CTRL+ALT+ DO WE DELETE? Leadership and Policy in Computing for our K-12 Educational System

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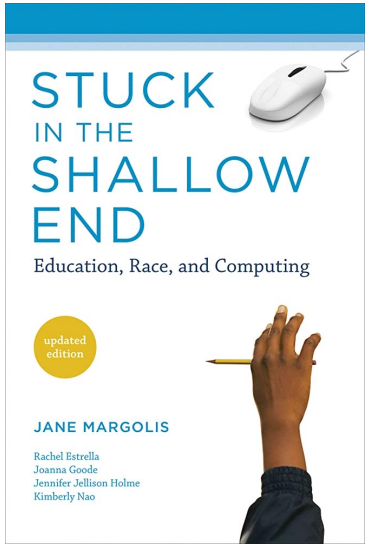
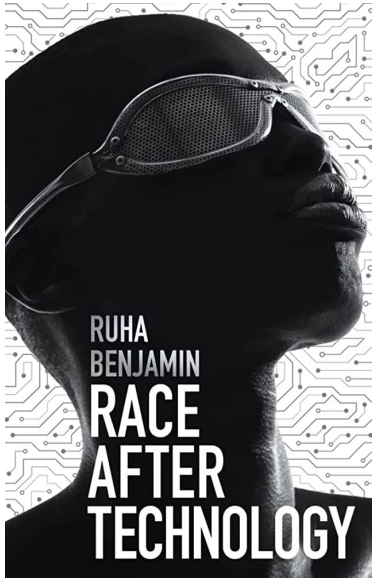
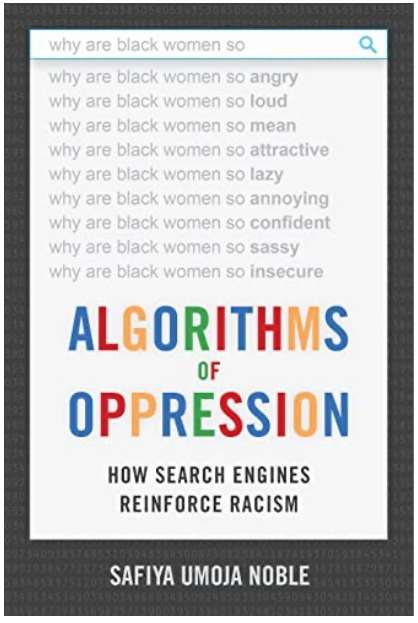
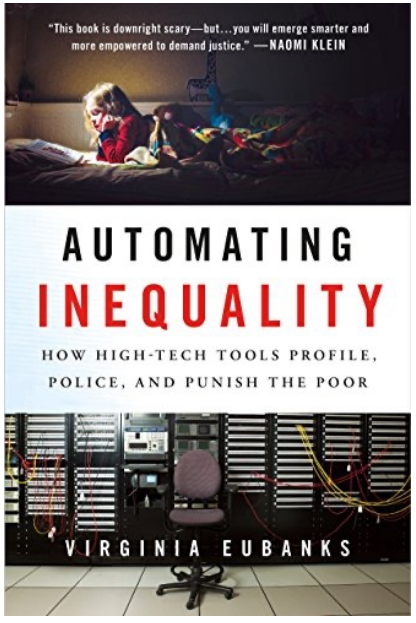
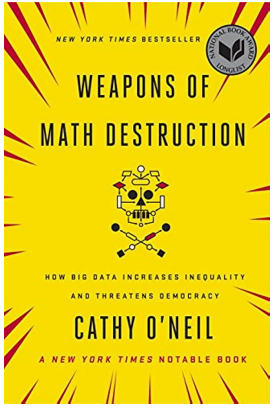
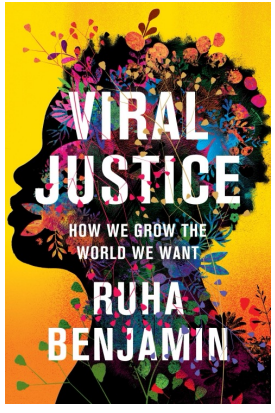

STUCK
IN THE
SHALLOW
END
Education, Race, and Computing
updated edition
JANE MARGOLIS
Rachel Estrella
Joanna Goode
Jennifer Jellison Holme
Kimberly Nao

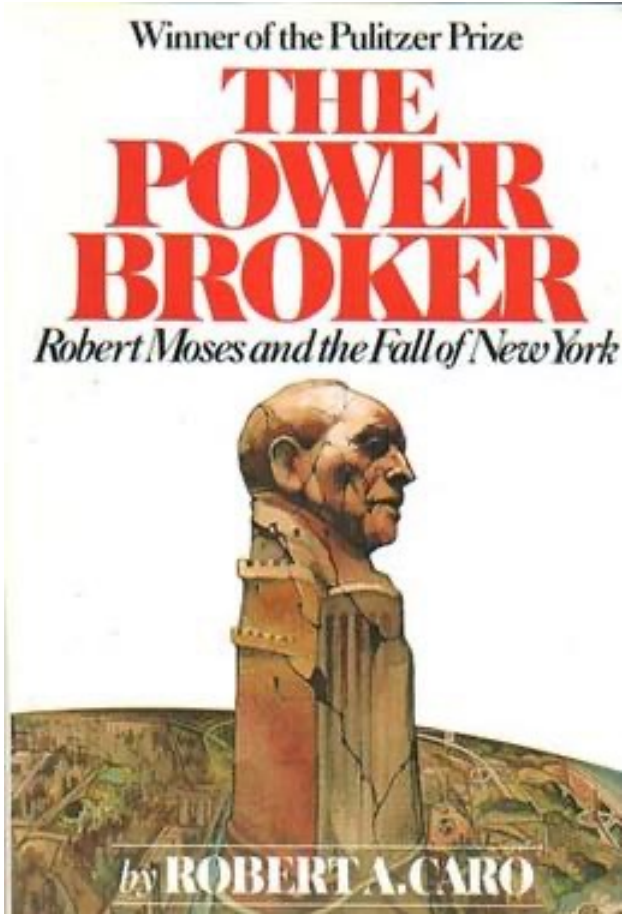

RUHA
BENJAMIN
RACE
AFTER
TECHNOLOGY


why are black women so
why are black women so angry
why are black women so loud
why are black women so mean
why are black women so attractive
why are black women so lazy
why are black women so annoying
why are black women so confident
why are black women so sassy
why are black women so insecure
ALGORITHMS
OF
OPPRESSION
HOW SEARCH ENGINES
REINFORCE RACISM
SAFIYA UMOJA NOBLE


"This book is downright scary—but... you will emerge smarter and more empowered to demand justice." —NAOMI KLEIN
AUTOMATING
INEQUALITY
HOW HIGH-TECH TOOLS PROFILE,
POLICE, AND PUNISH THE POOR
VIRGINIA EUBANKS


NEW YORK TIMES BESTSELLER
WEAPONS OF
MATH DESTRUCTION
HOW BIG DATA INCREASES INEQUALITY
AND THREATENS DEMOCRACY
CATHY O'NEIL
A NEW YORK TIMES NOTABLE BOOK


VIRAL
JUSTICE
HOW WE GROW THE
WORLD WE WANT
RUHA
BENJAMIN


Winner of the Pulitzer Prize
THE POWER BROKER
Robert Moses and the Fall of New York
by ROBERT A. CARO


YO-KAI

When We Think Education…

Institutional

District

State

Federal

Childs & Russell, 2017; StriveTogether, 2018

When We Think Education…

Institutional

District

Local

State

Federal

Childs & Russell, 2017; StriveTogether, 2018


SCHOOL BUS
STOP

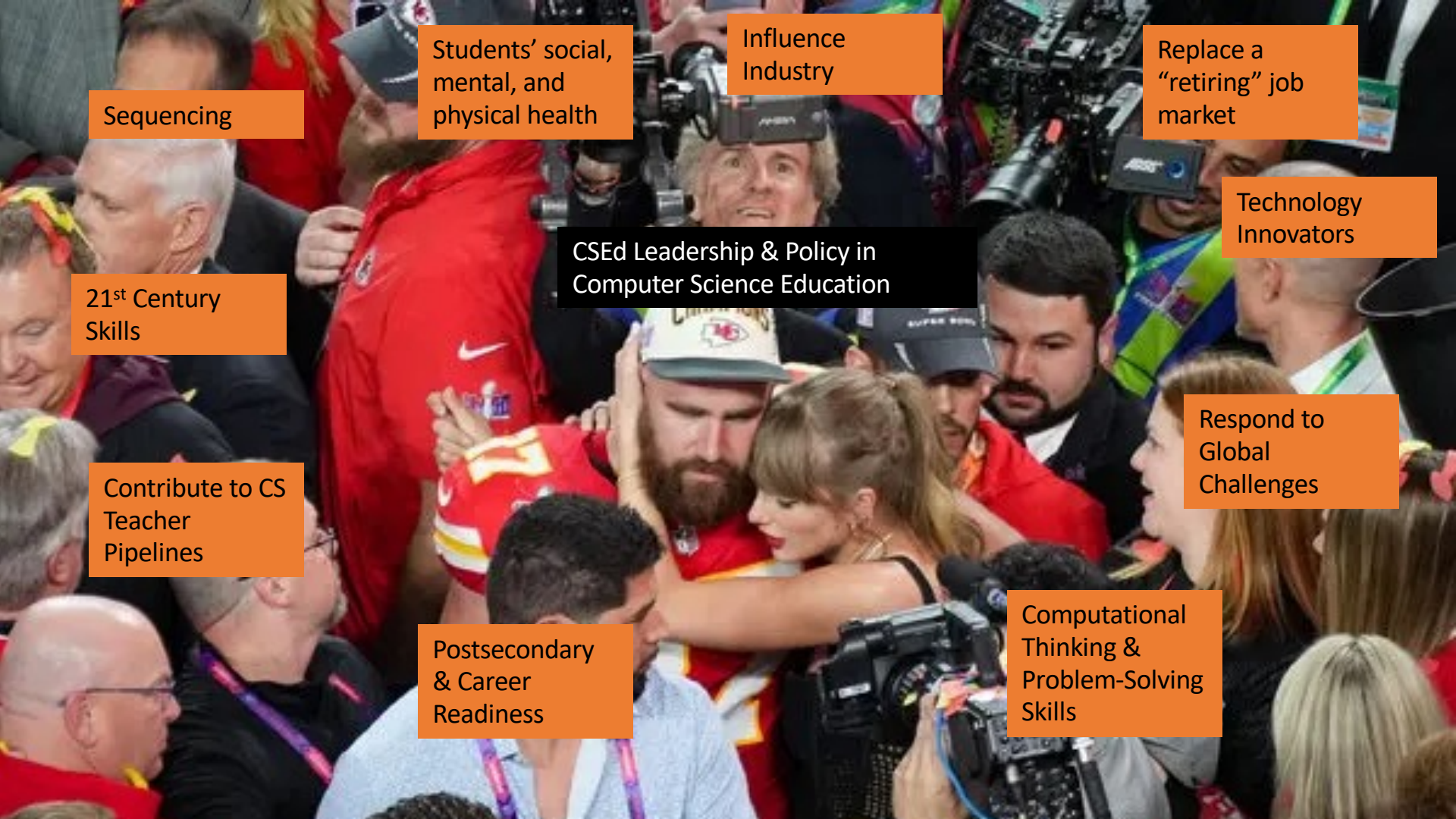
CSEd Leadership

- Equitable leadership and vision to support educational organizations
  (Flappan et al., 2021)
- Build leadership capacity to improve access and participation in computer science education
  (Childs et al., Forthcoming)
- Support educators in providing high-quality teaching & learning environments by creating a culture where equity & inclusion are valued
  (Goode et al., 2018)

CSEd Policy

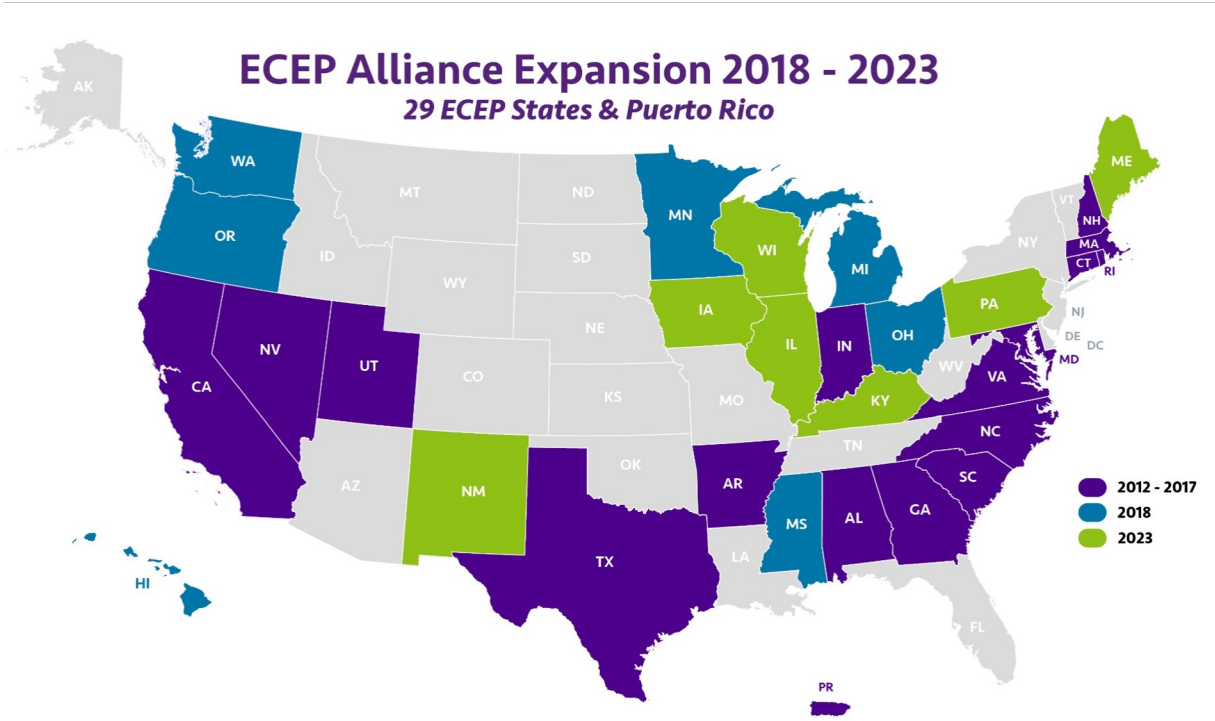
- Organize the myriad of resources within a ‘community’ to support students' educational opportunities
  (Childs & Lofton, 2021)
- Influence organizational capacity
  (Russell et al., 2016)
- Leverage expertise & knowledge
  (Childs & Grooms, 2018)
- Influence of outside the ”formal hierarchy” organizations on teaching & learning in CS education
  (Marshall & Grooms, 2022)


CSEd Leadership & Policy in
Computer Science Education

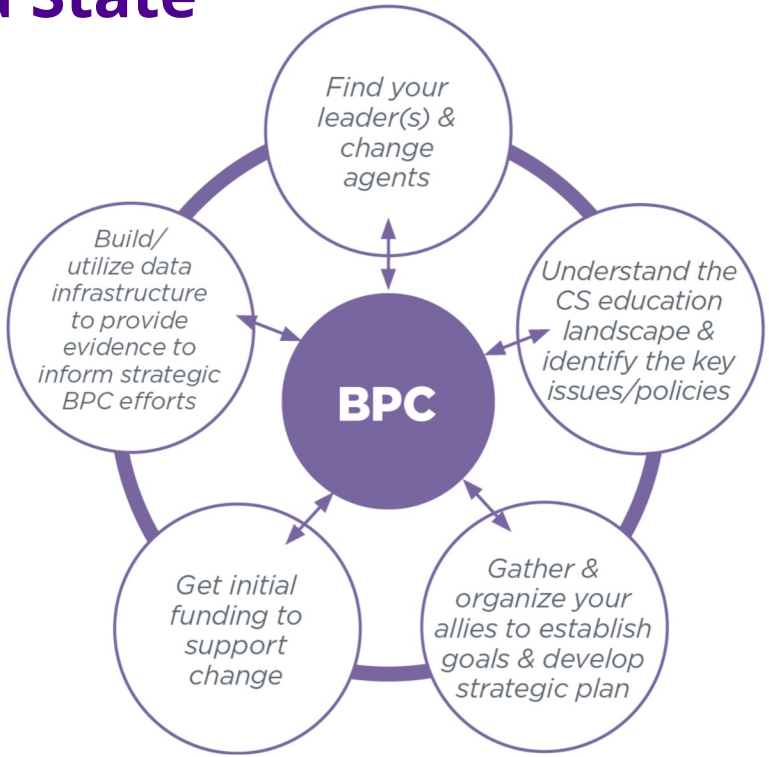

Sequencing
Students' social, mental, and physical health
Influence Industry
Replace a "retiring" job market
Technology Innovators
CSEd Leadership & Policy in Computer Science Education
21st Century Skills
Contribute to CS Teacher Pipelines
Respond to Global Challenges
Postsecondary & Career Readiness
Computational Thinking & Problem-Solving Skills

ECEP State Leadership

- **30** States & Territories
- **189** State leaders
- **66** IHE leaders
- **58** Government/SEA leaders
- **30** Non-profit leaders
- **19** K-12 education leaders
- **9** Industry/Other

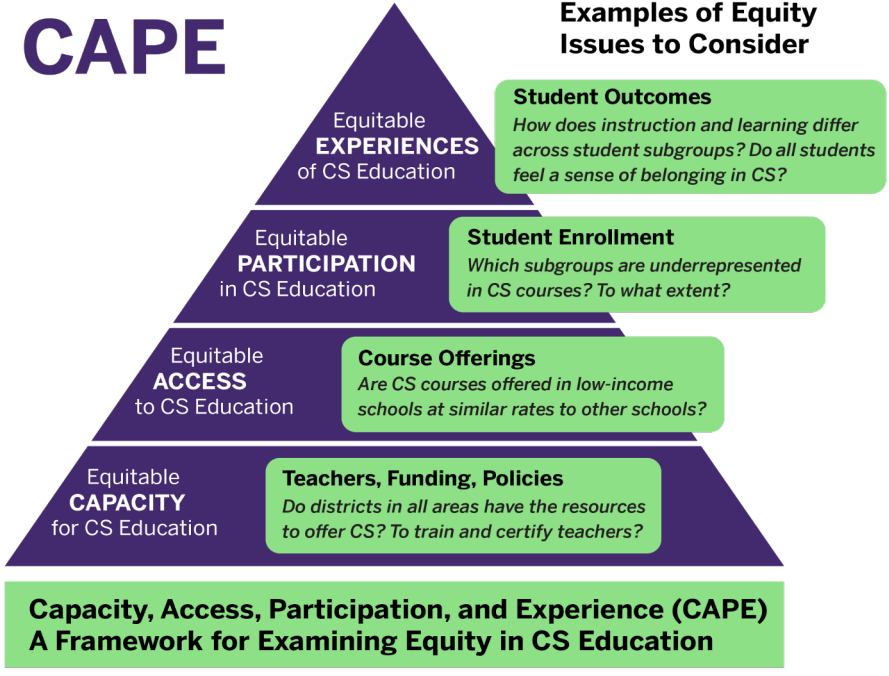


Broadening Participation in Computing: How to *Change* a State



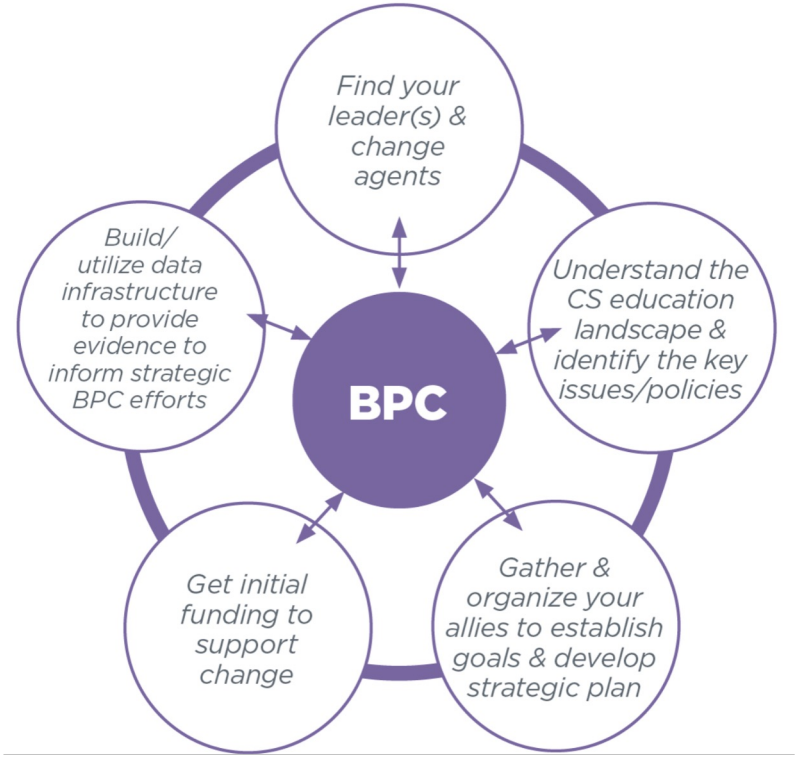
Ottenbreit-Leftwich, A. T., Dunton, S., Fletcher, C., Childs, J., *Jeon, M.*, Biggers, M., Delyser, L.A., Goodhue, J., Richardson, D., Peterfreund, A., Guzdial, M., Adrion, R., Ericson, B., Fall, R., & Abramenka, V. (2022). How to change a state: Broadening participation in K-12 computer science education. *Policy Futures in Education*. https://doi.org/10.1177/14782103221123363

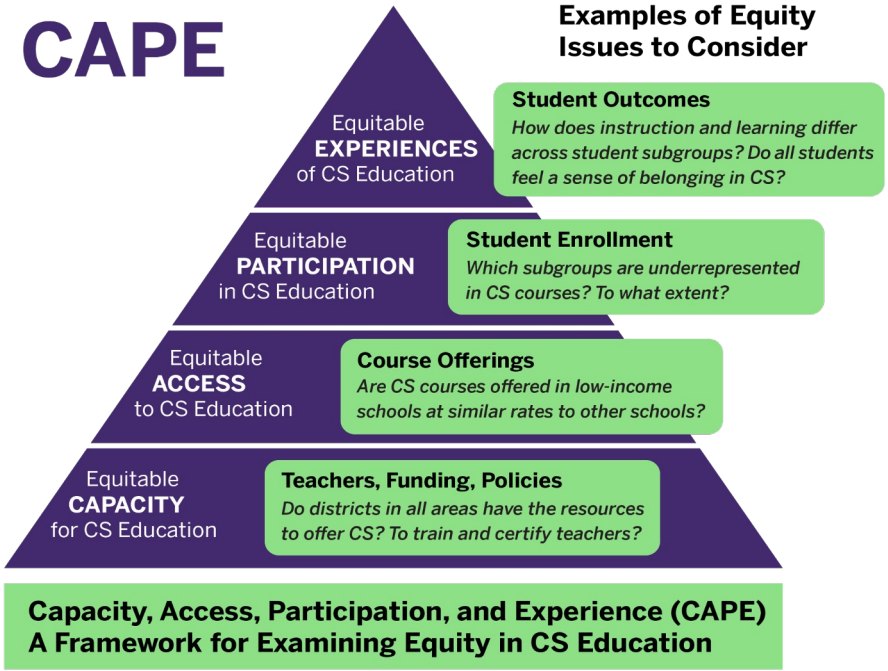
Broadening Participation in Computing: How to *Support* a State



Fletcher, C.L., Warner, J.R. (2021, February). CAPE: A Framework for Assessing Equity throughout the Computer Science Education Ecosystem. Communications of the ACM, 64(2), 23-25. doi:10.1145/3442373

Broadening Participation in Computing State by State





Broadening Participation State by State

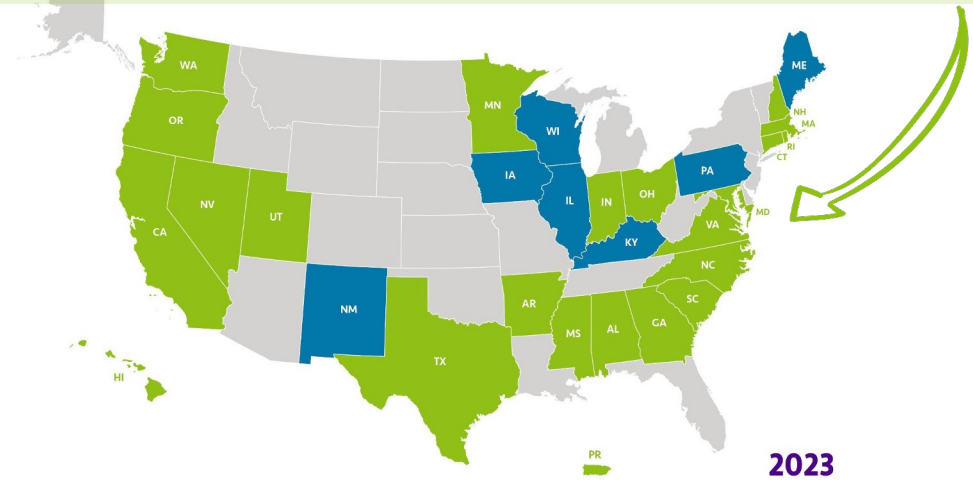
ECEP Expanding Computing Education Pathways

2008	2012	2016	2018	2021	2023
GA and MA coordinate statewide BPC efforts.	Launched **ECEP Alliance** with 4 states	ECEP grows to **17 member states**	ECEP 2 expands to **23 member states**	ECEP 3 awarded	ECEP expands to **30 member states**

ECEP's advocacy and policy efforts is impacting:

33,514,100 K-12 students

approximately **68%** of the total K-12 student population



ECEP BPC Challenge

GOAL
Increase equitable capacity for, access to, participation in, and experiences of K-12 CS education for historically underrepresented student populations at a state level.

ECEP BPC Challenge

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Increase equitable capacity for, access to, participation in, and experiences of K-12 CS education for historically underrepresented student populations at a state level.

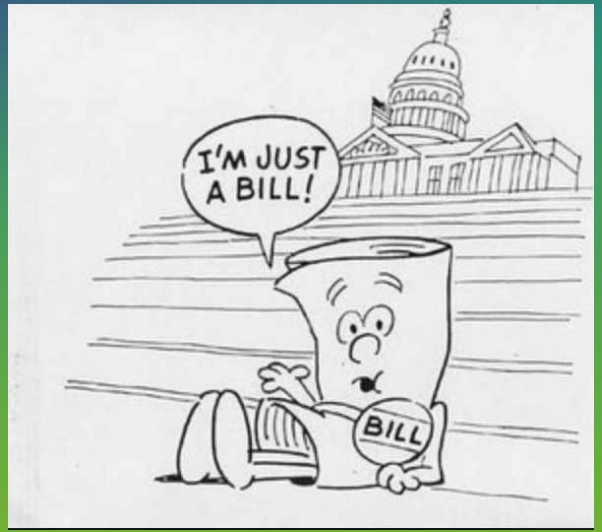
STRATEGY

Utilize collective impact to build the capacity of broad-based state leadership teams to implement equity-explicit, systemic changes in state policies, pathways, and practices.

Types of CS Education Policies in ECEP States

Garvin, M., Dunton, S. T., Trautmann, K., Childs, J., & Fletcher, C. (2024, May). Situating Equity in Education Policy to Advance Broadening Participation in Computing (BPC). In *Proceedings of the 2024 on RESPECT Annual Conference* (pp. 107-115).

State Laws



- CS education specific
- STEM education
- Library/media center education
- Teacher certification
- Dual enrollment
- High school graduation requirements
- Higher education admissions
- Pre-service teacher education

Regulations

Education governing authority:

- State (Local) Superintendent
- State (Local) Board of Education
- State Department of Education

Norms & Practices

- Priorities and/or competing time for other content disciplines
- Resources
- Funding
- Awareness
- Teaching & Learning

Policy Language

- 15 ECEP states require public high schools to offer CS.
- 18 ECEP states have CS as a graduation requirement.
- 13 ECEP states have CS as satisfying part of the higher education admission requirements.

- Some states, such as Texas, have banned the use of any student subgroup identification

- Other states, such as Maryland and Washington, identify student subgroups in policies.

Systemic Structures

- **What is taught**
  - 21 ECEP states have CS Content Standards which provide structure.
- **Who can teach CS**
  - 20 ECEP States which have certification guidance in place.
  - 15 ECEP states are working with IHEs to provide opportunities for preservice teachers to learn CS.

Systemic Structures

- **How CS as a content discipline is supported**
  - 18 ECEP states which have dedicated state funding to
    - convene task forces,
    - write and adopt CS state standards,
    - hire CS state specialists,
    - recruit CS teachers,
    - provide PD for in-service teachers,
    - create or enhance preservice teacher programs or courses,
    - hold strategic meetings at the state and local levels to implement and support CS instruction.

Authority & Accountability

- Some states take a top-down approach with more decisions occurring at the state level often with a State Superintendent or Chief overseeing the SEA and working with a State Board of Education.
- Other states defer many public education decisions and governance to local boards of education and Superintendents of Local Education Agencies (LEAs) requiring a more of a grassroots approach to reform policy locally.
- 19 ECEP states which have a designated CS specialist at the state level.

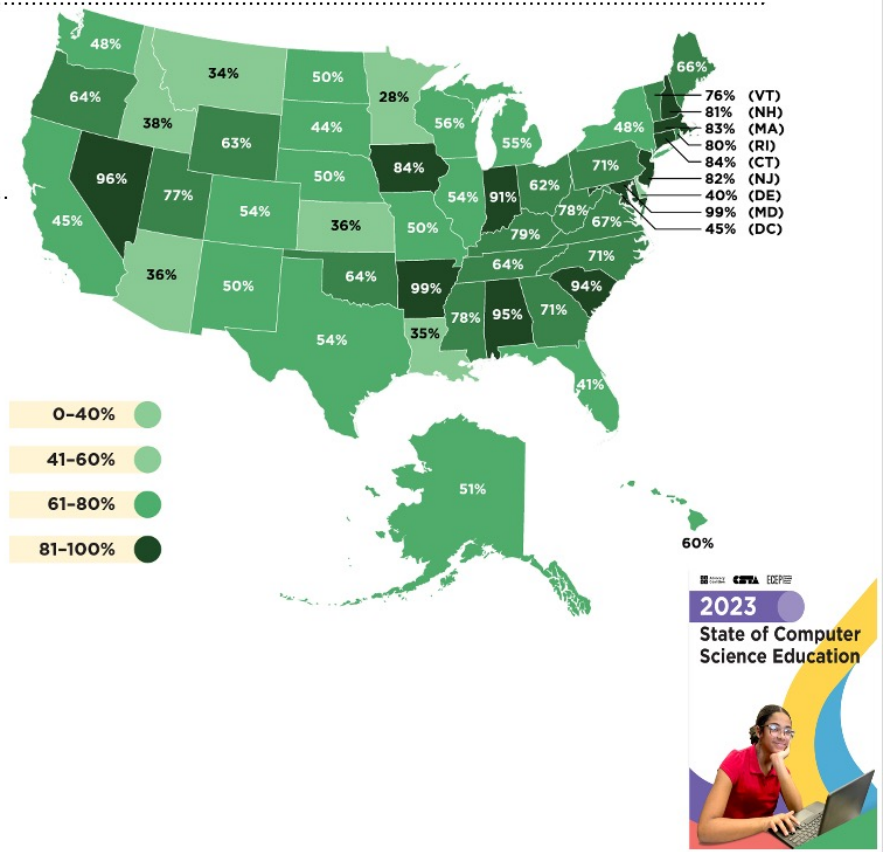
ECEP Expanding Computing Education Pathways

Click to add title

- **Illinois, Louisiana, Michigan, Minnesota, and New Hampshire** funded computer science education for the first time.
- **More than $120 million** was allocated for computer science.

- Ten states have adopted multiple CSEd policies: **Alabama, Arkansas, Georgia, Idaho, Indiana, Maryland, Nevada, Rhode Island, Tennessee, and Washington**.

- **North Carolina, North Dakota, and Rhode Island** adopted a graduation requirement in computer science.



Code.org, CSTA, ECEP Alliance (2023). 2023 State of Computer Science Education. Retrieved from https://advocacy.code.org/stateofcs

Implications for Policy & Practice

- Extend and build awareness around the CAPE framework to include directly targeted state policies (laws, regulations, and norms and practices).
- Support a reciprocal relationship between policy and research.
- Onboard new advocacy members to confront their own individual and group biases to fully comprehend the historical and current computing education context.
- Identify which types of policies govern or provide guidance on CAPE identified and assessed inequities.

Implications for Policy & Practice

Beyond the ECEP Alliance states, other states and governance structures in other countries also benefit from this research.

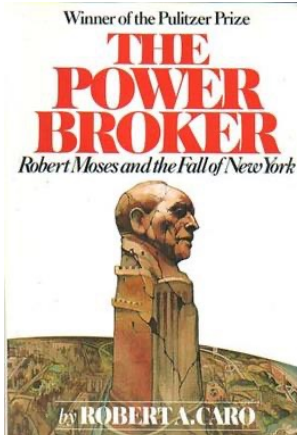
- Identify current policies.
- Work with stakeholders and decision makers to make the necessary policy changes with the appropriate policy language.
- Leverage current CSEd policies to increase policy awareness.
- Inform strategic plans to situate equity in education policy to advance BPC.

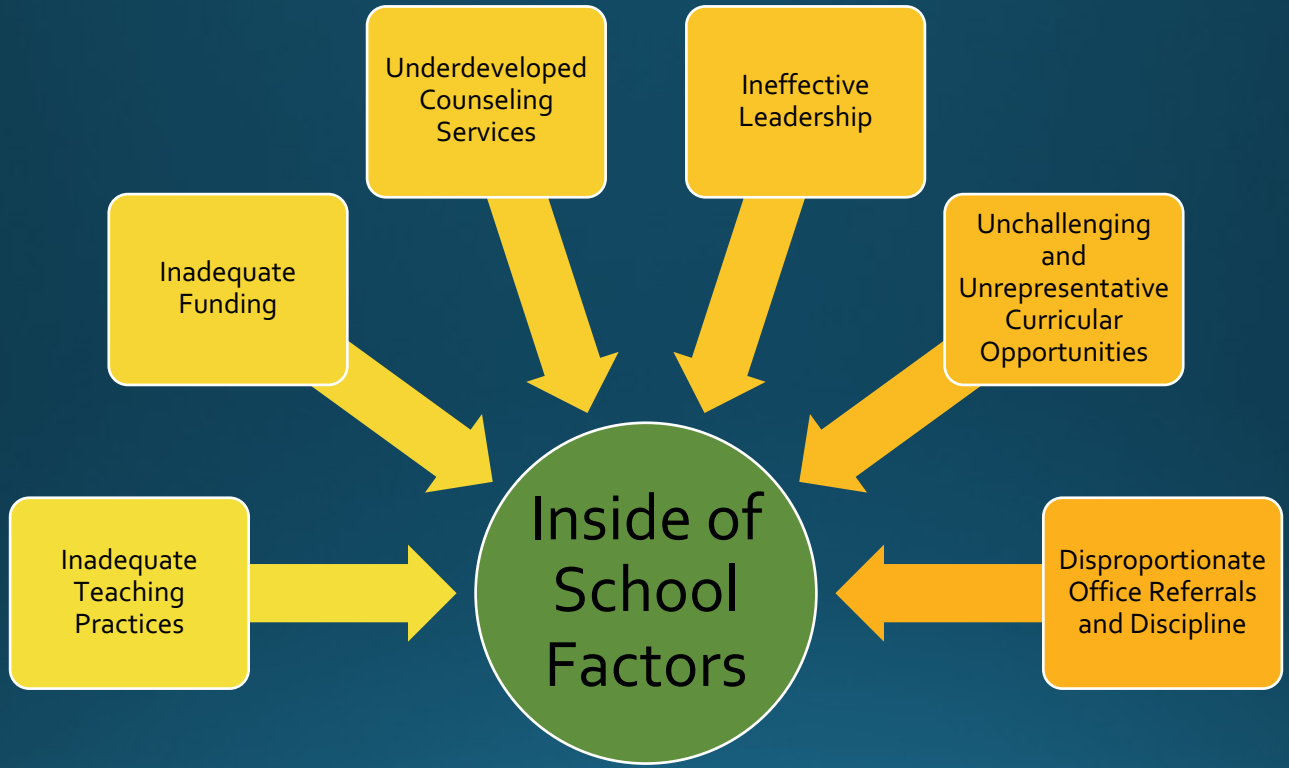
To Consider...

- What, if any, equity language is necessary to advance state CSEd policies?
- In what ways should CSEd leadership & policies impact the systemic structures in states?
- What role does accountability have in CSEd state policies moving forward?

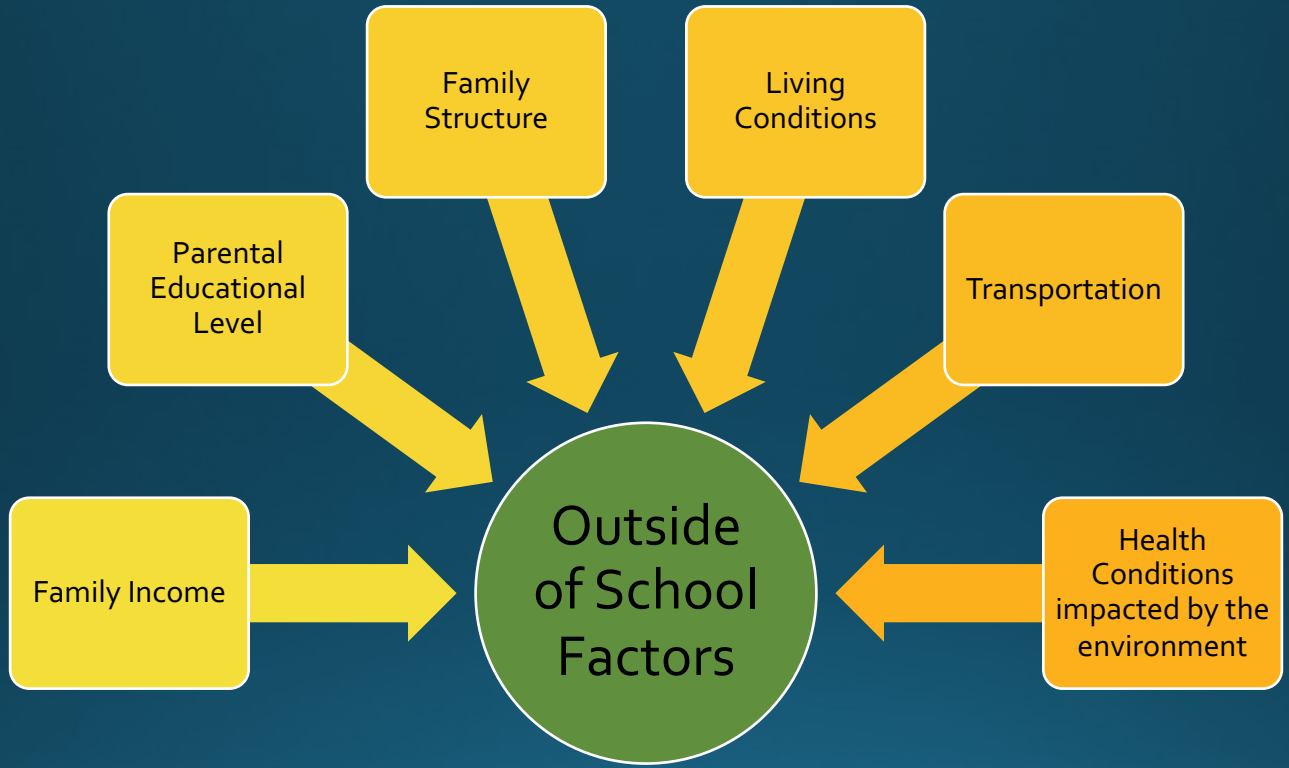
Without policies, frameworks, guidance that provide a different way of seeing & doing lenses for seeing & ways of doing….

- Ordered his engineers to build the bridges low over the parkway to keep buses from the city away from Jones Beach—buses primarily taken by with Black and Puerto Rican community members
- Communities of color neighborhoods bulldozed for urban renewal projects
- Policies created to discourage non-whites from certain parks and pools

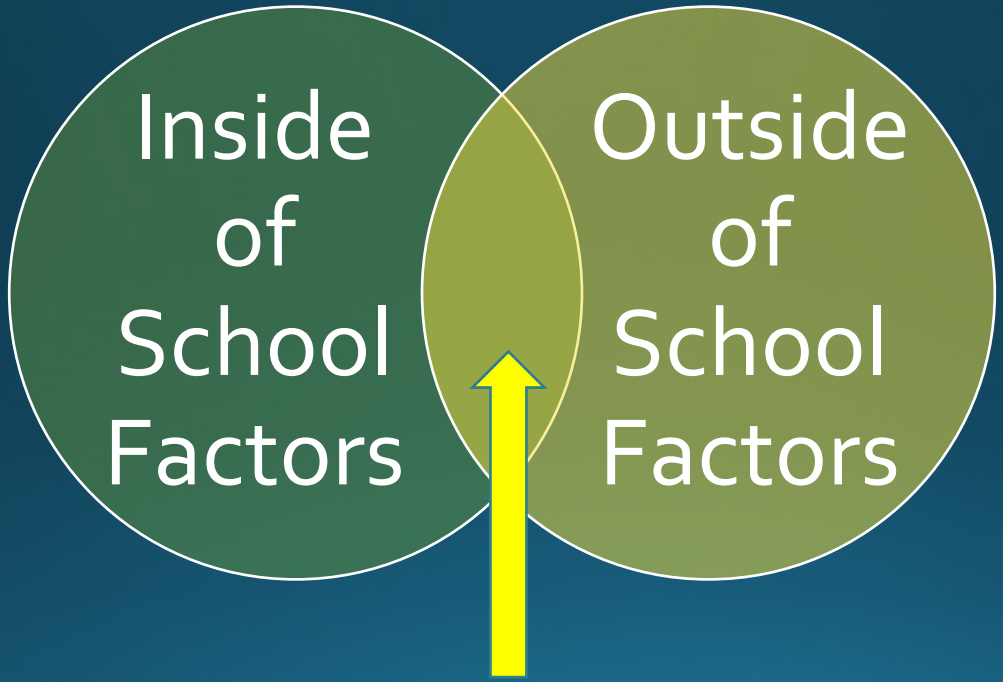




Childs & Lofton, 2021; Horsford & Heilig, 2014; Milner, 2013; Noguera & Wells, 2011



Childs & Lofton, 2021; Duncan & Murnane, 2012; Green & Gooden, 2014; Tate et al, 2011


Inside of School Factors
Outside of School Factors
CS Leadership & Policy

Students' social, physical, and mental health

Family Background

Neighborhood Context

School Environment

Zones of a Student's Daily Life

Childs & Grooms, 2018; Childs & Lofton, 2021; Gottfried, 2014

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