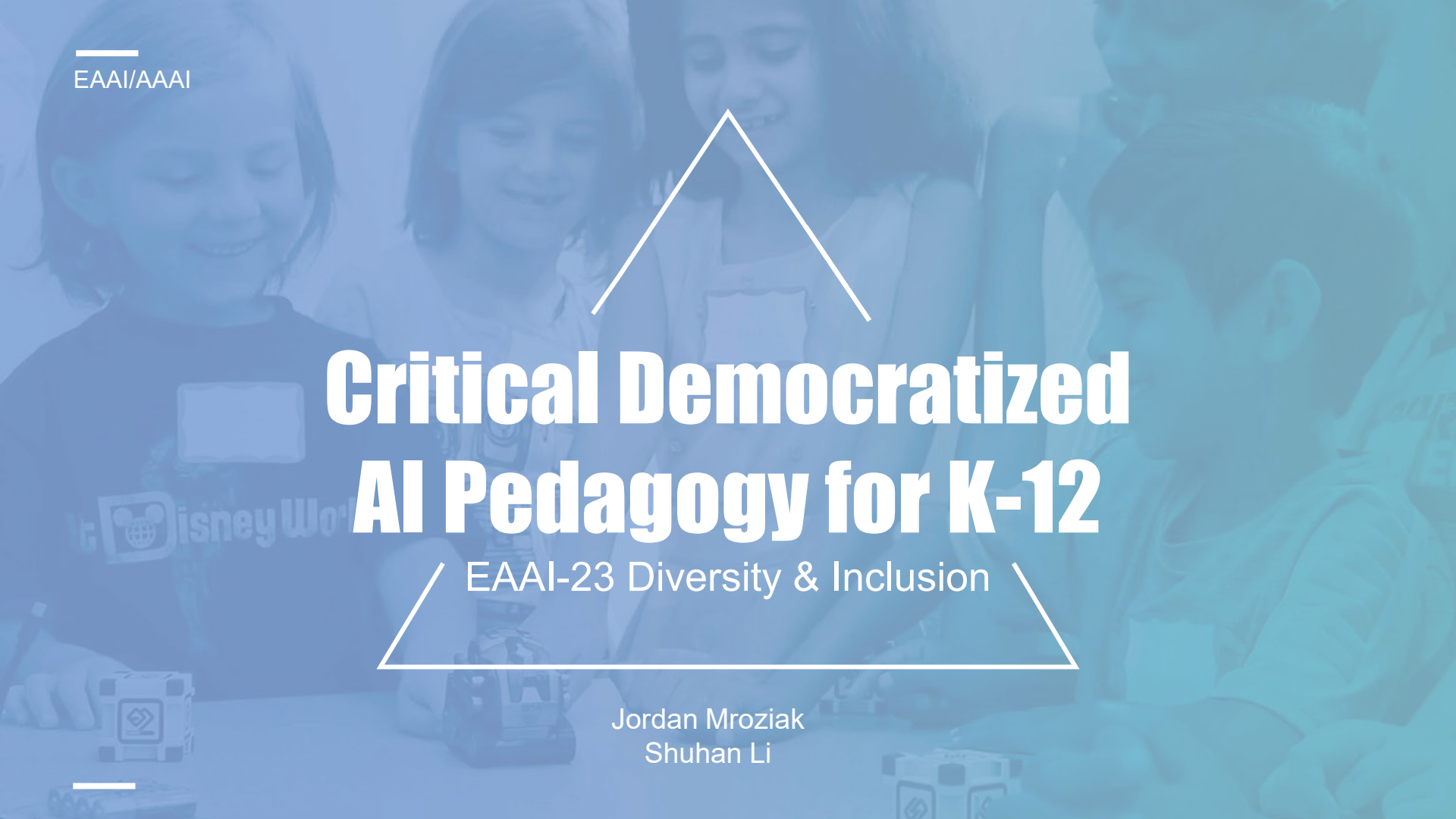


Critical Democratized AI Pedagogy for K-12

EAAI-23 Diversity & Inclusion

Jordan Mroziak
Shuhan Li

Background

- AI literacy education is a most recent discipline in the academia
- Most empirical research focuses on higher education (Ng et al.)
  - K-12 is an emerging but under-examined field
- Technology as protean (Pappert), opaque (Turkle), and rapidly changing (all from Mishra and Koehler's work on TPACK)
  - Leading to the question on pedagogy

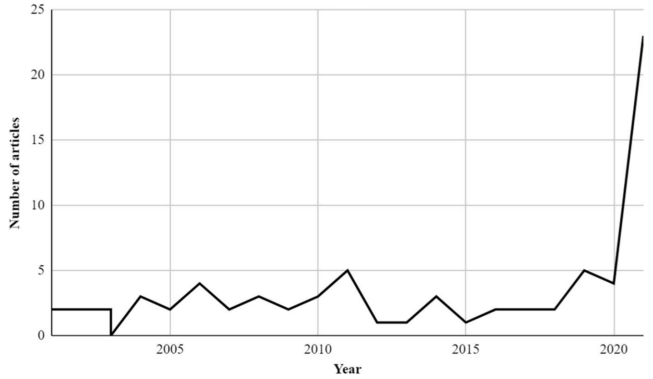
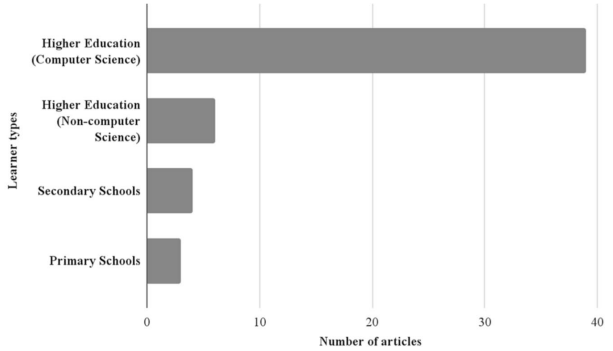


Fig. 2 Years of publication

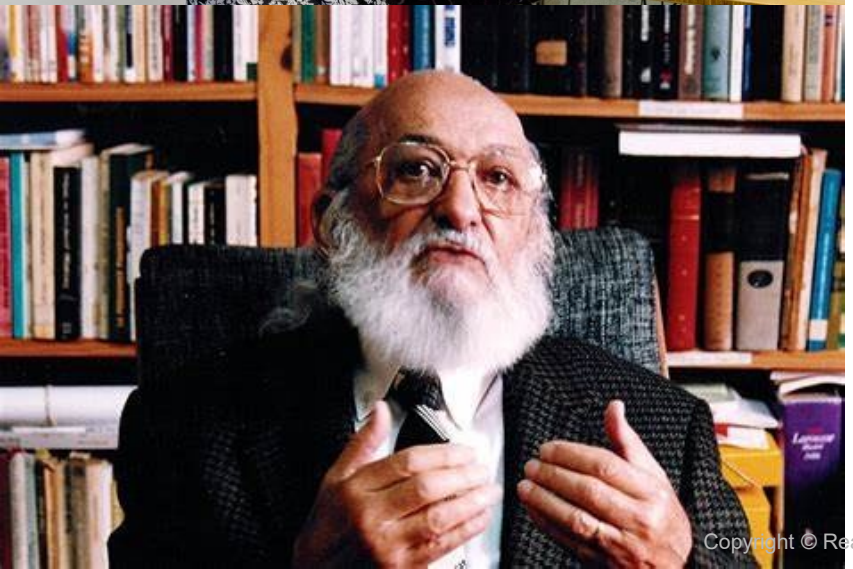


Remarks: Studies can be conducted at more than one educational level.

Fig. 5 Distribution of learner types. *Remarks:* Studies can be conducted at more than one educational level

ReadyAi
A WholeRen Group Company

How might we design a pedagogy of AI that is radically inclusive?



Inspirations

Radically Changing CS Culture with Critical Pedagogy

- Amy J. Ko
  - Broaden participation
  - Embrace cultural humility
  - Remove barriers
  - Diversify power
- Paulo Freire
  - Critical pedagogy
  - Humanist perspective

What needs to be changed…

“One cannot expect positive results from an educational or political action program which fails to respect the particular view of the world held by the people. Such a program constitutes cultural invasion, good intentions notwithstanding.” - Freire

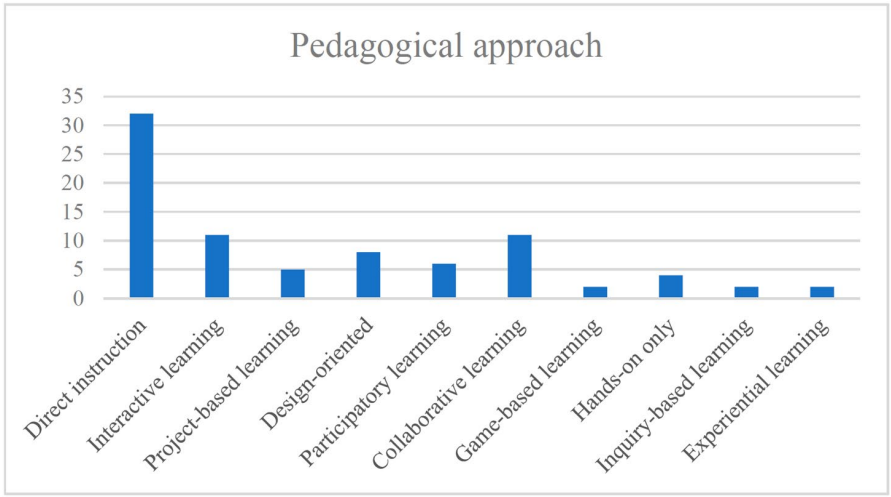
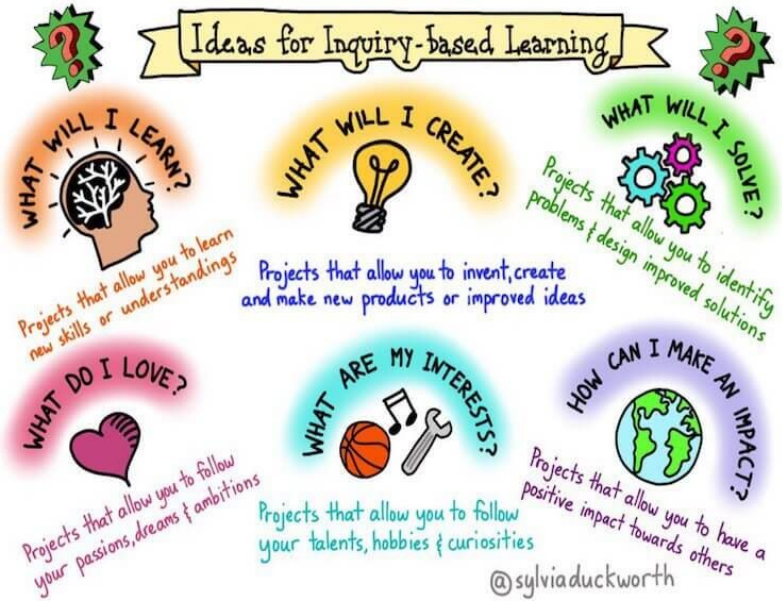


Figure 10. Pedagogical approaches adopted in K-12 AI teaching units.

Miao Yue; Morris Siu-Yung Jong; Dai, Yun. Sustainability; Basel Vol. 14, Iss. 23, (2022): 15620. DOI:10.3390/su142315620

Our Propositions

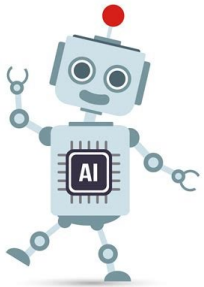
- **Move beyond programming**
  - The act of coding is NOT the exclusive fundamental component of AI pedagogy
- **Simplify jargons**
  - *AI literacy* can be built using vocabulary unattached to requirements of technical execution (algorithm, applications, perception, etc) which may overlap with the lexicon of computer science.
- **Multidimensional learning**
  - Any substantive engagement with AI fluency demands an interdisciplinary approach. One cannot teach AI responsibly if one neglects its social implications.
- **Driven by inquiry**
  - A model that promotes direct instruction as a primary tactic lacks its ability to remain authentic to the ways in which technology is consumed, negotiated, and interpreted beyond the classroom space as well as the AGENCY students feel with technology in their lives.



Conceptual Framework

For us, teaching critical AI literacy necessitates the following:

- **WHAT IS (Technology)**
  - Must provide a fluency of what constitutes artificial intelligence
- **WHAT CAN BE (Art)**
  - Must invite habits of curiosity and wonder so as to promote ‘possibility/creativity’
- **WHAT SHOULD BE (Justice)**
  - Must take into account and actively push back against both current and historical socio-cultural baggage



Critical Computational Expression (Lee & Soep, 2022)

- **Tech + Justice**
  - Leveraging technology for positive social impact
  - E.g. Native Land digital maps of Indigenous territories
- **Tech + Art**
  - Imagine, create, and collaborate with digital tools
  - E.g. STEAM Dance makerspace, workshops, and Modkit
- **Tech + Justice + Art = CCE**
  - Combination of all 3 aspects
  - Using critical and creative inquiries to obtain computational literacy, which in turn generates social advancement

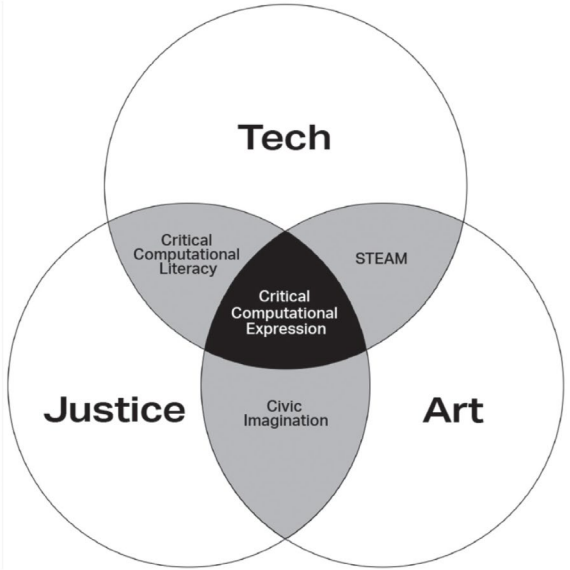


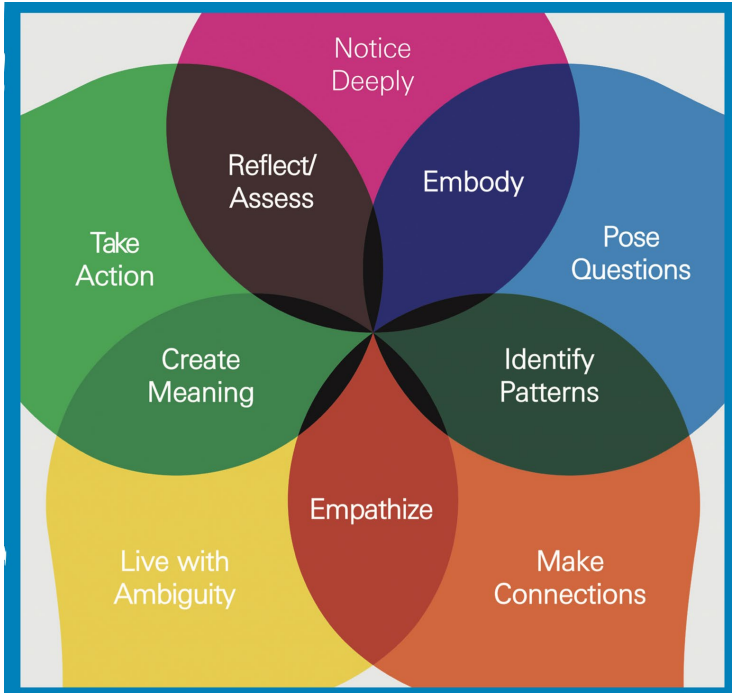
Figure 2.1
A visual diagram of the CCE framework.

What Is?

More weight to social impact, ethics, and bias reduction

What Could Be?

Imaginative Learning



https://www.mpsaz.org/highland/staff/clcuddy/files/lce_capacities_poster_-_extended_definitions.pdf

What Could Be (cont.)

Some prompts that we might contextualize:

- **Noticing Deeply**
  - What are the ways in which I interact with _____ and how does it interact with me (physical sensing, emotional sensing)? Is it unique in this way?
- **Questioning**
  - What if…questions of speculation for specific topics
  - What if I could make music by describing it to a computer?
  - What if I could teach my house to change based on my emotion?
- **Making Connections**
  - Have we seen something similar to _____ any place before?
- **Embodying**
  - How does the abilities of _____ happen in my own body?
- **Empathy**
  - Is the ability of _____ done by everyone? In the same way? How could it be done differently?
- **Take Action**
  - Can you create a different way for _____ to be done?

What Should Be?

Social Justice Standards for K-12 - "IDJA"

- *Identity*
- *Diversity*
- *Justice*
- *Action*

Dover, Alison. (2009). Teaching for Social Justice and K-12 Student Outcomes: A Conceptual Framework and Research Review. Equity & Excellence in Education. 42. 506-524. 10.1080/10665680903196339.

https://www.learningforjustice.org/frameworks/social-justice-standards

What Should Be (cont.)

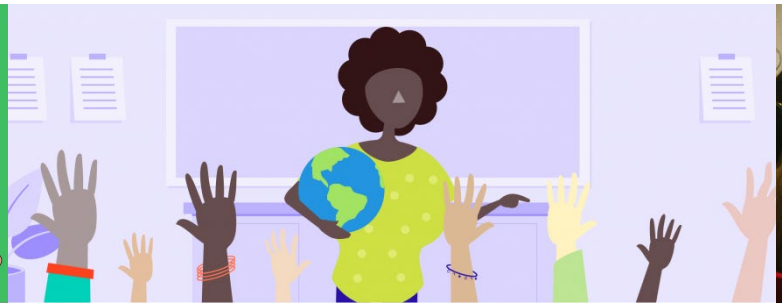
- **Identity**
  - How can AI bring about themes that are personal to you, your cultural background, identity, etc.?
- **Diversity**
  - Culturally responsive curriculum that draws on the experience of students from various demographic backgrounds
- **Justice**
  - In what ways can AI applications debunk biases and promote civil rights?
- **Action**
  - What will you do with AI technologies to garner positive social impacts?

Culturally responsive computing: a theory revisited (Scott et al., 2014)

Becoming Technosocial Change Agents: Intersectionality and Culturally Responsive Pedagogies as Vital Resources for Increasing Girls' Participation in Computing (Ashcraft et al., 2017)

Synthesized Practices

- Introduce students to basic concepts and mechanisms of AI
  - Accessible, low entry-point materials (What is AI? by MIT Day of AI)
- Engage students in creative hands-on projects that validate students' cultural backgrounds
  - Problem-solving with AI
  - Data activism
  - Creative and generative AI
- Use role models from historically underrepresented communities
  - Representation matters



Thank you!

Shuhan Li

+1 (646) 266-9046

sl5159@tc.columbia.edu

Jordan Mroziak, Ed.D.

+1 (412) 609-9607

Jmroziak@andrew.cmu.edu

jordan@readyai.org