Insights from Virtual Culturally Responsive Computing Camps

Jaemarie Solyst
jsolyst@andrew.cmu.edu
Carnegie Mellon University
Pittsburgh, PA, USA

Tara Nkrumah
tnkrumah@asu.edu
Arizona State University
Tempe, AZ, USA

Angela Stewart
angelast@andrew.cmu.edu
Carnegie Mellon University
Pittsburgh, PA, USA

Amanda Buddemeyer
amb467@pitt.edu
University of Pittsburgh
Pittsburgh, PA, USA

Erin Walker
eawalker@pitt.edu
University of Pittsburgh
Pittsburgh, PA, USA

Amy Ogan
aeo@andrew.cmu.edu
Carnegie Mellon University
Pittsburgh, PA, USA

ABSTRACT

Computer science (CS) education is an important subject for K-12 students in an increasingly computational world. However, common CS education practices may not be inclusive of all learners. Culturally responsive computing (CRC) initiatives aim to center and empower learners from diverse and historically excluded backgrounds. With a sudden shift to online learning, virtual educational experiences have been developed. We describe three main findings from running three iterations of an online synchronous CRC camp for middle school girls, which are: (1) Integration of power, identity, and CS concepts, (2) Participation in CS vs. power and identity activities based on learners' backgrounds, and (3) Adjusting instructor expectations about learner engagement to be more open-ended.

CCS CONCEPTS

• **Social and professional topics → Computer science education**; **K-12 education**; **Computing literacy**.

KEYWORDS

culturally responsive computing, online learning, out-of-school-time learning, computer science camp, middle school girls

1 INTRODUCTION / PROBLEM

There is currently a lack of diversity in computing, with K-12 being an ideal time to build STEM and computing identity. Culturally responsive computing (CRC) aims to center the identities and experiences of a range of learners, connect learners to each other and their communities, and position learners as techno-social change agents [2]. With the sudden shift to virtual learning in 2020, we explored the creation of an online synchronous CRC curriculum for girls in middle school that incorporates frameworks of culturally responsive teaching and computing [1, 2]. The goals of our program are to provide basic knowledge of CS concepts, encourage critical analysis of tech and computing, and embolden diverse learners.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).
SIGCSE 2022, March 3–5, 2022, Providence, RI, USA
© 2022 Copyright held by the owner/author(s).
ACM ISBN 978-1-4503-9071-2/22/03.
https://doi.org/10.1145/3478432.3499136

2 BACKGROUND / RELATED WORK

Pedagogy matters. CRC is informed by culturally relevant pedagogy [1] to engage diverse learners in CS [2]. Guided by the core components: asset-building (building upon learners' funds of knowledge), reflection (critical social thought), and connectedness (sense of responsibility to self and community) [1], CRC aims to shift power by positioning learners as techno-social change agents [2].

3 OVERVIEW / METHODS / RESULTS

We ran and iterated a synchronous CRC camp three times (C1, C2, and C3), recording sessions (10 hours per camp) and saving chat logs. Survey data was collected on learner backgrounds. Participants (C1: N = 10, C2: N = 8, C3: N = 13) were middle school girls 12-14 years old, compensated for participation. Many had a prior encounter with programming. Camps consisted of full-group sessions learning CS concepts. C1 and C3 also included power & identity activitie. We employed two types of breakout rooms: small group activities (e.g., collaborating on a Jamboard) and individual coding tasks.

After camps, researchers engaged in affinity diagramming analysis using the camp and survey data, and our research memos to uncover themes. We present three of the major findings from our data across camps. First is the value of integrating power & identity with CS concepts. Cohesiveness between power & identity activities with technical CS activities mattered, as did dedicating time solely to power & identity topics, which supported community building. Second is scaffolding learners in both technical topics and also in talking about identity. Learners with high prior knowledge in CS engaged less readily in talking about power structures but eagerly leaned into programming activities, while those with lower prior knowledge in CS showed opposite trends. Lastly, engagement looks different online than in-person, differing amongst diverse learners.

4 CONTRIBUTIONS AND FUTURE WORK

We present findings from running online synchronous CRC camps to inform future programs. Looking ahead, we aim to develop more curriculum and technical design recommendations that meet learner needs in educational CRC experiences.

REFERENCES

[1] Gloria Ladson-Billings. 1995. Toward a theory of culturally relevant pedagogy. *American educational research journal* 32, 3 (1995), 465–491.
[2] Kimberly A Scott, Kimberly M Sheridan, and Kevin Clark. 2015. Culturally responsive computing: A theory revisited. *Learning, Media and Technology* 40, 4 (2015), 412–436.