RIT’s Research on Pedagogy – Faculty Projects

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2007 FITL Conference
The Scholarship of Pedagogy

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Opportunity

• Chosen to develop an alternative sequence for at-risk students

• Idea was to cover the same material using one extra quarter

• Give the students more time to absorb the material
My Thoughts…

- Perhaps the students aren’t slow
- Maybe it’s the teaching methods
- What problems do other instructors have?
My Path of Discovery

- Constructivism
- Cooperative learning
- Learner-centered teaching
- Active learning
New Focus

• Traditional Focus
  – Cover as many constructs as possible
  – Lecture - primary mode of instruction

• My Focus
  – Use constructs to develop conceptual knowledge
  – Use active learning to supplement lectures
Risks

• Is approach legitimate

• Student evaluations

• Promotion and tenure

• Colleagues opinions
Problem

• Lots of active learning articles
• Few targeted intro programming courses
• Many focused on humanities, sciences, and advanced courses
Don’t Do This at Home

- Threw away old materials
- Redesigned course around active learning
- Developed my own activities
Consistent Sequence Results

- Increased retention by 9%
- Increased A,B,C grades by 14%
- Reduced feelings of intimidation by 40%
Personal Rewards

• Students loved the course

• Exceptional student evaluations

• Noisy classroom
Dissemination

- Technical Conference
Circle of Scholarship

Dissemination → Research

Measurable Results → Classroom Experiment

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Next Phase

• Faculty Learning Community member
• Attended Lilly Teaching & Learning conference
• Surveyed student feelings about course and specific activities
• Modified courses / activities
• Taught every section
Classroom Experiment: Think - Pair – Share with Playing Cards

• Instructor asks a question

• Students:
  – Think about the question
  – Share their answer with another person
  – Come to consensus
  – One person in the class is chosen to answer
Results

• 88% felt it helped them feel more comfortable when called upon

• 79% felt it helped them learn better

• 66% always discussed the question
Student Comment

- I think most IT students prefer to work alone, but I think we really learned more when we were forced to work together.
Results/Dissemination

• Technical conference papers

• RIT Teaching & Learning conference

• President White paper
Circle of Scholarship

Dissemination

Measured Results

Research

T/P/S Classroom Experiment

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Informing My Practice

• Reading the active learning books
• Learn why the activities work
• Tell students why I do what I do
Conference Presentation

- Presented my paper: “Infusing Active Learning in Intro Programming Courses”
- Met the NSF Director of CS Undergraduate Education
- NSF CCLI Grant was awarded based on my preliminary results
Comparison of Teaching Styles

- Traditional
  - 28% D, F, W rate
  - 59% A/B rate

- Active Learning
  - 8% D, F, W rate
  - 75% A/B rate
NSF Grant Main Goals

• Show evidence of increased learning

• Develop educational materials

• Disseminate via workshops
Classroom Evaluation

• Concurrent courses
• One with AL, one without
• Multiple assessments
• Student observations
Results/Dissemination

• Multiple technical conferences

• Multiple Teaching & Learning conferences

• Provost stated my scholarship model was his idea of research at RIT
Another Circle Completed

- Broader Dissemination/NSF Grant
- Measurable Results
- Better Informed Practice
- Research

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Broader Dissemination

• Multiple AL workshops for various RIT groups

• General AL presentations at T&L conferences
Another Circle Completed

Broader/General Dissemination

Measurable Results

Research

Informed Practice

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Workshops/Invited Presentations

• Multiple AL workshops at various colleges

• Keynote speaker

• Advisory board for Teaching Professor conference

• Invited speaker at Teaching Professor conference
Another Circle Completed

Workshops
Keynote Speaker
Invited Speaker
Measurable Results

Research
Informed Practice

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Results

• Tenure

• Promotion

• Eisenhart Outstanding Teaching Award

• Book publisher solicitations
Advice

- Research how others are teaching
- Adapt their discoveries into your classroom
- Disseminate the results
- Make contacts

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Scholarship Benefits

- Ultimately it is the students that have benefited from my scholarship

- Which is why I teach
This Could Be You

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This Could Be Your Students!

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Suggested Readings


Suggested Readings – Cont’d


The Faculty Learning Community
Rochester Institute of Technology
2006-2007

Susan Donovan
Academic Support Center

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Principles of FLC

- Cross-disciplinary
- Extended time commitment --year-long
- Shared purpose – enhancement of teaching and learning
Goals

• Collegiality
• Respect and trust
• Innovative teaching
• Scholarship
  – Scholarly teaching
  – Contributions to scholarship of teaching and learning
Activities

• Regular meetings
• Lilly Conference on College Teaching
• Readings
• Projects
• Associates (faculty, student)
• Presentation and poster exhibit
• Portfolios – Digital Media Library
FLC at RIT

- Modeled after Miami of Ohio’s plan developed by Milt Cox
- Project of the IETC, supported by the Provost’s Office
- Facilitators: Susan Donovan, Trudy Howles, Keith Whittington
- Pilot 2001-2002
- Next year, FLC7
• Creating an Environment of Deeper Learning in Circuit Theory Laboratory
  Rick Cliver (CAST)

• The iPodification of Society and Facebook
  Kijana Crawford (COLA)

• Cooperative Learning for Effective Teaching in a Large Class
  Irene Evans (COS)

• Principles of Accounting: Assessing Core Competencies
  Allen Ford (NTID)

• Development of Analytical Skills through Cooperative Learning
  Amit Ghosh (KGCOE)

• Identifying Systems Interconnectivity through Concept Mapping
  Deanna Jacobs (CAST)

• Collaborative Testing to Improve Academic Performance
  Sylvia Perez-Hardy (GCCIS)

• Variations on a Theme
  Sidonie Roepke (NTID)
Department of Computer Science
Faculty Pedagogy Projects

Trudy Howles
Computer Science

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Pedagogy Studies

• Active Learning/Studio Integration
• Student Quality and Testing Practices
• Longitudinal Study of First Year Students
• Intrinsic Motivation Study
• Learning Communities
Active Learning/Studio Integration

- Pilot in 2003 with PLIG funding
- Identified at-risk and under-prepared students
- Also studied the “objects-first” vs. the “objects-later” instructional approach
- Published papers in ACM, IEEE; conference presentation. Pilot became the basis for the CS Learning Communities
Student Quality and Testing Practices

• Studied student habits when testing programs, overall personal quality initiatives
• Resulted in presentations at several educational and professional conferences, journal articles.
• Became the basis for a CS special topics seminar
Longitudinal Study of First Year Students

• On-going. Identifying student behaviors, characteristics and themes
  – To date, published papers in CS education journals, conference presentations; designed internal workshop

• Collaborator: Susan Donovan, Co-PIs in Information Technology
Intrinsic Motivation Study

• Gathered data to assess why students lose interest and motivation in the first year
• Resulted in a conference presentation; still an interest area
2006 Study

• Started to examine the cost of small studio classes, and how to support the growing number of Learning Communities.

• Designed a study to examine the impact of teaching without access to computers, and in larger class sizes

• This study is the basis for my Ph.D. dissertation and is supported by my department and Dr. Mayberry

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My Observations

- There are lots of problems – pick one, read everything you can about it and design a study.
- Your lit review is critical to understanding the problem, what has already been done and what other opportunities exist.
My Observations

• Spend time to carefully design your study. The DOE is critical to a successful study!
• Be sure to address the delimitations (things you can control) and limitations (things you can’t control). State your assumptions.
• Goal: Make your study and the results generalizable!
My Observations

• Pedagogical Research involves studying students. I have found the IRB to be very accommodating and fair, but allow a few extra weeks in your schedule to obtain approvals.
Receiving Grants to Develop Pedagogy

Combining Scholarship with Teaching and Learning

Susan Barnes
Communication

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Academic Background

• Media Ecologist
• Toronto School of Communication
• Marshall McLuhan
• Neil Postman
What is Media Ecology?

- “Media ecology is the study of the ways in which our instruments of knowing—our senses and central nervous systems, our technologies of exploration, the physical media they require (like light, sound, electricity), and the conditions in which they are used—construct and reconstruct what we know, and therefore the realities that humans inhabit.” Christine Nystrom
In Other Words

• Kids growing up with computers share a different reality than kids growing up with books or television.
Postman

- Culture and literacy
- Educationist
- Focused on the balancing of print based literacy with other media environments.
- Was one of the first to argue for media literacy
Postman

- “Language structures our perception of reality”
- Different media will structure our reality in different ways
Current Literacies

• “Multiliteracies attempt to build on a broad understanding of the practices of alphabetic literacy and to expand the concept of literacy to include a random combination of digital practices used with video, audio, interactivity, still images, and so on.” Kathleen Tyner
Here and Now

• Embracing online technology is also embracing the idea of multiliteracies
• Moves education into embracing new types of realities
Here and Now

• Embracing online technology is also embracing the idea of multiliteracies
• Moves education into embracing new types of realities
• But what does this mean for teaching and learning?
Grant Research

- This is the central question behind my two grants
- NSF- Theoretical and Applied Approaches to teaching Social Computing in STEM Education
- PLIG-Online Advertising taught in Second Life
Teaching & Technology

• How do different online learning environments influence teaching?
• Is the online environment appropriate for the course content?
Course Content

• Fits with technology
• Is an integral part of grant
Learning Experiences

• If technology fails, students will still gain knowledge about a subject
• Experiential Learning
Learning Outcomes

• Pre- and Post testing
• In-depth Interviews
• Research Papers
• Dissemination
Educational Extensions

• Provide opportunities for masters students to conduct research
• Provide opportunities for students to work directly with faculty on research
• Builds a learning community beyond the classroom (new tools)
Conclusion

• Structured properly, grants can provide an educational opportunity that goes beyond the classroom experience to enhance our knowledge of educational tools.
Panchapakesan Venkataraman
Electrical Engineering

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