Connecting Teaching Lab Development with Education Research: An Introduction

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Introduction

This mini-workshop detailed an approach to lab design based on using the methods and findings of education research. It was intended as an introduction to this process.

Resources for Education Research

The best source for education research papers is the ERIC (Educational Resources Information Center) database. It is a very complete listing of articles from the education journals and papers presented at conferences. You go to http://ericir.syr.edu and then click on the "Search ERIC database" link.

I have no sophisticated strategy for searching; I use the 'shotgun' approach. For example, to find references on photosynthesis, I searched for "Term 1: photosynthesis AND Term 2: misconception" and looked through the resulting hits.

Major Journals

There are **many**; these are the ones I've found most useful to browse. All are available through UnCover (http://uncweb.carl.org) and at most education libraries.

- *Journal of Research in Science Teaching* (JRST) One of the most prestigious science education journals. It tends to have very high-quality articles with a strong research focus.
- *Science Education* this journal also has a strong research focus.
- *International Journal of Science Education* ditto
- *Journal of Computers in Math and Science Education* ditto
- *Journal of College Science Teaching*. Articles are typically based more on practice than on research.

References: Good Starting Points for Methods and Ideas

1. **Quantitative Methods** Several good analyses of open-ended surveys and interviews:
    - *Undergraduate Science Students' Images of Science* Ryder, et al., JRST 36(2) 201-219 [1999]
    - *Changes in Students' Understanding of Evolution Resulting from Different Curricular and Instructional Strategies* Jensen & Finley, JRST 33(8) 879-900 [1996]
    - *Variable Uses of Alternative Conceptions: A Case Study in Current Electricity* Heller & Finley, JRST 29(3) 259-275 [1992]
    - *Preservice Teachers' Views of the Nature of Science during a Postbaccalaureate Science Teaching Program* Palmquist & Finley, JRST 34(6) 595-615 [1997]
    - *Influence of a Reflective Explicit Activity-Based Approach on Elementary Teachers' Conceptions of Nature of Science* Akerson et al., JRST 37(4) 295-317 [2000]
    - *Science as Argument: Implications for Teaching and Learning Scientific Thinking* Science Education Kuhn, 77(3) 319-337 [1993]

2. **Qualitative Methods**
    - An excellent comparison of several methods of analysis of classroom interactions: *Interpreting Students' and Teachers' discourse in science classes: an underestimated problem?* Klassen & Lijnse, JRST 33(2) 115-134 [1996]
    - An in-depth analysis of classroom discourse: *Teacher Questioning in an Open-Inquiry Environment: Interactions of Context, Content, and Student Responses* Roth, JRST 33(7) 709-736 [1996]
    - Two detailed analyses of classroom interactions by Kelly & Crawford:
        - *Students' Interaction with Computer Representations: Analysis of Discourse in Laboratory Groups* JRST 33(7) 693-707 [1996]
        - *An Ethnographic Investigation of the Discourse Processes of School Science* Science Education 83 533-559 [1997]