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Facilitating Knowledge Construction Using Online Tools

For all Pedagoggles: http://staff.georgianc.on.ca/ctl/pub/pedagoggles.htm

Lens on Learning Theory

As societal demands become more complex, teaching and learning research is seeking ways to help students **achieve higher levels of thinking and performance.** One key finding is that **disconnected facts do not result in usable knowledge**. To be useful, facts must be connected and organized in a way that allows **transfer from one context to another**.

> "The meaning of "knowing" has shifted from being able to remember and repeat information to being able to find and use it. More than ever, the sheer magnitude of human knowledge renders its coverage by education an impossibility; rather, the goal of education is better conceived as helping students develop the intellectual tools and learning strategies needed to acquire the knowledge that allows people to think productively about history, science and technology, social phenomena, mathematics, and the arts. (Bransford et. al. 1999)

Because learners construct understanding about a topic, issue, or problem **individually based on interactions, prior knowledge, experience, and mental models**, helping students achieve the type of "knowing" described above is complex and challenging.

Constructivist pedagogy is one approach to teaching that focuses on helping students make more meaningful connections and on organizing information in ways that make sense to the learner. Some basic principals of constructivist pedagogy include:

1. Teaching and learning is focused around **problems** relevant to the students, and using information to construct knowledge related to the problems
2. Learning is structured around key **concepts**, rather than disconnected facts. The learning process seeks to illicit students' prior knowledge, understanding, and experience related to the concepts.
3. **Students' points of view** and suppositions are solicited and used in the learning process.
4. Students are viewed as thinkers with **emerging theories**.

Online tools powerfully support a constructivist pedagogy because they offer the following:

1. an environment where all students and teachers can actively participate in a **learning dialogue**, to share understandings, ask questions, seek elaboration, and make connections.
2. a way of **documenting thinking** – individually and collectively;
3. a **space** where each individual learner can express their thoughts;
4. **access to data** and information that can be used to extend, support, or challenge thinking;

Reflection on Practice

1. What problems or issues in your discipline are relevant to students? How can you structure learning around those problems or issues?
2. How can assignments, class activities, and assessment be designed to facilitate knowledge construction?
3. What aspects of our teaching do we need to rethink in order to facilitate knowledge construction (role of learners, role of teacher, role of the textbook and its content, use of class time, role of assessment, use of technology etc.)?
4. How can the online tools be used to support constructivist pedagogy?

Expanding Your Teaching Toolkit

Understanding Key Concepts

- **Pre-Class Quizzes or Self-Assessments:** Set up online quizzes to review key concepts before class. Spend time in class applying, analyzing, and making connections related to the concepts. Make this worth enough to provide incentive, but not too much since this is the beginning of learning not the end.
- **Interactive Exercises:** Provide links to online interactive tools and structure activities that get students to experiment with concepts and report results. Some examples appear below.
  Virtual Physics Lab http://www.colorado.edu/physics/2000/index.pl?Type=TOC
- **Online Discussions:** Discussions can be set up so that students are involved in analysis based on key concepts. This could include:
  - Evaluating something (article, event, media, argument, structure, model, performance, website, place or person in the community, organization, work of peers, etc.) in terms of specified criteria or using a mental framework, which is used by experts in your discipline.
  - Comparing and contrasting examples of something in relation to key concepts.

Applying Concepts to Relevant Problems

The online discussion tool can support a variety of teaching strategies that focus on problem-solving.

- **Case Studies:** Problem-solve a case online, teaching students a problem-solving process and structuring the assignment to create accountability for the process.
  Teaching with Case Studies: http://tlt.its.psu.edu/suggestions/cases/
- **Debates:** Design a formal online debate as a means of discussing controversial issues.
  Designing Online Debates: http://onlinelearn.edschool.virginia.edu/debate/home.html
- **Scenarios:** Have students take on different roles or perspectives in solving a problem. Each student researches and presents information related to his/her assigned role or perspective.

Facilitating Knowledge Construction

The key role of the instructor in knowledge construction activities is to carefully design the structure and the process of the learning activity and then to monitor, and provide feedback on that process.

- **Posting Assignments:** Design assignments so that each students results contribute to the overall knowledge and understanding of a topic. Have students post their assignments as well as read and respond to each other's work. Writing for a real audience motivates students.
- **Web Quests:** Create an assignment where students visit different websites and collect information in order to solve a complex problem or build knowledge.
  Designing Web Quests: http://www.ozline.com/learning/index.htm
- **Resource Sharing:** Students identify resources (websites, articles, books) that connect to various topics in the course and post an annotation of the resource, which includes a summary, an analysis, and an explanation of how it connects and adds to understanding of the course topic.
- **E-Presentation:** Students compile a Power Point slideshow that requires knowledge construction (i.e. application, analysis, or synthesis related to a certain topic; creating a visual model that integrates a variety of ideas). Students post and discuss these online.

More Information

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