

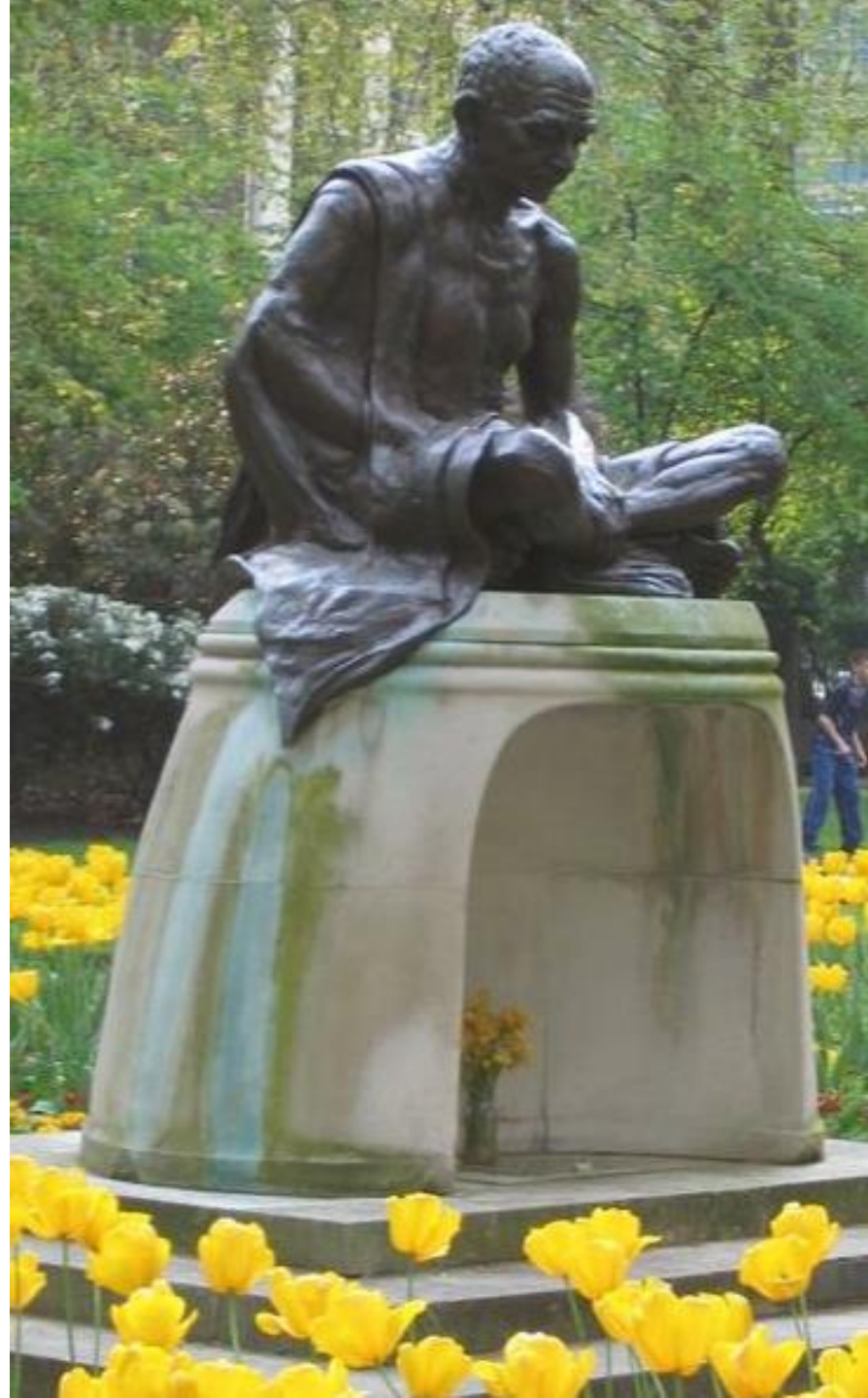
The Internet of Education: What role for Education Research?

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University of London

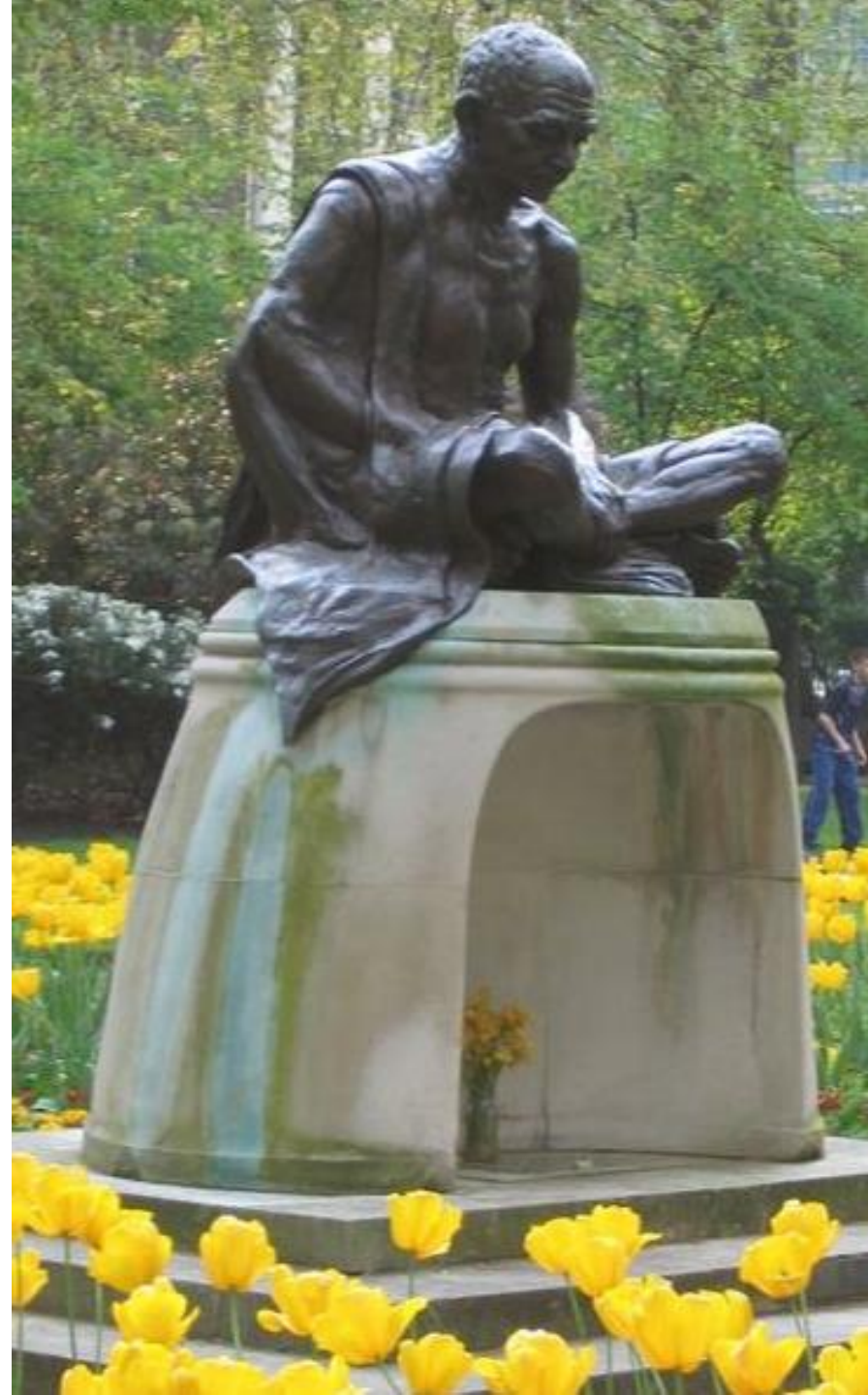


What do you think of western civilisation?



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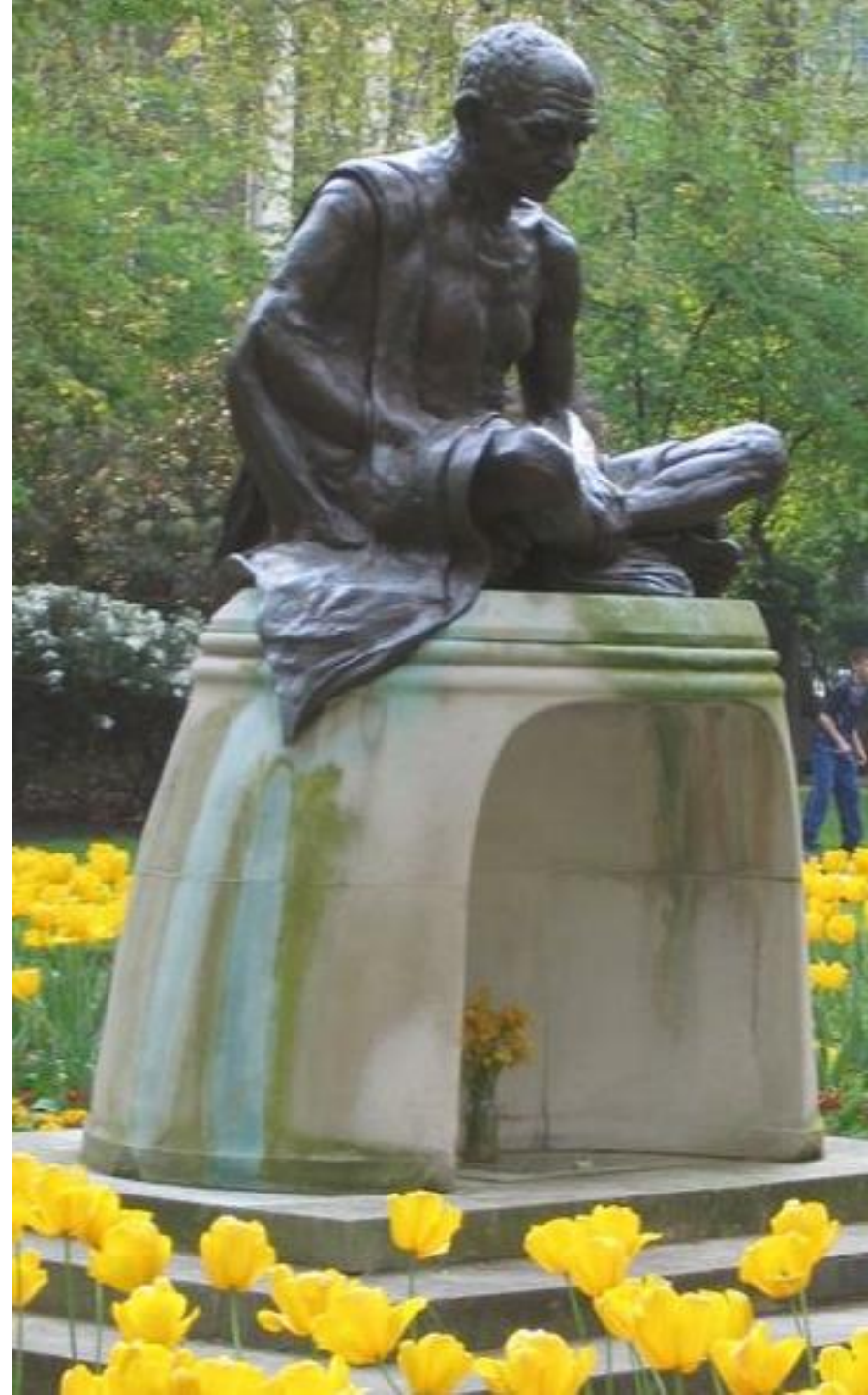
I think it would be a good idea!



What do you think of western civilisation?

I think it would be a good idea!

What do you think of technology in education?







Seymour Papert's contribution



October 1971

Artificial Intelligence
Memo No. 247

LOGO
Memo No. 2

TEACHING CHILDREN THINKING^{1,2}

Seymour Papert*

This report describes research done at the Artificial Intelligence Laboratory of the Massachusetts Institute of Technology. Support for the laboratory's education research is provided in part by the National Science Foundation under grant GJ-1049.

*This paper is deeply influenced by Cynthia Solomon and Marvin Minsky.

¹Presented at the Proceedings of IFIPS World Congress on Computers and Education, Amsterdam, The Netherlands, 1970.

²To be published in Mathematics Teaching (The Association of Teachers of Mathematics, Leicester, England: 1972).

The purpose of this essay is to present a grander vision of an educational system in which technology is used not in the form of machines for processing children but as something the child himself will learn to manipulate, to extend, to apply to projects, thereby gaining a greater and more articulate mastery of the world, a sense of the power of applied knowledge and a self-confidently realistic image of himself as an intellectual agent.

Programming

Lisp

Logo

Imagine

NetLogo

Scratch...

- constructionism



- people learn best by making things and sharing them

- people learn best by making things and sharing them
- people learn well if they care about what they're learning

- people learn best by making things and sharing them
- people learn well if they care about what they're learning
- let's not only make new ways to learn, let's make new things for learning

- people learn best by making things and sharing them

- [Kahn] takes a dim view of the constructionist idea that students won't really understand math unless they discover each principle on their own. "Isaac Newton would not have invented calculus had he not had textbooks on algebra."

- [Kahn] takes a dim view of the constructionist idea that students won't really understand math unless they discover each principle on their own. "Isaac Newton would not have invented calculus had he not had textbooks on algebra."
- Bill Gates is even more scathing: "It's bullshit," he says. "If you can't do multiplication, then tell me, what is your contribution to society going to be?"

technology

technology

- as an informational medium

technology

- as an informational medium
- as a constructional medium

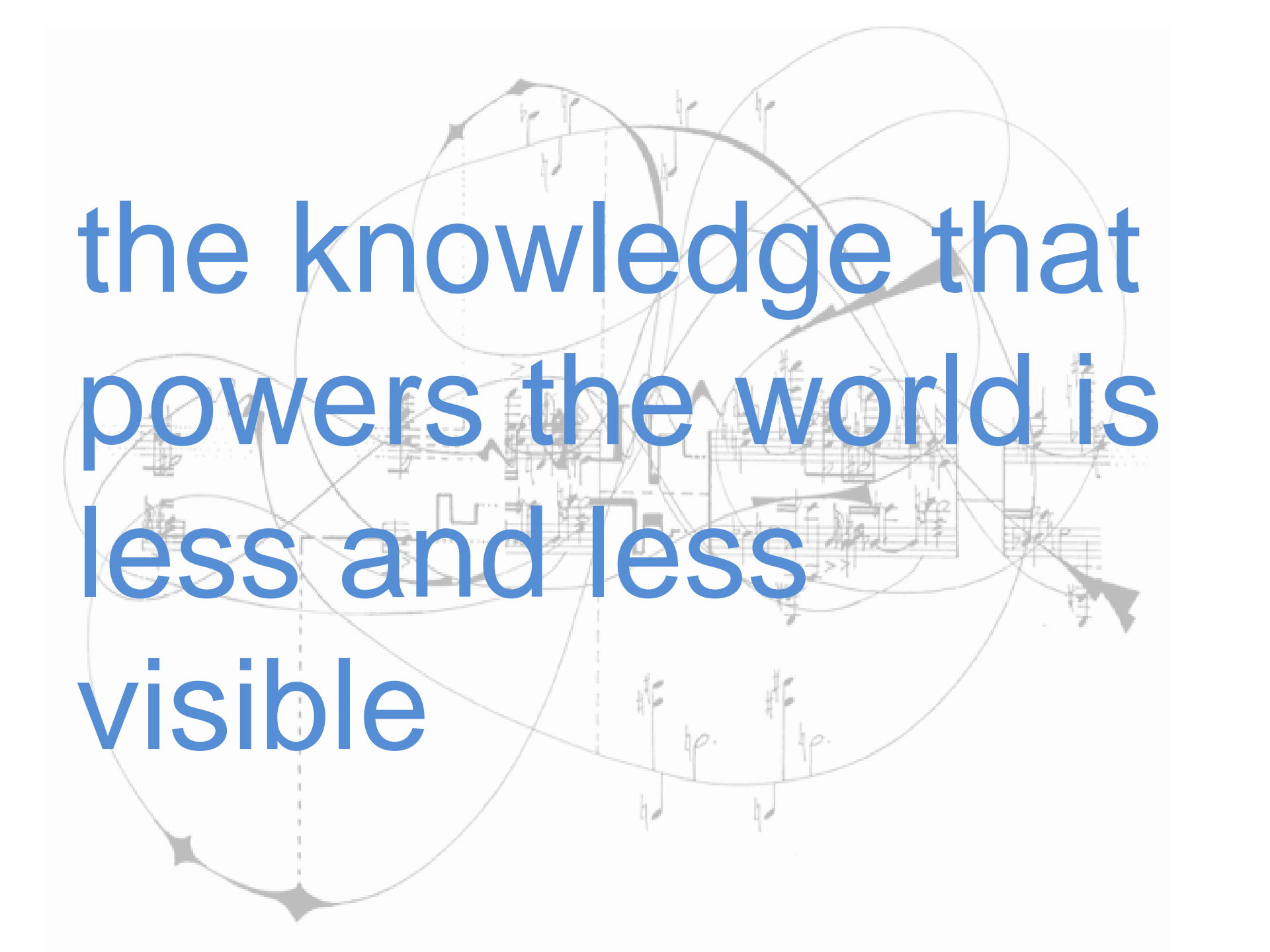
technology

- as an informational medium
- as a constructional medium

- ICT (ugh)

- people learn well if they care about what they're learning



The background features a complex, light-colored graphic. It consists of several overlapping circles and arcs, some of which are dashed. Interspersed within these shapes are various musical notations, including treble clefs, notes, stems, and dynamic markings like 'p.' and '>'. The overall aesthetic is that of a technical or scientific diagram combined with musical elements.

the knowledge that
powers the world is
less and less
visible

systems are read-only



- let's not only make new ways to learn, let's make new things for learning

CXXXVII × IV

CXXXVII x IV

build new representations for existing knowledge

education must **NOT** be read-only



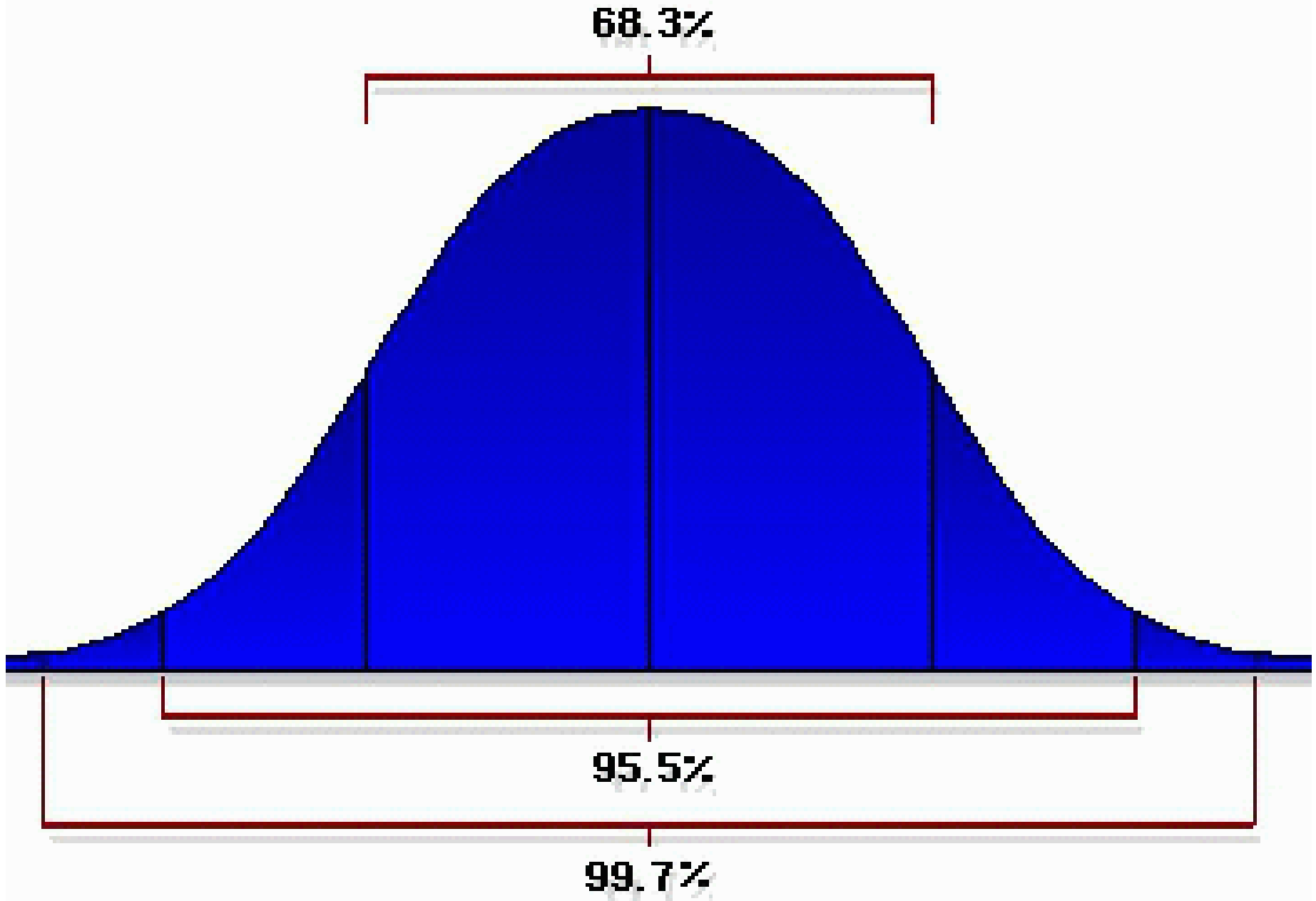
A photograph of a bridge at night, illuminated by warm string lights. The bridge's structure is visible, including a central support pillar. The sky is a deep blue. In the bottom right corner, a small portion of a truck is visible. A blue square containing the Goldman Sachs logo is positioned in the upper left quadrant of the image.

Goldman
Sachs



Goldman
Sachs

“We were seeing things that were 25-standard deviation moves, **several days in a row**” said GS’s chief financial officer, 2007.



A photograph of a night scene featuring a large, illuminated structure, possibly a tent or canopy, with a blue and white striped pattern. The structure is lit from above by a series of warm white string lights. The sky is a deep blue. In the lower right corner, a small portion of a red vehicle is visible. A blue rectangular box is overlaid on the left side of the image, containing the Goldman Sachs logo in white text.

Goldman
Sachs

A photograph of a night scene featuring a building facade with a blue square containing the Goldman Sachs logo. The background is filled with strings of warm white lights against a dark blue sky. The building's structure is partially visible, showing vertical columns and horizontal lines.

Goldman
Sachs

The expected waiting time for this event, 25 s.d., is $6 \cdot 10^{124}$ **life of the universe**

A photograph of a building facade at night, featuring a blue square with the Goldman Sachs logo. The building is illuminated by warm lights, and the sky is dark blue. The logo is white and consists of the words "Goldman" and "Sachs" stacked vertically.

Goldman
Sachs

The expected waiting time for this event, 25 s.d., is $6 \cdot 10^{124}$ **life of the universe**

3 days in a row!

'new trends'

- MOOCs ++, higher education policies, computer human interaction, machine learning, user analytics, automatic assessment, visualization





View In iTunes

\$4.99

Category: Education

Updated: Jan 31, 2011

Current Version: 1.5

1.5

Size: 3.9 MB

Languages: English, Dutch, French, German, Japanese, Portuguese

Seller: Paul Schmitt

Copyright ©2010-11

palasoftware Inc. All rights reserved.

Rated 4+

Requirements: Compatible with iPad. Requires iOS 3.2 or later

Customer Ratings

Current Version:

★★★★ 16 Ratings

All Versions:

★★★★ 195 Ratings

More iPad Apps by palaware



SoccerMate (score and track

Description

This is the best integer practice app or program I have found in 34 years of teaching math. – Tim Seiber, Math Teacher

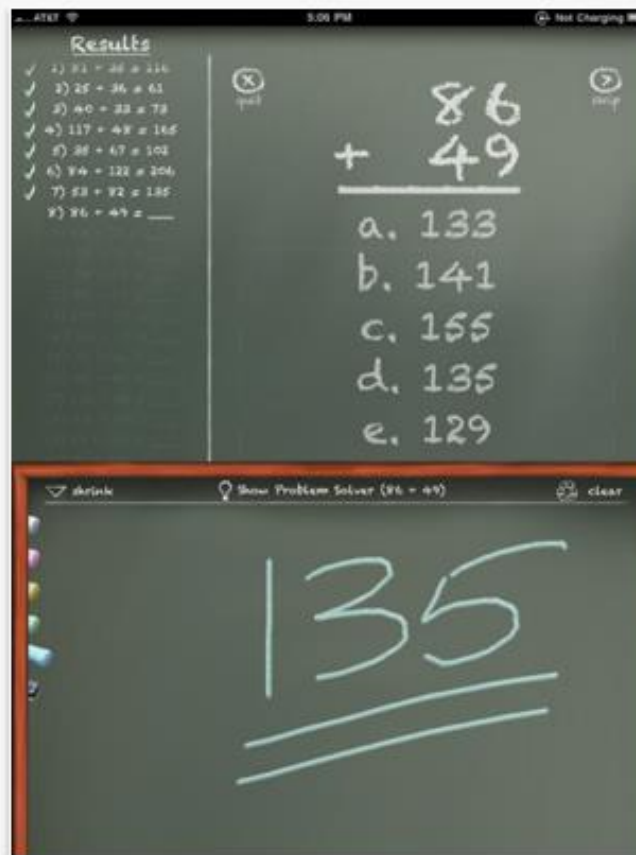
[palaware Web Site](#) ▶ [MathBoard Support](#) ▶

[...More](#)

What's New in Version 1.5

- Added landscape support.
- Added support for left handed students.

iPad Screenshots



tel.ac.uk

TECHNOLOGY ENHANCED LEARNING RESEARCH PROGRAMME (2007-13)



1 Connect

Exploit the power of personal devices to enhance learning.

2 Share

Catch the wave of social networking to share ideas and learn together.

7 Engage

Go beyond the keyboard and mouse to learn through movement and gesture.

10 Know

Employ tools to help learners make sense of the information overload.

8 Streamline

Enhance teachers' productivity with new tools for designing teaching and learning.



Learning Designer puts teachers in the driving seat. It's a power tool for them just like computer-aided design is for architects. We want teachers to be able to play with lesson planning, to be creative. And we want to capture their pedagogy, to give them the chance to share their good ideas.

Professor Diana Laurillard, director of Learning Designer project.



Technology Enhanced Learning Research Programme, UK

9 Include

Empower the digitally and socially excluded to learn with technology.

//

Echoes has a massive impact on children with autism. It enables them to communicate and succeed without any barriers or feeling constrained by everyday teaching. They are free to explore, learn and develop by themselves, which is absolutely fascinating to see.

Ian Lowe, Headteacher, Topcliffe Primary School



Technology Enhanced Learning Research Programme, UK

11 Compute

Understand how computers think, to help learners shape the world around them.

some ideas are
unlearnable,
because of the way
they are represented





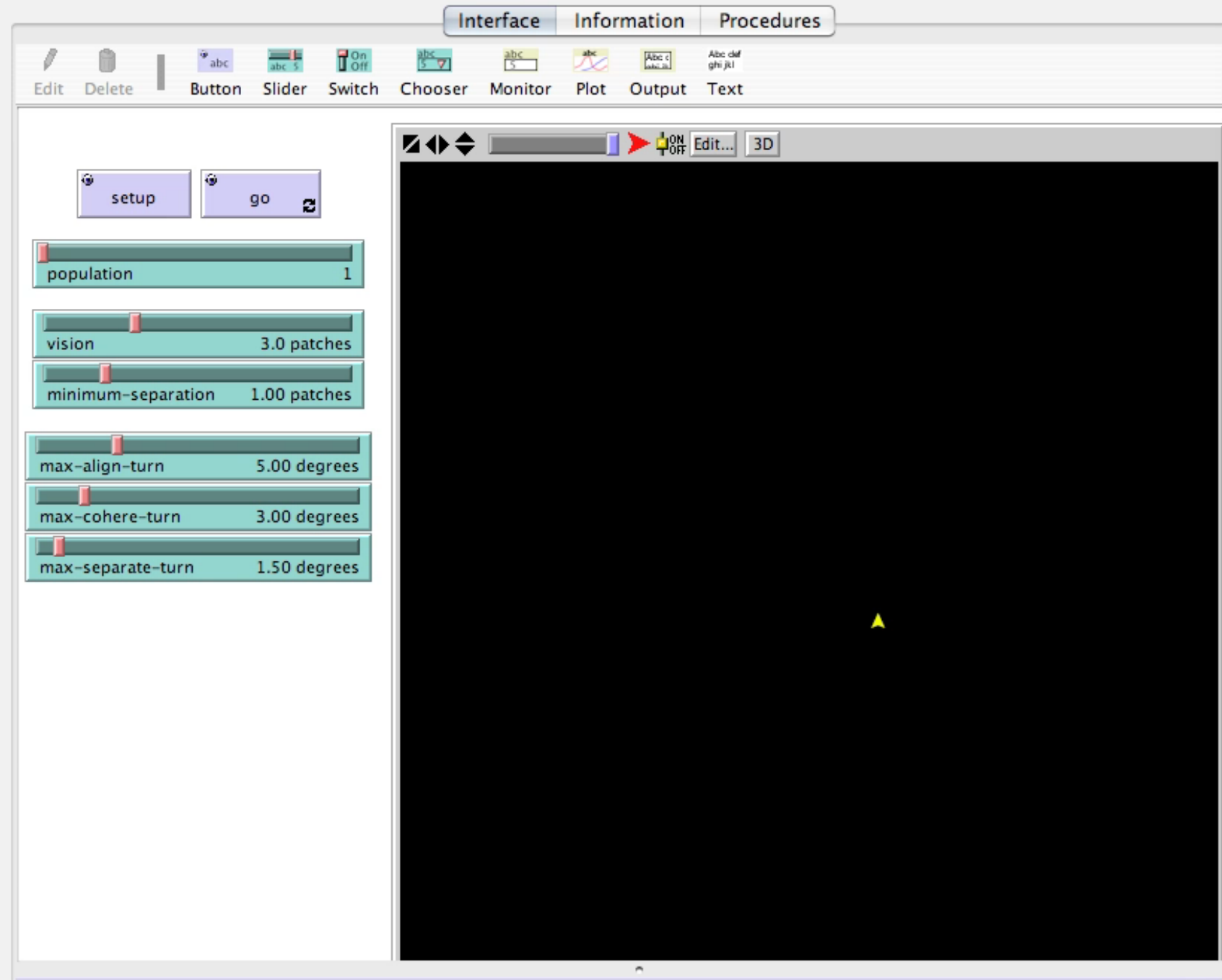
Let us consider a Taylor expansion of $\psi(\mathbf{v}^*)$ around \mathbf{v}' . Thanks to (23), we get

$$\begin{aligned} \psi(\mathbf{v}^*) &= \psi(\mathbf{v}') + \gamma a(|\mathbf{x} - \mathbf{y}|) \nabla \psi(\mathbf{v}') \cdot (\mathbf{q} \cdot \mathbf{n}) \mathbf{n} + \\ &\frac{1}{2} \gamma^2 a(|\mathbf{x} - \mathbf{y}|)^2 \sum_{i,j} \frac{\partial^2 \psi(\mathbf{v}')}{\partial v'_i \partial v'_j} (\mathbf{q} \cdot \mathbf{n})^2 \mathbf{n}_i \mathbf{n}_j + \dots \end{aligned} \quad (24)$$

If the interactions are nearly elastic, so that $\gamma \ll 1$, we can truncate the expansion (24) after the first-order term. Inserting (24) into (21) gives

$$\begin{aligned} \langle \psi, \bar{Q}_P(f, f) \rangle &\approx \frac{1}{\epsilon} \int_{\mathbb{R}^3} \int_{\mathbb{R}^3} \int_{\mathbb{R}^3} B(|\mathbf{x} - \mathbf{y}|) (\psi(\mathbf{v}') - \psi(\mathbf{v})) \\ &+ \gamma \nabla \psi(\mathbf{v}') \cdot a(|\mathbf{x} - \mathbf{y}|) (\mathbf{q} \cdot \mathbf{n}) \mathbf{n} f(\mathbf{x}, \mathbf{v}) f(\mathbf{y}, \mathbf{w}) d\mathbf{v} d\mathbf{w} d\mathbf{y} \\ &= \langle \psi, \mathcal{Q}_P(f, f) \rangle + \gamma \langle \psi, \mathcal{I}(f, f) \rangle. \end{aligned} \quad (25)$$

It is a simple matter to recognize that in (25) $\mathcal{Q}_P(f, f)$ is a Povzner collision operator of the type (5), since the post-interaction velocity v' in (25) is obtained from the pre-interaction velocities (v, w) through the elastic interaction (21).



2 CHALLENGES

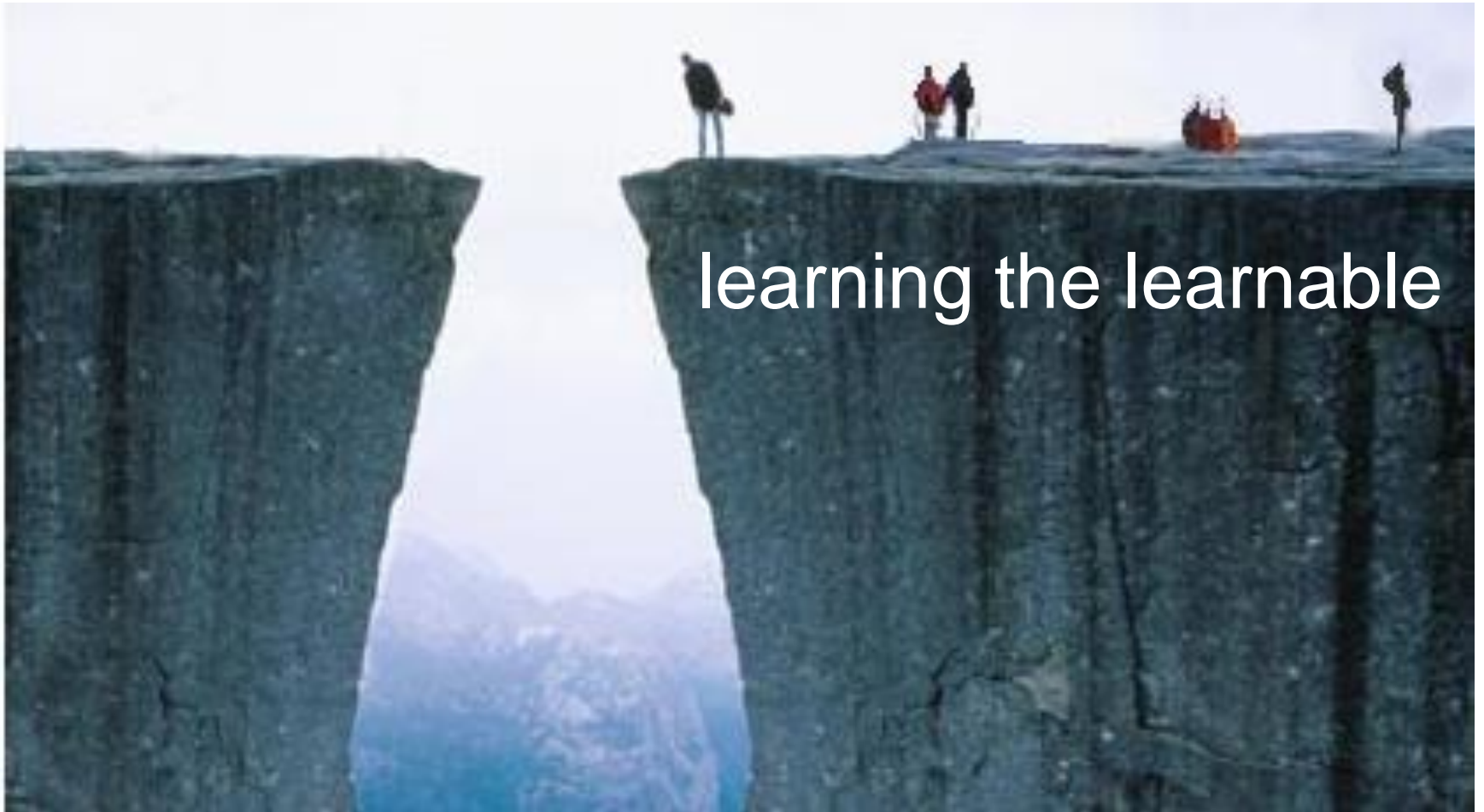
1. building learning technologies

2 CHALLENGES

1. building learning technologies

2. building learnable curricula





learning the learnable