

# Active Learning in the Polytechnic Integrated Freshman Year Experience

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Nathan Mentzer & Lakshmy Mohandas  
Purdue University

# Agenda

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- Motivation
- Polytechnic Freshman Year Experience
  - Design Thinking
  - Integration of Humanities
  - Active Learning
- Research Informed Reflection

# Rationale

- Most people spend 95% of their time interacting with the technologies of the human-made world (National Center for Technological Literacy, 2010).
- “Americans are poorly equipped to recognize, let alone ponder or address, the challenges technology poses or the problems it could solve” (Pearson & Young, 2002, pp.1-2).

# Design Thinking

- Goals
  - Write Problem Statement
  - Apply Ethnographic Methods
  - Develop Information Literacy
  - Document
  - Manage
  - Apply Strategies of Ideation
  - Prototype Solutions
- 1100 Freshman Students
- 1 Semester ~ 16 weeks

# Active Learning - Motivation

- How People Learn (NAP, 2000)
- STEM Integration in K12 Education (NAP, 2014)
- Changing the Conversation (NAP, 2008)
- Active learning increases student performance in science, engineering, and mathematics (Freeman et al., 2014)

# Active Learning - Integration

Meeting times	Courses & Characteristics	
10:30am 50 minutes 2 days/week	Design Thinking in Technology (Tech 120)  40–45 students standard but flexible syllabus	
11:30am 50 minutes 3 or 4 days/week	Introductory Composition (Engl 106)  20 students individual syllabi	Fundamentals of Speech Communication (Com 114)  20–25 students standard, strict syllabus

# Active Learning – Reflection Year 1

- High (but vague) expectations
- Low Accountability
- New instructors, some with very little advance preparation
- Low “buy-in” from some instructors and some students
- Mixed levels of flexibility

# Active Learning –Year 2-3

- 6 integrated (Tech + English + Com) and 6 non-integrated sections (Tech only) for Fall and Spring
- 15 instructors from all 3 programs
- Required pre-semester teaching workshops
- Explicit expectations:
  - Contract commitment and accountability log
  - At least 10 logged instructor meetings
  - At least 3 planned co-teaching days
- \$750 stipend for English and Com instructors—  
1/3 to start, 2/3 after a successful semester
- No shared classroom space or reduced class sizes



# Active Learning – Reflection

- Communication – instructors making time to meet, share information, and help negotiate potential differences in terminology/concepts.
- Flexibility – instructors' willingness to adjust teaching plans and incorporate new strategies along the way
- Engagement – when instructors took extra steps to make the integration meaningful for their students, including visits to the other instructors' classrooms and outside activities

# Active Learning – Research

- Student Learning
  - English
  - Communication
  - Design Thinking
- Engagement
  - Attendance Rates
  - Sense of Community
  - Discussion Quality

# Active Learning – Student Habits

- Flipped Active Classroom
  - Assumes Students Prepare for Class
  - Anecdotal Evidence to the Contrary
- Traditional Student Habits
  - Class During the Day, Study at Night
  - Read vs. Listen or Both -> Pass Exam
  - Learning = Knowledge of the Right Answer

# Active Learning – Class Prep

- Quasi-experimental Research Design
  - Comparison Group: No quizzes (n=200)
  - Treatment Group: Short, low value pre-meeting quizzes (n=260)
  - Spring Semesters, Multiple sections, Multiple instructors, no major course changes
- Data
  - Time Spent on Blackboard
  - Final Course Grades

# Active Learning – Results

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- Time spent on Blackboard
  - Without Quizzes: 95 hours
  - With Quizzes: 190 hours
  - Significant

# Active Learning – Results

- Final Course Grades
  - Without Quizzes: Group Mean 86%
  - With Quizzes: Group Mean 88%
  - Significant
- Final Course Grades (Lower Quartile)
  - Without Quizzes: Group Mean 77%
  - With Quizzes: Group Mean 82%
  - Significant (statistical and practical)

# Implications

- Integration of Coursework is Complex
  - Expectations and Accountability
  - Flexibility
  - Communication
  - Engagement
- Active Learning
  - Potential for Impact
  - Culture Shift for Instructors and Students
  - Expectation Management