



NSEC Education and Outreach Activities

NSEC Annual Workshop
10 May 2002



Making connections

EDUCATION

TEACHERS

**K-12
STUDENTS**

**NSEC
FACULTY**

**GENERAL
PUBLIC**

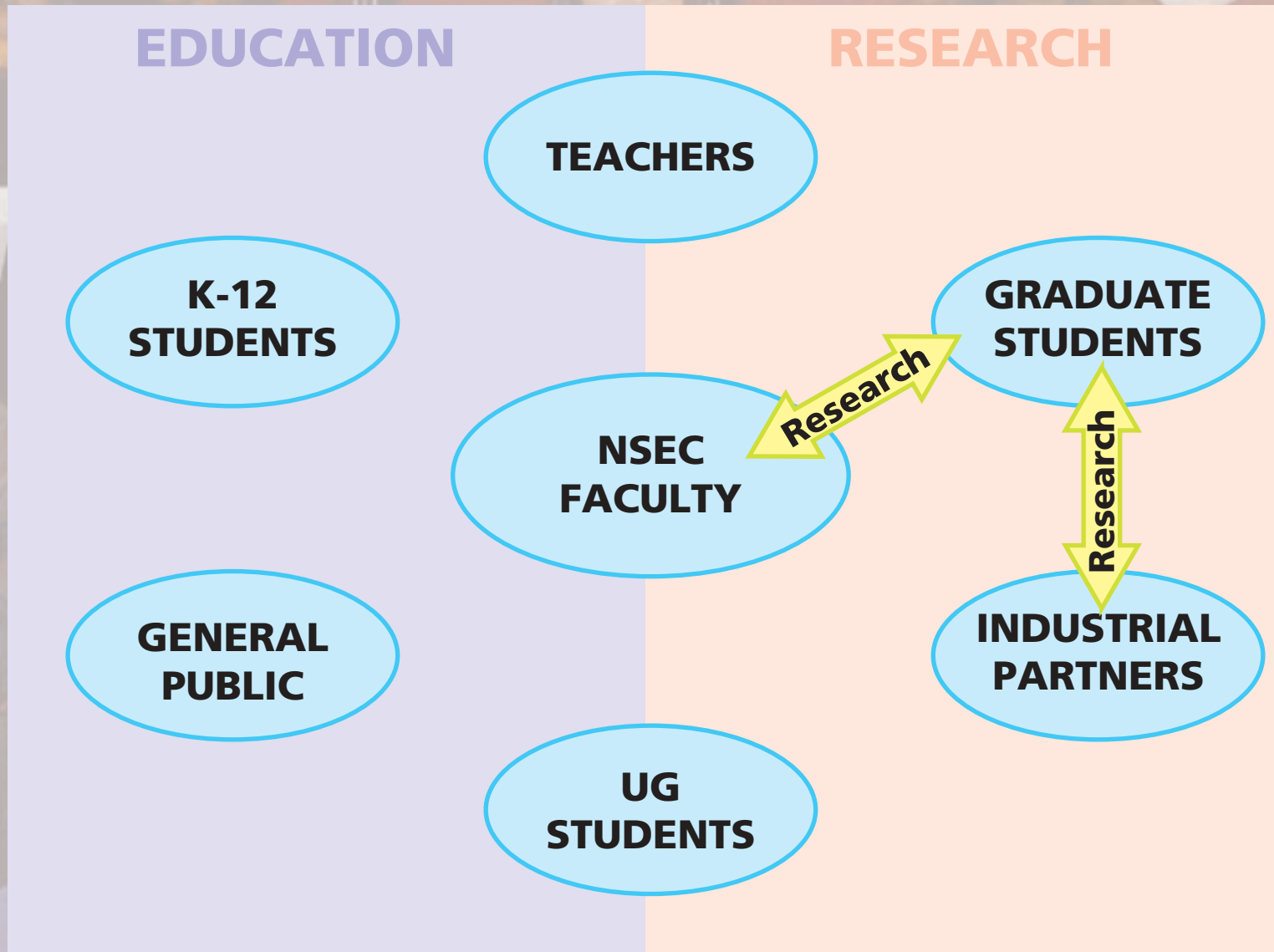
**UG
STUDENTS**

RESEARCH

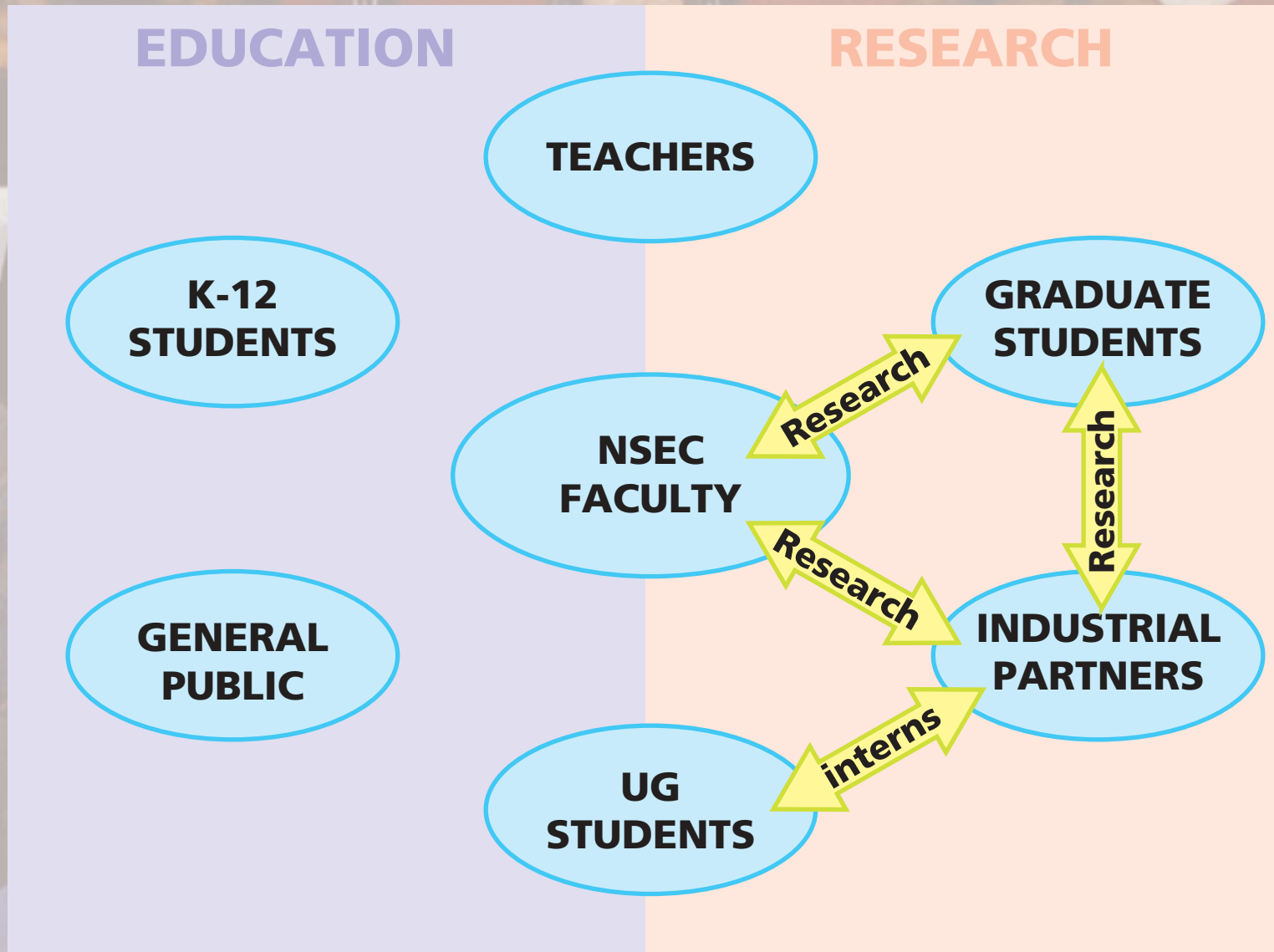
**GRADUATE
STUDENTS**

**INDUSTRIAL
PARTNERS**

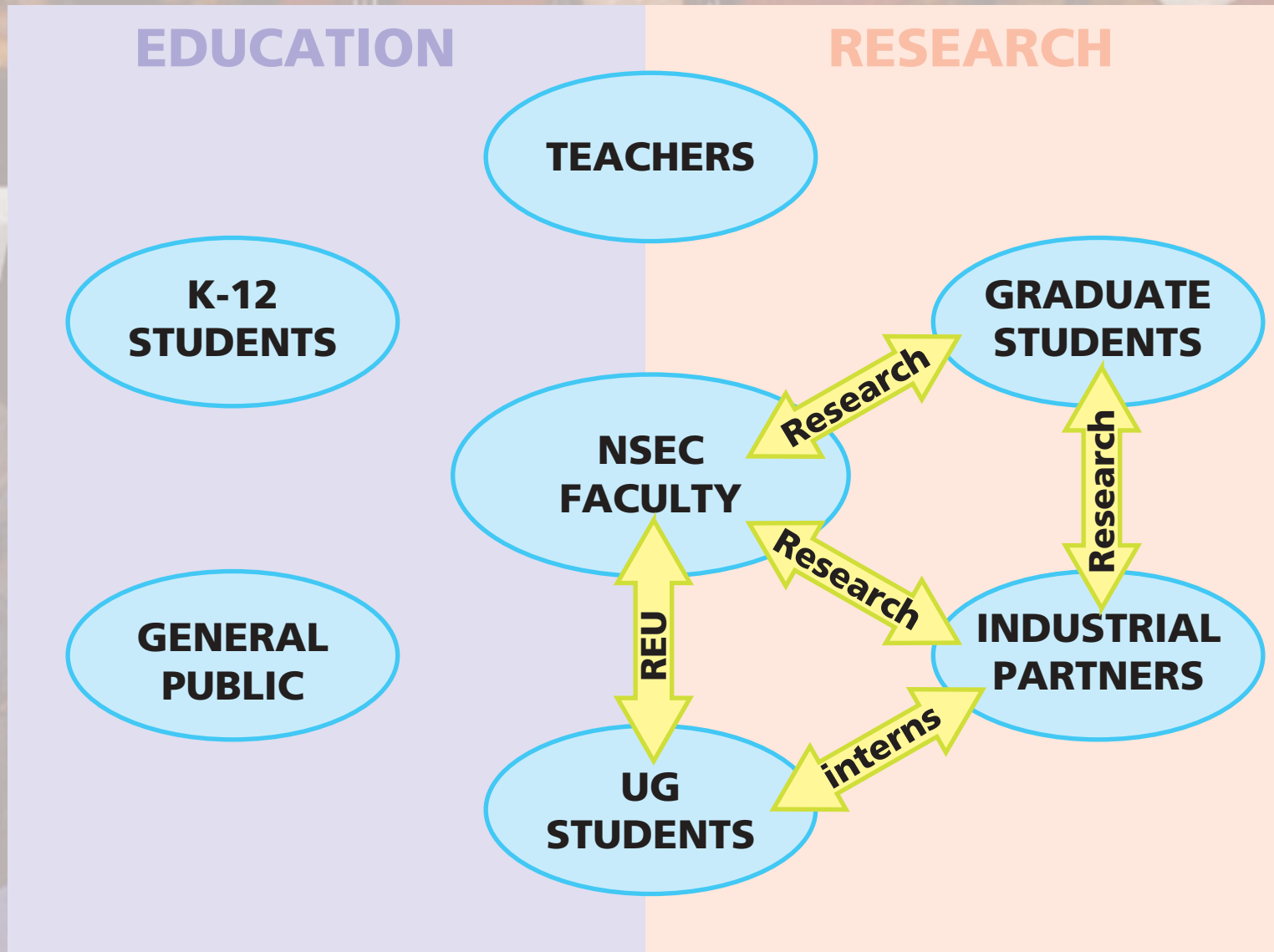
Making connections



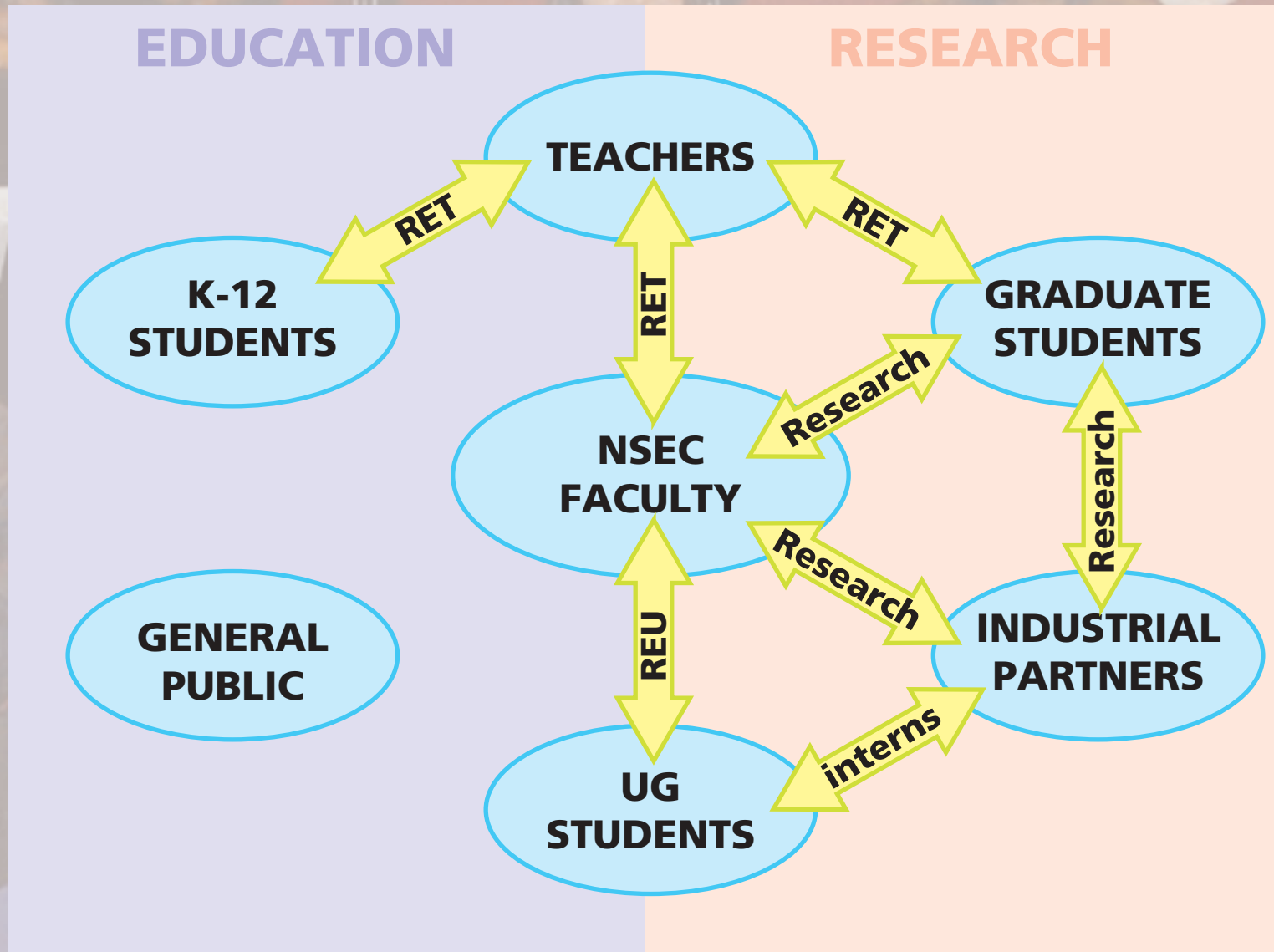
Making connections



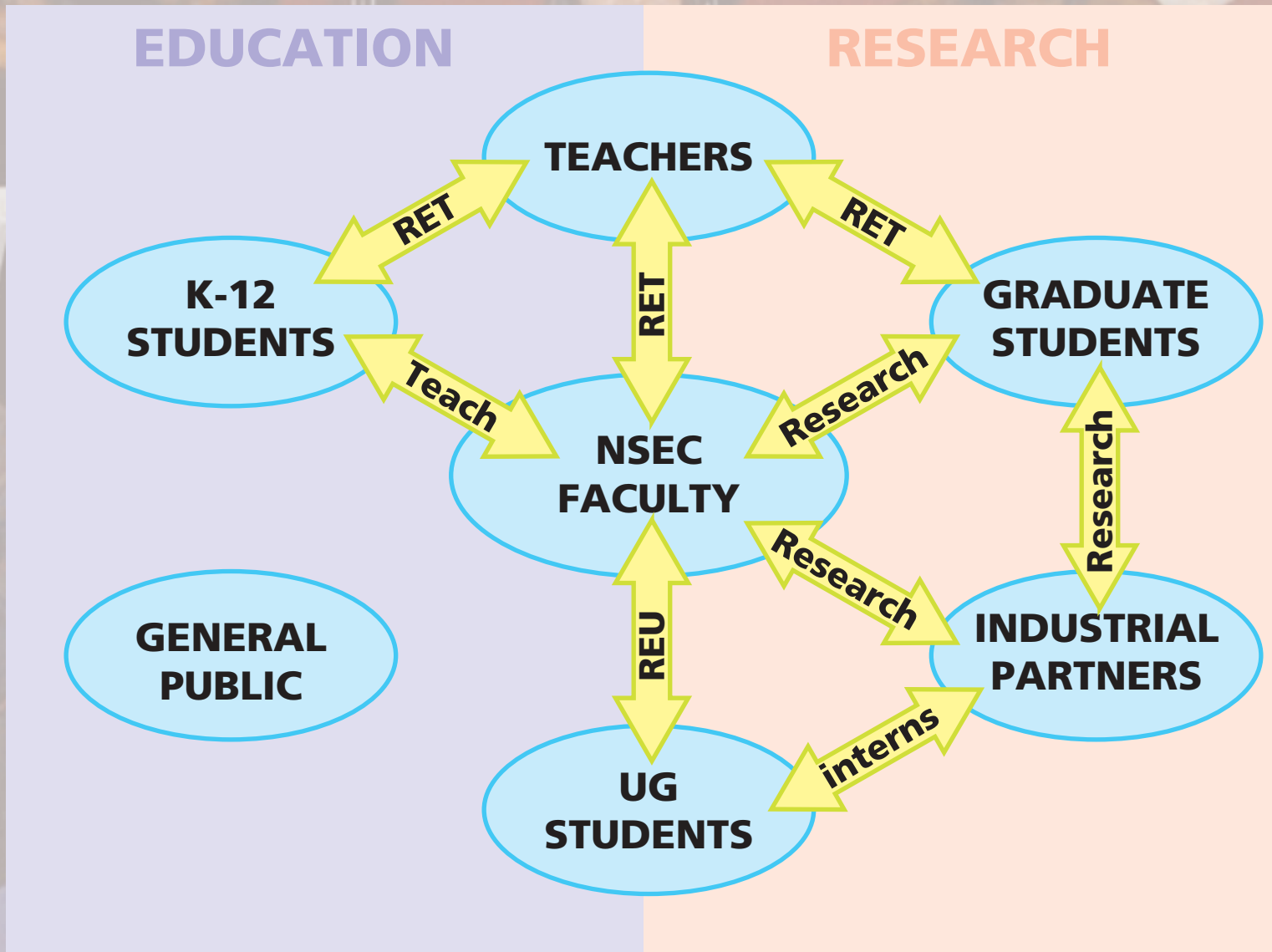
Making connections



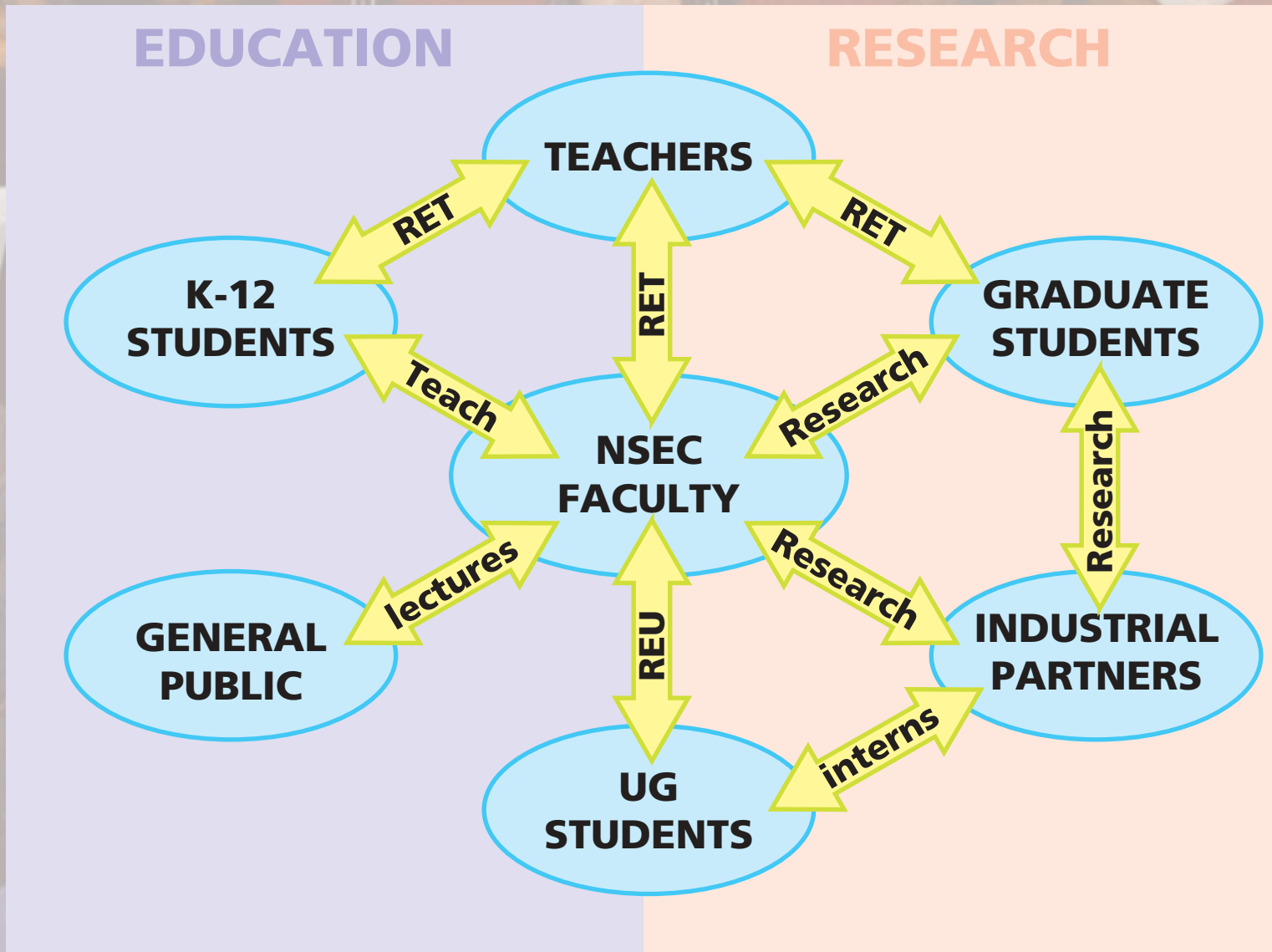
Making connections



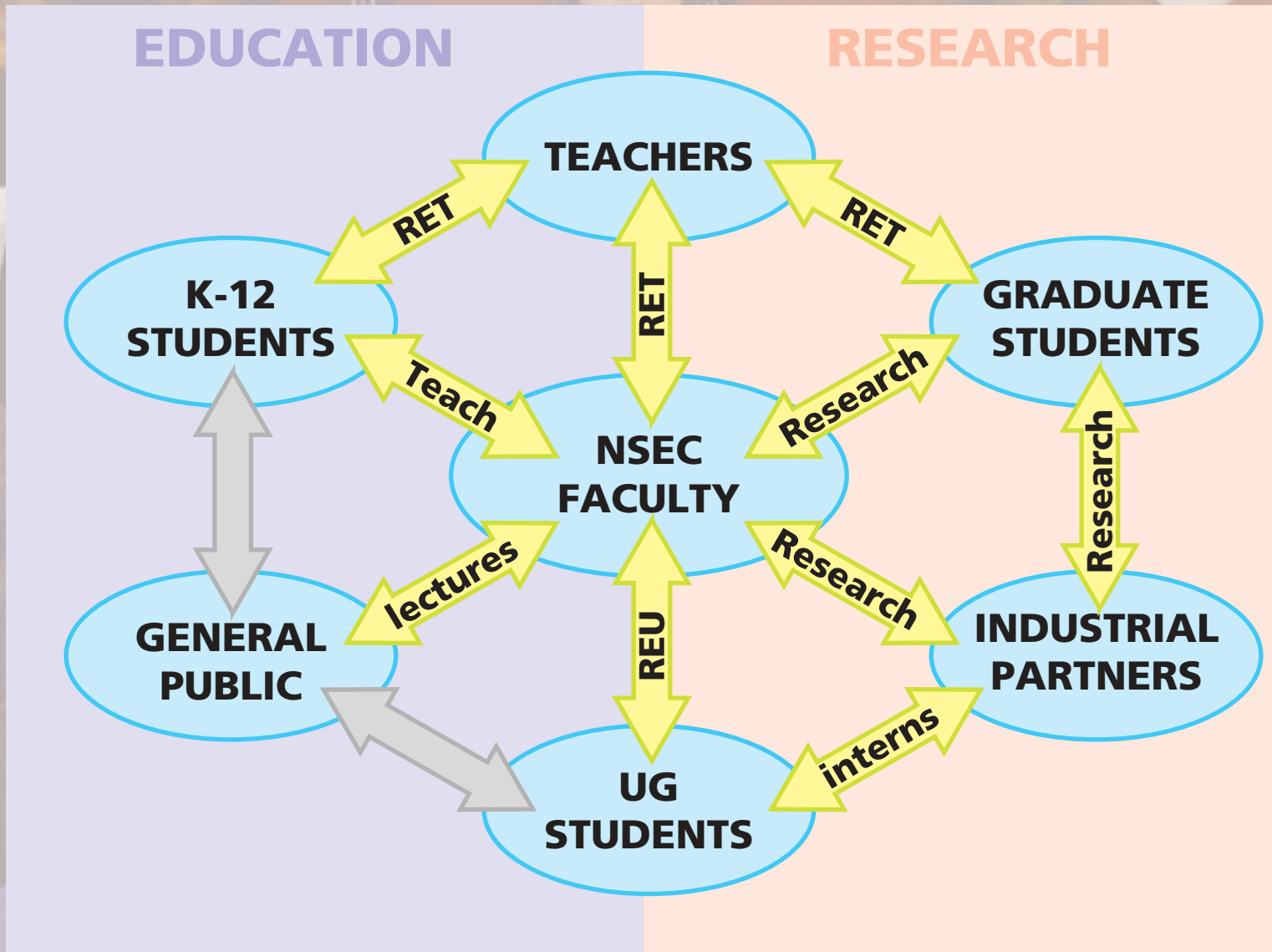
Making connections



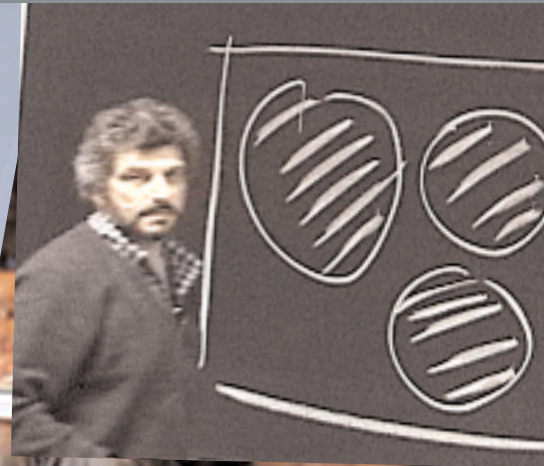
Making connections



Making connections



Broad Faculty Involvement



Campus visits



Undergraduate programs

Research Experience for Undergraduates:

- ▶ **Summer research projects for undergraduates**
- ▶ **Matching funds provided DEAS and College**
- ▶ **Interdisciplinary research environment**
- ▶ **Use of shared experimental facilities**

Teacher Workshops



Teacher Workshops

- ▶ on average 1/year
- ▶ attended by ~50 teachers/yr
- ▶ run by RET teachers in future?

- ▶ ConceptTests
- ▶ Feedback
- ▶ Problem with Problems
- ▶ Discussion

Peer Instruction Workshop
for science and math teachers

Harvard University
May 5, 1999

Are you interested in interactive teaching?

 THE MATERIALS RESEARCH SCIENCE AND ENGINEERING CENTER at Harvard University announces a workshop for middle and high school science and math instructors on Peer Instruction by Professor Eric Mazur. The basic goals of Peer Instruction are to exploit student interaction during lectures and focus students' attention on underlying techniques. It has been assessed in many case studies using standardized, diagnostic tests and shown to be twice as effective as the conventional lecture approach to teaching. Peer Instruction is now employed in a wide range of science and math courses at the college and secondary level.

In this two hour workshop, participants will learn about Peer Instruction, serve as the "class" in which Peer Instruction is demonstrated, and learn about available teaching materials. You may read more about the technique in *Peer Instruction, A User's Manual* from Prentiss Hall or visit the Peer Instruction web site at galileo.harvard.edu.

The Peer Instruction Workshop will be provided at no charge for the first 150 science and math teachers who apply from 7-9 p.m. in the Science Center (Lecture Hall D), 1 Oxford Street, Cambridge, MA. For more information about this program, contact Robert Graham, MRSEC Assistant Director: Materials Research Science and Engineering Center, Harvard University, Nine Oxford Street, Cambridge, MA 02138. Tel: 617/495-4995 Fax: 617/495-9054



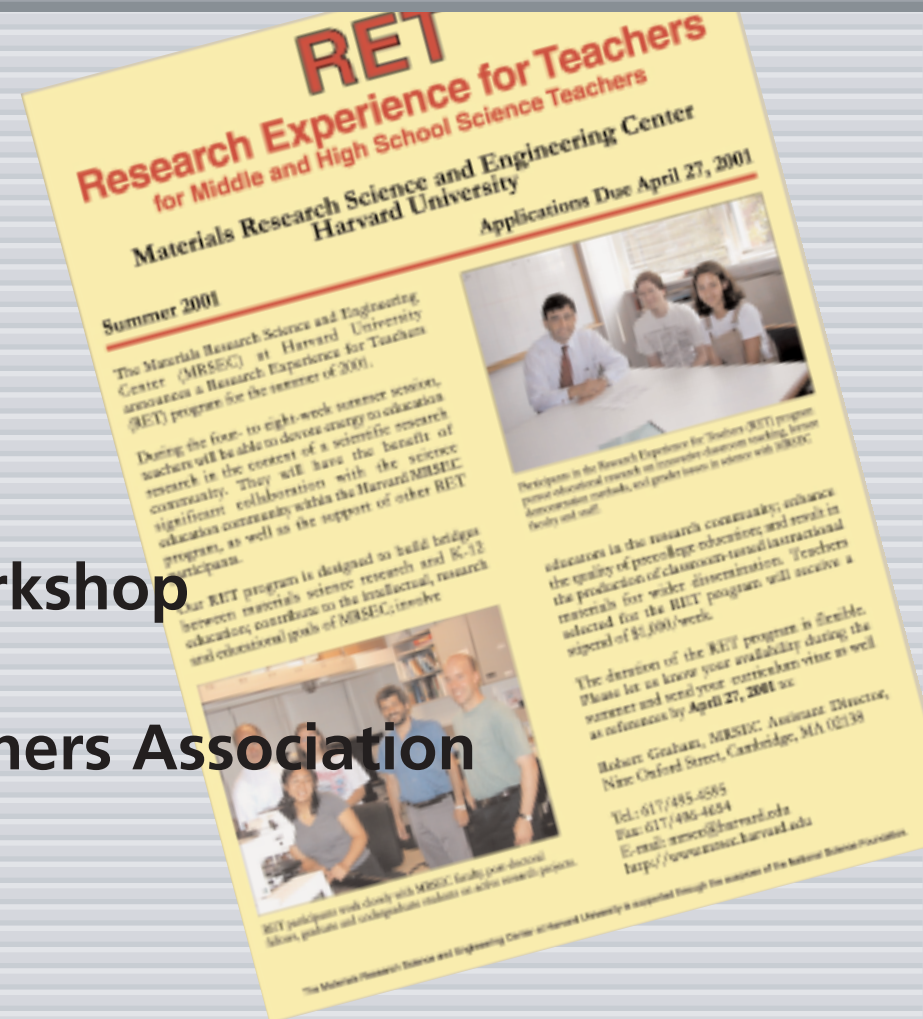
Electronic queries via the internet are encouraged. The Materials Research Science and Engineering Center at Harvard University is supported through the auspices of the National Science Foundation.
Photos show students teaching students with Peer Instruction. (bottom) Eric Mazur, Professor of Physics at Harvard University.

Teacher Workshops

- 
- ▶ **high impact (100 teachers x 60 students/year)**
 - ▶ **very positive feedback**
 - ▶ **good attendance**
 - ▶ **high involvement**
 - ▶ **excellent RET recruiting opportunity**

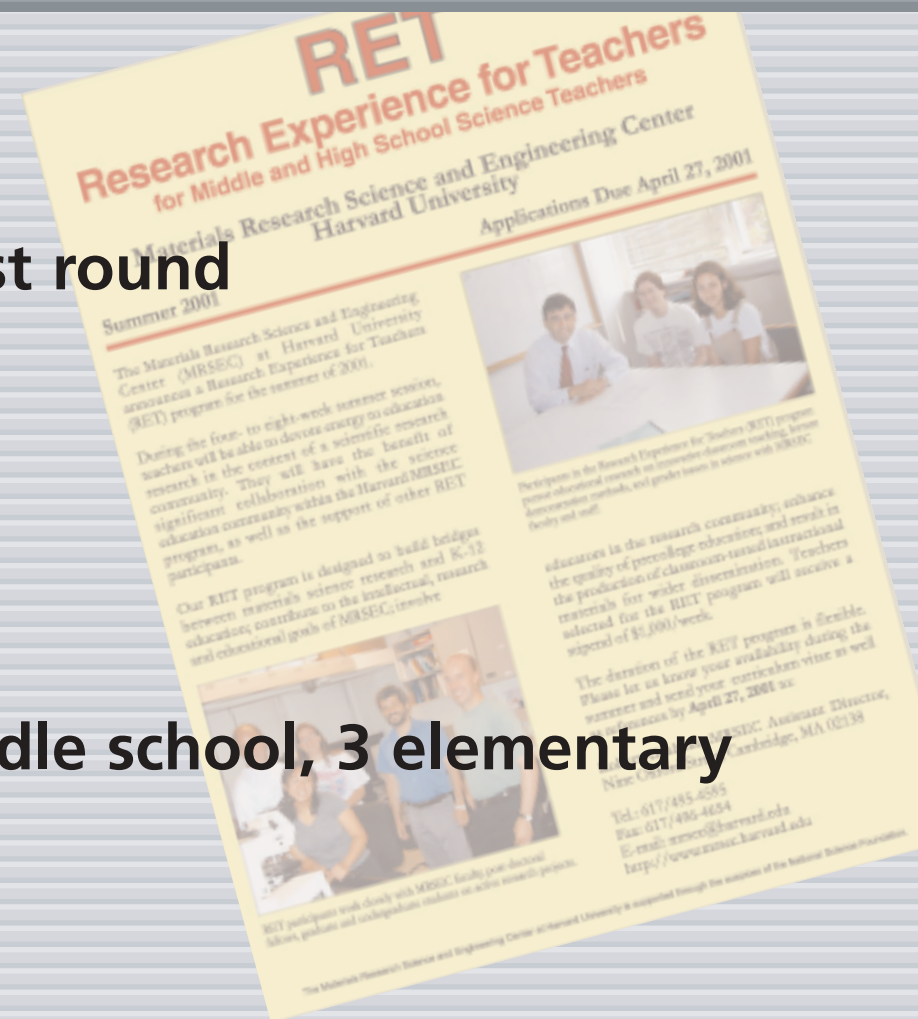
RET recruitment

- ▶ RET flyer
- ▶ MASS newsletter
- ▶ Peer Instruction Workshop
- ▶ Boston Science Teachers Association



RET applications

- ▶ 13 applicants for first round
- ▶ 10 women, 3 men
- ▶ 13 public school
- ▶ 7 high school, 3 middle school, 3 elementary



RET activities

- ▶ **direct exposure to research environment**
- ▶ **development educational activities**
- ▶ **weekly meetings**
- ▶ **joint final meeting with REU participants**



RET participants

Charles Hughes

Elementary

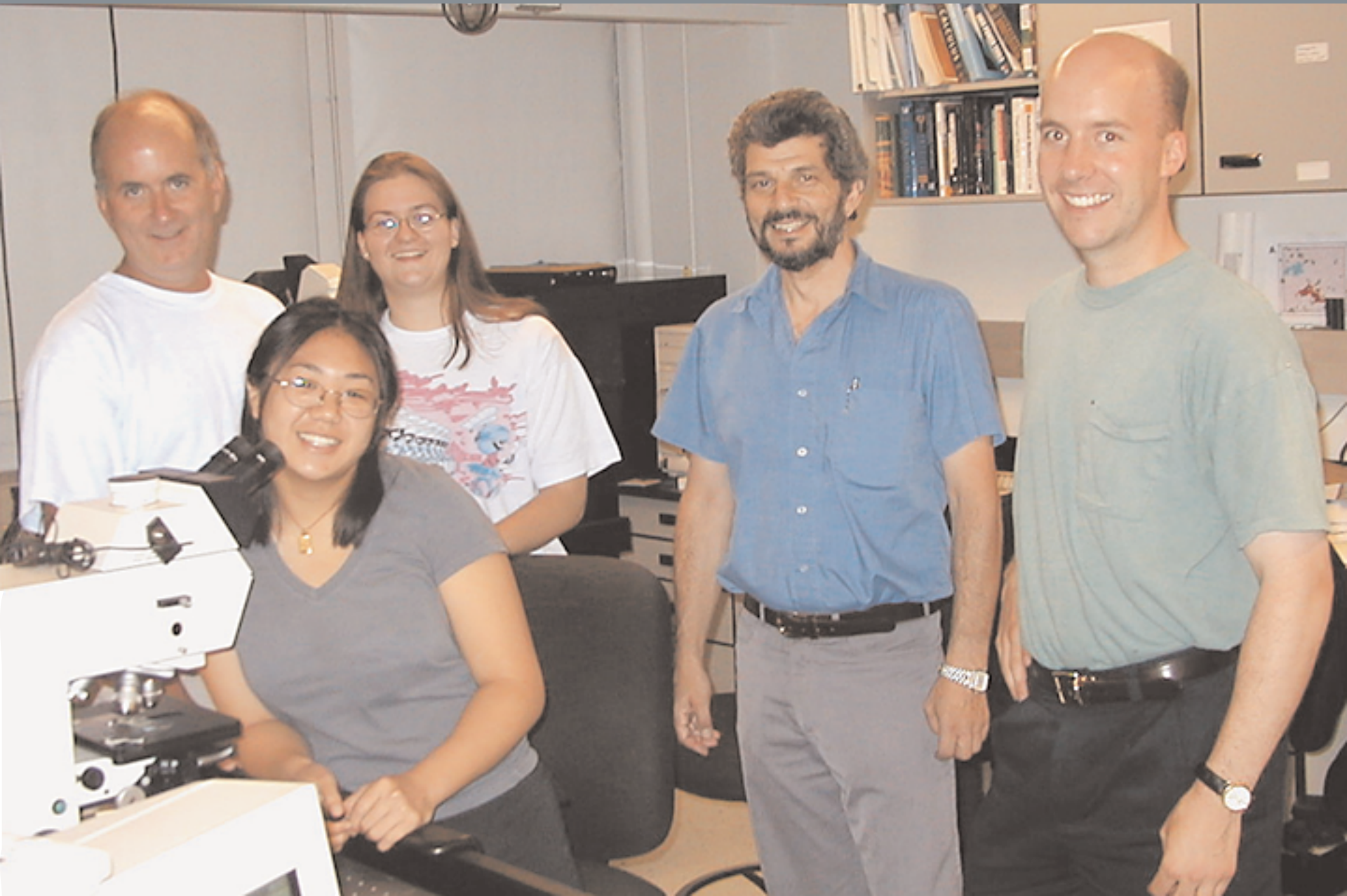
Horace Mann School for the Deaf



Project (Weitz Group):

Multiparticle tracking in cells

RET participants



RET participants

James McNeil
Geology
Middle School



Project (Stone Group):
Effect of bubble size on foam drainage



RET participants

Kristy Lenihan

Physics

High School



Project (Mazur Group):

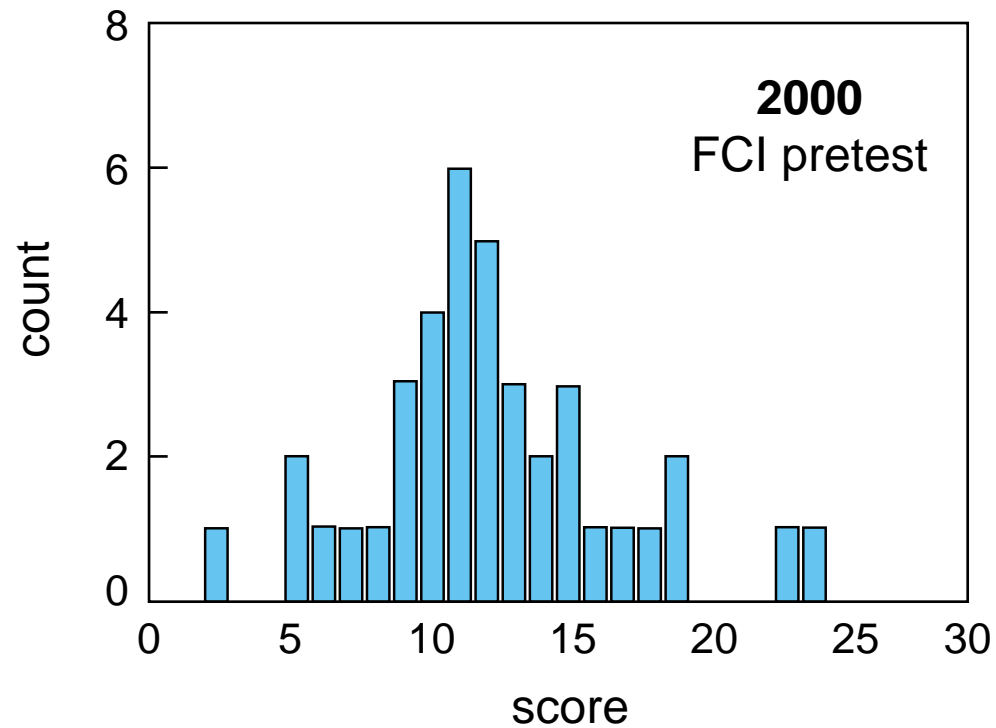
Research: Micromachining of transparent materials

Education: Development of optics curriculum

Goals

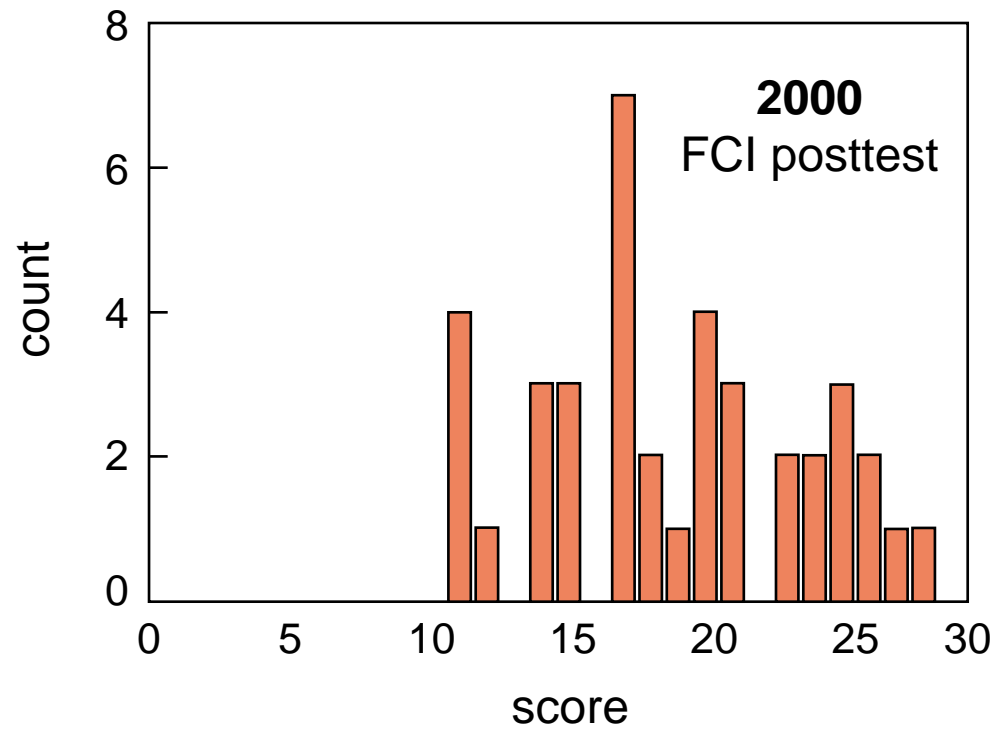
- ▶ **learn and participate in graduate level physics**
- ▶ **design lesson plans for AP students**
- ▶ **observe procedures and interactions**
- ▶ **augment and improve instructional strategies**

FCI data



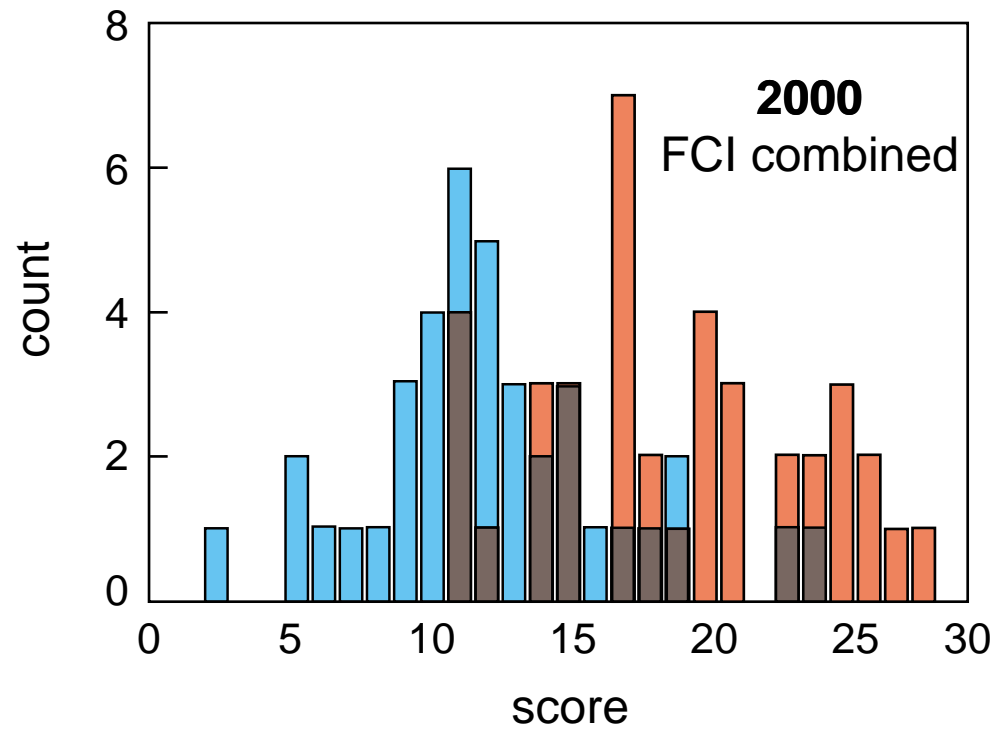
average: 44%

FCI data



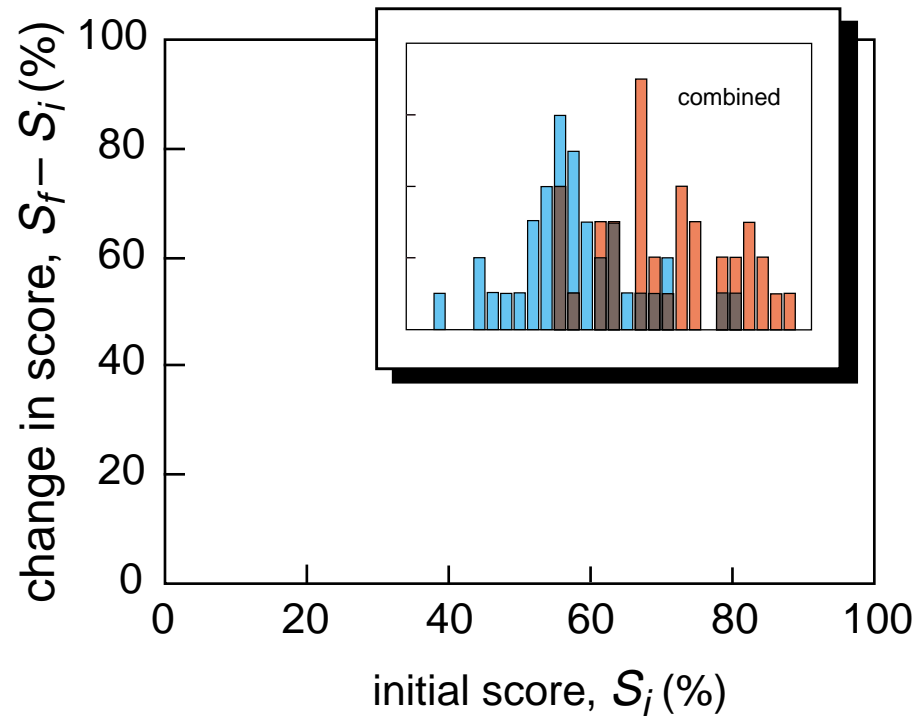
average: 66%

FCI data

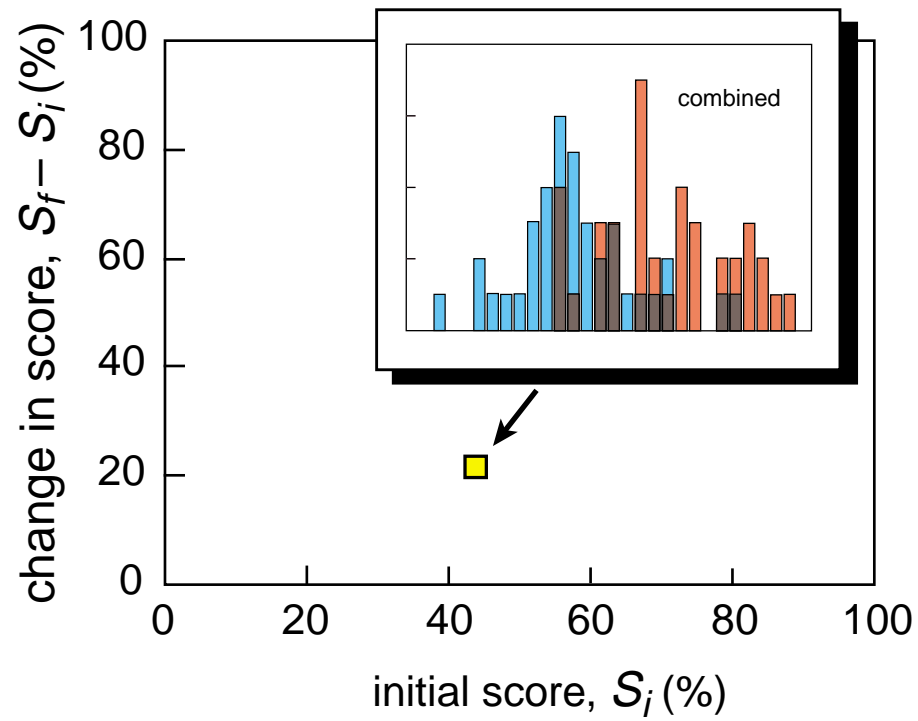


gain: 22%

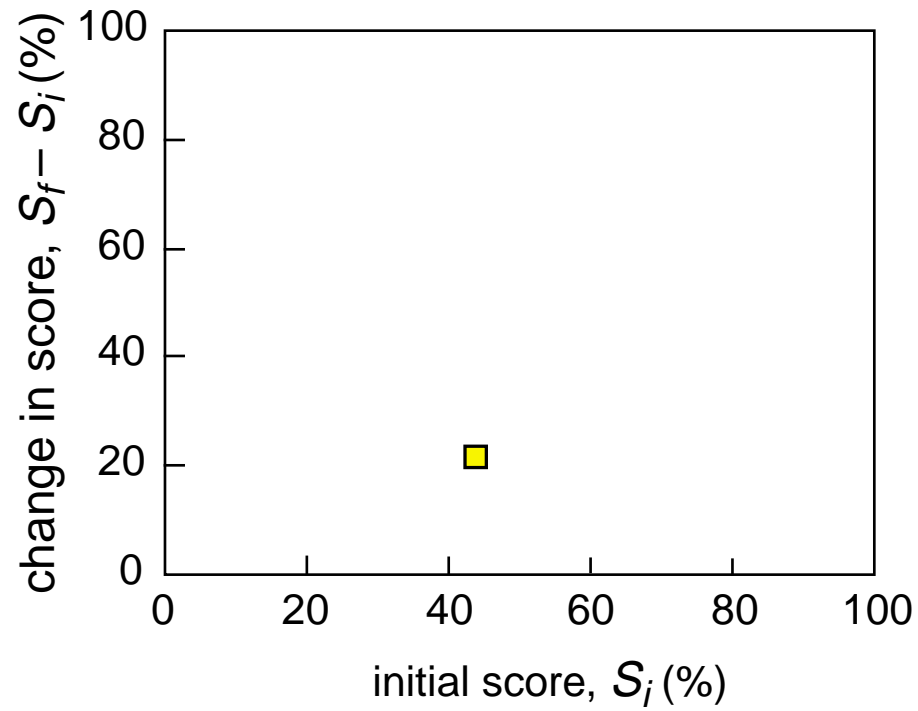
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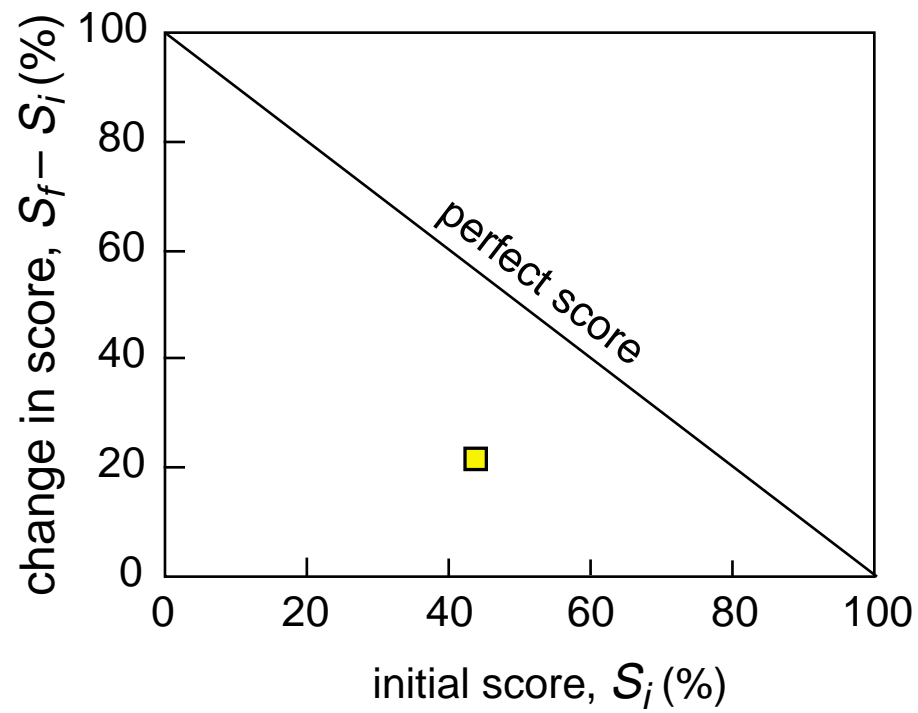
FCI data



FCI data

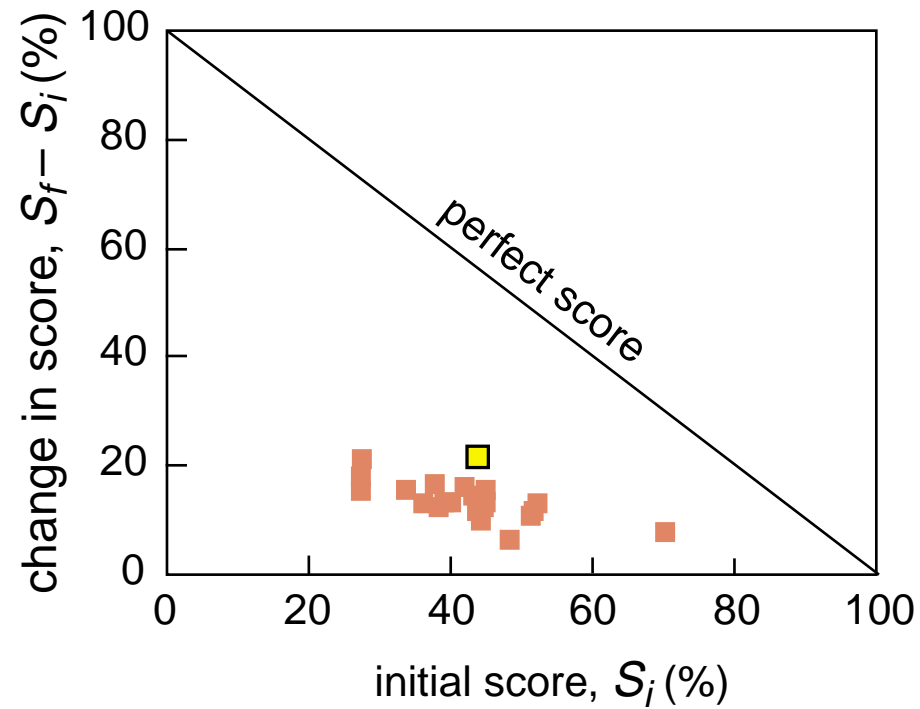


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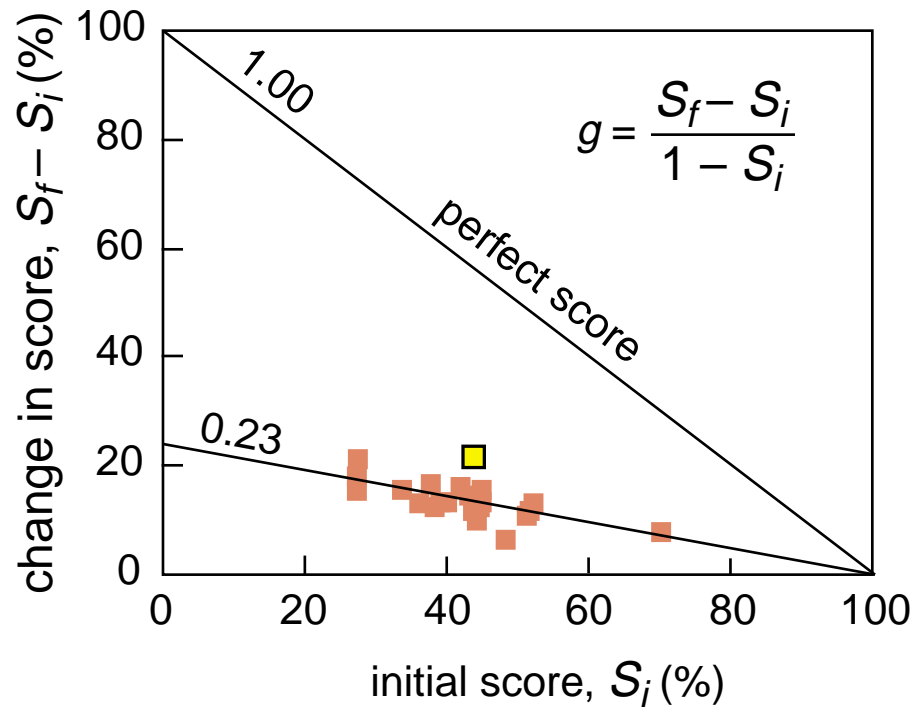
FCI data

traditionally taught courses



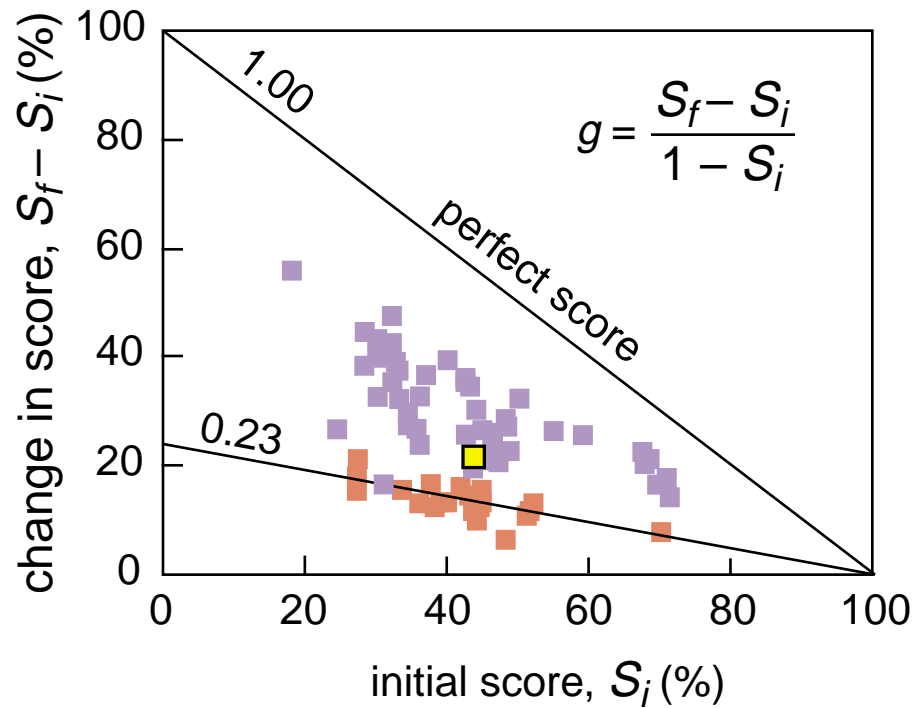
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traditionally taught courses



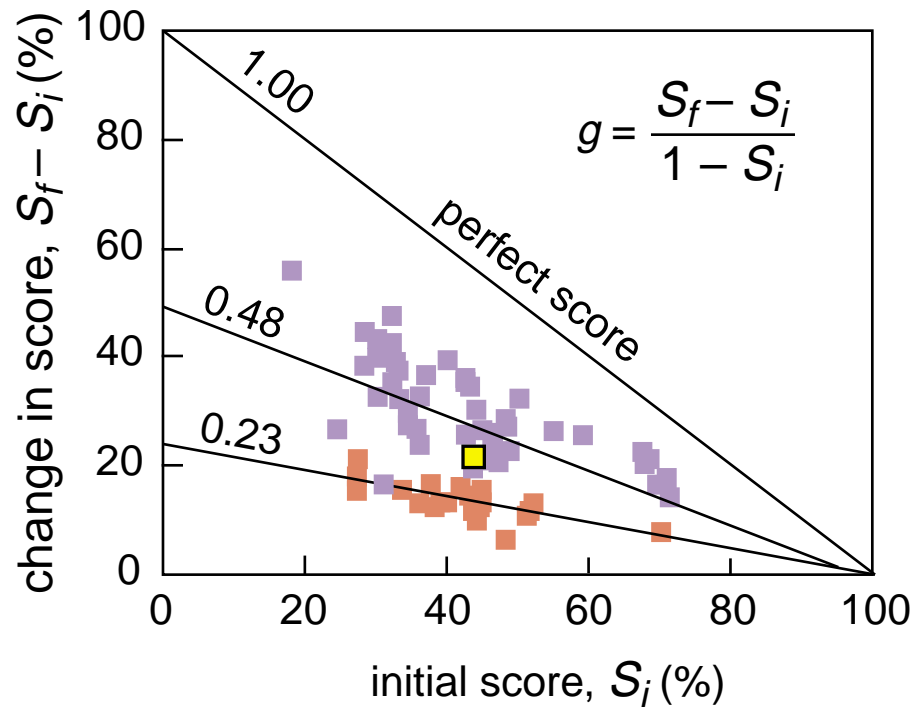
FCI data

interactively taught courses



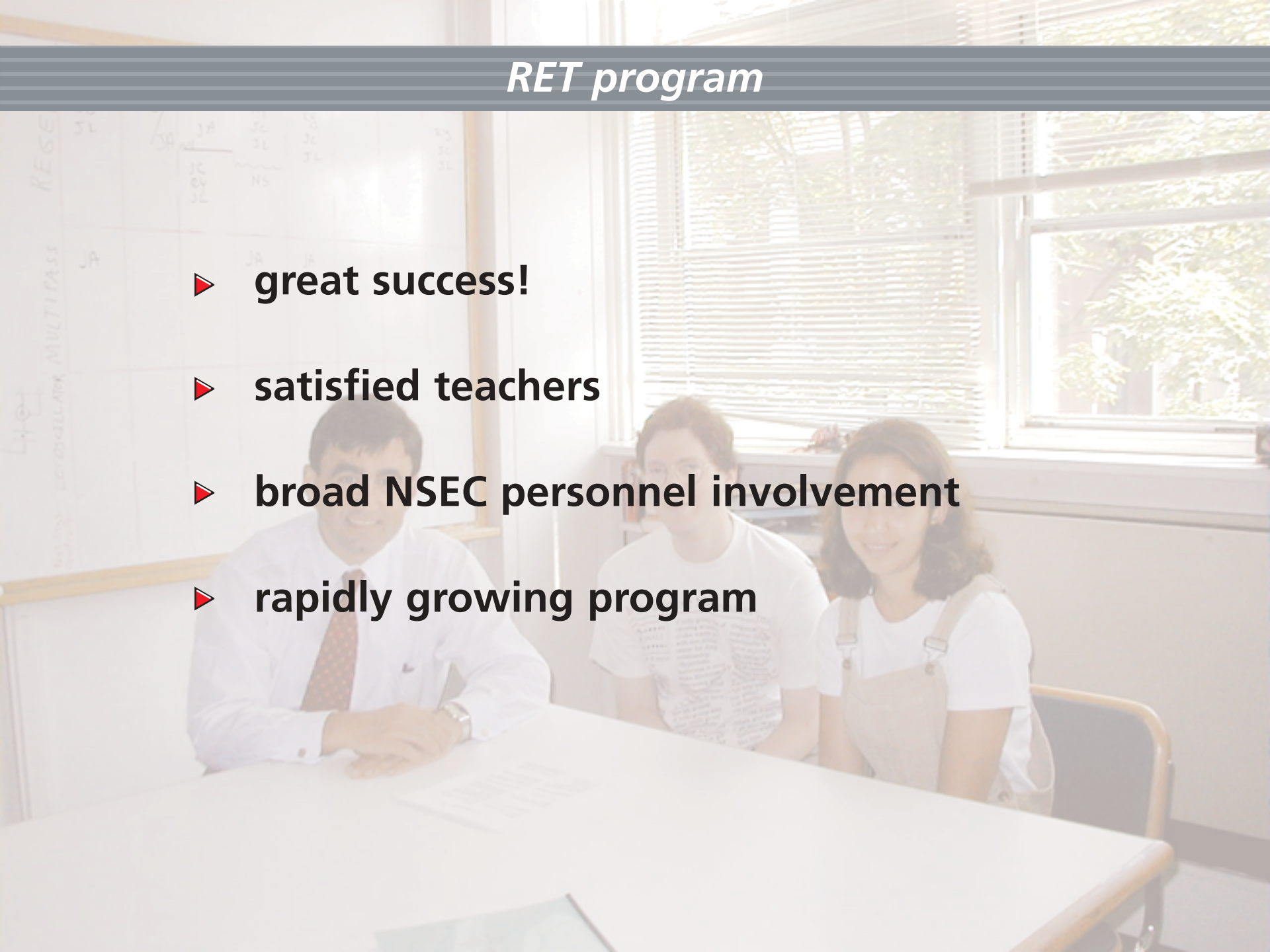
FCI data

interactively taught courses



RET program

- ▶ **great success!**
- ▶ **satisfied teachers**
- ▶ **broad NSEC personnel involvement**
- ▶ **rapidly growing program**



Conclusion

Harvard NSEC Education & Outreach program:

- ▶ **faculty commitment**
- ▶ **broad involvement**
- ▶ **diverse target audience**
- ▶ **high impact**