Educational machines and how they work

AU Research Webinar Series

Jon Dron, 4th June 2020

How could this be used for learning and teaching?

The stick becomes a technology when we add methods (and maybe other stuff)

The same is true of all technologies.

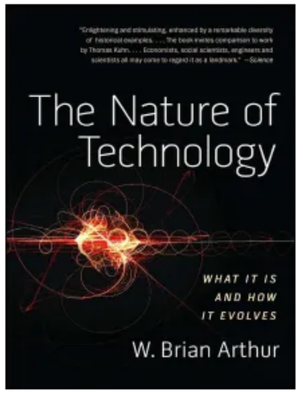
Stupid question: *does the use of screws in classrooms improve learning*?

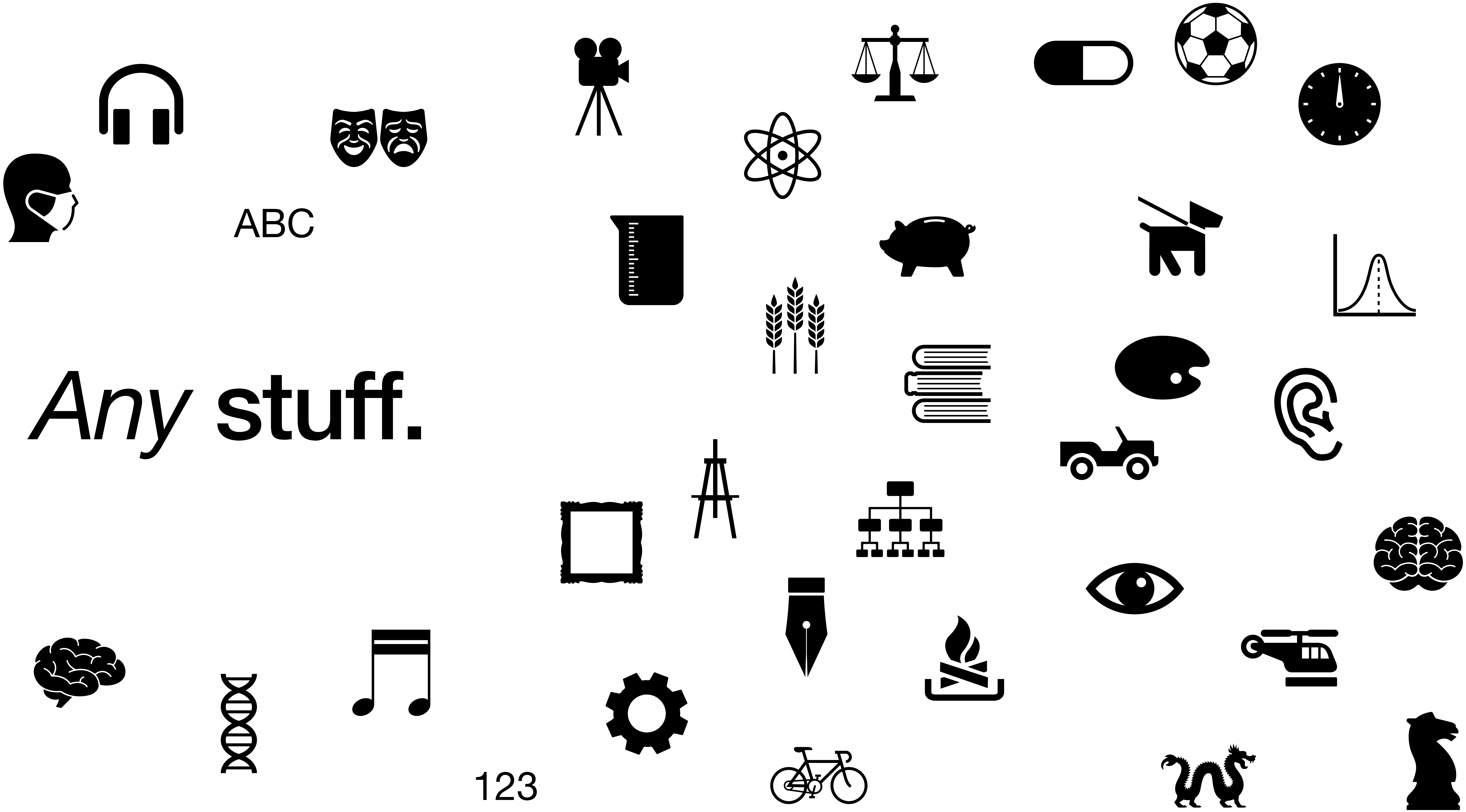
Similarly stupid question: *does the use of computers in classrooms improve learning*?

Equally stupid question: *does the use of <insert preferred teaching method here> in classrooms improve learning*?

Technology:
The ways we organize stuff to do stuff

More formally, **an orchestration of phenomena to our use** (W.Brian Arthur)




ABC
Any **stuff.**
123

A noun and a verb

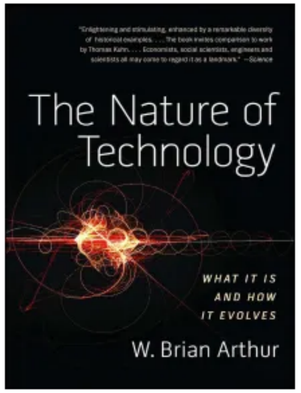
I am using writing to write something written

Painters paint paintings

Production lines produce productions

Teaching methods teach

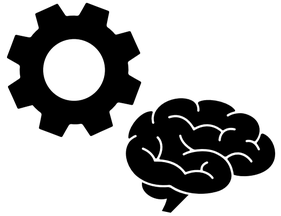
All technologies are assemblies



Almost all technologies are assemblies of *other* technologies

Pedagogies (methods of teaching) are technologies too

(and always parts of other assemblies)



Machines in our minds

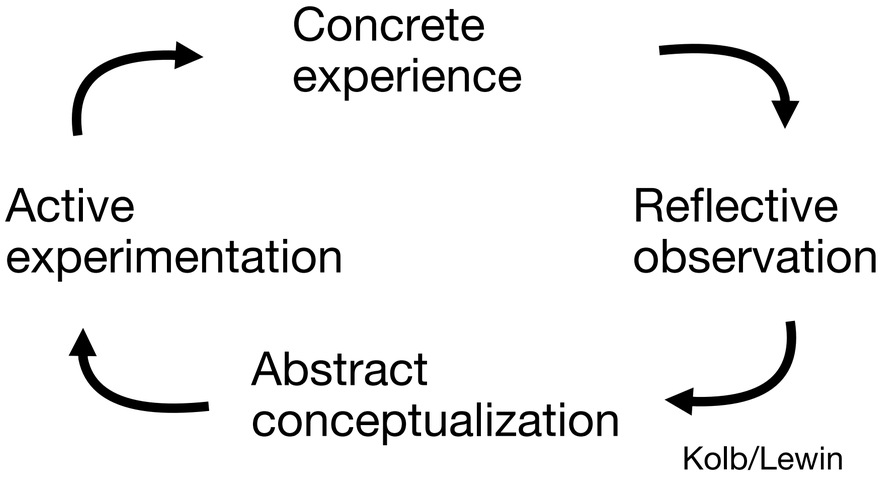
Tell me and I forget, teach me and I may remember,

involve me and I learn.

Franklin

Criticize the work, not the student

The compliment sandwich



Kolb/Lewin

1. Encourage contact between students and faculty
2. Develop reciprocity and cooperation among students
3. Encourage active learning
4. Give prompt feedback
5. Emphasize time on task
6. Communicate high expectations
7. Respect diverse talents and ways of learning

Chickering and Gamson

Don’t punish or reward

Kohn

1. Gaining attention
2. Informing participants of objectives
3. Stimulating recall of prior learning
4. Presenting the content
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback
8. Assessing performance
9. Enhancing retention and transfer

Gagne

Tell ‘em what you are going to tell 'em, tell ‘em, tell ‘em what you told ‘em

Learning technology

/ˈlərniNG/ /tekˈnäləjē/

noun and verb

A technology which includes one or more pedagogies as part of its assembly

We don’t just *use* technologies.

We *participate* in them.

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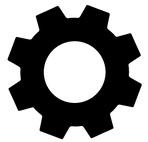
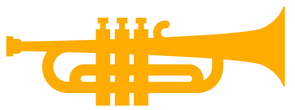
Hard participation

Our participation is predetermined



Soft participation

We are active orchestrators of phenomena



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Softness is an absence.

We can use soft technologies well

Nearly all technologies are assemblies of soft and hard.

Softness and hardness depend upon your point of view.

Image by Jules Feiffer, from The Phantom Tollbooth, by Norton Juster

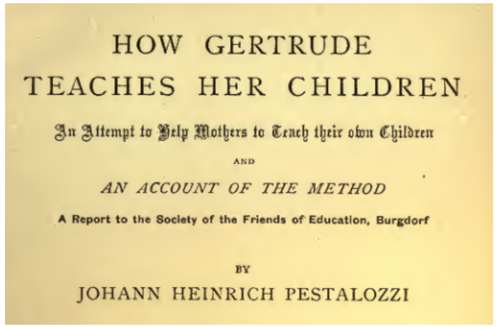
It’s the assembly that matters.

You can add methods/tools to hard technologies to make them softer

Richard Dean Anderson as MacGyver

You can add constraints/rules to soft technologies to make them harder

Harder pedagogies



1894

"I believe it is not possible for common popular instruction to advance a step, so long as formulas of instruction are not found which make the teacher…merely the mechanical tool of a method."

https://openlibrary.org/books/OL7244777M/How_Gertrude_teaches_her_children

2010

Script for Day: 053

TITLE: Reading and enjoying literature/ words with "b"

TEXT: The Bath

LECTURE: Assemble students on the rug or reading area. . . . Give students a warning about the dangers of hot water. . . . Say, "Listen very quietly as I read the story." . . . Say, "Think of other pictures that make the same sound as the sound bath begins with."

Schwartz, B. (2015). *Why We Work*. Simon & Schuster/ TED.

Softer pedagogies

https://flic.kr/p/Er4hEx

https://flic.kr/p/iRBaxm

https://flic.kr/p/824UaJ

All pedagogies are at least a bit soft (to the teacher)

But…

Designated teachers are not the only teachers

We don’t just *participate* in learning technologies.

We *co*-participate.

Not just designated teachers…

Textbook authors

Graphic designers

Institutional regulators

Application developers

Tech support staff

Curriculum designers

Learning designers

Editors

Course/program boards

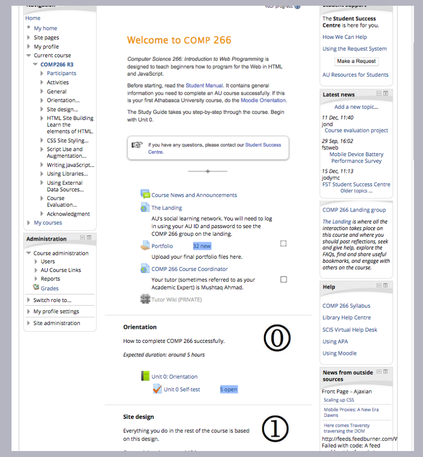
Administrators

Other students

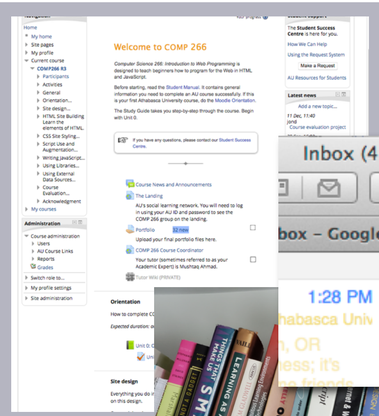
above all,

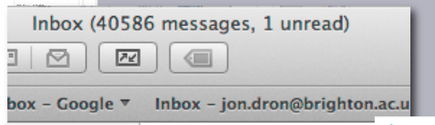
the learners themselves

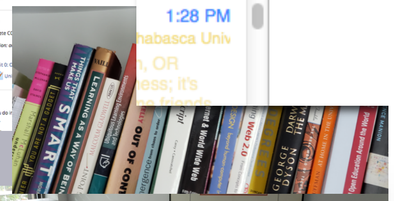
The teaching environment

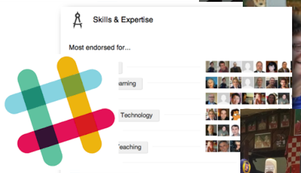


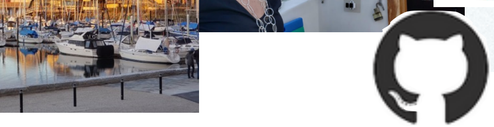
The learning environment











The distributed teacher


Architects


Universities


Legislators


Exam boards

Amazon recommends

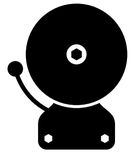

Illustrators

Semesters

Programmers


Teachers

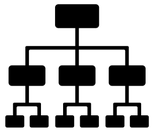

Social media


LMSs

System admins

Website builders


Computers

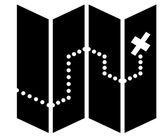



Timetables

Textbook authors

Stack Exchange

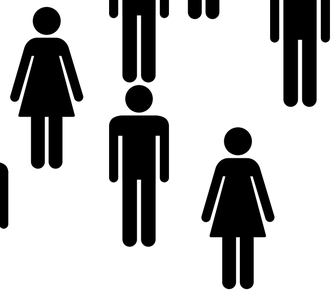
Desks




Lecture theatres

Friends and families

The learner




Committees

Classmates

People on buses

News sources

Cleaners

Google search

Laboratories

Books

Administrators

Learning designers

Wikipedia

Learning is not *entailed* by teaching methods

Learning can at best be *enabled* by teaching methods

Kauffman, S. A. (2019). *A World Beyond Physics: The Emergence and Evolution of Life*. Oxford University Press.

E.g.

https://flic.kr/p/Y6Kbf6

‘Bad’ teaching works better (on average) than ‘good’ teaching

De Bruyckere, P., Kirschner, P. A., & Hulshof, C. D. (2015). *Urban myths about learning and education*. Academic Press.

Hattie, J. (2013). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Taylor & Francis.

E.g.

https://flic.kr/p/7GFSFA

No teacher at all - not (necessarily) a problem

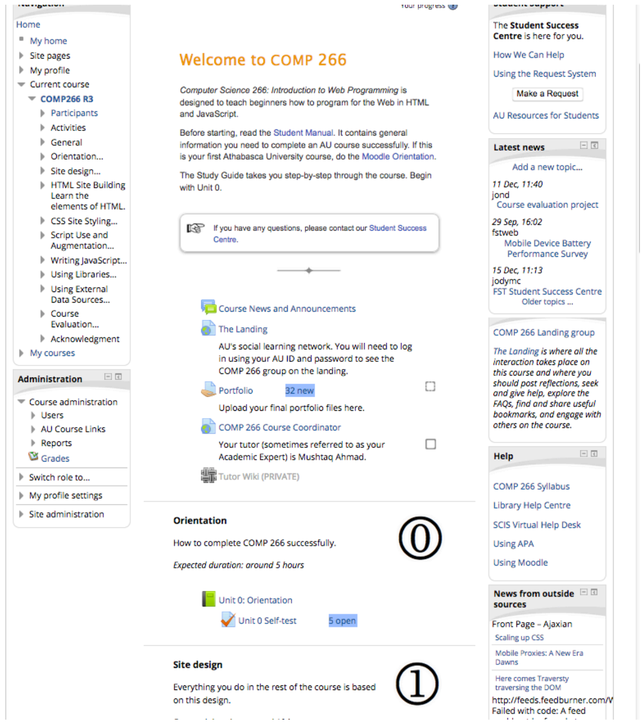
E.g.

$\sum\sigma$

The two sigma problem

Bloom, B. S. (1984). The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring. *Educational Researcher*, *13*(6), 4-16. Retrieved from http://www.jstor.org/stable/1175554

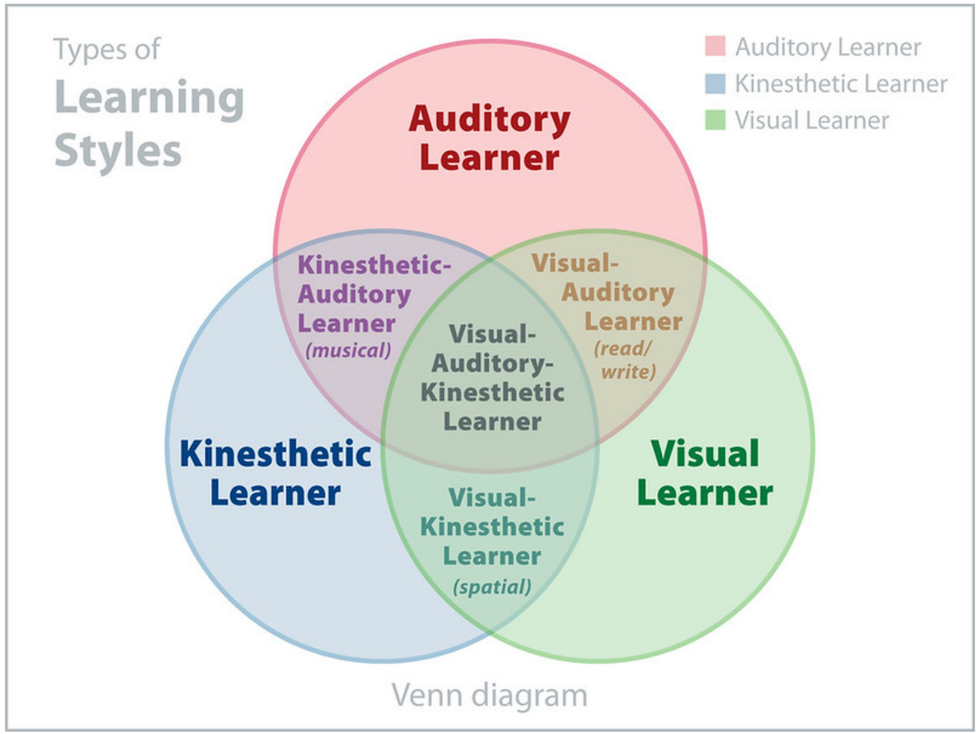
E.g.



No significant difference (on average)

E.g.

Being-taught habits (AKA learning styles)



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Reductive educational research

“Everything works” (Hattie, 2013)

Equally true:

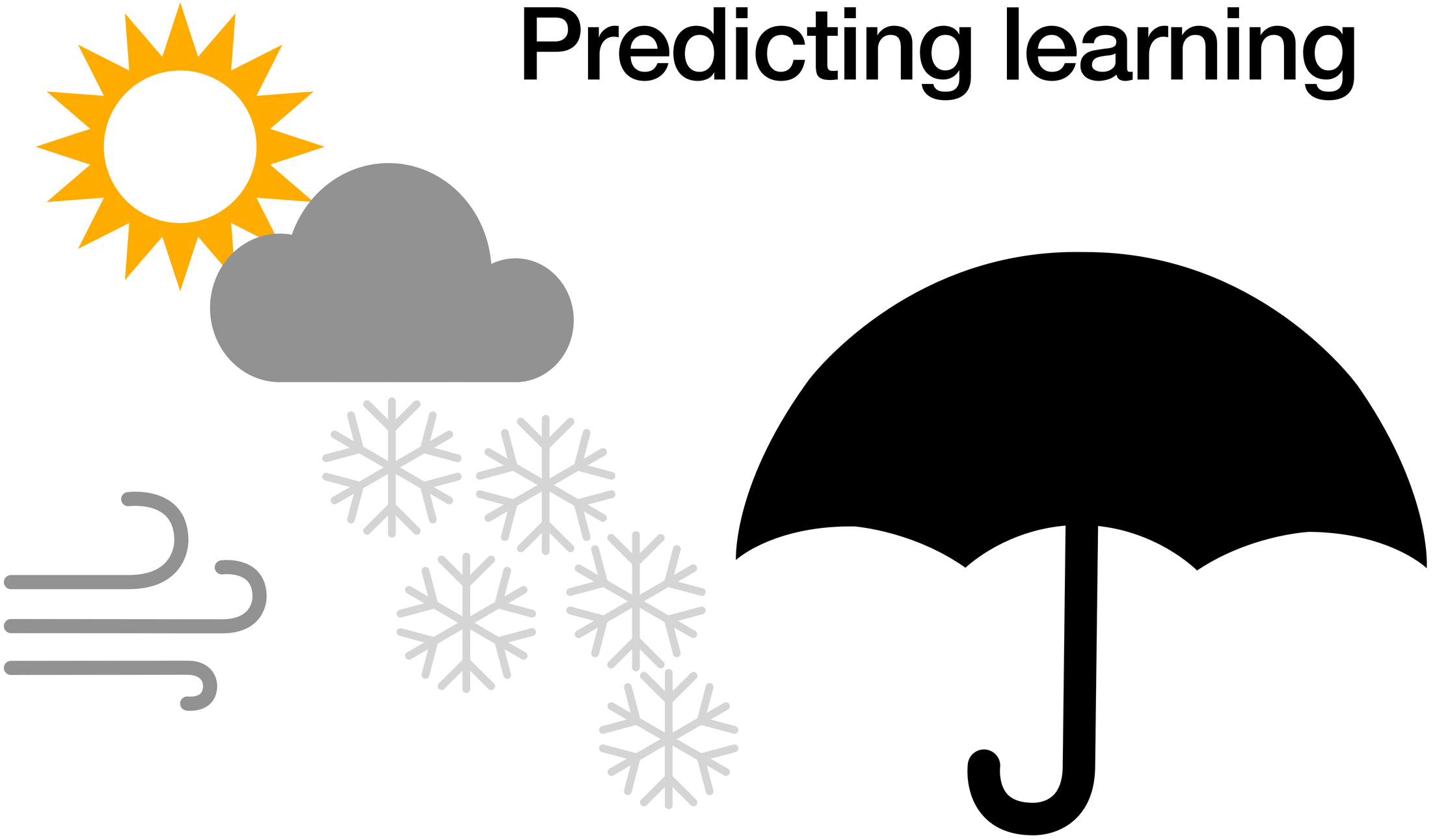
“Nothing works” (Dron, today)

Education is technology

Technology *is not* applied science

Reductive educational research shows that this hard machine worked as intended in this hard assembly

Predicting learning



Towards smarter research agendas

How to *be* a teacher

How to teach (generative, not summative)

Generative research methods

e.g.

Appreciative inquiry

Outcome harvesting

Design-based/action/participative research

https://appreciativeinquiry.champlain.edu/

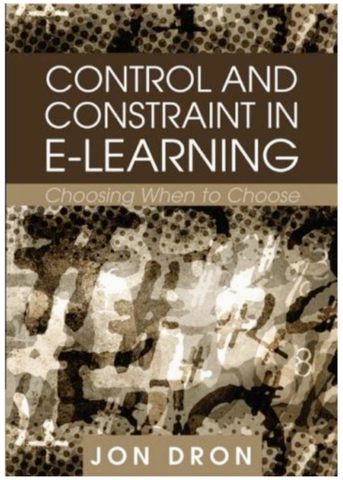
https://www.annmurraybrown.com/post/2019/01/21/outcomes-harvesting-a-different-type-of-evaluation-method

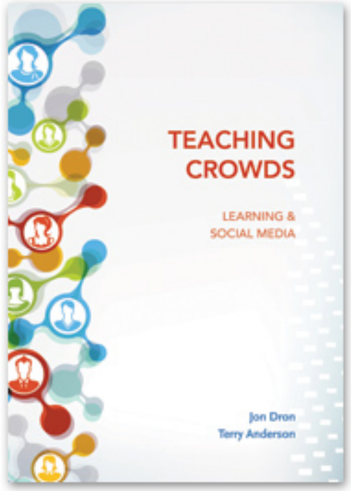
Being a teacher

Passion (for the subject, for teaching)

Compassion for learners

Reflection and observation





Thank you

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Stay healthy!