

ERICH W. VOGT:

# The Last Lecturer?

*An attempt to broker peace between  
Lectures & Learning*

by

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# ***OUTLINE***

- What Erich Said & Did
- What **P**hysics **E**ducation **R**esearch Shows
- How to Please [almost] Everyone

# Teaching with Erich

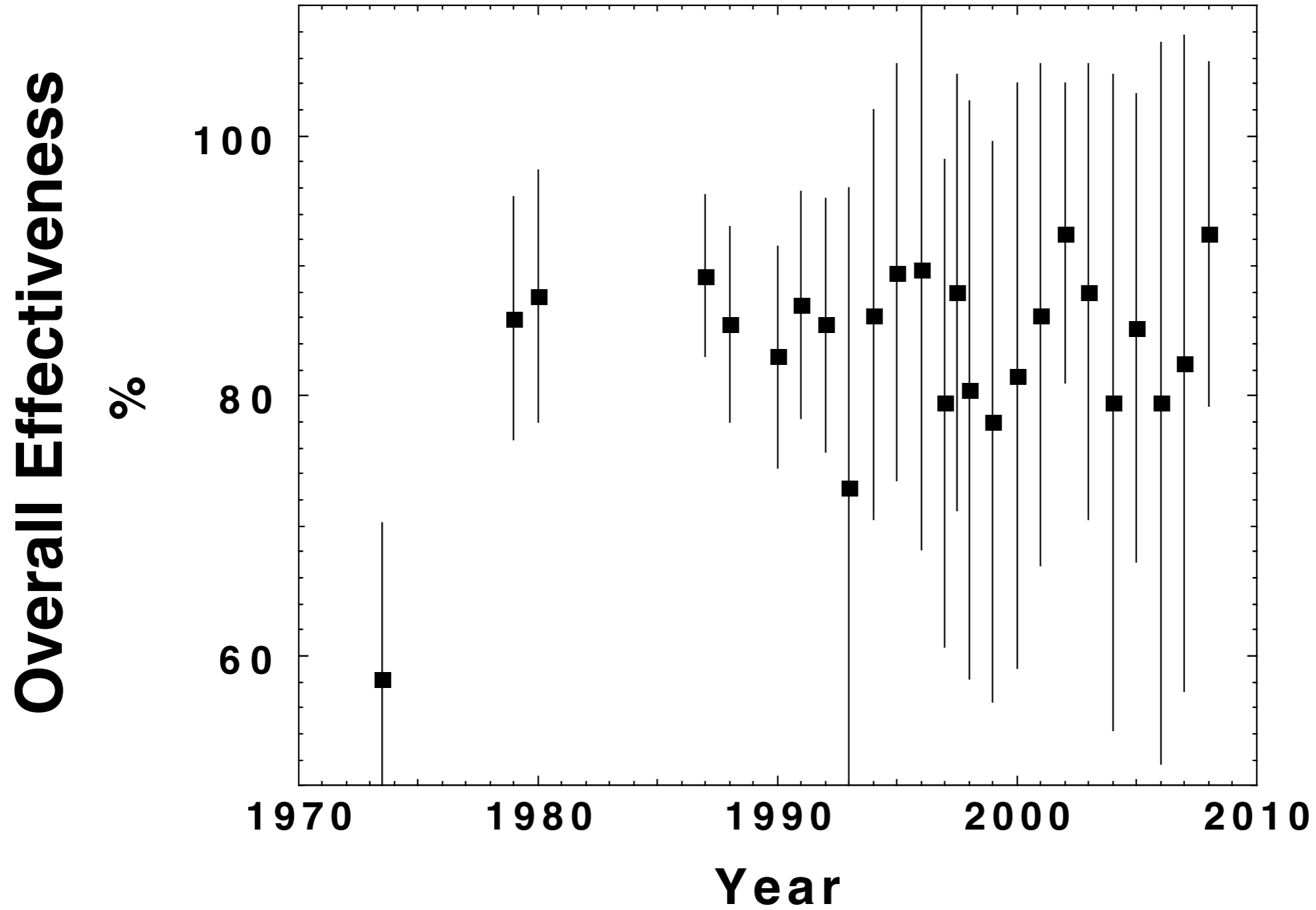
Erich & I co-taught 1st Year Honours Physics at UBC in the 1990s; then I “subbed” for him occasionally until he stopped teaching at age 80.

I need not speak for Erich about teaching, inasmuch as you can hear his own words from the interview on the UBC Library “Legacy” site.

Nevertheless I think there are more things he would want to say....

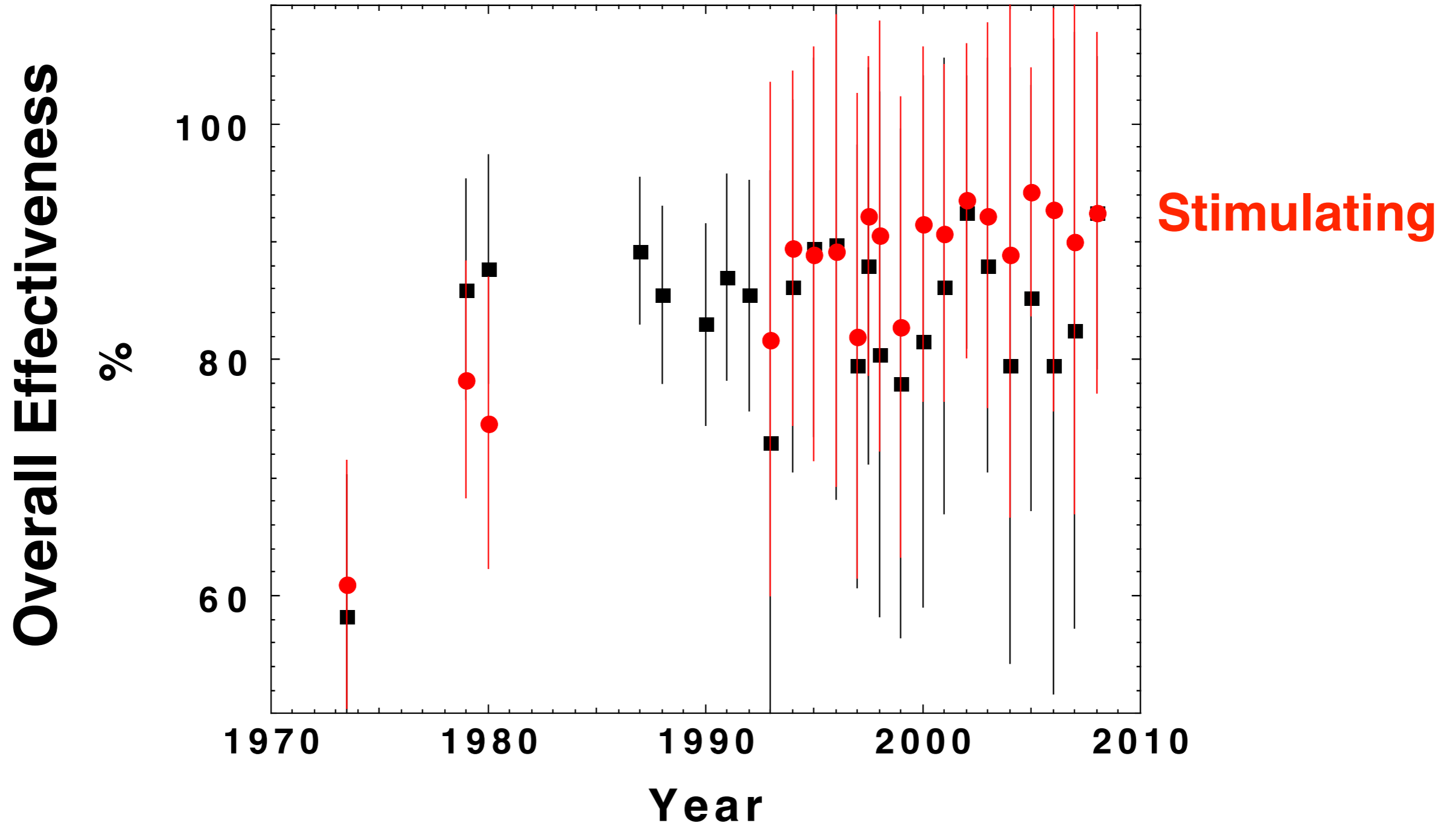
# *The Obvious:*

## Erich Vogt's Teaching Evaluations



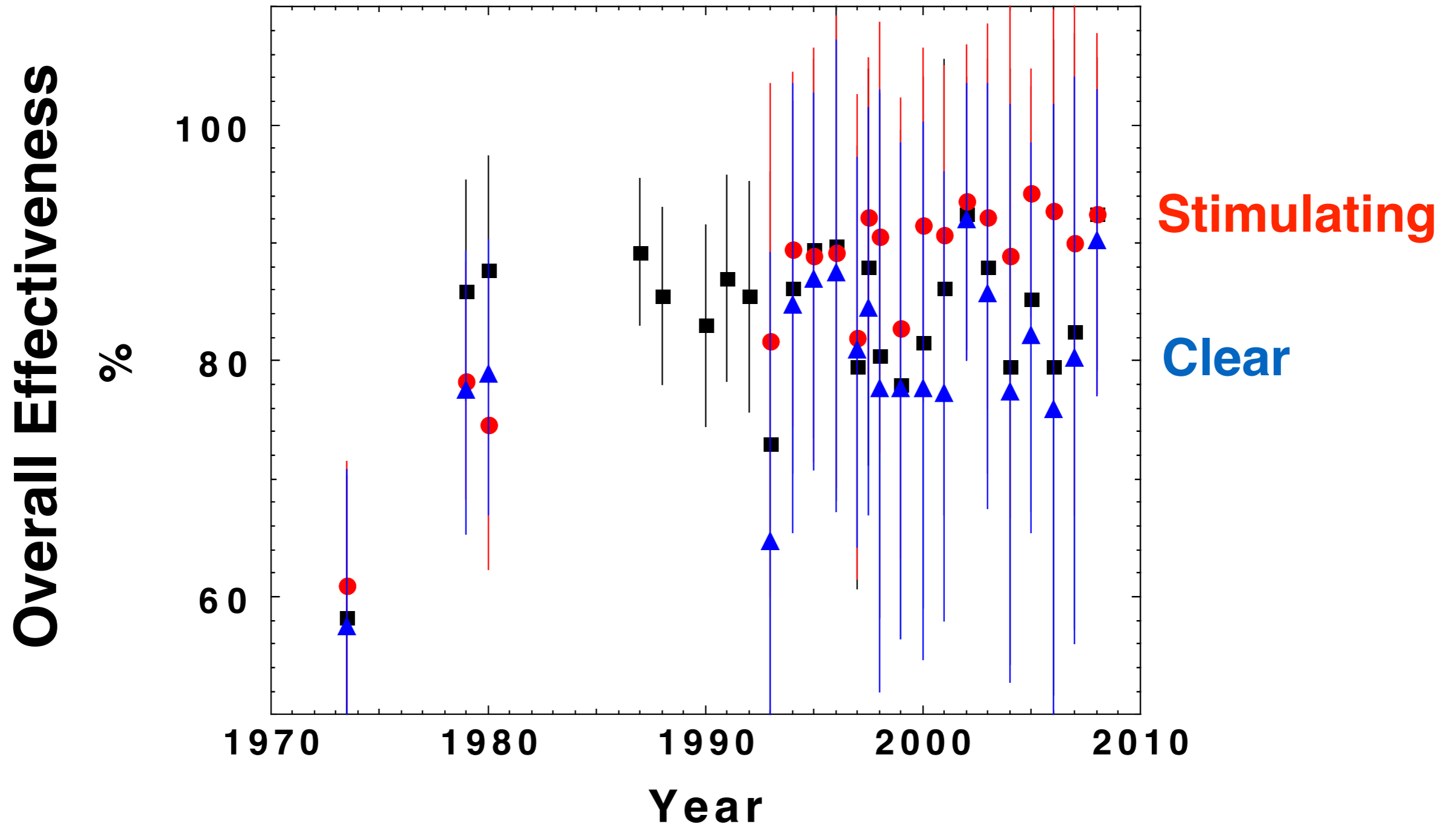
# *Details:*

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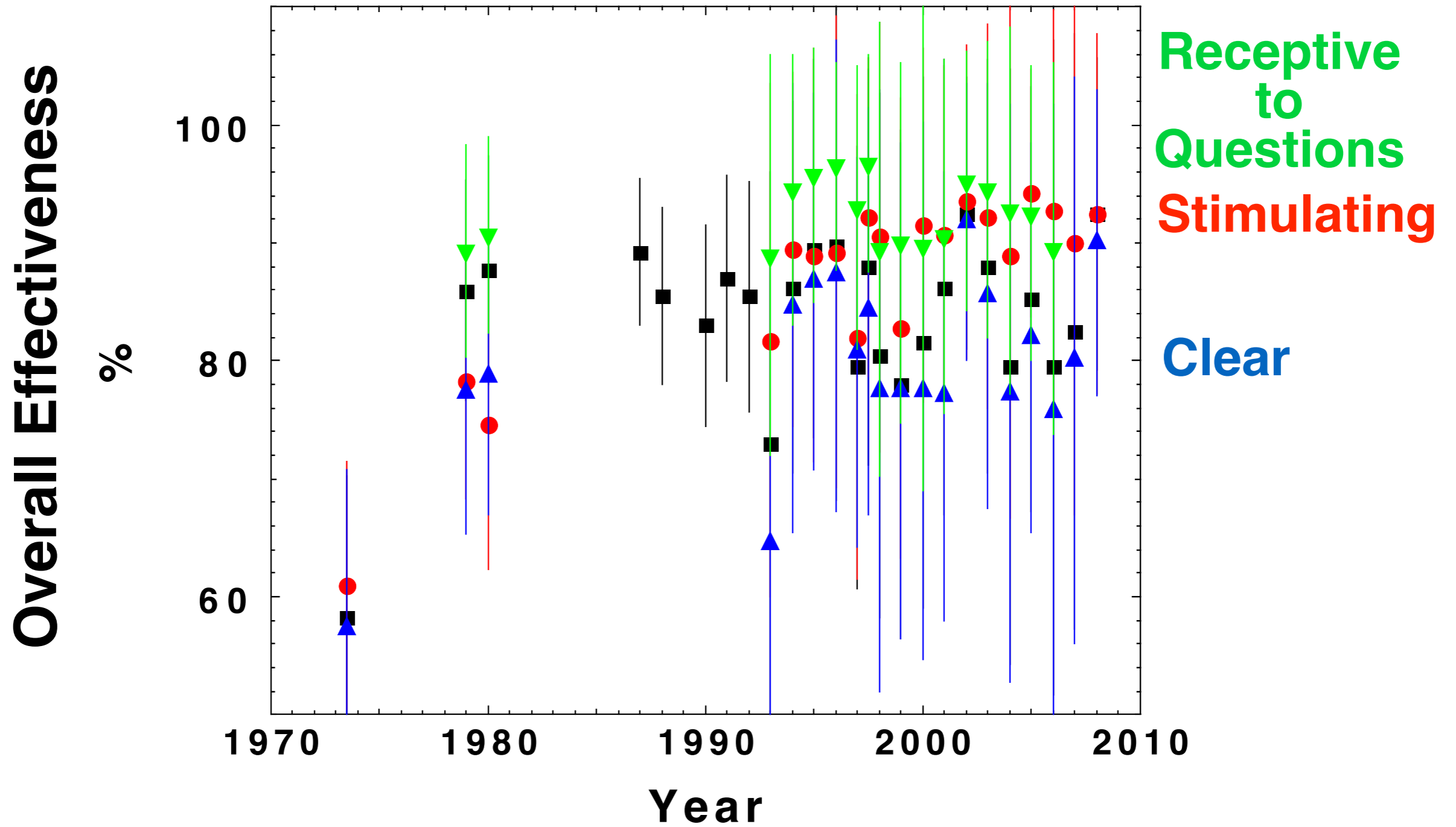
# *Details:*

## Erich Vogt's Teaching Evaluations



# *Details:*

## Erich Vogt's Teaching Evaluations



# ***Erich generally***

- Decibels
- Happy Birthday | Joyeux anniversaries | Yom Huledet Sameakh | Shēngrì kuàilè | Gelukkige verjaardag | Boldog születésnapot | Buon compleanno | Hau'oli lā hānau | С днём рождения !
- Failure is not an option.
- Don't worry, be happy!



# ***Erich on Teaching***



“Nothing gets the students’ attention as much as if they believe that *you know who they are* ... and that *you care*.”



“The main job of the teacher is to get the students so interested in the subject that they go and learn it on their own.”

# ***Erich on Teaching***

- “One of the reasons I liked to teach first year was that the students’ eyes still light up when you tell them something new.”
- “[Teachers] should focus on their own strengths and use those to get the response from the class that is necessary.” [...] “I don’t think there is such a thing as a uniform approach to teaching. You have to work it out for yourself.”

What ***P**hysics*  
***E**ducation **R**esearch*  
Shows

# Excerpts from PER Review (Doktor et al., 2014)

*“Synthesis of discipline-based education research in physics”*

DOI: 10.1103/PhysRevSTPER.10.020119

(58 pages, 539 references)

- “...even when students know the right answers (*i.e.*, when they have supposedly overcome their misconceptions) brain activation [fMRI] suggests that many students may still hold the misconception in memory yet suppress it.”
- “Most instructional techniques begin by making students aware of their misconceptions (*e.g.*, by demonstrating to students inconsistencies in their own reasoning across contexts...), and then guiding students through a series of activities or reasoning exercises to reshape their concepts to accommodate scientific concepts.”
- “...teaching done in a clear, elegant manner, even [by] charismatic instructors, quite often does not help students overcome misconceptions. [...] research showed... that quality of lecturing or instructor charisma had little to do with helping students learn concepts about which they held deeply rooted beliefs that contradicted physical laws.”

# Interactive **E**ngagement exercise

Assume that your mass is 70 kg.

*Within the context of Newtonian Mechanics, approximately what **net** force do you exert on the Earth?*

**A:** 70 kg.

**B:** Just under 700 N.

**C:** Zero.

# *The Feynman Effect*

- Richard Feynman's lectures were famously clear, understandable and entertaining. Rapt audiences wondered why the subject was considered hard... until they left the lecture hall. Ten minutes later, their comprehension evaporated and they were left with only the *memory of having understood*.
- PER has confirmed that having concepts explained to you, no matter how cogently, does not implant them into your long-term understanding. For that you must take some initiative, work it out for yourself, or discuss it with others (*"interactive engagement"*).



# IMNSHO

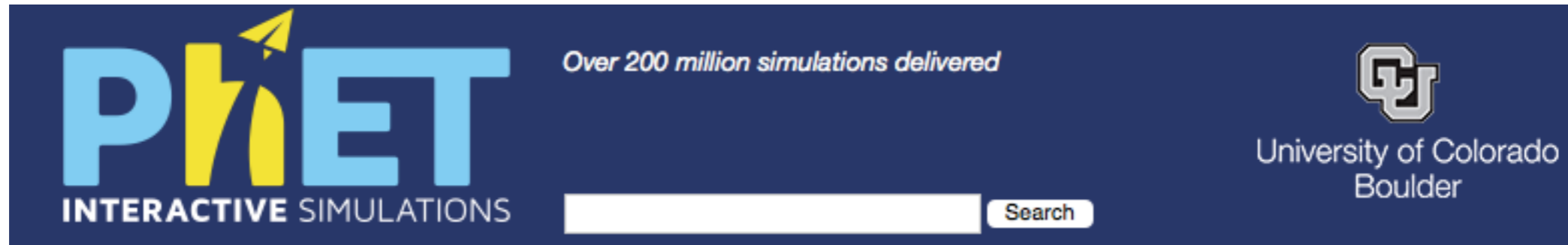
- The *science* of Physics Education Research (PER) reminds me of astronomy before Kepler. A plenitude of tools and expertise have not yet spawned a *general explanatory theory*.
- PER is a crucial discipline, but the current literature seems to encourage a phenomenological, if not reductionist, approach (“*Just find out what works best!*”) which impoverishes the holistic educational experience.
- The *memory of having understood* (due to a great lecture) can provide the **motivation** to *understand again*. With that motivation firmly in place, PER-based techniques *can* facilitate the learning process.

# How to Please

[almost]

# Everyone

?



<https://phet.colorado.edu>

- Hundreds(?) of “physically correct” simulations 😊
- Play and explore without fear of destruction 😊
- No need to operate actual lab equipment 😞
- Open Source 😄

# Excerpt from Koschmann (1996)

## *“Paradigm Shifts and Instructional Technology”*

(**C**omputer-**S**upported **C**ollaborative **L**earning)

- “If machines can be programmed to display intelligent behavior, there is no reason, at least in principle, that systems could not be designed to assume the role of a skilled teacher. Since **one-on-one tutoring is commonly considered the gold standard against which other methods of instruction are measured**, the [CSCCL] paradigm is founded on the proposition that **education could be globally improved by providing every student with a personal (albeit machine-based) tutor.**”

(“Okay, smartass, what do you suggest?”)

- Effective PER methods can be delivered by “expert systems” with infinite patience. (*e.g.* PhET+CSCCL.)
- This will free human teachers to “*focus on their own strengths*” (like giving wonderful lectures).
- Problem: fewer human teachers may be needed. We will need to educate university administrators, politicians and *parents* about the proper role(s) of Physics in society.



“The main job of the teacher is to get the students so interested in the subject that they go and learn it on their own.”

# ***Acknowledgements***

- [\*\*\*Erich\*\*\*](#), of course, and his UBC [\*Legacy interview\*](#)
- Alan Poon (whose [\*talk\*](#) on Erich's teaching is online)
- Carl Wieman and the [\*CWSEI\*](#) team at UBC
- PER review by [\*Doktor et al.\*](#) and its 539 references
- [\*Koschmann\*](#) & other developers of CAI/ITS/CSCCL

*This talk* is at <http://jick.net/vogt/Vogt-teacher/>

# FYSREs

- For decades Erich Vogt taught bright, eager 1st Year Physics students who are ineligible for NSERC Undergraduate Student Research Award (USRA) subsidies (only for 2nd & higher years).
- The *Erich Vogt **F**irst **Y**ear **S**tudent **R**esearch **E**xperience (**FYSRE**)* awards offer budding academic stars in 1st Year Physics courses at UBC an opportunity for paid work experience in Physics or Astronomy research at UBC or TRIUMF. Outstanding 1st Year students apply as if for an NSERC USRA. A chosen student's summer salary is shared by the supervisor and the FYSRE grant.
- The first FYSRE recipient (Summer 2014) was [\*Walter Wasserman\*](#). We now have a batch of excellent applicants for Summer 2015.
- More endowment = more FYSREs! **[Make Your Donation Now!](#)**

