

RIT's Research on Pedagogy – Faculty Projects

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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%

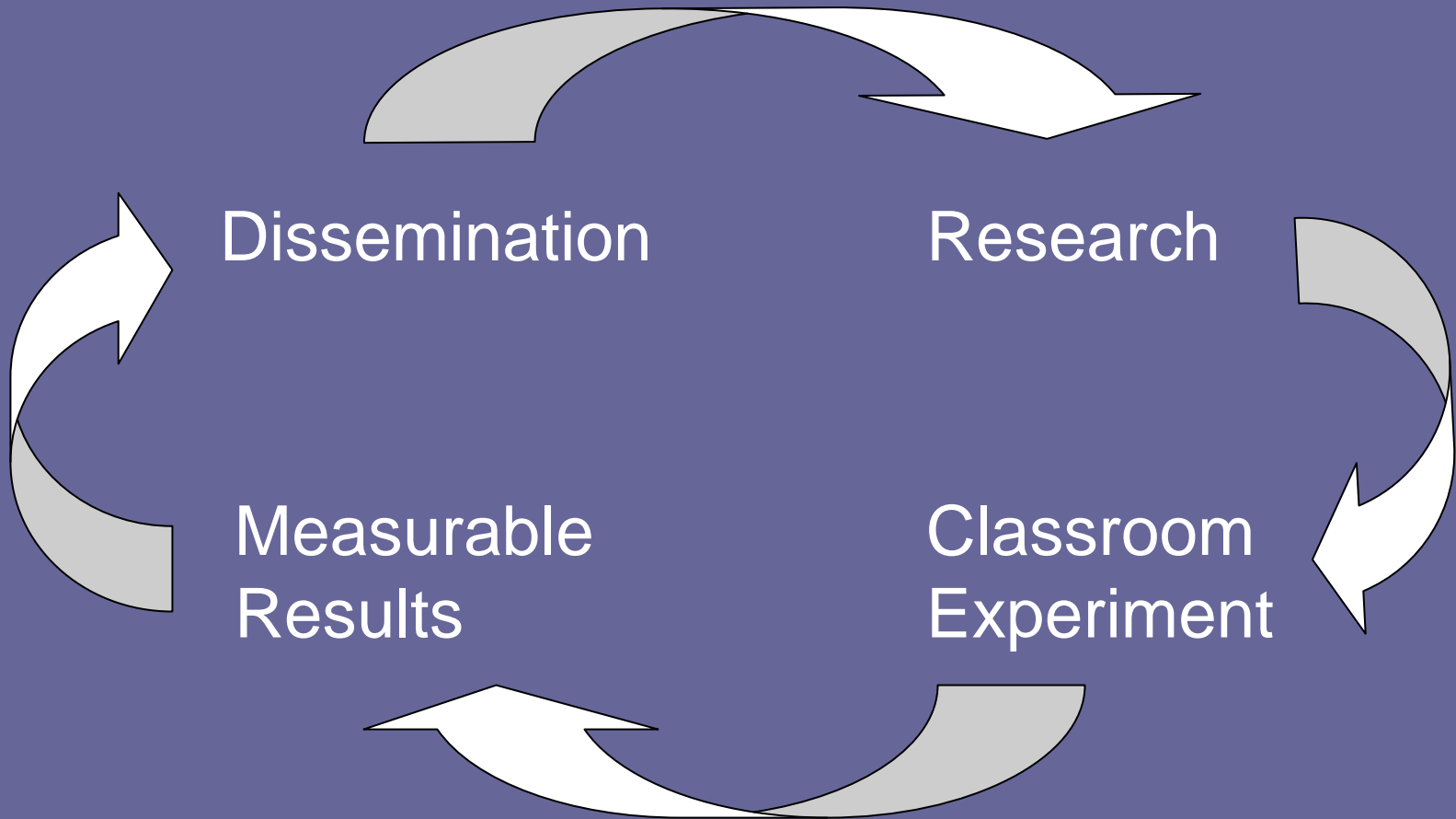
Personal Rewards

- Students loved the course
- Exceptional student evaluations
- Noisy classroom

Dissemination

- Technical Conference

Circle of Scholarship



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

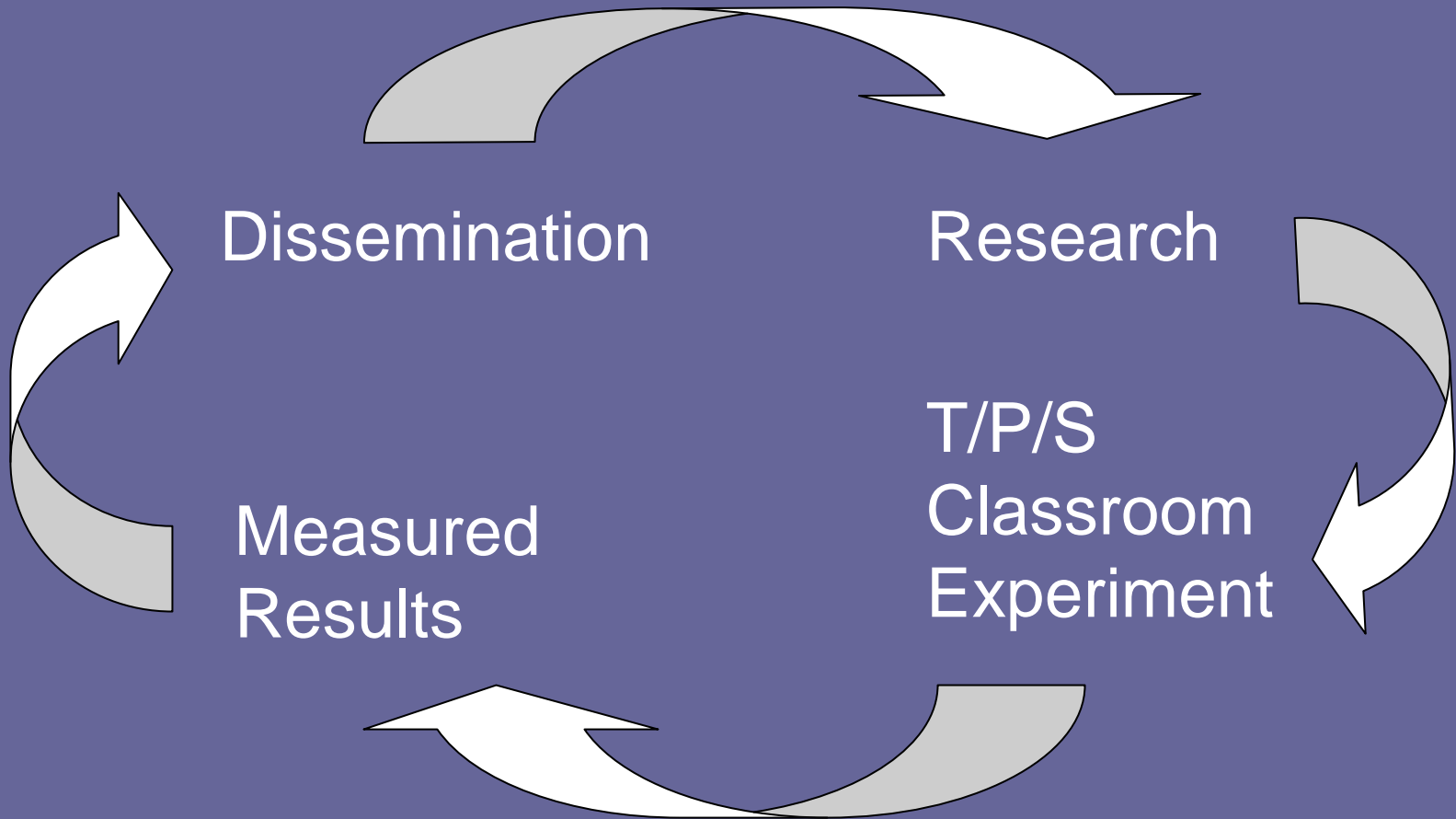
Student Comment

- 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



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

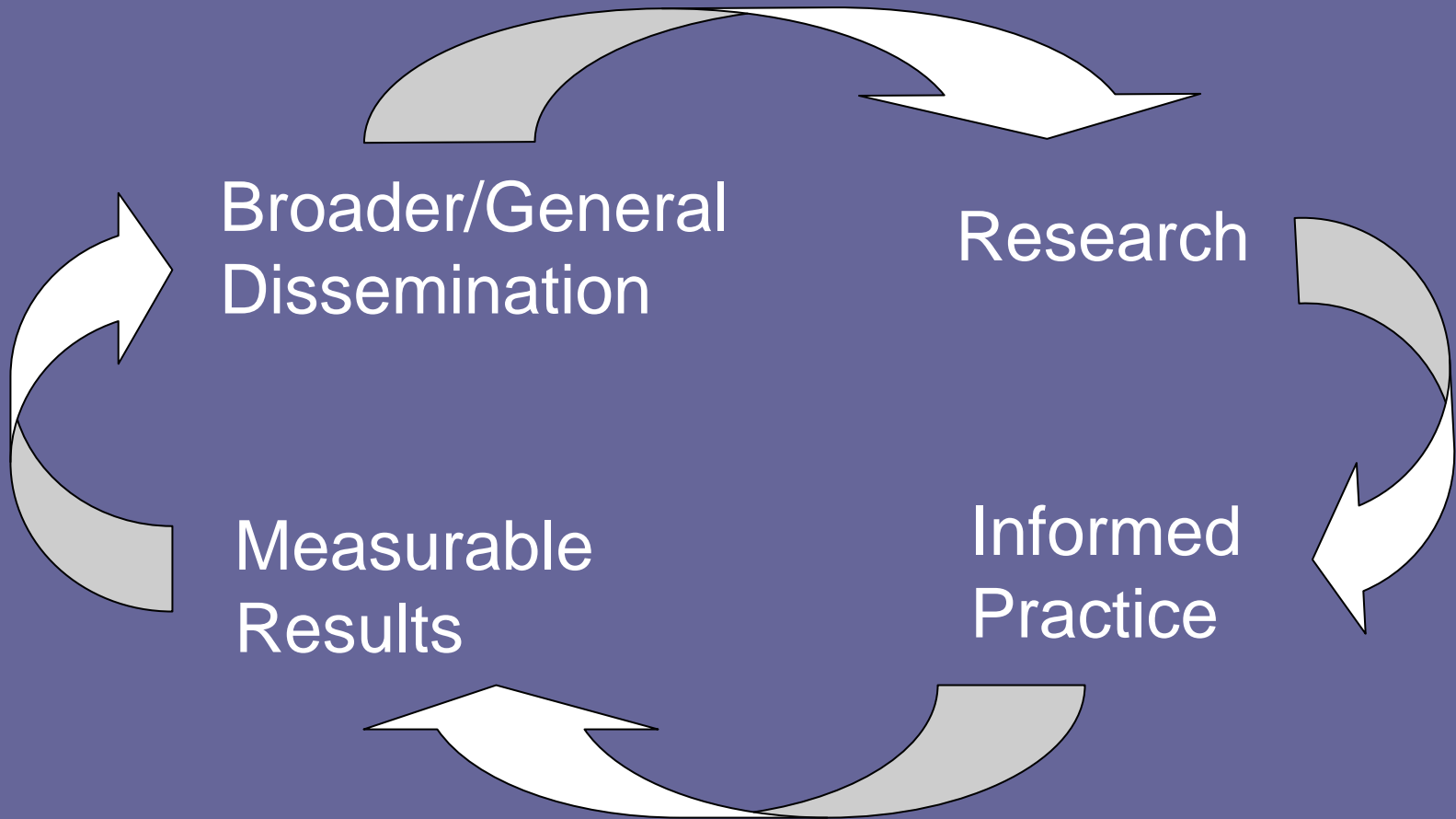
Another Circle Completed



Broader Dissemination

- Multiple AL workshops for various RIT groups
- General AL presentations at T&L conferences

Another Circle Completed



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



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

Scholarship Benefits

- Ultimately it is the students that have benefited from my scholarship
- Which is why I teach

This Could Be You



2007 FITL Conference

This Could Be Your Students!



2007 FITL Conference

Suggested Readings

- Angelo, T. and Cross, K (1993) *Classroom Assessment Techniques*, Jossey-Bass.
- Bonwell, C. and Eison, J. (1991). *Active Learning: Creating Excitement in the Classroom. ASHE-ERIC Higher Education Report No. 1.*
- Brookfield, S. (1995). *Becoming a Critically Reflective Teacher*. Jossey-Bass
- Fink, L. D. (2003). *Creating Significant Learning Experiences*. Jossey-Bass

Suggested Readings – Cont'd

- Meyers, C. and Jones, T. (1993). *Promoting Active Learning: Strategies for the College Classroom*. Jossey-Bass.
- Millis, B. J. and P. G. J. Cottell (1998). *Cooperative Learning for Higher Education Faculty*. Oryx Press.
- Weimer M. (2002) *Learner-Centered Teaching: Five Key Changes to Practice*. Jossey-Bass.



The Faculty Learning Community

Rochester Institute of Technology
2006-2007

Susan Donovan
Academic Support Center

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

FLC6

- ***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

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

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

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

2007 FITL Conference