Hablando de la Formación de Profesores de Ciencias

New Trends in the Formation of Physics Teachers

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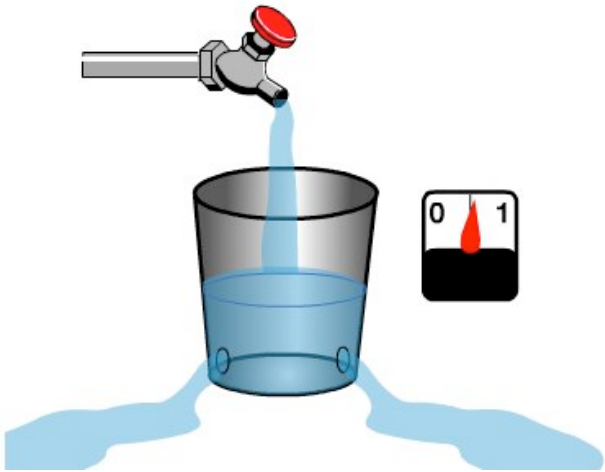
PHYSICS TEACHER EDUCATION

ILLINOIS STATE

UNIVERSITY

Teacher Preparation



- Recruitment
- Preparation
- Retention
- Other trends in the preparation of science teachers

Recruitment of Candidates

- Pipeline Project (Illinois Section AAPT)
  - Guidelines for teachers
  - Brochure for students
- Recruitment Workshop (Arizona State U)
- Learning Assistants (U of Colorado)
- Free Introductory Courses (U of Texas)

National Standards

- National Research Council:
  - *National Science Education Standards*
  - *Inquiry and the NSES*
  - *How Students Learn*
- Project 2061:
  - *Science for All Americans*
  - *Benchmarks for Science Literacy*
- National Science Teachers Association:
  - *2004 Teacher Preparation Standards*

Knowledge Base

- Content knowledge of physics
  - Subject matter
  - Process skills
- Pedagogical knowledge
  - How students learn
  - How to match teaching and learning
- Pedagogical content knowledge

Authentic Best Practices

- Addressing preconceptions
  - Subject matter preconceptions
  - Epistemological preconceptions
- Teaching for understanding
  - Employing the “Inquiry Spectrum”
  - Applying learning to real-world phenomena
- Promoting metacognition/self-regulation
- Establishing a proper class atmosphere

Student-centered Classroom Atmosphere

- A classroom will be **student centered** to the extent that the teacher builds on knowledge students bring to the learning situations.

Knowledge-centered Classroom Atmosphere

- The classroom will be **knowledge centered** to the extent that the teacher helps students develop an organized understanding of important concepts in the physics teaching discipline.

Assessment-centered Classroom Atmosphere

- The classroom will be **assessment centered** to the extent that the teacher makes students' thinking visible so that ideas can be presented and verified.

Community-centered Classroom Atmosphere

- The classroom will be **community centered** to the extent that the teacher establishes classroom norms that learning with understanding is valued and that all students feel free to explore what they do not understand.

Physics Teacher Education Program

Required PTE courses

- PHY 209 - Introduction to Teaching
- PHY 302 - Computer Applications
- PHY 310 - Readings for HS Teaching
- PHY 311 - Teaching HS Physics
- PHY 312 - Teaching by Inquiry
- PHY 353 - Student Teaching Seminar
- STT 399 - Student Teaching in Physics

Special PTE Projects

- Inquiry-oriented Labs (110, 111, 112)
- Service Learning Project (209)
- Discussion Leadership (310)
- Lesson Study, Role Playing, Capstone (311)
- Student Performance Tasks (312)
- Social Context Project (353)
- STT Effectiveness Reporting Sys (399)

Other Trends 1

- Learning theories and learning styles
- Learning cycles
- Inquiry teaching
- Active learning
- Chunking behaviors
- Authentic problem solving

Other Trends 2

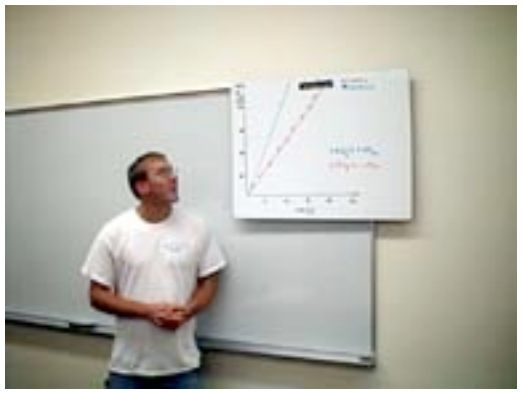
- Conceptual understanding and intuition
- Alternative assessments
- Novice versus expert understanding
- Deep versus surface learning
- Mental models
- Critical thinking tasks

Other Trends 3

- Curriculum projects and management
- Diagnostic and study skills
- Cooperative learning
- Inclusion
- New strategies (PBL, peer instruction, structured problem solving, case study method, inquiry demonstrations & labs)

Classroom Technology

- Whiteboards
  - Peer instruction
  - Socratic dialogues



- Classroom response systems “clickers”
- Interactive computer simulations
- CBL- and MBL-based inquiry labs

Teachers in Residence

- Teaching/co-teaching courses
- A “reality check” for universities
- Liaison with schools & teachers
- Recruiting teaching candidates
- Mentoring candidates & new teachers
- Supervision of student teachers
- Managing learning assistant program

Current National Initiatives

- PTEC and PhysTEC – two coalitions dedicated to improving physics teacher preparation
- comPADRE – a website with resources for teacher educators
- UTeach – an NSF-funded initiative involving fewer than 10 universities

Current ISU Initiatives

- Levels of Inquiry
- Learning Sequences
- National Institutes for Physics Teacher Educators (NIPTE)