



Equity and Inclusion in Computer Science

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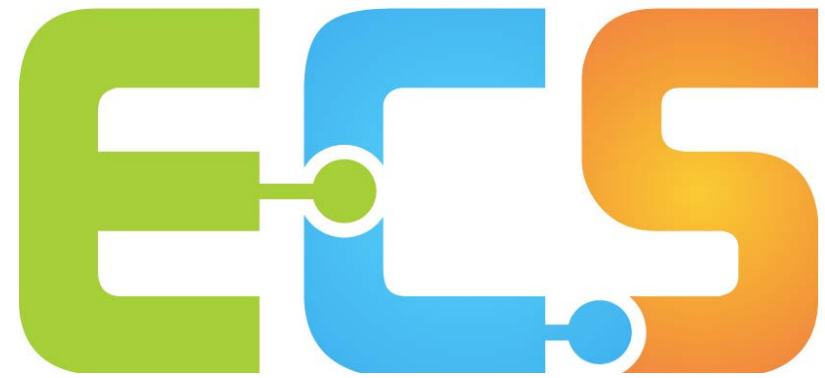
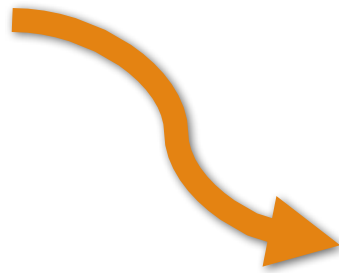
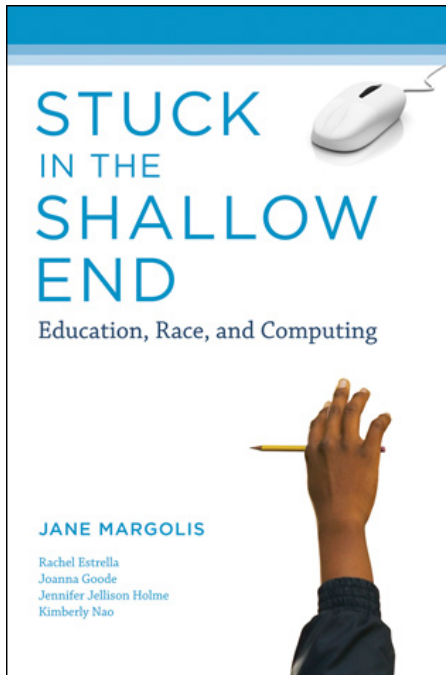
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CS for All: Focusing on Equity and Inclusion



- \$4 billion in funding for states and \$100 million directly for school districts in his forthcoming Budget to expand K-12 CS by training teachers, expanding access to high-quality instructional materials, and building effective regional partnerships.
- Expanding access to prior NSF supported programs and professional learning communities through their CS10k Initiative that led to the creation of more inclusive and accessible CS curriculum including *Exploring CS* and *Advanced Placement (AP) CS Principles* among others.



www.exploringcs.org

2008: A new introductory high school course designed to “build new talent” and engage all students in computer science

Broadening Participation in High School CS

Access: Availability of Course to All Students

Teacher Champion

Administrative Support

Community Support

University or Private Partnerships

Diversity: Attracting and Enrolling Students into Course

Reputation of course

Active Recruitment

Placement into course

Equity: Effectively Teaching All Students

Engaging Curriculum

Culturally Relevant Pedagogy

Inclusive Learning Environment

Design of Exploring Computer Science (ECS)

Curricular Units

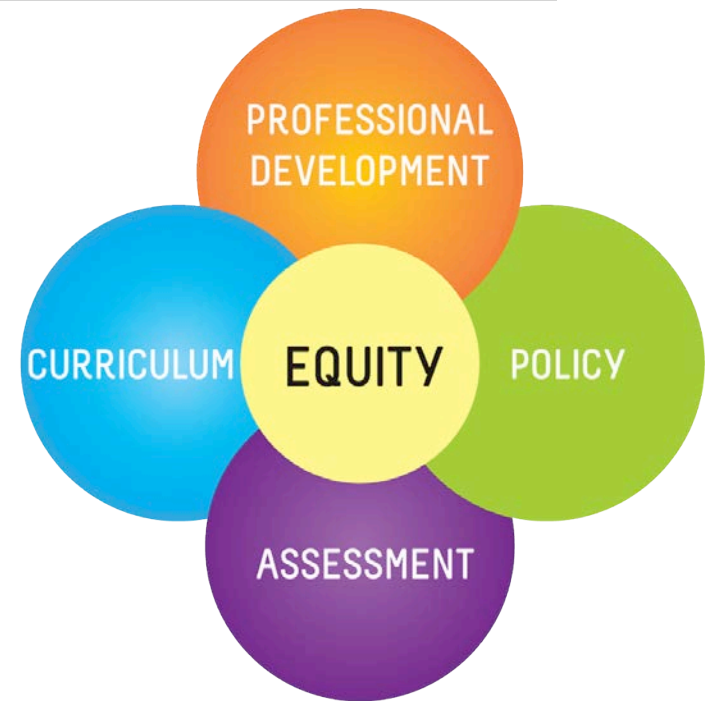
1. Human-Computer Interaction
2. Problem Solving
3. Web Design
4. Introduction to Programming
5. Computing and Data Analysis
6. Robotics

Computational Practices (same as AP CS Principles)

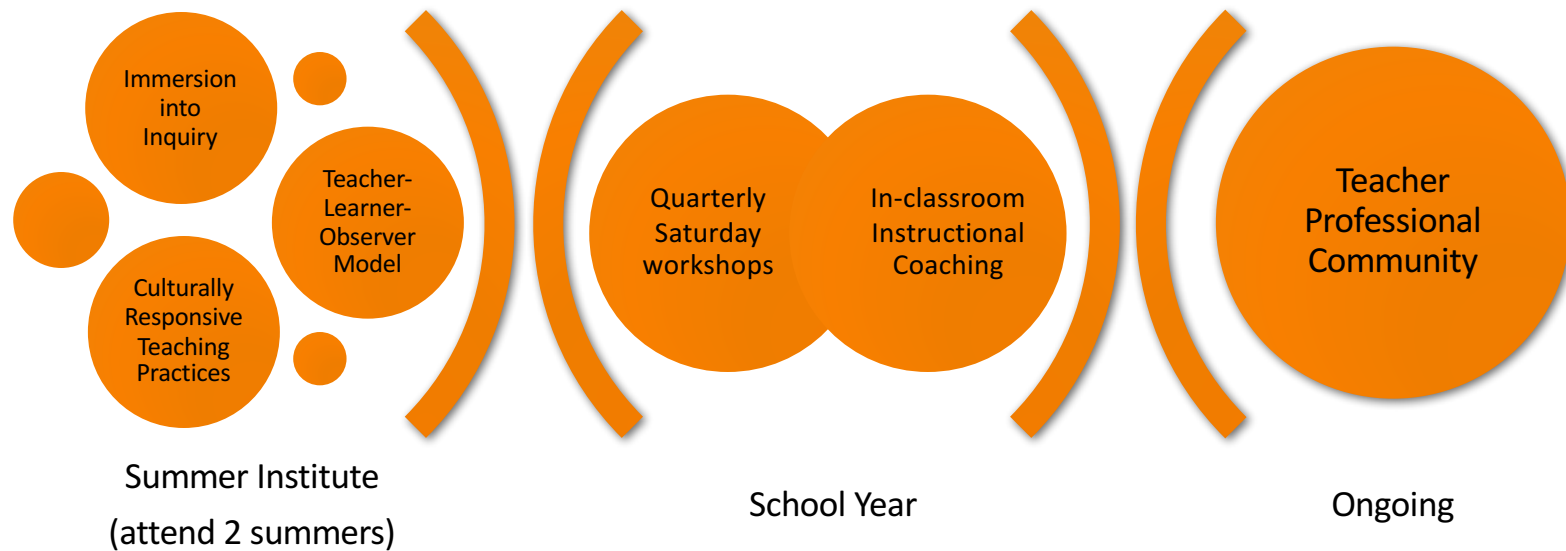
- **Analyze effects** of computing
- **Design creative solutions** and artifacts
- Apply **abstractions and models**
- **Analyze computational work** and work of others
- **Communication** computational thought processes
- **Collaborate** with peers on computing activities

Learning Assessments

- Developed and validated by SRI, International
- Unit Assessments
- End-of-Course Learning Assessment Units 1-4



ECS 2-Year Professional Development




Culturally Relevant Pedagogy in CS

Most frequent equity-based teaching practices in ECS classrooms:

- Teachers use culturally-responsive teaching that connects computer science learning to students' personal experiences and the social and political contexts relevant to students, their families and their communities.
- Teachers encourage collaboration and validate multiple perspectives through peer-to-peer learning, small group work, and in-depth whole class discussions.

Most frequent inquiry-based teaching practices in ECS classrooms:

- Teachers use guided inquiry: carefully designing, facilitating, and assessing learning opportunities so that students engage in active learning.
 - Teachers support exploration, autonomy, risk-taking, and creativity by resisting “giving” students immediate solutions and encouraging students to make projects uniquely their own.
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#1: Situating CS in the Local Community

Use the local community context to examine issues and solve problems

Carpool Route



#2: Integration of EthnoComputing

Understand how **cultural groups engage in computational practices**

Cornrow braiding



Basket weaving



From Ron Eglash' Culturally Situated Design Tools

#3: Allowing for Student Choice

Encourage **students to bring in own identity, interests, creativity, and choice** into the classroom

Program robots to dance to their favorite song



#4: Power and Civic Participation

Students examine **how computing can be used for civic engagement**

Data collection, analysis, and representation about community's fresh food access



Resources

Exploring Computer Science

<http://www.exploringcs.org/>

AP CS Principles

<http://apcsprinciples.org/>

Bootstrap – for Algebra integration

<http://www.bootstrapworld.org/>

NCWIT's Counselors for Computing

<https://www.ncwit.org/project/counselors-computing-c4c>

White House CS for All

<https://www.whitehouse.gov/blog/2016/01/30/computer-science-all>

