



**The Abdus Salam
International Centre for Theoretical Physics**



2334-11

**AIP Industrial Physics Forum 2012: Capacity Building for Industrial Physics in
Developing and Emerging Economies**

16 - 19 April 2012

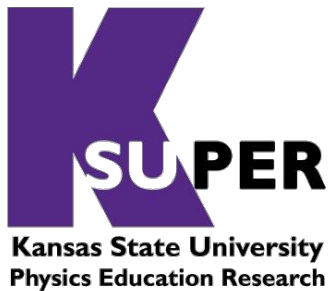
Introduction to the Education Strand

Dean Zollman
*Kansas State University
USA*

Introduction to the Education Strand

AIP Industrial Physics Forum 2012: Capacity Building for
Industrial Physics in Developing and Emerging Economies

Dean Zollman
Kansas State University, USA



Capacity Building with Physics

Needs

- Physicists
- Physics students
- Physics curriculum
- Physics teachers
 - Primary
 - Secondary
 - University

Building capacity means change

Constantly changing

- Physics
- Students
- Technology

But what about

- Curriculum
- Education of teachers

Sometimes
very slowly

Changing the way physics is taught needs

- Alternatives to traditional teacher education
- Technology in physics education
- Alternative ways of delivery
- Updating the content of physics being taught
- Physics Education Research
 - Fundamental research on teaching–learning of physics
 - Foundation for the improvement of physics education

Changing the way physics is taught needs

Today

Alternatives to traditional
teacher education

Technology in physics
education

Changing the way physics is taught needs

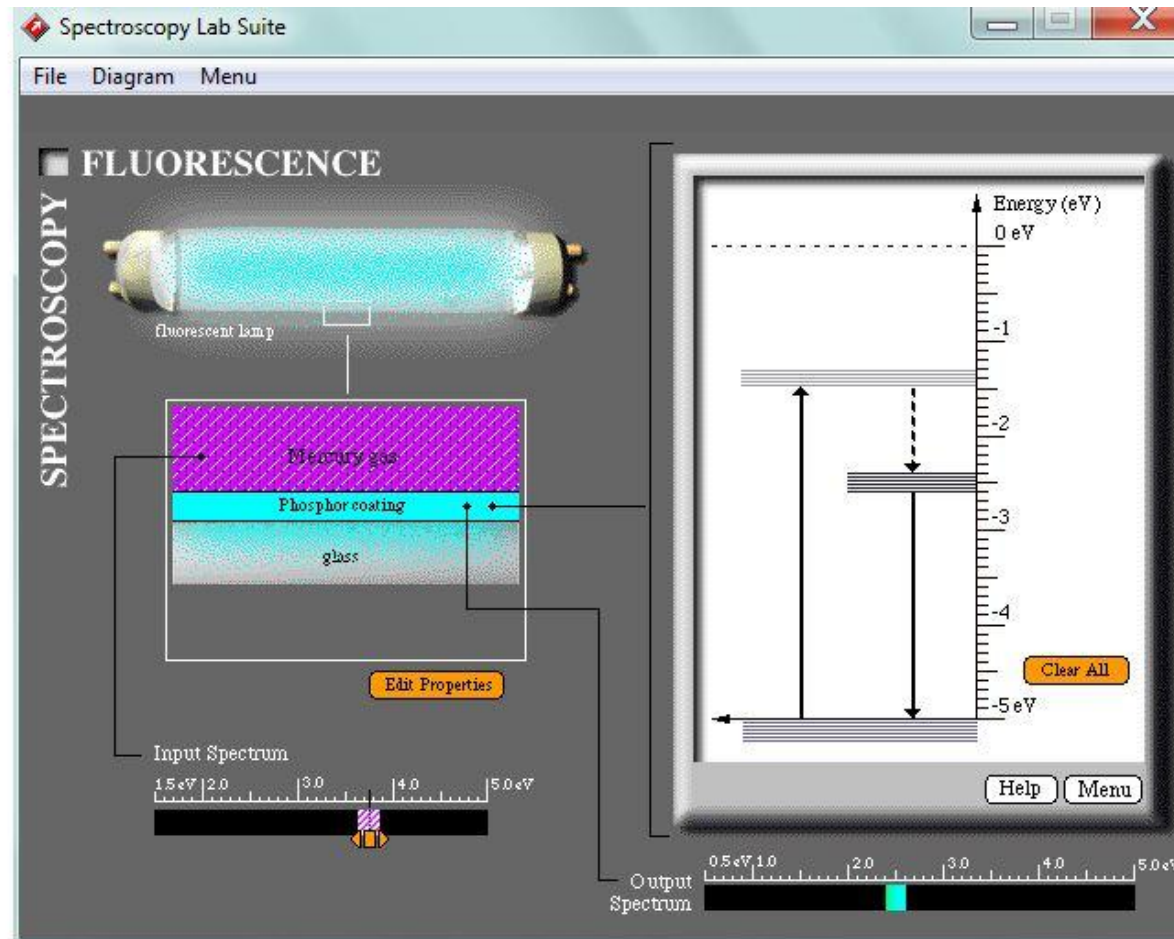
Tomorrow

Alternative ways of delivery

Undergraduate research

Modern content

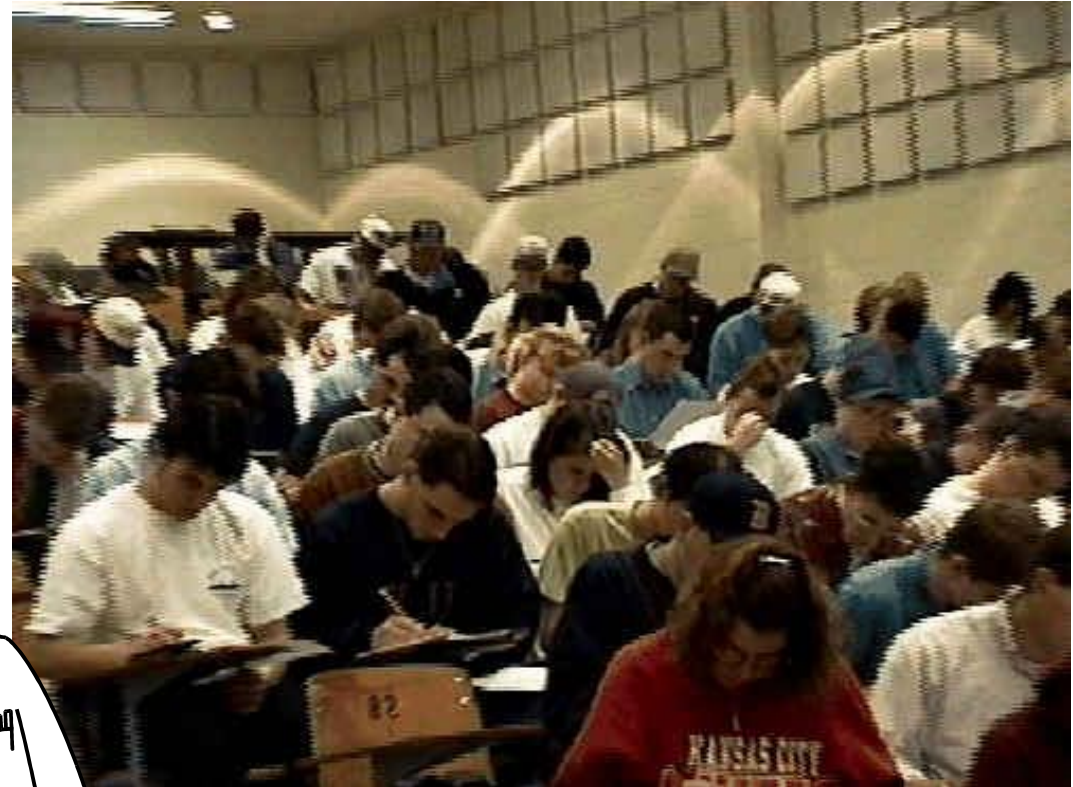
When can students understand



Physics Education Research

- ▶ Begun in the 1970s
- ▶ Physicists investigating teaching–learning of physics
- ▶ Fundamental conclusion
 - Most students must be actively involved in their learning; passive listening to lectures seldom works
 - Even the few who can learn passively are well served by active learning

Transmit Information



Build Understanding



More on physics education

Status, Contributions, and Future Direction of
Discipline-Based Education Research

http://www7.nationalacademies.org/bose/DBER_Homepage.html

Click on Meeting 2 Commissioned Papers

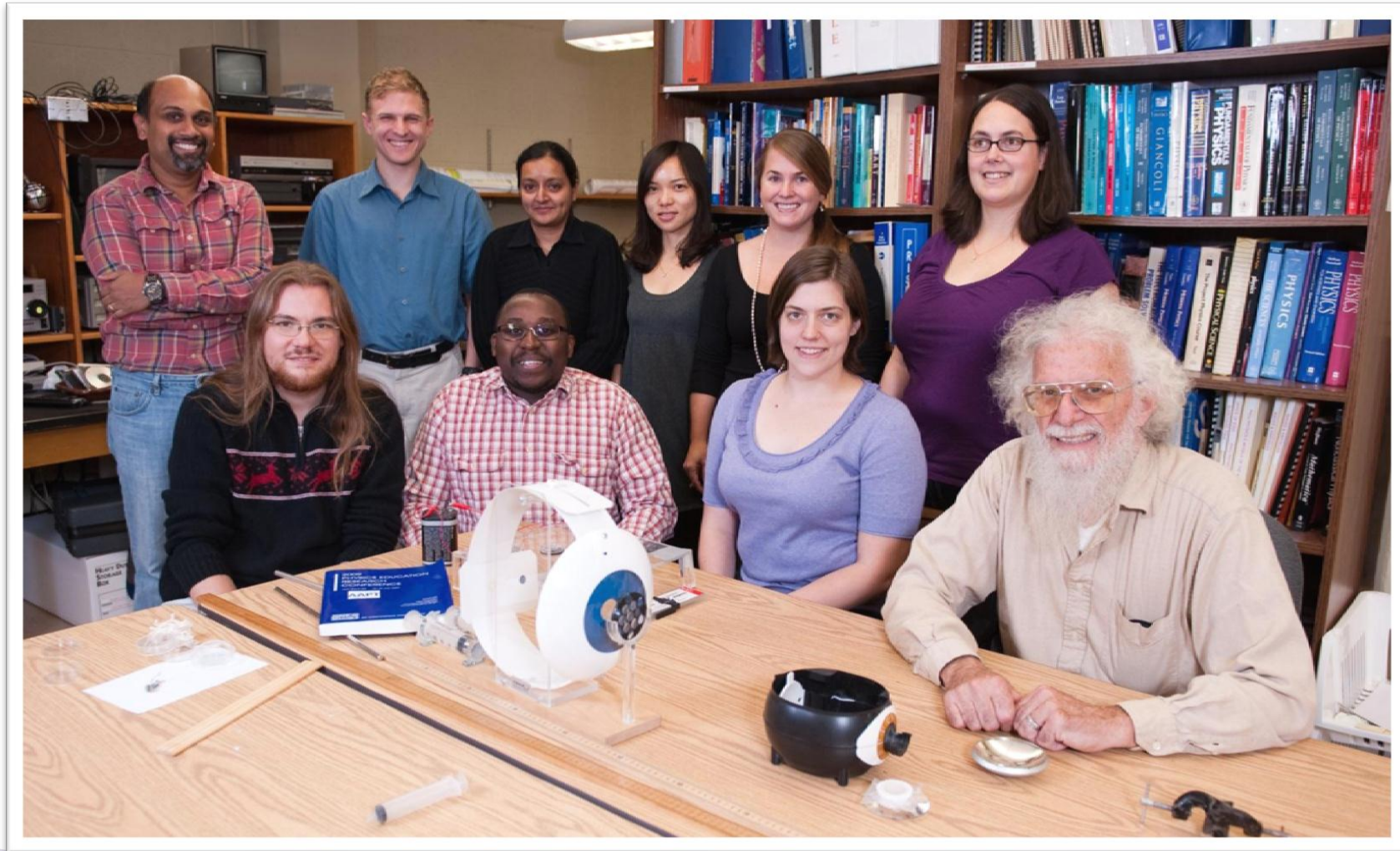
Look for

Cummings: “A Developmental History of Physics
Education Research”

Mestre & Docktor: “A Synthesis of Discipline-Based
Education Research in Physics”

Coming soon: Report on Undergraduate Physics
Education from US National Research Council

Kansas State University Physics Education Research Group



<http://web.phys.ksu.edu>

