Online Professional Development: Applying What the Research Says for Effective Learning

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Assistant Executive Director
e-Learning and Government Partnerships
The PD Landscape
The Need
and
The Challenge
PD should incorporate the following:

Subject Matter Knowledge and Pedagogical Content Knowledge

Teachers’ Belief System

Understanding How Students Learn

Shulman, 1986, 1987, Morine-Dershimer et al (1999); Bransford et al. (2000); Hennessey (1999); Appleton (2002); Brickhouse (1990); Carlsen (1992); Czernai & Lumpe (1996); Gess-Newsome (1999); Glasson et al. (1993); Heywood (2007); Howitt (2007); Jones et al (2007); Lee (1995); Lee & Houseal (2003); Luera (2005); Morine-Dershimer et al. (1999); Munck (2007); Nespore (1987); Pajares (1992); Posner et al. (1982); Schmidt & Buchman (1983); Shallcross et al. (2002); Simmons et al. (1999); Tobin & Fraser (1990); Wenner (1993); Yerrick et al. (1997)
A significant, positive correlation exists between student achievement and teachers’ content knowledge (subject matter & pedagogical content knowledge)

Detrimental effects occur when teachers do not feel confident in science
The US PD Landscape

What we know—Local Systemic Change K-8 Evaluation: (75,000 data points - 10 yr NSF Longitudinal study)

Teachers of Science with less than 16 hours of PD in last year:

– What % at K-4 level? 76%
– What % at 5-8 level? 57%
– What % at 9-12 level? 32%

Research calls for 50-80 hours/yr to effect a change in practice.

Statistics for Professional Development

• What return-on-investment is typical for face-to-face Professional Development?

  06-07 US Dept. of Ed Math/Science Partnerships:
  ▪ Funded 501 projects at $181 Million
  ▪ Average award per project: $337,000
  ▪ Average # teachers impacted/project: ~110 teachers
  ▪ Total Teachers Impacted: 56,000. Total in US: 3 Million

• How many completed an online professional development course in the last year?

  You are not alone! In 2008 over 3.9 million learners in the US took a course online…

  (The Sloan Consortium: Staying the Course: 2008; Project Tomorrow; National Survey on Internet Use; 2008).
Welcome to Your Personalized Learning Web Space!

Albert, you’ve already earned 1555 Activity Points!

You’ve recently earned: Gold Indexer Complete Indexers You’re close to earning: Sapphire Commenter Post 16 more comment/questions

Be sure to update your profile and review your points & badges!

With these resources you can build your professional development plan, track your activities and assess your progress. You can start at “Explore Learning Opportunities” below or by creating your game plan with the PD Plan and Portfolio tool. You may also review an archived Web Seminar or a multimedia overview of the Learning Center.

Explore Learning Opportunities
- Advanced Search
- See all FREE Lesson Plans
- See all FREE Resources

NEW LIVE SUPPORT
Online Advisors now available!

Featured PD Resource
Ocean’s Effect on Climate and Weather: Global Circulation...
### April 2011: 6,100+ e-PD Resources and Opportunities

#### Do-It-Yourself Learning
- SciGuides [39]
- Science Objects [80]
- SciPacks [21]
- Archived Seminars/Podcast [350+]

#### Live Online Seminars & Classes
- Web Seminars [120/yr]
- Short Courses [50+/year]

#### Books & Articles
- Journal Articles [3,600+]
- NSTA Press Books [252+]
- e-Books [136+]
- e-Chapters [784+]

#### In Person Experiences
- Symposia [6-10/year]
- PD Institutes [6-10/year]
Last Four Quarters

Active User Growth

Over 76,000 Educators
Last Four Quarters

582,757 Resources in Libraries

6,100 resources
582,757 additions
across users’ libraries
Learning Center Resources

FREE NSTA Science Objects
Currently 80 free two-hour Science Objects are available:

- Force and Motion
- Electric and Magnetic Forces
- Nature of Light
- Energy
- The Universe
- The Solar System
- Earth, Sun and Moon
- Gravity and Orbits
- Cell Division and Differentiation
- Cell Structure and Function

- Resources and Human Impact
- Coral Reef Ecosystems
- Plate Tectonics
- Earth’s Changing Surface
- Rocks
- Ocean’s Effect on Weather and Climate
- Chemical Reactions
- Atomic Structure
- Nutrition
NSTA SciPacks

3-5 Science Objects

10-Hour, self-directed, inquiry-based learning experience

Content Mentor
Email Support

Assessment and Certification

Pedagogical Implications

National Science Teachers Association
Certification of Science Content Proficiency

NSTA Learning Center

Interactive Learning beyond Narrative and Images

Which of the following best describes the concept of inertia?

- Inertia is just a name that describes the fact that an object obeys Newton's first law.
- Inertia is sort of an "internal force" that actively resists changes in motion. For example, when you try to push something, its inertia pushes back on you.
- Inertia is something that pushes an object along once you have thrown and released it.
- Inertia is something an object has when it's moving, an object loses its inertia.

If a force is exerted on an object, you can be sure the object will accelerate.

Check Your Thinking

False. In order to figure out whether or not an object will accelerate, you must determine the net force acting on it. It's possible that the force in question is balanced out by another force, leading to zero net force and zero acceleration.
Learning Center
Tools
PD Indexer and The PD Plan and Portfolio

- Diagnose gaps in Content Knowledge Understanding
- View Resources and Opportunities for Consideration
- Add to your Plan
### Cronbach Alpha Internal Consistency

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Learning Center
Community
Building a Vibrant Learning Community

- Psycho-emotional Opportunities
- Compelling Content
- Social Engagement
Wendy Ruchti
Wendy Ruchti has been part of the Educational Foundations Department at Idaho State University's College of Education since 2008. She received a PhD in Education from the University of Idaho in 2005 with an emphasis in curriculum and instruction in STEM education. At ISU, she has taught several educational foundations courses. Her research interests include elementary science education and creating collaborative online learning environments. Before coming to ISU, she taught middle school science and math.

Lara Smetana
Lara Smetana is an assistant professor of science education at Southern Connecticut State University. She brings classroom experience as an 8th grade physical science teacher and has worked with a variety of informal education programs across the country. Lara teaches courses in elementary science methods and educational technology and mentors student teachers. Her research interests include pre- and in-service teacher education and the use of educational technology in science teaching and learning.

Kathy Sparrow
Dr. Kathy Sparrow is currently an adjunct professor at Florida International University (FIU), teaching Elementary Science Methods. She previously worked as a middle and high school science teacher as well as the Science Supervisor for Akron Public Schools. She was a Regional Director for SECO, served on the NSTA Board of Directors and was president of the National Science Education Leadership Association (NSELA). Kathy was also awarded the Outstanding National Science Supervisor Award in 1999.
While looking for something else I came across a great Podcast (7 minutes long) which provided insight on being a scientist and using the scientific method. It is a must for a teacher and students to hear. I suggest your listen to this scientist describe his involvement with the scientific method and then share your thoughts on this as well.

Attachments

Podcast: Scientific Method (Podcast)

What an awesome discussion. I have spent time reading, researching and reflecting on this thread. There is part of the discussion that I think I disagree with:

"the scientific method is great for young children who have not developed a strong cognitive ability to think. If the same as you have to learn to walk before you can run. The scientific method is a way for them to gain an understanding of the process. However, as they grow older and have more experiences and make more decisions they should be weaned off this and introduced to scientific inquiry."

I believe all children, even very young children can think scientifically and therefore engage in the inquiry process. I am attaching an article which talks about young children doing science inquiry and a graphic from one of my favorite authors, Karen Worth.

So what do others think?
Welcome to Your Personalized Learning Web Space!

Albert, you've already earned 1250 Activity Points!

You've recently earned:
- Ruby Commenter
  - Post comment/questions
- Sapphire Commenter
  - Post 16 more comment/questions

You're close to earning:
- Activity Progress Bar
- Your Activity Matters!
  - It saves Polar Bears!

Be sure to update your profile and review your points & badges!

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Learning Center
Efficacy and Accountability
Indexers and Assessments

Force and Motion Assessment
1437 Pre-tests taken with a 57% avg score
473 Post-tests taken with a 69% avg score
totals as of 9/14/2010

Rock Cycle Assessment
226 Pre-tests taken with a 60% avg score
77 Post-tests taken with a 72% avg score
totals as of 9/14/2010

Energy Assessment
1005 Pre-tests taken with a 67% avg score
325 Post-tests taken with a 81% avg score
totals as of 9/14/2010
Research on the Learning Center


• **Experimental Design Study:** Pretest-posttest delayed-treatment/control group design with random assignment finds *significant gains in teacher content knowledge, teacher self-efficacy, and students’ learning for grades 5-8 in treatment group across two SciPacks.* (2009) n = 56, large Midwestern district, teachers in grades 5-8.

• **Descriptive Quantitative Study:** Found *significant gains in teacher learning* for pre-posttest and pretest-final assessment across 7 different SciPacks. (2010). n = 85, teachers in grades 3-6 from 11 different states.
Learning Center
State and District Deployments

Over 200 unique deployments across 70 State/District Partnerships as of January 2011
2010 National Education Technology Plan

Through online learning systems, teachers may enhance their learning through blending the best of onsite PD with online PD that provides immediacy, convenience, self-direction, and collaboration with other colleagues and experts via professional learning communities.

For teachers to effectively facilitate using interactive resources, learning systems, and connectedness to online communities, teachers need to experience it firsthand—as part of their own learning and professional development.

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Recognize our Collaborators
Thank You

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The NSTA Learning Center
http://learningcenter.nsta.org