What does your digital footprint say about you?

(Machine Learning to understand Human Learning)

Giora Alexandron

Department of Science Teaching

מכון ויצמן למדע

WEIZMANN INSTITUTE OF SCIENCE

Machine learning is about providing machines the ability to learn and improve from experience (data) without being explicitly programmed

Online Learning is Booming

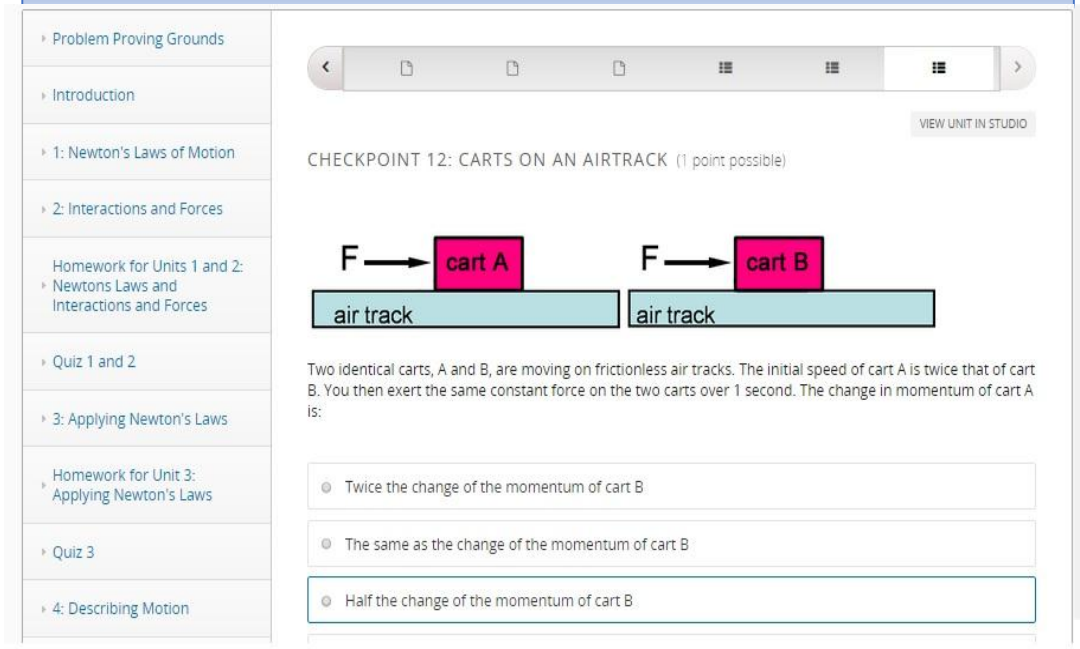
Our Lab: **C**omputational **A**pproaches in **S**cience **E**d (CASEd)

Mission statement: “Understanding and optimizing learning and the environments in which it occurs, using **computation & data**”

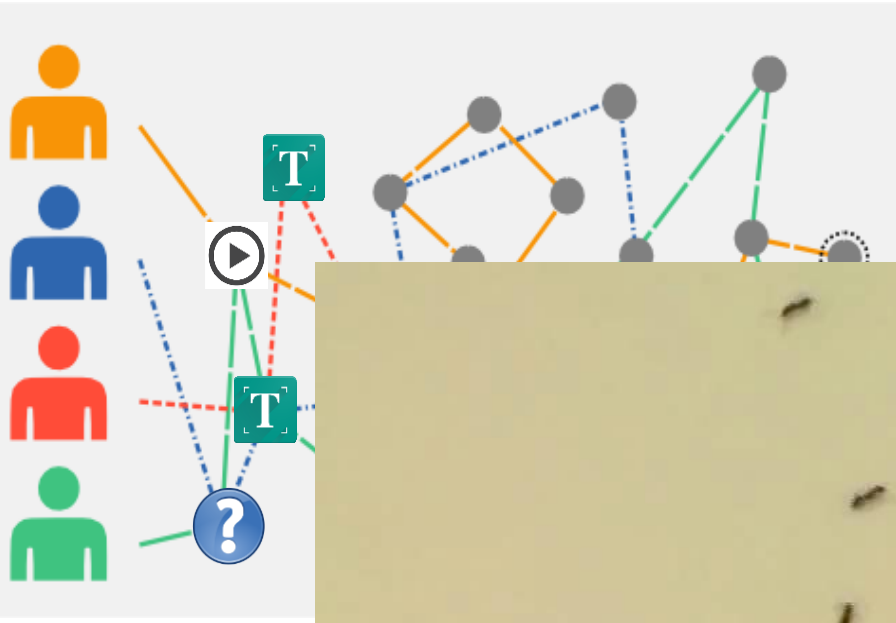
Data-Driven Recommender Systems

edX | MITx
Free online courses from MIT

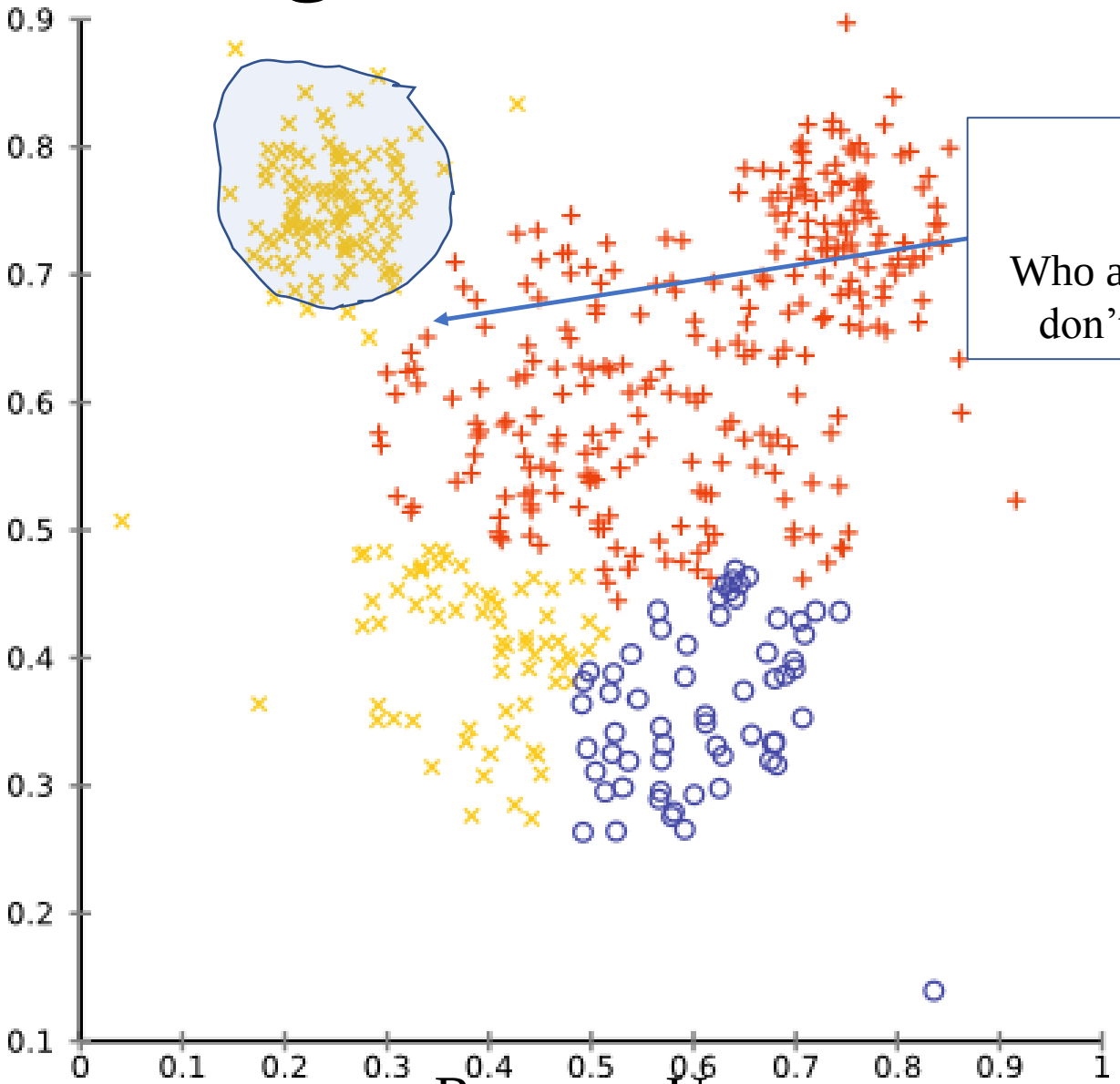
Physics Massive Open Online Course



RELATE
Research in Learning, Assessing and Tutoring Effectively
Education Research Group of Professor David Pritchard
Department of Physics and Research Laboratory of Electronics, MIT



High performing learners and course resources



Success

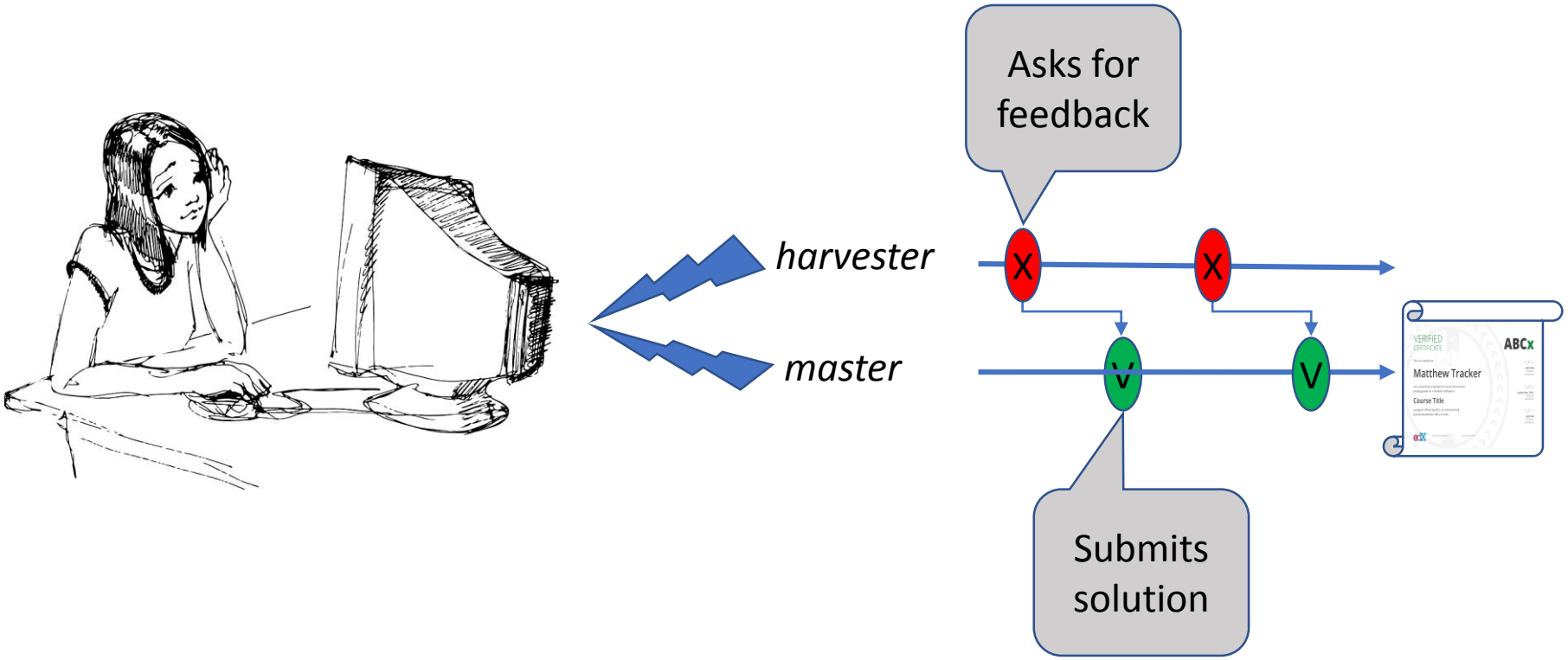
Resource Use
(videos, explanations, simulations)

???

Who are these high performers who don't need the course resources?

* Illustrative figure

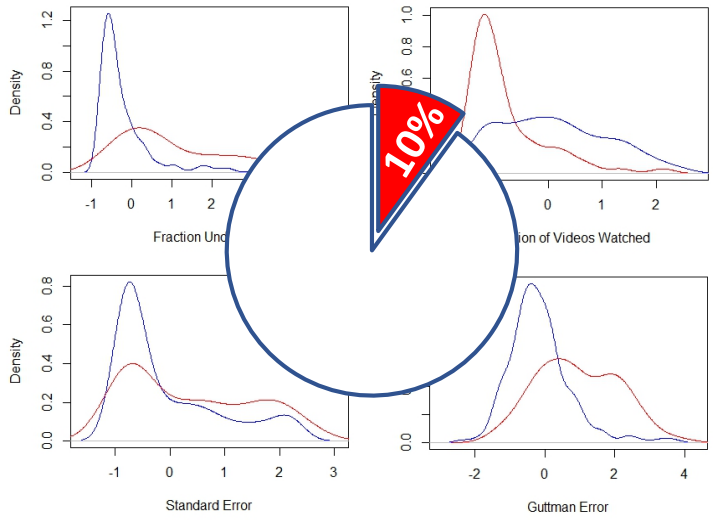
“Copying Using Multiple Accounts”



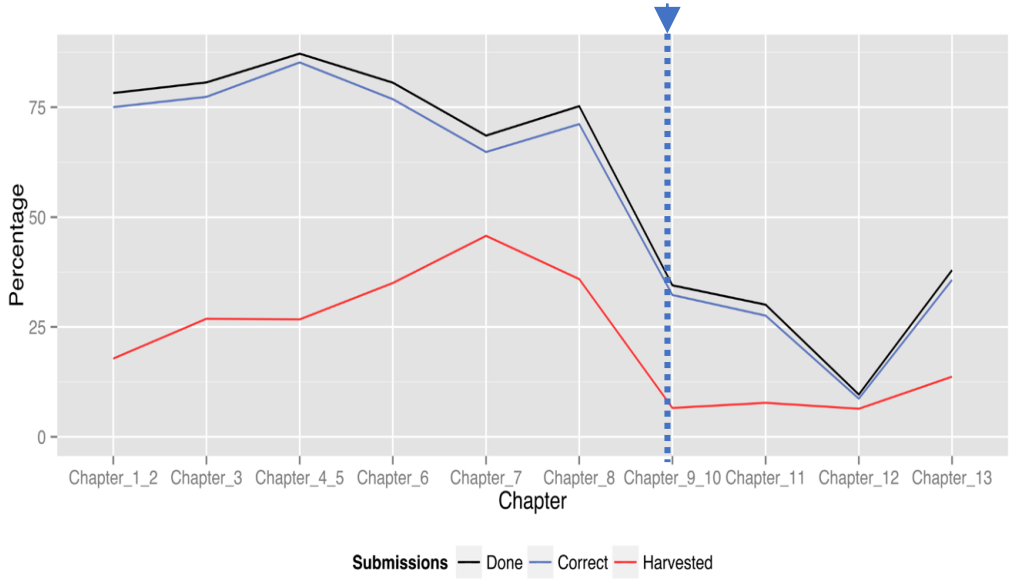
* *LWMOOCs’15, LAS’16 , PALE’16, C&E’17, TLT’18;* With Ruipérez-Valiente, Pritchard, Chen, Lee, & Muñoz-Merino

The role of machine learning

DETECT



UNDERSTAND

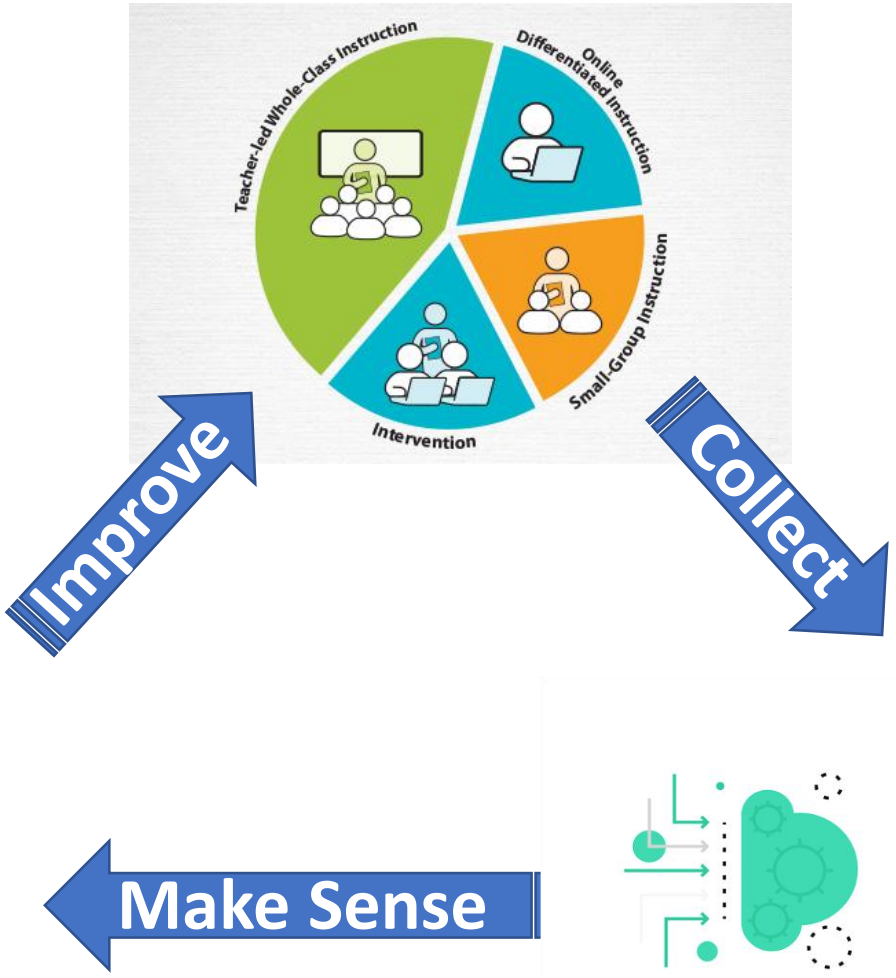


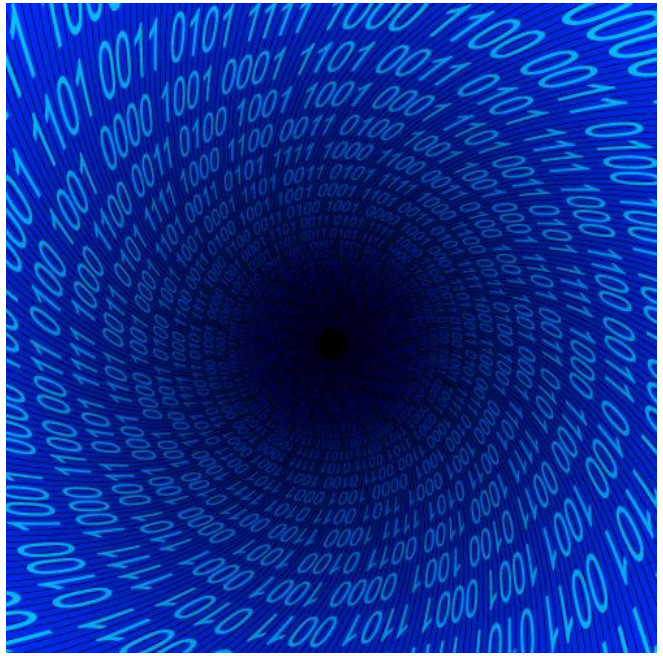
PREVENT

Design affects behavior

Find the one that works best

Optimizing with Data & Machine Learning

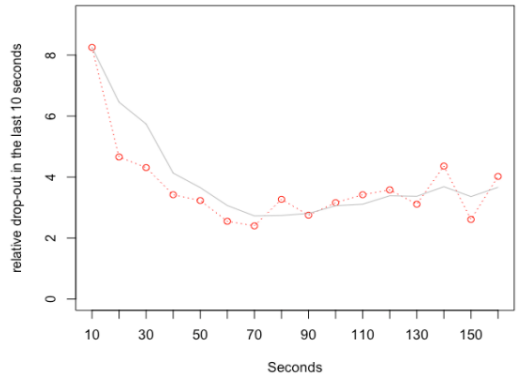


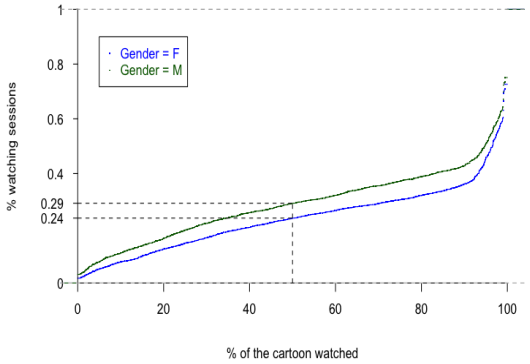


Pedagogic Efficacy of Instructional Cartoons

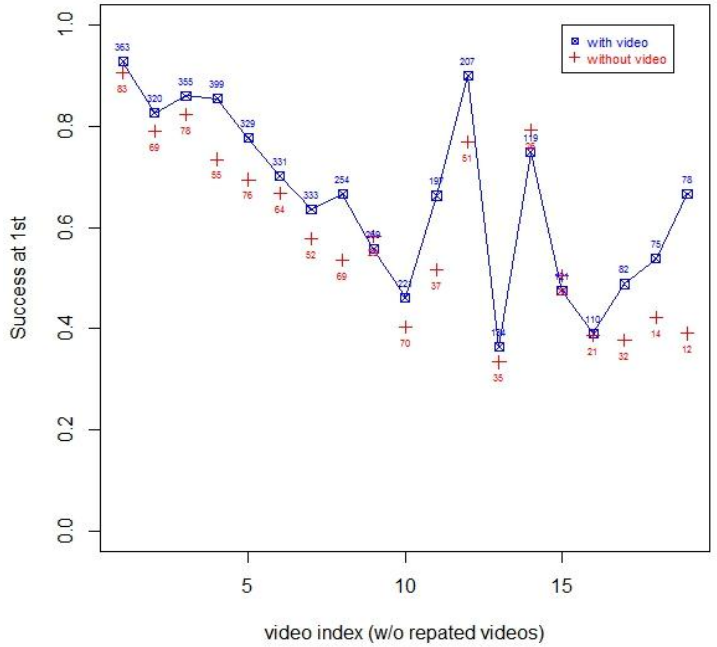
Learning Environment

Engagement



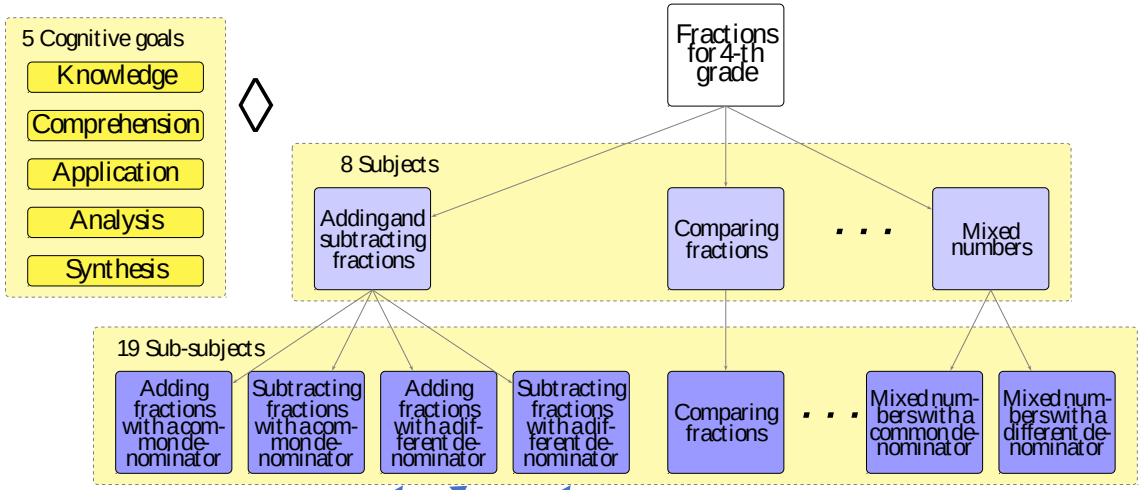


Efficacy

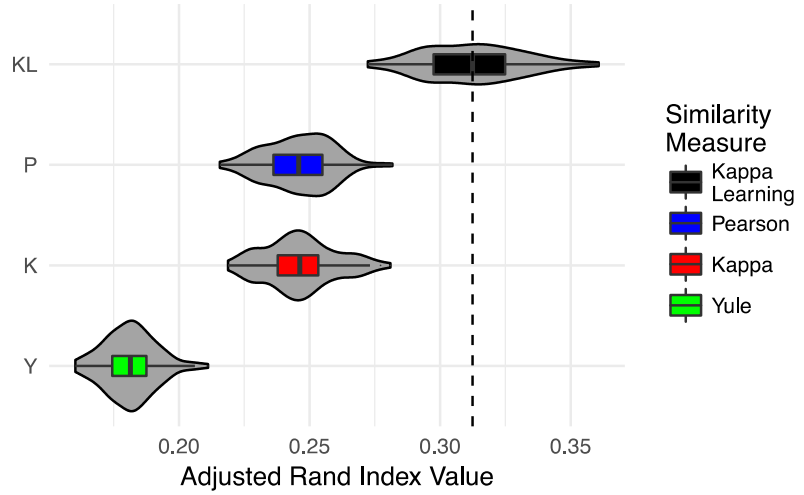


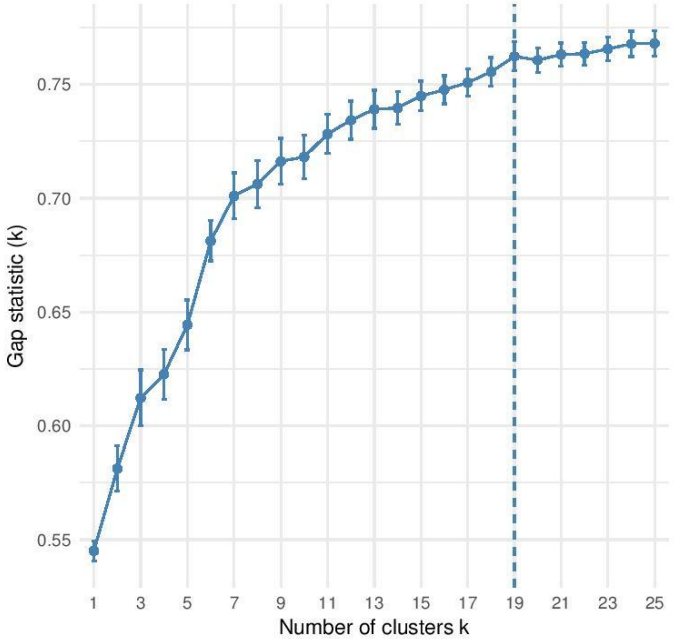
* *EdMedia'18;* With Levy, Keinan, and Hershkovitz

Discovering Knowledge Structures in K-6 Math



	Item 1	Item 2	Item 3	Item 4	Mean
Person 1	1	1	1	1	1
Person 2	0	1	1	1	0.8
Person 3	0	0	1	1	0.6
Person 4	0	0	0	1	0.5
Person 5	0	0	0	0	0.2
Mean	0.8	0.6	0.4	0.2	





* Nazaretsky, Hershkovitz and Alexandron. *arXiv:1812.08390*

AI in Education: The Promise

personalization

Thanks for listening!