

What is “Teacher Effectiveness” and How May it Be Assessed?

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Supported in part by PhysTEC through NSF PHYS #0108787

Effective at doing what?

Teachers have many goals...

- Non-subject-specific learning goals
- Science process skills
- Science attitudes
- Science content knowledge

Goals

- Non-subject-specific learning goals
 - *Functioning*: sustained, persistent on-task effort
 - *Reasoning*: observation, classification, correlation
 - *Attitudes*: interest, enjoyment, and perseverance
 - *Process*: productive questioning, thoughtful investigation
- Science process skills
 - Control experiment, test conclusions and reproducibility
- Science attitudes
 - Interest, enjoyment, and perseverance in science learning
- Science content knowledge
 - Understanding of concepts and unifying principles, ability to apply in solving problems and applying to real contexts

Weighting of learning goals as function of grade

Different grade levels have emphases on different goals:

- *lower grades*: more emphasis on general learning and process skills
- *upper grades*: more emphasis on specific science concepts

Assessment Measures

- Direct Measures
 - assessment of learning gains made by teacher's students
- Indirect measures
 - observations of teacher's classroom functioning and pedagogical style
- Pre-service measures
 - assessments of knowledge and skills of teachers in training

Direct Measures

Assessment of Learning Gains Made by Teacher's Students

- Students' non-subject-specific learning skills
 - Qualitative observations + ?
- Students' science attitudes
 - Attitude surveys, e.g., MPEX and CLASS
- Students' science process skills
 - Qualitative observations and rubrics to assess skills with experiment design, execution, and analysis
- Students' science conceptual knowledge
 - Multiple-choice and free-response written diagnostics, interviews

Indirect Measures

Observations of teacher's classroom functioning

- Classroom management
 - are students on-task and engaged?
- Planning and implementation
 - Are instructional goals and plan specified?
 - Is there evidence for effectiveness of materials used?
- Instructor engagement with students
 - Do students use inductive and deductive reasoning strategies?
 - Does instructor use inquiry-based questioning strategies?
 - Assess with rubrics (e.g. RTOP) and qualitative observations by experienced instructors

Preservice Measures

Knowledge and Skills of Teachers in Training

- Knowledge of physics concepts
- Knowledge of science process skills
- Knowledge of “Nature of Science” (practices and philosophies of scientific community),
- Pedagogical content knowledge (knowledge of and interest in issues related to teaching and learning of specific concepts)
- Ability to implement effective methods and guide student inquiry