



Notes on Providing Effective Professional Development for Inquiry Science

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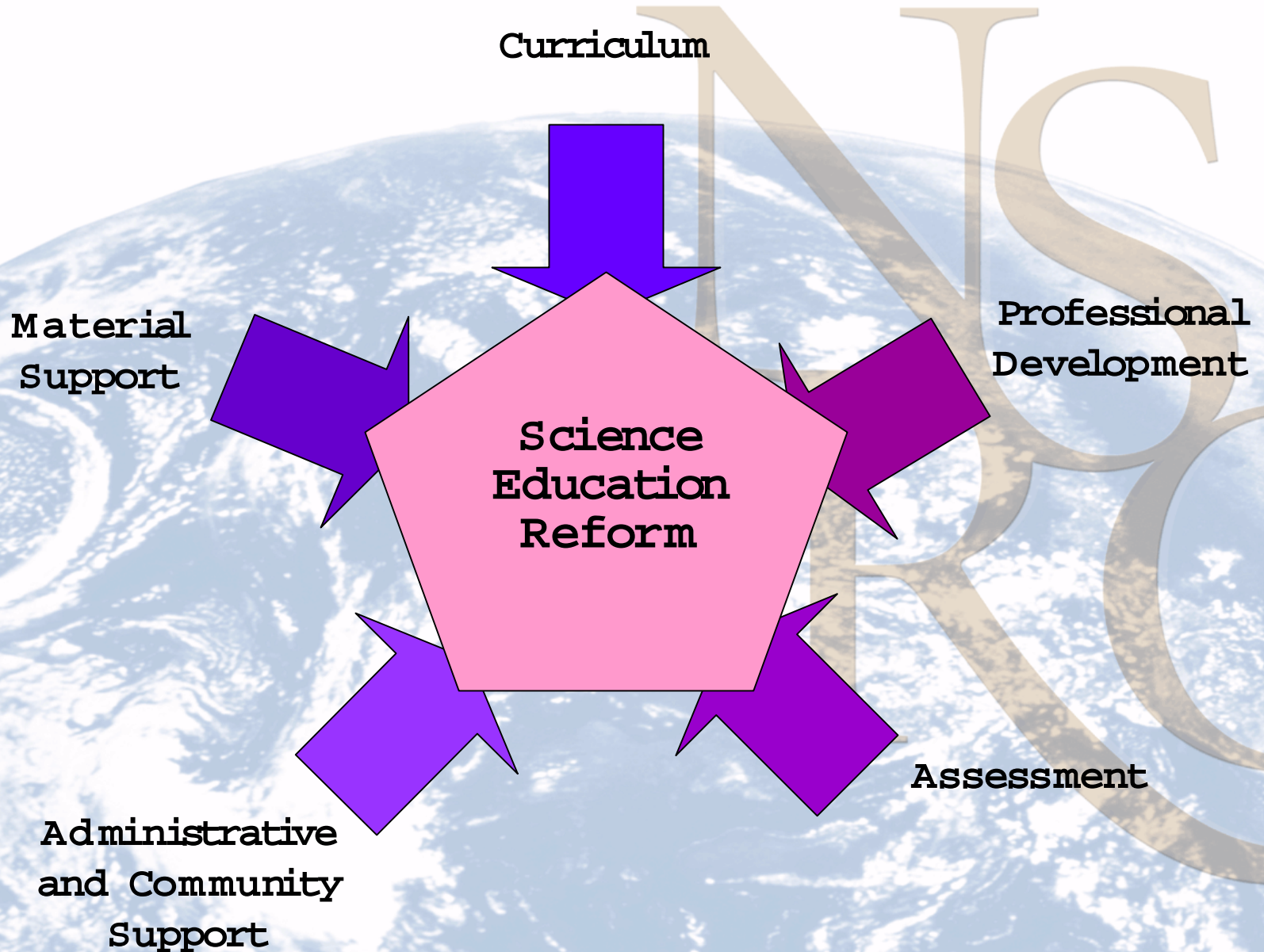
The NSRC

- Established in 1985 to improve the quality of science education for all children
- An organization of the Smithsonian Institution and the National Academies
- Develops inquiry, research-based, curriculum (STC and STC/MS)
- Conducts PD
 - Promotes science education reform (LASER)
 - Provides professional development support (PD Center)

Characteristics of Effective Professional Development

- Aligns with and supports system based changes that promote student learning [“Elements of Reform”]
- Has the teaching of students and their learning at the core of the experience
- Is sustained and uses a wide range of strategies
- Is informed by best available research and practice in teaching and learning
- Builds upon existing knowledge and experiences

PD: One component for Science Teaching Reform



We observe that effective PD

- Relates directly to teacher needs (including local science standards) organization and practice
- Contextualized to available exemplary curriculum materials
- Includes course delivered using exemplary pedagogical techniques
- Encourages teachers to think about how students come to understand science concepts.
- Includes appropriate reference to student development.
- Consists of a continuum of structured, valid professional development experiences

Some Examples of Effective Professional Development Strategies

- Using curriculum as a vehicle
- Immersion into inquiry
- Collaborative examination and research of teacher practice
 - teacher-teacher
 - scientist teacher
- Inquiry based content courses (for college or professional credit)

*See also “Ideas that work—Science Professional Development”



Using Curriculum as a Vehicle for Professional Development

- Implementing new curriculum materials
- Adapting curriculum materials and strategies to better meet student needs
- Creating new instructional materials

Immersion into Inquiry



- Engage teachers in the type of inquiry learning that they will use with their students
- Provide opportunities for teachers to work with scientists and participate in research activities

Collaborative Examination and Research of Teacher Practice

- Examination of classroom case studies—video or narrative—participants develop skills, diagnose and analyze problems and suggest courses of action
- Collegial lesson observation
- Action Research—Examining their own teaching by engaging in classroom research
- Examining student work to understand their thinking and suggest appropriate instructional strategies

Valid professional development experiences

- A continuum of PD experiences designed to provide a progression of experiences.
- Substantial commitment of time (100 – 200 hours/teacher over 5) years
- Ongoing to buffer teacher turnover



Determining Impact

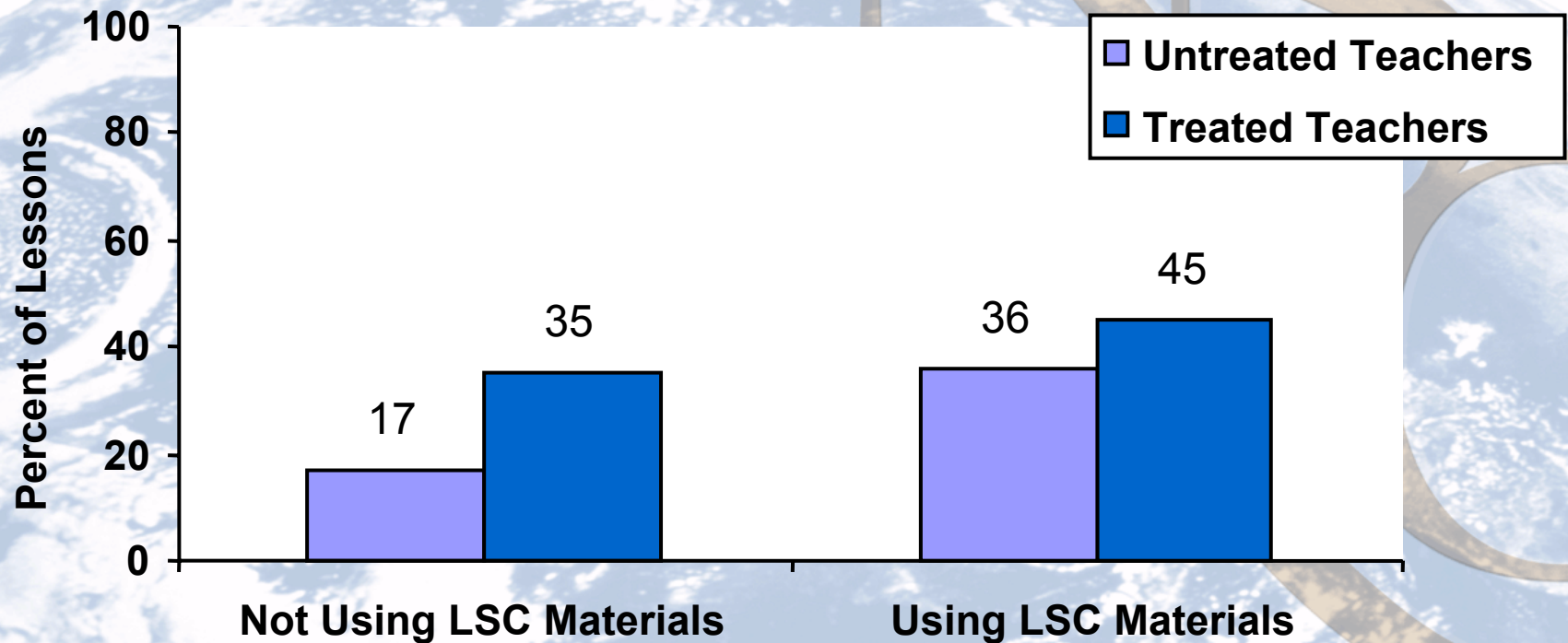
Mainly based on specific case studies

- Oklahoma State (Center for Science Literacy)
- South Carolina (Clemson)
- Washington State (Seattle area)
- Delaware
- ASSET (Around Pittsburg Pennsylvania)

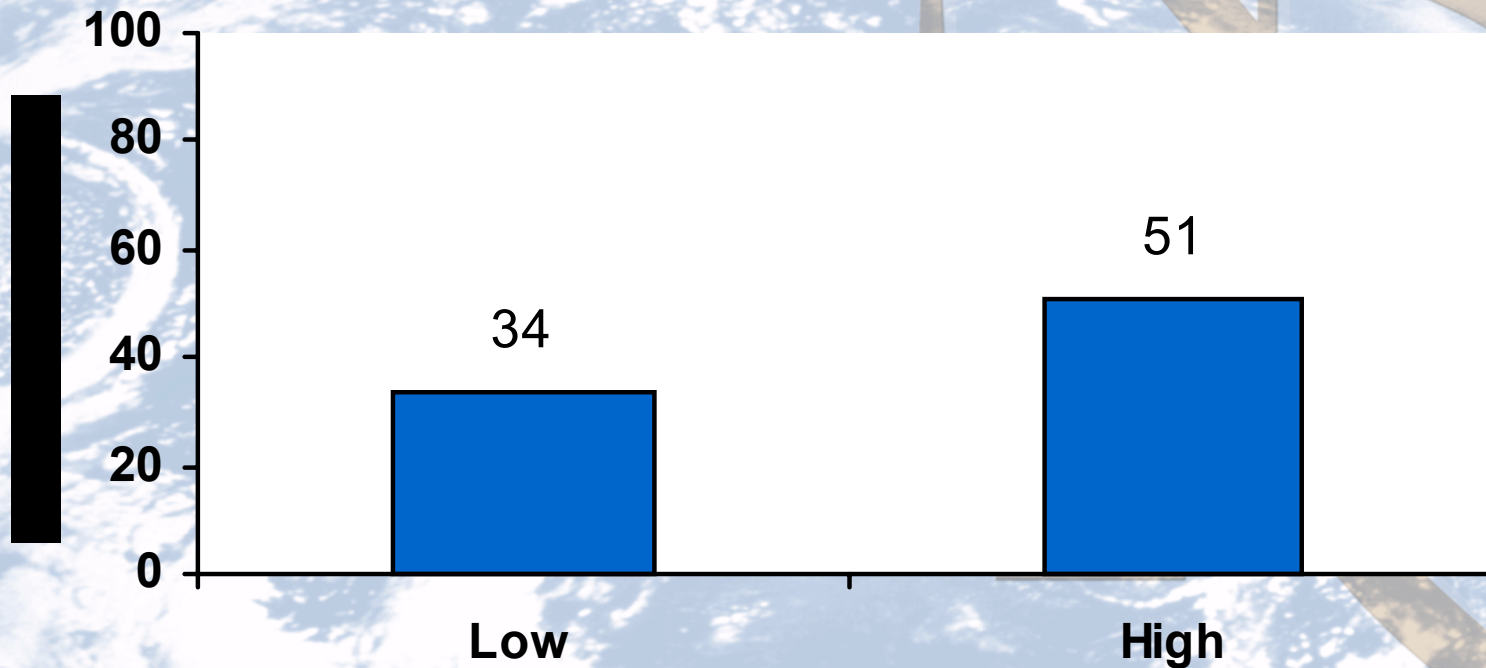
Study of Local Systemic Change Initiative (LSC) Projects

- Designated instructional materials
- 130 hours of professional development
- Target all teachers, not just volunteers
- Address the “system” constraints and incentives

Highly-Rated Lessons, by Use of LSC-Designated Materials and Treatment



Highly-Rated Lessons, by Adherence to LSC-Designated Materials



Weiss et al 2004



NSRC PD Center Strategies

- Overview and awareness workshops
- Curriculum unit implementation courses
- Unit related teacher and teacher leader “second level” pedagogy courses
- Curriculum enhancement courses
 - Inquiry
 - Technology
 - Note-booking
 - Literacy
- Summer Academies—Interaction with scientists
- Content Courses for Graduate Credit