

Building a Research Foundation for K-12 AI Education

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Research Questions

- Why introduce AI education to K-12?
- How to introduce AI education to K-12?
 - How to develop curriculum? What's developmentally and grade appropriate? What's the learning progression?
 - Teacher PD?
 - How do students learn AI in the context of math, science? Integration to CS/CT education? Formal vs. Informal?
 - What type of learning is most effective (for specific subject of AI)?
 - Unplugged
 - Robots, intelligent tutoring systems, game-based
 - ...
 - ...

K-12 AI Education Research Vacuum

Despite the accelerating pace of AI technology development both in the US and abroad and the rapidly growing interest in a strategy for K-12 AI education, there is *no K-12 AI education research foundation* on which such a strategy can be readily based.

AI for K-12 Education: Observations

- Time sensitivity
- AI a form of computational thinking (CT)
- Model of K-12 CS/CT (e.g., CSTA)
- AI education learning progressions
- AI K-12 curriculum design
- Professional development
- Criticality of AI ethics

Interdisciplinary Call to Action

AI

Educational
Psychology

Teacher
Education

STEM
Education

K-12
AI Education

AI Ethics

Learning
Sciences

AI in
Education
(AIED)

Developmental
Psychology

Interdisciplinary Call to Action

Evidence
Base

K-12
AI Education

K-12 AI
Curriculum

K-12 AI
Learning
Technologies

K-12 AI
PD

K-12 AI
Assessment

...

AI

Educational
Psychology

AI Ethics

Teacher
Education

STEM
Education

Learning
Sciences

Developmental
Psychology

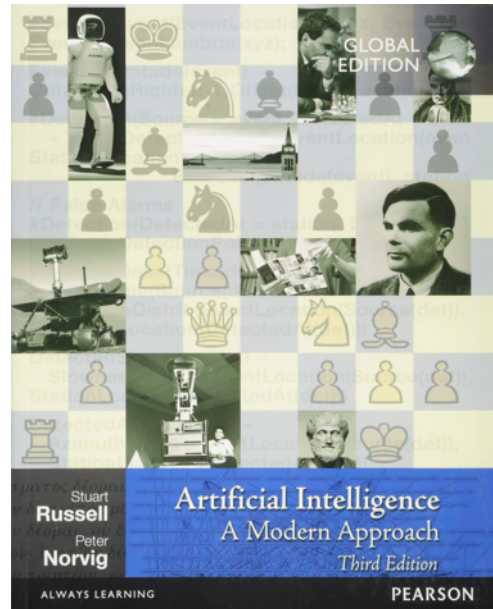
AI in
Education
(AIED)

AI for High School Students through Game-based Learning



- Research Questions
 - How to make AI education assessible to high school student?
 - How to design game-based learning to support AI, CT and math skills development?
- Team composition
 - Researcher in game-based learning
 - Game developer
 - Learning scientist (K-12)
 - Researcher on assessment in K-12
 - AI educator in higher ed
 - K-12 math, CS teacher

AI and Math



Philosophy

Cognitive Psych

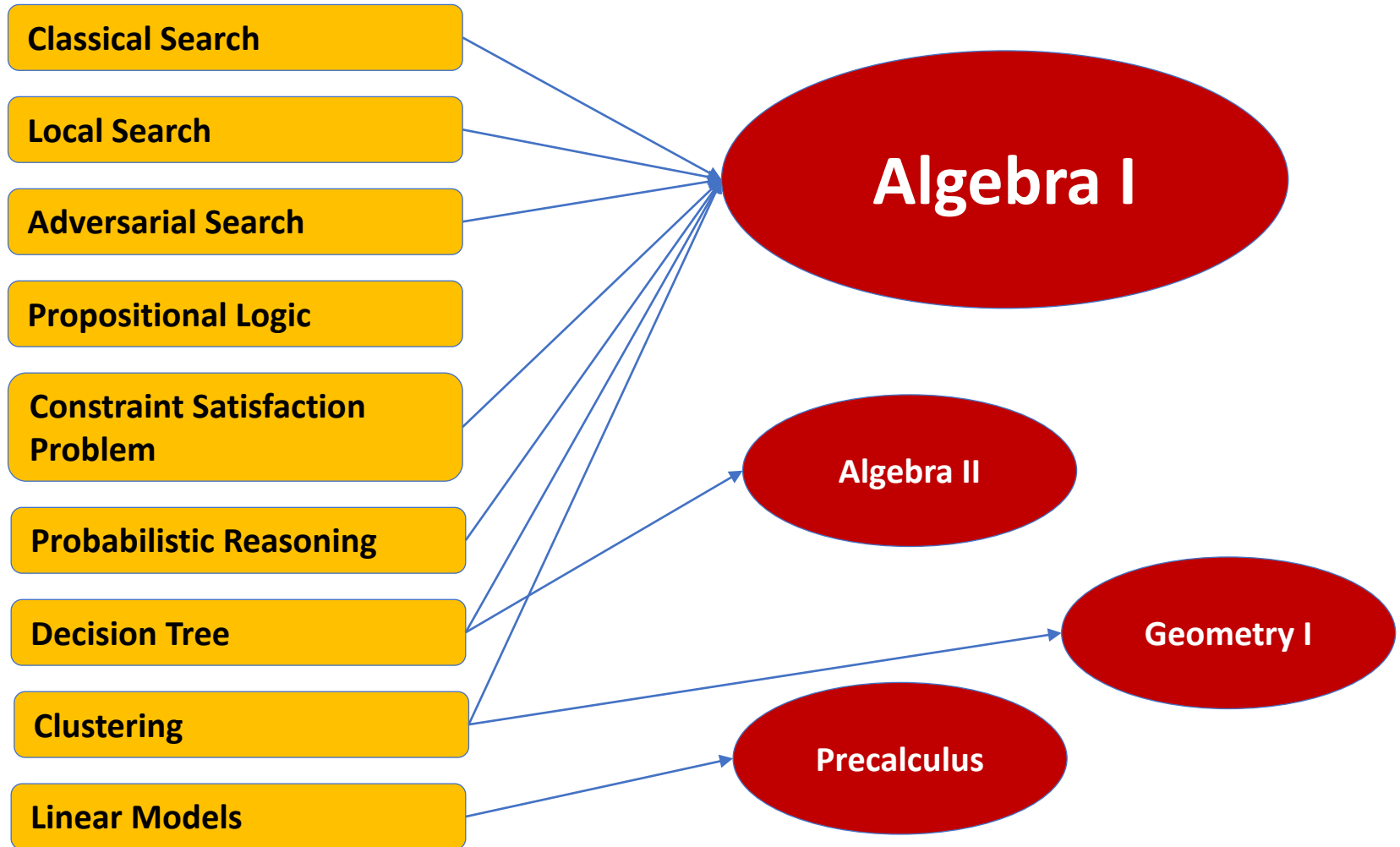
Economics

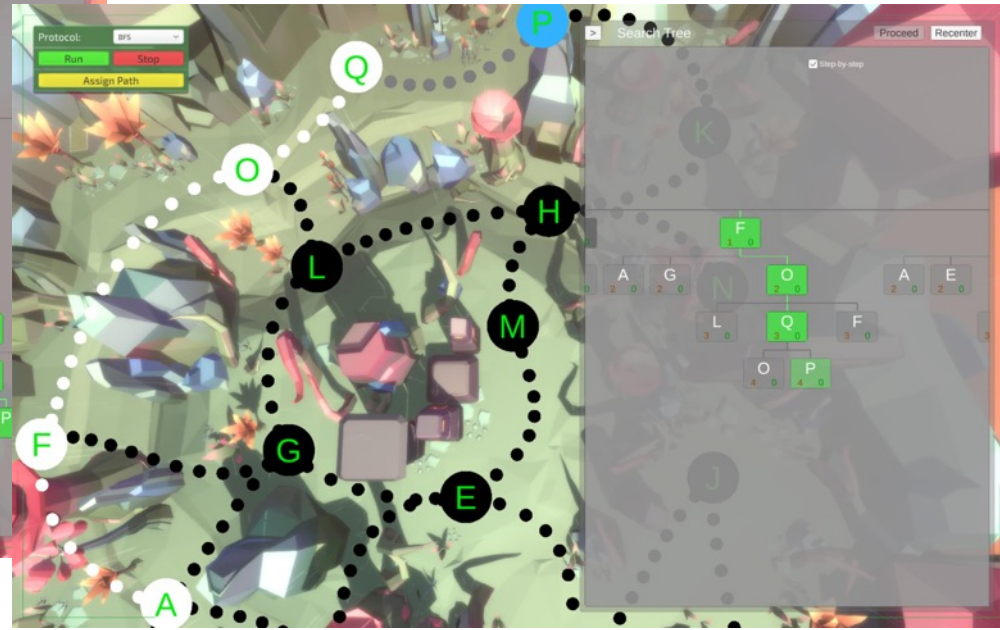
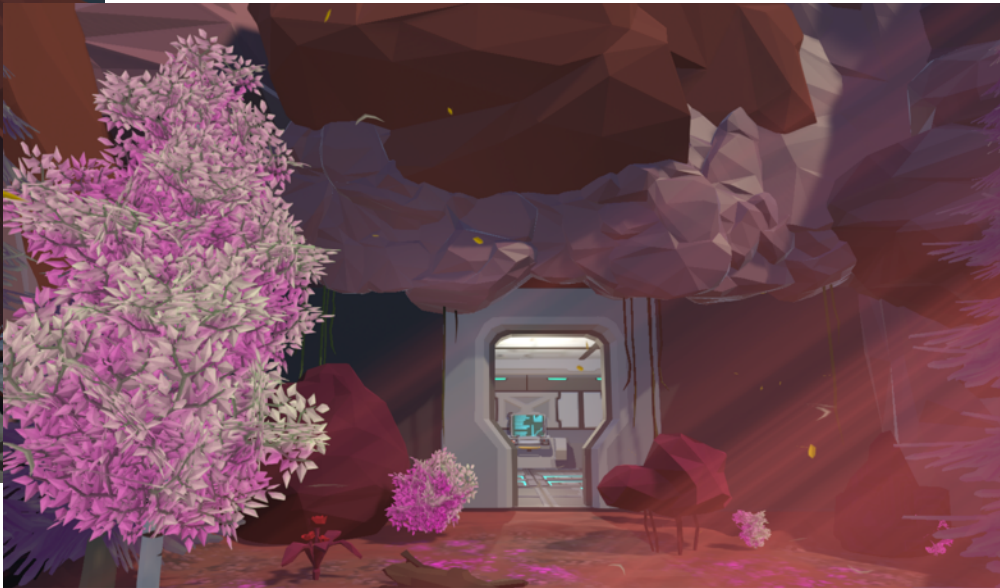
Linguistics

Neuro Science

Mathematics

AI and Math





Example Team: PrimaryAI



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Instructional Technology



Cindy Hmelo-Silver
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Collaborative Learning



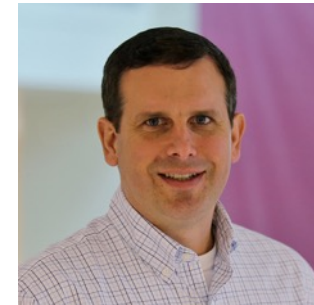
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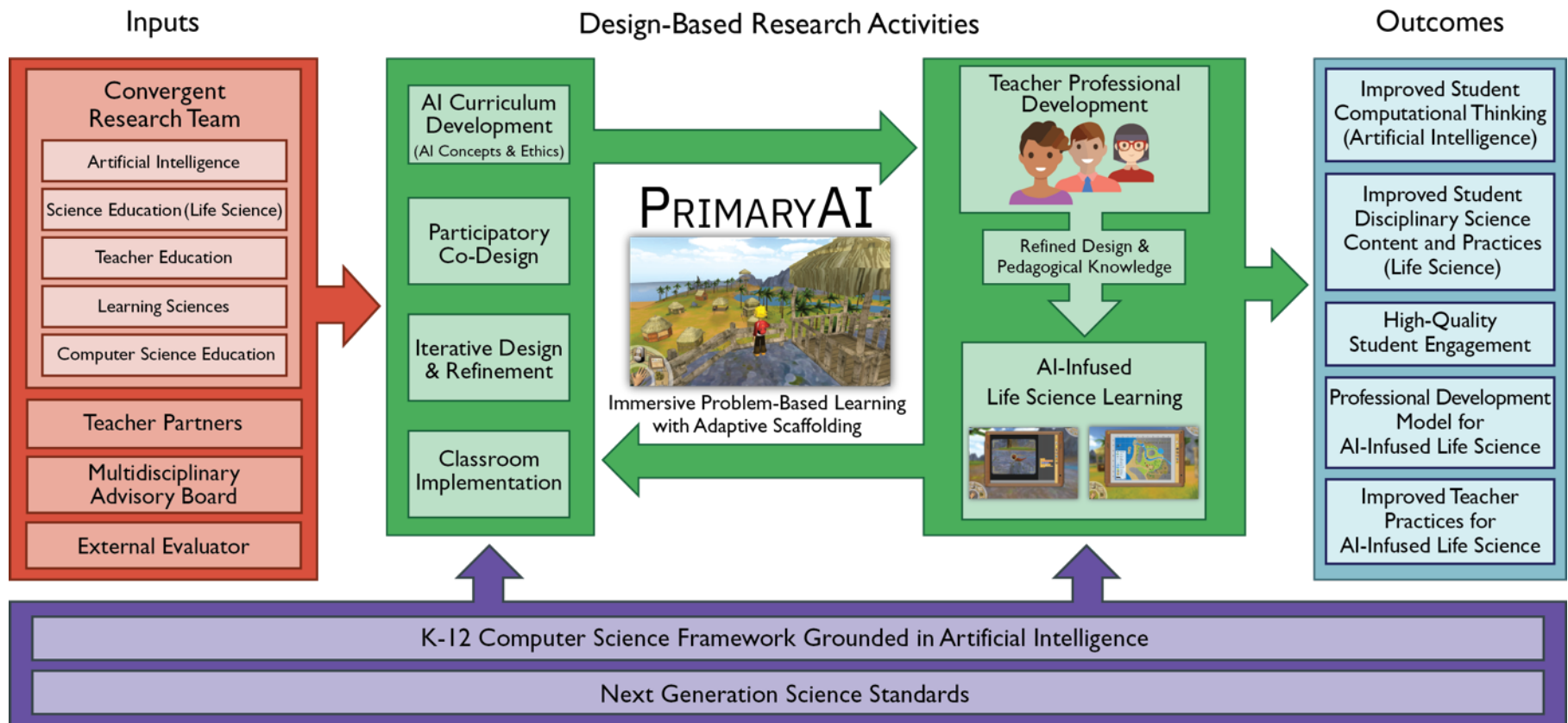


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PrimaryAI: Integrating AI into Upper Elementary Science



Creating an AI-Educated Populace

To succeed we need to develop an understanding of:

- How should K-12 students learn about AI?
- What should K-12 students learn about AI?
- What technologies can support students learning AI?
- How can we help teachers help students learn AI?
- How can we assess students' AI competencies?





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