Equity-Focused Teaching in K-12 CS: Strategies for Teachers, Teacher Educators, and District
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Equity-Focused Teaching in K-12 CS: Strategies for Teachers, Teacher Educators, and District
Session Agenda

- Define equity and equity-focused CS teaching and learning
- Integrating CS with an equity lens
- Family and community engagement
- Practical examples
- Resources
We advocate for the use of equity-focused teaching and learning as an essential practice within computer science classrooms.

(Madkins, Howard, & Freed, 2020, p. 1)
Defining Equity in CS Classrooms

- What does *equity* mean to you?
  - In the chat:
    - Type your role, location, and definition of equity.
    - Hit enter when I say, “Go!”
What do we mean by equity-focused?

Justice-oriented approach...

- Empowers students to use CS knowledge for transformation
- Moves beyond access and achievement frames
- Asset- or strengths-based approach centering students and families
Identifying and Rejecting Deficit Thinking

ONCE upon a time there was a little black boy, and his name was Little Black Sambo.
How do we effectively do this work together?
Considerations for Equity-Focused CS Teaching

- Your beliefs (and your students’ beliefs) and how they impact CS classrooms
- Tiered activities and pair programming
- Self-expressions vs. CS preparation
- Equity-focused lens
Integrating CS with an equity lens

- Provide a Basic Understanding of Computer Science Language for ALL
  - Flow
  - Data Type
  - Syntax

- Teach Tools & Allow Creativity to Flourish
  - Allow Exploration in the Platforms
  - Interest Drives Engagement

- Identify Your Purpose
  - Self-Expression vs. Computer Science Preparation
  - Autonomy and Capacity vs. Arbitrary Standards Compliance
  - High Expectations
What does this mean?

- Progress is mutually beneficial
- Enrollment in CS, when available, may have the largest influence on students’ selection of STEM fields
- Greater attention should still be given to the preparation of our youth
  - Broadening participation
  - Engaging Equity Pedagogies in Computer Science Learning Environments: [https://inspire.redlands.edu/jcsi/vol3/iss2/1/](https://inspire.redlands.edu/jcsi/vol3/iss2/1/)
Different Paths to CS Literacy

Flowchart

Scratch

Flowgorithm

Visual Studio
Parents without backgrounds and insights into the changing landscape of technology struggle to negotiate what roles they can play, such as how to work together in computing activities or how to find learning opportunities for their children.

(DiSalvo, Ried, & Roshan, 2014; Roque, 2013)
Practical examples

- Family and community engagement
- Building community
- Innovative professional learning opportunities
- Preservice teacher education
Family and Community Engagement
Building Classroom Community

- We should be...
  - Self-Aware
  - Relational
  - Mindful
  - Intentional
Building Classroom Community

- Connect with students’ cultural practices and lived experiences
- Empower students to become change agents
- Foster and maintain relationships with students, families, and communities
Innovative Professional Learning Opportunities

- Professional learning communities
- Reach across stages/grade levels
- Lesson study
Preservice Teacher Education
Engaging Equity Pedagogies in Computer Science Learning Environments

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Abstract
In this position paper, we advocate for the use of equity-focused teaching and learning as an essential practice within computer science classrooms. We provide an overview of the theoretical underpinnings of various equity pedagogies (Banks & Banks, 1995), such as culturally relevant pedagogy (Ladson-Billings, 1995, 2000) and share how they have been utilized in CS classrooms. First, we provide a brief history of CS education and issues of equity within public schools in the United States. In sharing our definition of equity. Along with our rationale for how and why these strategies can be taken up in computer science (CS) learning environments, we demonstrate how researchers and educators can shift the focus from access and achievement to social justice. After exploring the differences between the relevant theoretical frameworks, we provide practical examples from research of how both practitioners and researchers might use and examine equity-focused teaching practices. Resources for further learning are also included.

https://inspire.redlands.edu/jcsi/vol3/iss2/1/
Lesson Examples

Flowchart-Based Programming
Example lessons on programming based in a flowchart program. This platform is ideal for introducing younger learners to computational thinking.

Windows Form Programming
Example lessons in programming for Windows-based PC computer operating systems typically used with productivity software.

Kids Corner
Example lessons demonstrated by elementary school student Kamau, demonstrating how easy and fun real coding can be.

https://www.k12stemequity.com/
EdTech Leaders’ Beliefs: How are K-5 Teachers Supported with the Integration of Computer Science in K-5 Classrooms?

Nicol R. Howard

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Abstract

Educational Technology Leaders' support of computer science teachers in K-5 classrooms are influenced by their beliefs about school-based program implementation criteria, available district-level support, and state mandates on the integration of computer science. The researcher in this study examines the beliefs about Computer Science teacher support, and training in five different Educational Tech Leaders’ districts, to determine sustainable implementation practices for K-5 schools. In order to effectively integrate computer science in K-5 instruction, administrators and program decision-makers must be aware of the beliefs Educational Technology Leaders hold related to the implementation process of programs, specifically related to the training of K-5 teachers who facilitate the computer science curricula in classrooms. Information reported in this study may inform school-level, district-level, and state-level decisions related to sustainable computer science program implementations.

Learner-Centered and Culturally Relevant Pedagogy
Tia C. Madkins, Jakieta O. Thomas, Jessica Solyom, Joanna Goode, and Frieda McAlear

INTRODUCTION: CULTURALLY RELEVANT PEDAGOGY

Underrepresented minority students (for example, black, Latino, Native American/Alaskan, Hawaiian/Pacific Islander in the United States) have historically experienced racialized and stereotypical forms of schooling both inside and outside of school settings. Educational inequity studies of K-12 classrooms and communities have found that the following teaching strategies are ineffective:

- Engaging students with programming activities that are not relevant to their own experiences.

Culturally relevant pedagogy (CRP) was first proposed by Ladson-Billings as well as Airasian and Danks in the 1990s. CRP is founded on the idea that teachers must use a familiar cultural context to potentially increase equitable outcomes. This framework outlines three themes for academic success: (1) implementing culturally relevant pedagogies that support students' cultural and linguistic backgrounds, and (3) helping students to understand, recognize, and critique social injustices. This type of teaching also emphasizes the authentic and meaningful support between teacher and student for connecting curricula to students' home cultures and everyday lived experiences.

WHY CULTURALLY RELEVANT PEDAGOGICAL PRACTICES MATTER IN COMPUTING?

One emerging area of scholarship combines the well-established research and practice of culturally relevant pedagogy with programming education to develop engaging and effective programming instructional frameworks for underrepresented students of color. This line of research provides a conceptual foundation for integrating culturally relevant pedagogical frameworks into programming instruction across learning contexts. In programming, principles of culturally relevant pedagogy and related approaches include: (1) supporting student identity development, (2) cultivating a critique of hegemony in computing, and (3) addressing epistemological barriers.
Design to Disrupt: Making Space for Every Student in CS

As #BlackHistoryMonth draws to a close and #WomenInSTEMMonth begins, Dr. Nicki Washington illustrates Computer Science with the whom it should represent, along with the why these identities matter.
In small groups, discuss the following:

1. Think about an upcoming lesson (or set of concepts, topics, etc.) you will teach in the coming weeks.
   a. What are some ways you can revise that lesson to be more equity-focused? How do you think your students will respond?
   b. How can researchers approach designing a study related to equity-focused teaching and learning?

2. What are some realistic ways schools/districts/researchers can better engage with families and communities?
   a. What kinds of responses do you anticipate from families and communities as you (further) engage equity-focused teaching and research?

3. Think of an existing professional development model that has worked well for you and your colleagues.
   a. How can you use this model to build capacity to (further) engage equity-focused teaching?
   b. What kinds of supports will you need from administrators or your district?
Questions?
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