Introduction to the Education Strand

Dean Zollman
Kansas State University
USA
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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