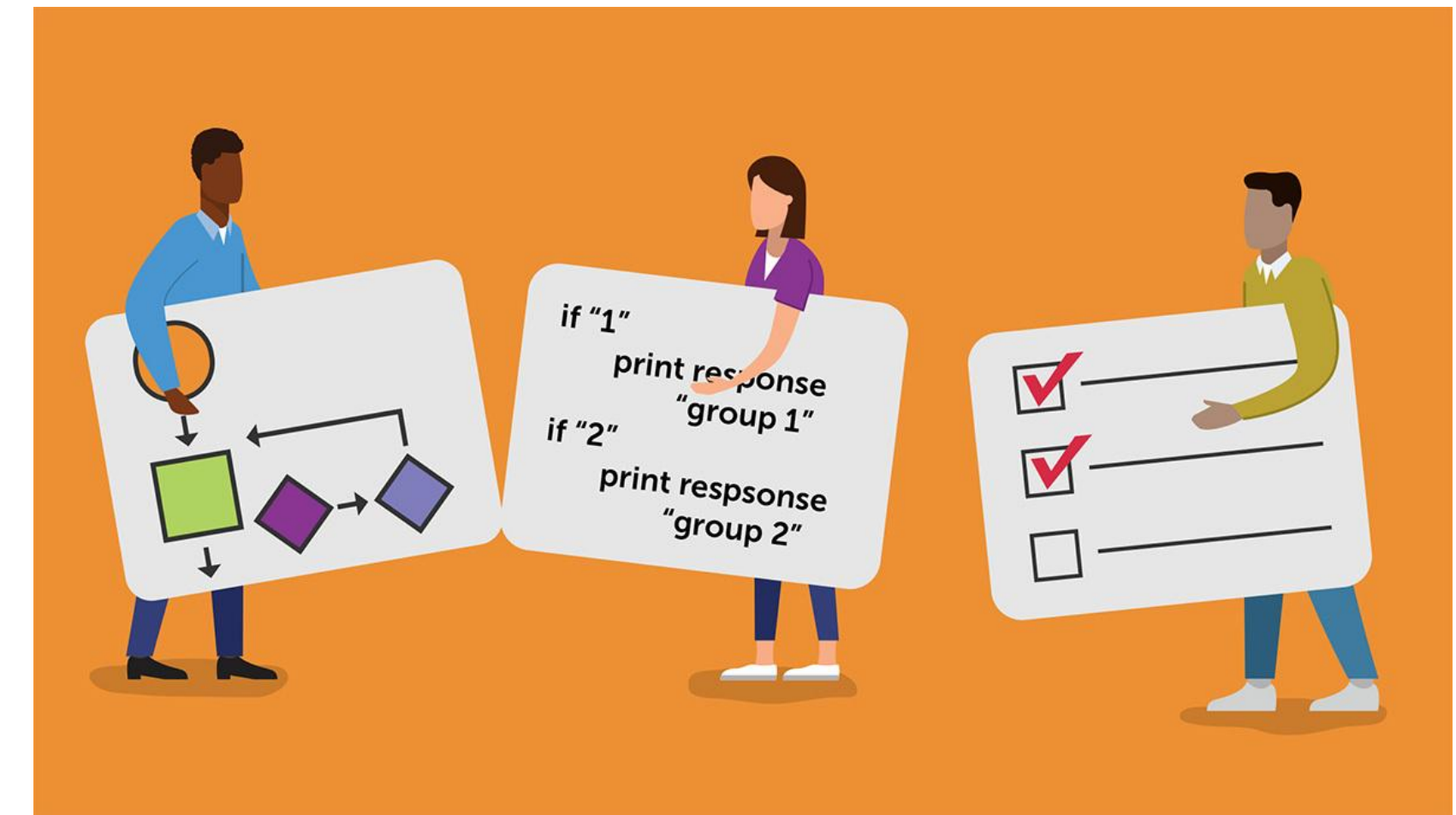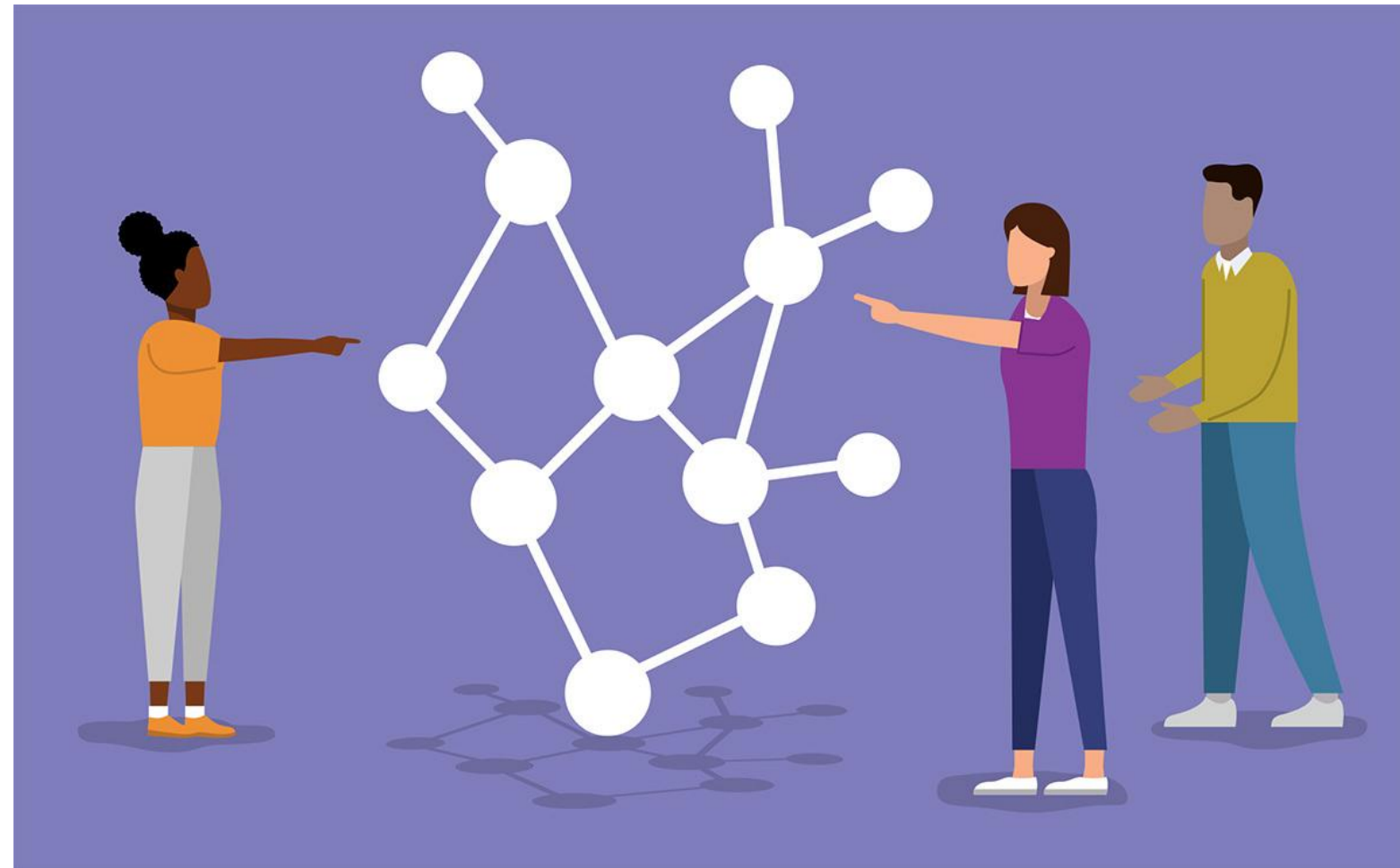# Intelligence Augmentation for Collaborative Learning

Jeremy Roschelle, Executive Director, Learning Sciences Research

Roschelle J. (2021) Intelligence Augmentation for Collaborative Learning. In: Sottilare R.A., Schwarz J. (eds) Adaptive Instructional Systems. Design and Evaluation. HCII 2021. Lecture Notes in Computer Science, vol 12792. Springer, Cham. https://doi.org/10.1007/978-3-030-77857-6_17

JRoschelle@digitalpromise.org

@Roschelle63

Digital Promise®
Accelerating Innovation in Education

Today's Classrooms DON'T Look Like This

Instead, Today's Classrooms Look Like This

@Roschelle63
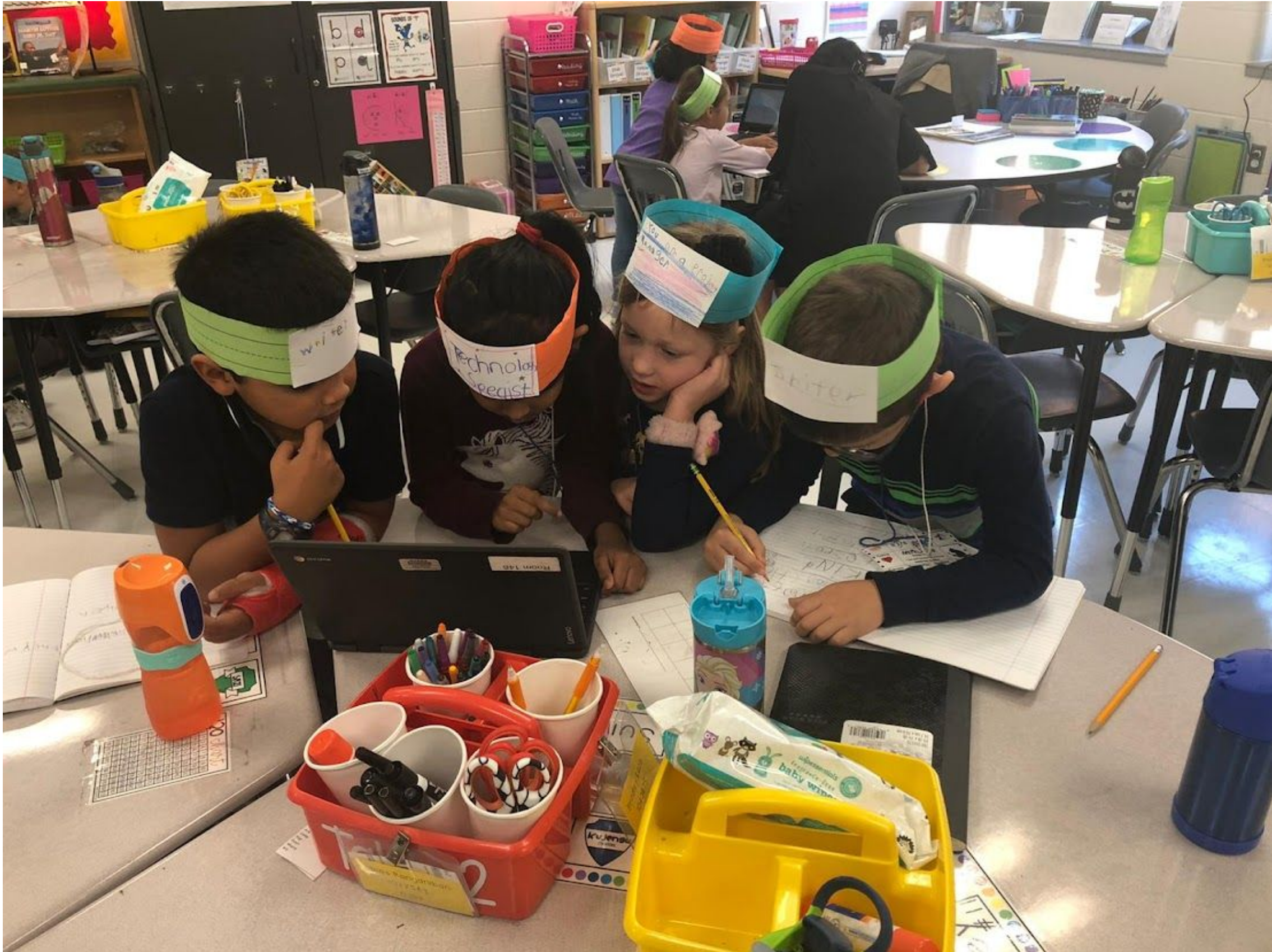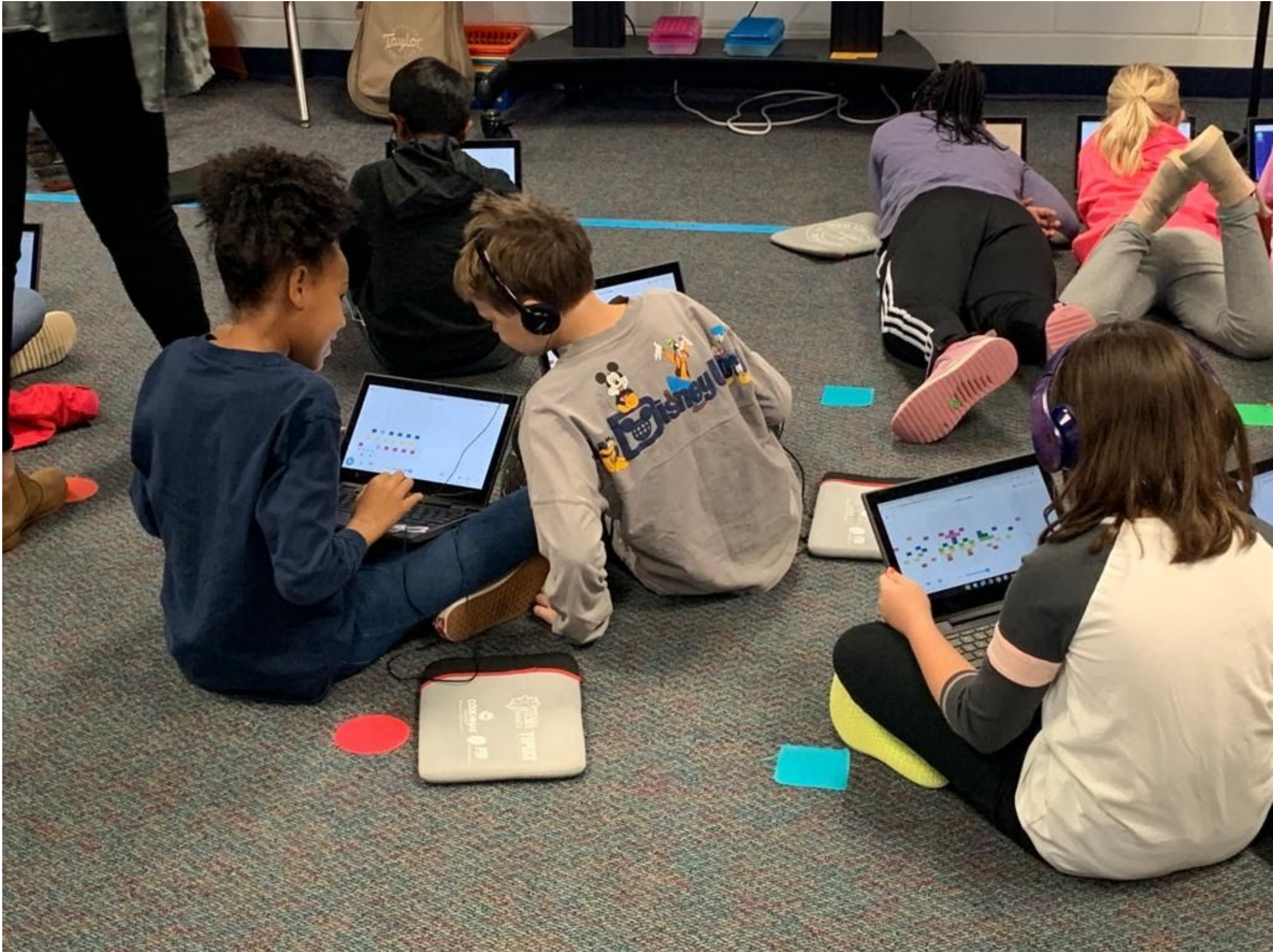
Plan for This Talk

1. Shift from *individual* to
   social and contextual learning

2. Highlight value of CSCL

3. Three Quick Scenarios

4. Recommendations for social and
   contextual Augmented Intelligence for
   learning

About my work

CIRCLS
Center for Integrative Research in
Computing and Learning Sciences

Community Hub for NSF's
"Research on Emerging Technology
for Teaching and Learning"
CIRCLS.org

Digital Promise works with large
national networks of innovative schools
see League of Innovative Schools
see Verizon Innovative Learning Schools

@Roschelle63

Digital Promise
Accelerating Innovation in Education

AI Messaging: EdTech vs. Educator Goals

EdTech messaging about AI over-emphasizes individual, cognitive

- Often tackling isolated skills

- Personalized - 1:1

- Adaptive - to one learner at a time

- Often remedial (deficit oriented)

image of AI as a personal agent for an individual student can be limiting

@Roschelle63

Today's Curricular Frameworks emphasize social, contextual

- Complex intellectual challenges

- Discourse, argumentation

- Project-based, group work

- Engaging student identity, culture (asset-oriented)

rethink AI to augment the social intelligence of teachers and students

**Digital Promise**
Accelerating Innovation in Education

Computer Supported Collaborative Learning

CSCL has been a field of the learning sciences for about 30 years

Has a scholarly society, a handbook, a series of international conferences

Has lots to offer, but rarely applied at scale or outside its bubble

see isls.org for conference series and more...
also see iaied.org for recent AI & ed research

Activity system

Figure 2: Activity Theory Diagram

© Matt Bury 2012

@Roschelle63
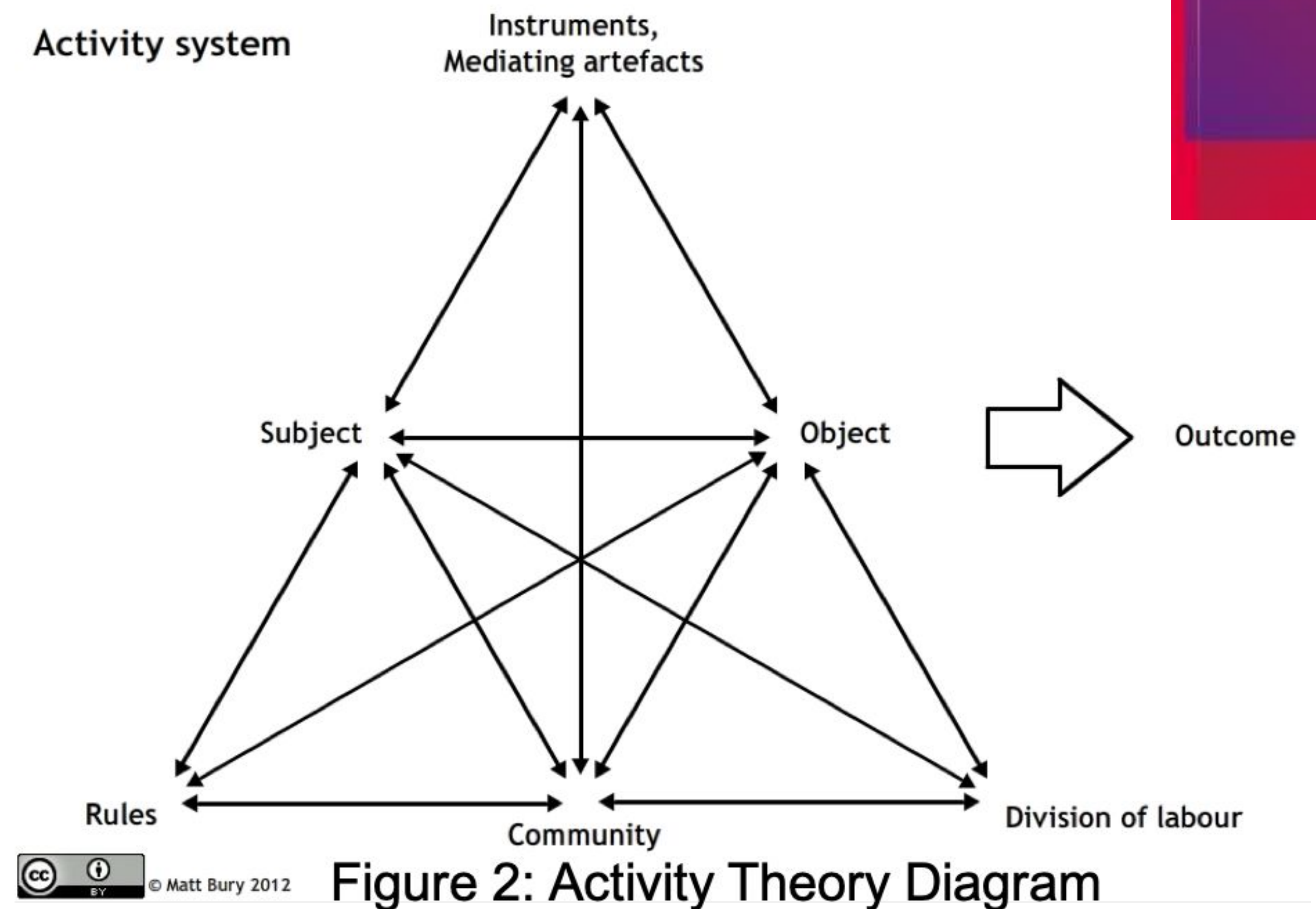
Computer Supported Collaborative Learning

(an old) Definition of CL: "coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem"

"Scripts" understanding roles, responsibilities, dynamics of CL, and how computers can providing enabling supports for better CL

Kirschner and Erken's 3x3 framework
1. Cognitive, motivational and social aspects of learning
2. Community, small group and individual levels
3. Tools for representation, discourse, and process

@Roschelle63

CSCL Grand Challenge for IA

When it is well-structured, collaborative learning has proven to be extremely effective, especially for learning concepts and complex problem solving

And Learning to Collaborate is a valuable life skill.

But it's never as simple as "students, work together"
In practice, collaborative situations often fail to be productive

How could intelligence augmentation make **orchestrating** social and collaborative learning more easy, equitable, effective?

@Roschelle63

Digital Promise®
Accelerating Innovation in Education

CSCL Scenarios the Field is Exploring

"How can one teacher create an equitable and collaborative classroom for all students?"
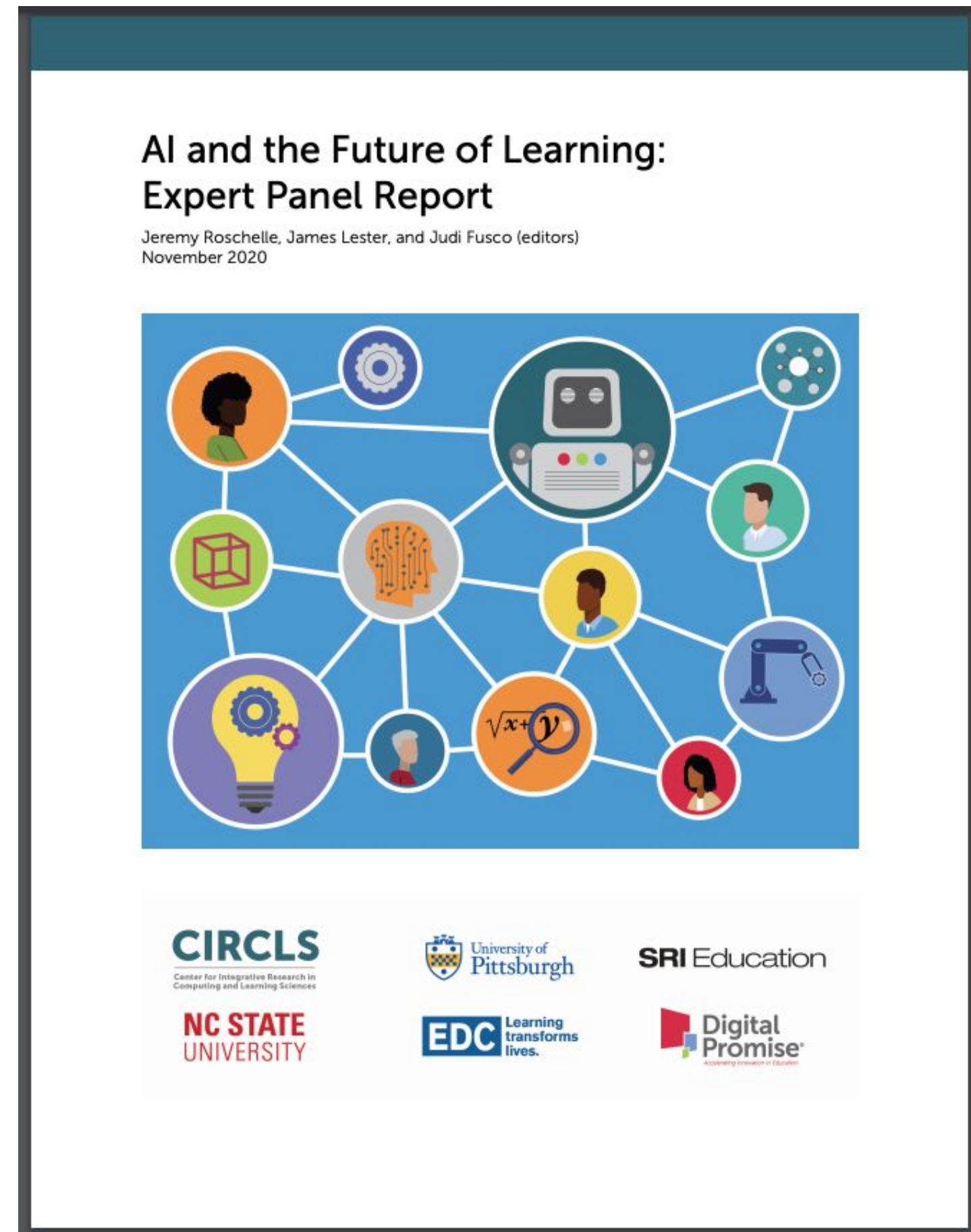
see $20M NSF iSAT AI Institute
https://www.colorado.edu/research/ai-institute/

Could AI reveal social learning patterns, including related to equitable discourse?

see https://TeachFx.com

Could a voice-based AI assistant make it easier for teachers to manage CSCL?

see https://merlynmind.com

AI and the Future of Learning: Expert Panel Report
Jeremy Roschelle, James Lester, and Judi Fusco (editors)
November 2020

CIRCLS
Center for Integrative Research in Computing and Learning Sciences
NC STATE UNIVERSITY

University of Pittsburgh

SRI Education

EDC Learning transforms lives.

Digital Promise

see CIRCLS.org

@Roschelle63

Digital Promise®
Accelerating Innovation in Education

Recommendation: Add Four New Verbs

Individualized EdTech approches

- **Assess** (what each student needs)

- **Assign** (appropriate next activity)

- **Adapt** (providing personalized supports, hints, guidance)

Recommendation: Add Four New Verbs

Intelligence Augmentation for Collaborative Learning

1. **Automate** (complexity of organizing social, contextual learning)
2. **Add awareness** (of what is occurring in social learning)
3. **Assist** (facilitate engagement in social learning behaviors)
4. **Augment** (social intelligence about group learning in a context)

Individualized EdTech approches

- **Assess** (what each student needs)

- **Assign** (appropriate next activity)

- **Adapt** (providing personalized supports, hints, guidance)

Digital Promise®
Accelerating Innovation in Education

Recommendation: Ethics, Equity

As we explore Intelligence Augmentation for Collaborative Learning, issues of ethics and equity *are paramount.*

Not enough time in this short presentation to also cover these issues.

What do you see?

- Is Intelligence Augmentation for Collaborative Learning a compelling grand challenge?

- What do we know that can be brought to bear to accelerate advances?

- Who needs to be engaged in participatory design and research?

Thank you!

JRoschelle@digitalpromise.org
@Roschelle63