Supporting & Sustaining Innovative Classrooms of the Future

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Biomedical Engineering – GA Tech

• 1997 - Georgia Tech joined with Emory University School of Medicine to establish the joint Georgia Tech/Emory Department of Biomedical Engineering

• First graduate class began in 2000 (7 PhD students); undergraduates in 2001 (40)

• Rated 4th for BME programs -- US News & World Report (8/06)

• 770 FT undergraduates enrolled (‘06); 89 FT graduate students (‘06)

• Combines biosciences + engineering + clinical/medical applications + statistics
“Biomedical Engineers often serve as integrators or facilitators, using their skills in both the engineering and life science fields. They are employed in industry, in research facilities of educational and medical institutions, in teaching, in government regulatory agencies, and in hospitals.” (http://www.bme.gatech.edu/)
Elements of the GA Tech PBL Program ...
The Problem

Ovarian Cancer Screening

- With approximately 25,000 new cases of ovarian cancer diagnosed annually, this disease has become the fourth most common cause of cancer death among women in the United States. The pelvic examination is the most widespread form of screening; however, due to the anatomic location of the ovary, detection rates for the disease are thought to be quite low. Further, since ovarian cancer causes minimal, nonspecific or no symptoms at all, those cancers detected by pelvic examination are often far advanced leading to a 50% 5-year survival rate, a very poor prognosis indeed. Another screening method, ultrasound, is widely used for diagnostic testing for pelvic masses, but its usefulness as a screening tool is limited by high rates of false-positive results and low positive predictive value.

- Your team has been selected by the National Cancer Institute to investigate the current status of ovarian cancer screening, including the effectiveness of the most commonly used methods. You are expected to identify and make recommendations regarding potential future screening strategies, which relative to current strategies improve the sensitivity without sacrificing specificity.
Philosophical Principles

The distinguishing features of PBL have generally been accepted as:

- Presentation of a problem as the start of a learning process
- Presentation of learning problems in as realistic ways as possible in an educational setting (problem driven approach)
- Organization of learning processes in response to the problems
- Emphasis on student responsibility and initiative in learning
- Better accommodation of individual students' state of knowledge and experience at the starting point of learning
- More scope for integrating multi-disciplinary considerations
- More collaborative relationship between students and teachers in the learning process
- Emphasis on self-directed lifelong learning
- Use of Cognitive Apprenticeship concept – linking theory and practice

Major Goals for BME 1300

Development of:

- inquiry skills
- knowledge acquisition skills
- problem solving skills
- team skills
BME 1300

How it works …

- Real world connections / problems (e.g. Ovarian Cancer)
- Information-**intensive** course
- Team based approach / use of team wikis
- Student driven; presentation-**intensive**
- Intensive use of departmental resources – 7 faculty; 4 post docs teach in Fall ’06
Integration with the Library

- FULL Integration – meeting student needs
- Use of technology tools as ENABLERS for student learning
- Pushing back the limitations of restricted facilities
- Astonishing freshmen at the point of need!
- Library interactions with students -- include support with facilities, resources, people
Integration with the Library

- Classroom instruction – addresses immediate information need of 1st problem
  - consistent with PBL model – focused on the ‘problem’
  - hands-on training with databases/e-journals
  - walking out with articles they need!

- Research Consultations with groups/individuals
  - website created: http://www.library.gatech.edu/research_help/librarians/lcritz/BME1300.htm

- Shared resources – Emory & GA Tech e-journals and databases

- Bibliographic management – EndNote
  - required use in reports/projects
  - in-class instruction
  - ‘Aha moments’
Integration with the Library

- Study zones – 1st, 2nd floors as group study zones – social and productive -- PEER REVIEW
- Presentation Studio -- PEER REVIEW
  - includes Librarian review, if requested
- LWC/LEC – computer labs – HW & SW to support development of presentations, reports
- Homer Rice Center - electronic classroom for hands-on information literacy training
Integration with the Library

Extensive use of Library resources:

- books (handbooks, encyclopedias, ....)
- print journals, e-journals
- all used in place of textbook
- need for up-to-minute info and information from a myriad of different ‘fields’ (medicine, basic biology, microbiology, mechanical engineering, electrical engineering, ...)
Integration with the Library

Iterative and building process - transition occurs during semester:

• from “I can’t possibly read this”

• to knowing that it ‘takes a village’ to succeed (peers, grad students, etc.)

• to developing some self-sufficiency and being able to choose/use appropriate articles
Next Steps for Library Integration

• Continued integration with other BME classes (e.g. patents)

• Support of other BME campus partnerships (e.g. IRB process)

• Possible program-level integration of IL skills in future
PBL Rooms
Presentation Studio - Library
LEC - Library
Elements of the GA Tech PBL Program

**PROBLEM**
- Ovarian cancer
- Heart monitors
- Mad Cow Disease

**RESOURCES**
- Emory/Tech e-journals
- Print journals
- Handbooks, etc.
- EndNote

**SPACES**
- PBL Room
- Library study spaces
- Presentation Studio
- Lecture Classroom
- Library HRC
- Whitaker Computer Lab
- LWC/LEC

**PEOPLE**
- Student Teams
- Facilitators
- Librarian
- Library staff
- BME faculty

*BME 1300*
Questions? Comments?

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