The Web in High School Science Teaching: Constructing a Technology in Practice

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How does the teacher enter the mediating space between student(s) and technology?

Subject Matter

Web Technology

Teacher

Students

How does the nature of the information space affect the work of teaching?

Textbooks

Curriculum

Materials

The Classroom

The Web

Unbounded

Unfamiliar

Unpredictable

Can be false

useless, or

misleading

Up-to-date

Broad range of

content

Multiple

representations

“Authentic”

content

Critical elements:
- Task design: fit to curriculum, method of assessment
- Student products: continuous or final, group or individual
- Classroom layout: availability of technology, support

The Challenges:

Fitting the Web into the curriculum
- Integrating with content goals
- Preparing by finding online resources and making something of them
- Managing technology problems

Managing classroom discourse
- Knowing what you know and don’t know to be able to respond appropriately to student’s ideas
- Keeping track of student activity
- Managing differences in student work

Establishing accountability for knowledge
- Assessing student work
- Keeping knowledge at stake - i.e., maintaining substantive learning goals

What can the technology give to the teacher as a resource for teaching?

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What’s Missing:
- Contextual clues: What is the student doing, where is she heading?
- History: What has the student done before, what has he learned?
- Boundaries: In what domain will the student work? (In what ways can the teacher know that domain?)

Make the mediating space more meaning-filled

Data

Three teachers, no special access to technology, “ordinary” teachers doing what any teacher could do
One Web unit (1-2 weeks) each
Pre- and Post-interviews
Classroom video
Observation notes
“Process video” - student work on computers

Data Analysis:
- “Event Recorder”: Analysis of time and sequence of teaching episodes
- “NUDIST”: Coding and Analysis of transcripts and notes

Data Categories:
(1) What is the task or phase of teaching? (TASK)
(2) What is the content of the teaching? (CONTENT)
(3) What is the teacher teaching? (CONTENT)
(4) How is the teacher teaching? (ACTION)
(5) What are the apparent challenges of the teaching? (CHALLENGE)

Owens’ Chemistry
Classroom 5/18/99 34 Interactions
- Students searching on-line for information about radium
- Open-ended assignment
- Assessment of their performance in a debate
- Computers always on-line, available in the classroom
- Web assignment different from usual classroom routines
- Used a broad range of content
- Used up-to-date content, not available in textbooks
- Pushed the teacher’s knowledge to the limit, teaching more than you know
- No meaningful boundaries, no contest for the teacher to work with

Varner’s Physical Science
Classroom 5/11/99 81 Content Interactions
- Learning to use weather maps
- Using the American Meteorological Society web site
- Highly structured assignment
- Evaluated on written questions answered daily
- Laptops brought into the classroom - a special event

Varner’s Physical Science Class
- Used up-to-date data
- Doing what they were learning to do
- Read weather maps, forecast the weather
- Rounded assignment, bounded domain
- Teacher knew the site well
- Similar to traditional textbook use

Robbins’ Biology
Classroom 5/4/99
- Reports on infectious diseases
- Open-ended assignment
- Use on-line and print resources
- Evaluation of the reports
- Computers always available and on-line

Robbins’ Biology
Classroom 5/4/99
- Internet completely integrated
- Just another tool
- Biopsychic use of the Web
- Information found, not worked on
- Interactions focused on finding content

- Author
- Teacher
- Student
- Location
- Teacher’s path

- Computer
- Student
- Location