming digital worlds, we will engage the iSchool research and practice community in a future-oriented CT discussion, including how existing initiatives can support, inform, and align with their work, and inviting them to envision the next generation of teaching and research innovations.

Duration: One 90-minute session

Special Requirements: A room with round tables that will facilitate group discussion.

References:
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