Technology Integration in Teacher Education

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Outline

- Some issues in Technology Infusion
- And its Pedagogical innovations:
  - Groups, contextual, projects, participation
- A coursework example in statistics
- How to develop the method components
- Some warnings and caveats
- Conclusions

Course Goals and Objectives

- Learn a specific topic of interest
  - Theory (why) and practice (how to)
- Create a multidisciplinary, team work environment
- Other Specific work skills
  - Problem solving using statistics
  - Oral/written presentation skills
  - Synthesis/summarization skills

Example Course Content

- Part I: Descriptive and Probability
  - Data, EDA, distributions, transformations
- Part II: Inferential
  - Confidence intervals, hypothesis tests
- Part III: Modeling
  - Regression and ANOVA
- http://lcs.syr.edu/faculty/romeu/ECS526Summer.pdf

Creation of Study Groups

- Size: three to six students
- Selected by assignment on first day
- Internal democracy: elected leader
- Division of labor within the group
- Constant (email) communication
- Homework presentation every week
- Final Project at end of the course

Group Role and Procedures

- Group work is the basis of the course
- Select own final project, leader, etc.
- Meet weekly (in cyberspace and real)
- Divide homework among them
- Put it back together for the presentation
- Group members learn from each other
- http://web.cortland.edu/romeu/groups.html

Division of Topics into Classes

- Too many topics with too many parts
  - Divide into classes (of “equivalence”)
  - E.G. the class of confidence intervals
- Each group works on a class element
  - All groups cover the entire waterfront
  - E.g. one group works on CI for the mean
  - Another, for CI for the proportions, etc.
- Then, present in class and share materials

Assignment of HW to Groups

- Sent by email to students and groups
- Tutorials, examples and case studies
  - Readings in the internet, as examples
- Students learn to decompose problem
  - Each works on a task individually
  - Then, puts problem tasks together
- Power point presentations in class

Cooperative Learning Objectives

- Learn to work in groups
  - Learn to get along with others
- Learn to scope/divide a problem into parts
- Learn communication skills:
  - Use of Power point and Excel software
  - For the oral and written presentations
- Summarizing their results

Contextual Projects

- Students own interests are the key
  - Raises the level of interest in assignments
- Students have subject matter knowledge
  - The tasks have meaning for them
- Students have personal interest in topic
  - Probably will reuse the material
  - In their other courses or in real life

Weekly Mini-Projects

- Different project to every group
  - Permits cooperation among students
- Use class/course reading materials
  - As tutorials and examples for their work
  - Alleviates the instructor from detail work
  - Leaves time for higher level consulting
- Project topics complement each other
  - http://web.cortland.edu/romeu/ecshw.html

Systems Analysis Assignments

- Provides the “big picture” of problems
  - Recognize a problem
  - Define the data required
  - Define the solution procedure
  - Collect and process the data
  - Obtain the problem results
  - Conclude in practical terms

Homework Presentations

- Weekly, all groups are given a HW
  - Power point presentation w/highlights
  - Word document with the explanations
- Students/instructor ask Groups questions
  - Expand on the subject during presentation
- Students study material constantly
  - Presentations are 20% of their final grades

The Final Project

- Contextual: each group chooses topic
  - Many times a real life problem (work)
  - Otherwise, instructor provides context
- Covers all material given in the course
- Applied: problem-solving approach
- From Problem Statement to Conclusions
  - http://lcs.syr.edu//faculty/romeu/FinProjExamp.htm
- Provides 20% of student Final Grade

Testing and Grading

- “Mid Term” tests
  - Three parts each: in-class, group, take-home
  - Individual work (in-class and take-home)
- All tests are open book, open notes
- Take homes: thought-provoking
- Group work: computer-based
- Tests are only part of student’s final grade

Course Administration: The Often Neglected Component of Technology Infusion

- Technology infusion bears a cost
- One cannot turn one's back to it
- The following reading is of interest:
- http://lcs.syr.edu/faculty/romeu/courseart.html
- You will find detailed discussion there.

Conclusions

- Technology infusion is more than it seems:
- TI develops “active learning”
- TI develops “democratic habits”
- TI develops “peripheral skills”
- TI develops “networks of students”
- TI allows to teach more with less
- TI requires Administration Support!!!