Teaching for Understanding
Summer Institute
Strong Museum, July 11-15, 2005
Notes & Thoughts
Mark D. Fairchild
Project Zero's mission is to understand and enhance learning, thinking, and creativity in the arts, as well as humanistic and scientific disciplines, at the individual and institutional levels.

Through Lines

- What is understanding and how does it develop?
- How is inquiry related to understanding?
- How can frameworks help us support all our students in developing genuine understanding?
Monday, July 11

- What is understanding?
- Think of something you understand; How was that achieved?
  - Practice & Reflection
  - With Sustained Motivation

- How do you know you understand?
  - Success, Satisfaction, Recognition, Explain to Others, Repeatable, Gets Easier, Extend to New Situations/Uses, Fix Errors

- Performance-View Definition
  - UNDERSTANDING is the capacity to use information and ideas flexibly in novel circumstances.
Interpretation in Different Media

- What is Understanding?
- How does understanding develop?
- How does a poem mean?

Understanding is comfort with topic
Develops through practice, reflection, play
Discussion is an accelerator/expander
A poem means by providing the raw material for understanding
Can completely stand alone, but doesn’t need to
Tuesday, July 12

- Jigsaw on understanding
  - 16 students
  - 4 papers assigned
  - Each paper read by 4 students

Session 1

- Break into 4 groups by paper read
- Answer 3-4 questions on the paper as a group
- Discuss answers to understand paper
Session 2

- Shuffle groups
- Each group of 4 has one representative for each paper
- Answer 3-4 questions about an example (learning experience in this case)
- End with full group discussions/review

AM Conclusions

- In addition to other attributes, understanding also requires ...
  - PLAYFULNESS
  - SERENDIPITY
Pre-Knowledge Sticks

- Need to empty out the old ideas
- You are not just filling a void
- Harvard grads: Explain the seasons or phases of the moon?
- MIT grads: Light a bulb with one wire and a battery?

Dimensions of Understanding

- PURPOSES (Why, Reasons)
- METHODS (How, Processes, Disciplinary)
- FORMS (Where, Product, Outcome, Tools)
- KNOWLEDGE (What, Content)
Using Dimensions

- Laying out objectives in the 4 dimensions
- Choose and refine your teaching based on what you want to do in those 4 dimensions
- USE ALL 4 (not just knowledge)

Disciplines

- Pre-disciplinary Learning
  - Topics that cross disciplines and are interesting
- Disciplinary Learning
  - Learning tools well
- Inter-Disciplinary Learning
  - Solving the toughest problems
Wednesday, July 13

- WHAT ARE DISCIPLINES?
- Communities with some common understanding, interests, motivations, and processes.
- Topic: Tip of the iceberg
- Discipline: The whole iceberg

A Goal ...

- Help develop students who can look at a situation through the “glasses” of various disciplines (the scientist, the artist, the historian, the engineer, the writer, etc.)
Disciplines (Slices of Pie)

- **PURPOSES** (similar across disciplines - center)
- **METHODS**
- **FORMS**
- **KNOWLEDGE** (different across disciplines - edge)

- Do educators spend too much time on knowledge (not readily transferred across disciplines) and not enough on purposes (readily transferred)?

Levels of Understanding

- **NAÏVE**: no ability or alertness, low inclination (internal)
- **NOVICE**: range of ability & inclination (external), low alertness [rote & ritual]
- **APPRENTICE**: range of ability, high internal inclination, highest alertness
- **MASTER**: highest ability, inclination, alertness
Entry Points

- How does form follow function in flowers? (A question in botany).
- How do entry points contribute to and distract from the development of understanding (A question of pedagogy).

Entry Points

- **Aesthetic:** ... Start by observing and drawing what you see. Group says what they see and what it does.
- **Interpersonal:** ... I think it ... and share/discuss
- **Quantitative-Logical:** Sorting ... sort by some attribute then name the sorting and explain why (each taking turn).
- **Experiential:** Dissecting and translate into motion
- **Narrative:** List words and write a poem
- **Philosophical:** What is, why, and what evidence
Narrative Example

☐ A writing tool
☐ List words under...
  ☐ See, Hear, Smell, Feel, Think, etc.
  ☐ Take them together to write

Circular symmetry wonders
Tough flowers fragile
Beauty is a function
Spongelike cave surprises
Curiosity enlightened
Mysteries unsolved
Subtle smudges leave dusky patterns
Squeeks!
Thursday, July 14

We do not describe the world we see;
We see the world we can describe.

-Peter Senge

Teaching for Understanding Framework

- Generative Topics
- Understanding Goals
- Performances of Understanding
- Ongoing Assessment
**Generative Topics**

- Central to some discipline(s)
- Engaging to students and teachers
- Accessible through resources
- Richly connected to other valued topics

**Understanding Goals**

- Explicitly articulated for clarity
- Publicly posted and referred to
- Directly aimed at concepts to be understood (not work to do)
Performances of Understanding

- Development and demonstration of understanding
- What is done to learn
- CRITERIA:
  - Active engagement, Thinking, Aimed at understanding goal, Expanding of context

Ongoing Assessment

- Occurs throughout instruction (not just at the end)
- Focuses on learning and understanding (not just judging and grading)
- Varies by who does and how conducted
- Refers to public criteria known to students
“Lesson Plans”

- Grade & Subjects
- Overarching Understanding Goals (Through Lines)
- Generative Topic (Unit)
- Unit-long understanding goals
- Sequence of understanding goals
  - Introductory, Guided Inquiry, and Culminating performances
- Skill strands (Criteria for evaluation)

General Learning Methods

- (1) Play, then Play, then Test
- (2) Lecture, then Read, then Test
- (3) Play, then Lecture or Read, then Test

- #3 works best for understanding
  - Early education errs on #1 side
  - Later education errs on #2 side
  - #3 works on all levels
You are teaching for understanding when ...

- The learning is generative
- The understanding goals are clear and explicit
- Students are working on performances of understanding almost constantly
- The assessment is ongoing

Faculty Meetings

- Would be better to be about teaching for understanding instead of administrative trivia.
- Huge changes could occur.
- e.g., Bi-weekly faculty/staff “dangerous” seminars
Assessment Funnel

- **WHO**: Self, Peers, Teachers, Other Experts?
- **WHAT STUDENTS**: Say, Make, Do?
- **How**: Casual or Formal Looking?
- **When**: All Understanding Performances!
- **Why**: To gather evidence of understanding.

Want to mix up a variety of assessment types in a given course.

Self & Peer Assessments

- If the students are involved in doing the assessment, it is also a performance of understanding.
Always keep aiming at your understanding goals...

Friday, July 15

- Museum Resources
- Assessment Strategies
Museum Points of Entry

- Slow down
- Explore a single artifact with entry point types and questions
- not 7 seconds per object ... 30 minutes per object

MUSE-QUESTs Booklets

- Questions for Understanding, Exploring, Seeing, and Thinking

These five games synthesize the structure of The Generic Game with The Entry Point Approach to learning, which accommodates individual differences among learners. The result is five different sets of open-ended questions, each of which accesses learning through a particular entry point: 1) Experiential, 2) Narrative, 3) Aesthetic, 4) Foundational, and 5) Logical/Quantitative.
Ongoing Assessment

- How are performances of understanding assessed (use various methods)
- Do it continuously, not just at the end

Resources

- Teaching for Understanding Guide (work book)
- Teaching for Understanding: Linking Research with Practice (research book)
- The Disciplined Mind
- MUSE QUESTs Booklets
- <www.pz.harvard.edu>
Conversion of Material

- From Traditional Unit Topic to Generative Topics
- From Behavioral Objectives to Understanding Goals
- From Activities/Lessons to Performances of Understanding
- From End of Unit Evaluation to Ongoing Assessments

Overall Conclusions

- There is a better, systematic, way to improve learning ... but the molds need to be broken, at least a little bit.
- Easily adapted to graduate education ... more difficult (subversive) at lower levels.
- Continuous improvement.
What is understanding and how does it develop?

- Ability to apply knowledge in novel circumstances.
- Information & Ideas.
- Communication in multiple media, disciplines, modes.

How is inquiry related to understanding?

- Inquiry provides motivation
- Pose meaningful questions
- Address & reflect upon inquiries of meaning to learners
- Relate to the world & life
How can frameworks help us support all our students in developing genuine understanding?

- Organize the closet of teaching units
- Keep focus on understanding goals
- Integrate performances of understanding with ongoing assessment
- Break out of the stranglehold of teaching to examinations...

The Multiple Intelligences

- Logical-Mathematical Intelligence
- Musical Intelligence
- Spatial Intelligence
- Bodily-Kinesthetic Intelligence
- Intrapersonal Intelligence
- Interpersonal Intelligence
- Naturalist Intelligence
RIT Followup

- Community
- Workshops
- Followup Discussions/Reflections
- Change courses one little step at a time ... forever.