Meeting Student Challenges to Innovative Instruction with Improved Assessment Techniques

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What's "innovative" instruction?

What do you think?

- Project-based
- Student-centered
- Collaborative
- Constructivist

What do all these approaches have in common?

- What do you think?
- Teacher not lecturing
- Teacher coaching
- Teacher facilitating
- Students leading the work

What sometimes happens…

- Students say…
- "This is too hard…"
- "Just tell me what to do. That's what good teachers do…"
- "You're making me do your job…"
- "What am I learning here anyway?"

What also sometimes happens…

- The dean says…

- "How do you know that this lesson is meeting our SLOs?"

- "I've gotten some complaints from students about this lesson. What's up?"

How we want to respond…

- "I can show you that they're learning MORE than the simple facts,
- It teaches students how to apply that knowledge in the real world…"

How can you back that up?

- By using some of the ideas and tools from this presentation
- In this presentation I will:
  - Review an R&D project around assessment of project-based learning involving community college instructors in the U.S.
  - Engage you in some of the reflection activities that helped instructors identify and measure the skills taught in innovative instruction

Project Background: CTE Instruction

- Career and Technician Education (CTE)
- New 21st-century technical fields such as biotechnology, forensics, & environmental science require:
  - Hands-on skill but also...
  - Application of advanced math and science concepts
  - Coordinated interdisciplinary teamwork that requires excellent communication skills

Description of Scenario-Based Learning Project

- 2003-Present
- National Science Foundation's
Advanced Technological Education program
- Produces online instructional materials that engage student teams in solving real world problems in a variety of workplaces
- Pedagogy represented a departure from pure technical content-focus
- Involved community colleges in California, New York, Wisconsin, and a 4-year university in Utah

QuickSoft Associates-- Ajax

Welcome & Orientation

Welcome

Orientation

Tasks & Assignments

1.0: Bicycle Club Website

1.1: Requirements document

1.2: One feature fully implemented

1.3: Two features fully implemented

1.4: All features fully implemented

1.3: Two Features Fully Implemented

Overview | **Requirements** | **Resources** | **Debrief**

From	Project Manager
Subject	Deliverable 3

I'm glad to see that most of you have implemented one feature. Our client is impressed with the quick results, and it is very helpful for marketing to have something concrete to show them.

In fact, our clients are so impressed that they have offered a bonus of $1000 per team. You will each be able to divide up this $1000 between team members in whatever way you feel is fair. When you submit the fourth and final deliverable as a group, you will each (individually, and privately) also submit a note telling me how you think the bonus should be divided up between your group's members.

For the meeting next week, you need to fully implement another feature. Again, the screen layout doesn't have to be real pretty because we'll put the graphic designers on it later. Please just make it easy to read.

Again, please post questions and post your deliverable to the website.

..Palo Alto Bicycle Club
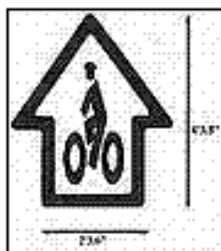
Current Weather

04/10/2009

Palo Alto   51 °F

® accuweather.com

www.flickr.com

Top 10 Reasons To Join Palo Alto Bicycle Club

10) would bike your way to health and happiness.

9) would remember to pray before a meal and stretch before a bike ride.

8) would remember to CYA in office and bike ride.

7) would remember when biking and talking. You are YELLING.

6) would remember any saddle no good for men, but might be fun for women.

Find out the rest by joining P.A.B.C. !!!

Club Membership

Latest News

Latest_on_PABC   LOGIN
0 Followers   FOLLOW

There will be a party after Sunday group ride at Max's
22 days ago   ☆ ↰

Monday 2:11
Latest_on_PABC

twitter   GET WIDGET >>

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Innovative Lesson: Lots learned, but how can you document it?

- How would you document student learning in this task?

- Approach: *Evidence-centered assessment reflection* (EC-AR)
  - Based on evidence-centered design (ECD) (Messick, 1994; Mislevy, 2007; Mislevy & Riconscente, 2006)
  - Allows assessment designers to capture more complex student performances in a wider range of assessment tasks
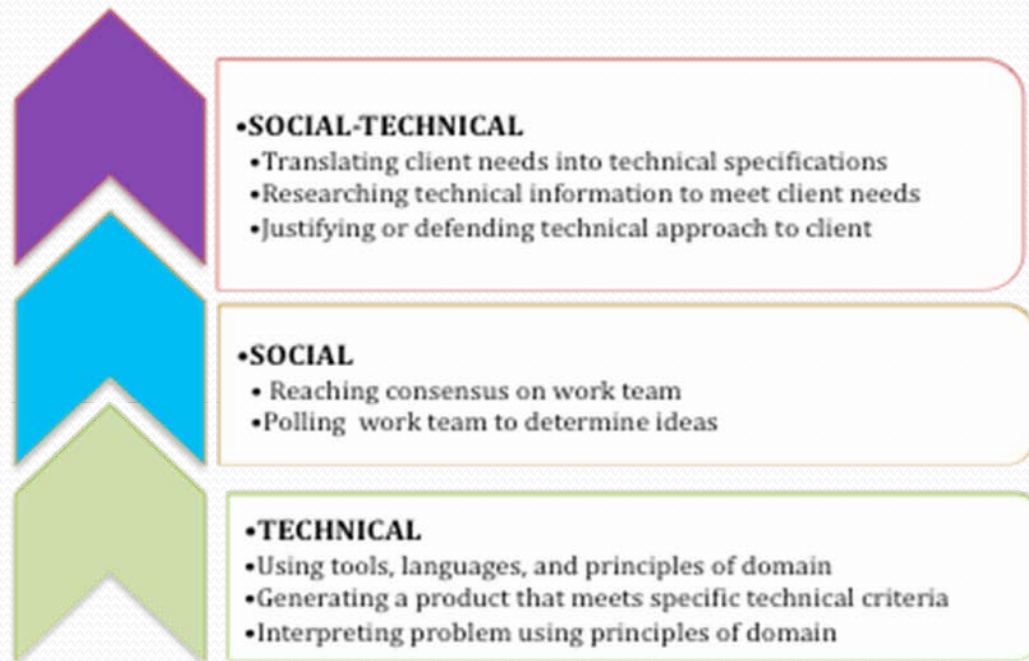
Approach: EC-AR Process

- CTE instructors had designed SBL tasks
- Instructors participated in EC-AR Interview
  - Instructors identified key priorities and learning goals of SBL tasks (Domain analysis, EC-AR Step 1)
  - Instructors documented learning goals and ways to get evidence (behaviors, work products, assessment features) that students have achieved the goals in "assessment blueprint" (Domain modeling, EC-AR Step 2)
- Researchers created a blueprint
- Instructors and researchers used blueprint to create in-class formative assessments and final summative test items

EC-AR Results

- 72 final assessment tasks

- 44 in-class formative assessments

- CTE instructors identified and assessed a broader range of skills than just the technical

EC-AR Results: Defined 21st Century Skills for CTE Real World Tasks

•**SOCIAL-TECHNICAL**
 •Translating client needs into technical specifications
 •Researching technical information to meet client needs
 •Justifying or defending technical approach to client

•**SOCIAL**
 • Reaching consensus on work team
 •Polling work team to determine ideas

•**TECHNICAL**
 •Using tools, languages, and principles of domain
 •Generating a product that meets specific technical criteria
 •Interpreting problem using principles of domain

EC-AR Results

- Content Validity (Instruction/Industry Experts):
  - Endorsed assessment items as relevant to both education and industry goals.
  - Educators wanted more clarity around learning goals.
  - Industry reps wanted more complexity in assessment tasks.

EC-AR Results

- Construct Validity (26 final test items, 104 Student Think alouds):
  - Comparing high and low performers, we found:
    - Stronger students could coordinate technical and social dimensions
    - Weaker students did not have solid grasp on technical and did not know how to integrate social elements to inform technical decisions.

EC-AR Workshop Activities

- We will do some "quick demo" activities to give you a sense of how the EC-AR process works

- Think of your most innovative classroom activities in this task

EC-AR Assessment Interview Task

Knowledge/Skills to be Learned	Pre-requisite Knowledge/Skills

Real World Application for Learning Goals?

- Does the knowledge or skill you're teaching help students do any of the following:
  - Frame a problem
  - Conduct research or analysis
  - Generate a product
  - Use tools
  - Make inferences or reach conclusions
  - Work on teams
  - Make presentations

Evidence of Learning

What does successful learning look like? (Behavior)	What document or performance can student produce? (Work product)

Final blueprint steps…

- Describe the features of an assessment
  - What pictures, diagrams from the field can stimulate student thinking?
    - Log files for network security, snippets of code for programmers

Final blueprint steps…

- What kinds of questions will help students engage in the behaviors that you want to measure?

  - Not too broad, not too "off the shelf" (Not just Ohm's law computations in engineering)

  - Alignment with what you want to teach: How to read the specifications of a electronic component and determine if component will work in constrained system

Final blueprint steps…

- What kinds of scoring rubrics or keys will you use to score open-ended questions?
  - 3-level?
  - Holistic, analytic?

Summary	In this design pattern, a student is presented with a hypothetical user's specific Web site development needs. Can students integrate the user's needs into a practical software development process?
Rationale	It is important for students to have an opportunity to practice Web site development in a realistic, user-informed way because it helps students apply programming in the service of actual users.
KSAs	■Skill of identifying and asking appropriate questions to specify user requirements ■Skill of generating use cases based on user requirements ■Skill of addressing user needs in specifying system requirements

Potential observations	■Identifying users' primary needs for Web site use ■Define the user's complete range of possible uses for the Web site ■Identifying appropriate Web development tools
Potential work products	■Generate a list of written questions to ask of a user to identify and understand Web site needs ■Write a use case ■Provide a written rationale for user interface decisions and selection of Web development tools ■Sketch or electronic mockup of user interface design

Question #2:

The Everest Hiking and Rock Climbing Club wants to make sure that the end user is able to use the Web site in various ways. Please write up at least three different use cases that specify how the end user will interact with the Web site. Because of time constraints, you do not have to write up the full use case format, just give a descriptive name for each use case.

Possible responses	• user reviews listings of local routes, selects one to read more detail • user searches for packing list of first aid gear for backpacking • user reviews listings of other local outdoor clubs, selects one to read more detail
Scoring Key	Above proficient= comprehensively identifies and articulates what end users want. Offers at least 3 or more searches. Proficient= end user needs are generally included or addressed in specifications, though some aspects are missing, and offers at least 2 searches Below proficient=end user needs are not included or addressed in specifications, or no use cases articulated.

Knowledge and Skills Assessed: Skill of generating use cases based on user requirements. This skill is part of **"Framing a problem and identifying design constraints."**

Suggested Form and Procedure: Paper and pencil test administered by instructor.

Suggested Uses: May be used *formatively* as a pretest to get a sense of students' prior knowledge before participating in the scenario, and the teacher may review the information to see where to give special support on the task to the class. May be used *summatively* in quizzes or final examinations after the task for testing and grading students' proficiency.

Information

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