FLIPPING MY COURSE: ENGAGING STUDENTS TO PROMOTE DEEPER LEARNING & ACADEMIC SUCCESS

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AGENDA

- Background Info & Obstacles
- What is a “Flipped” Classroom?
- My Approach
- Results
- Takeaways
**BACKGROUND**

- Introductory Microbiology (MIBO3500)
- Up to 600 students per term
  - 2 sections (300 seat capacity each)
- Meets 2x week
  - 75 minutes each
- Students are highly motivated
- High level of peer pressure
OBSTACLES

- Large enrollment
- Making connections with students
- Learning spaces
- Motivation & engagement of students
TRANSFORMING LEARNING

TRADITIONAL
- Faculty speaks
- Students ‘listen’

FLIPPED
- Students speak
- Faculty facilitates
FLIPPED CLASSROOM MODEL

Now What
- Learner-Generated
  - Creative, Personalized Projects
  - Presentations

Experience
- Educator-Suggested
  - Games, Simulations
  - Interactives
  - Experiments
  - Community Project
  - Arts Activities

So What
- Learner-Generated
  - Blogging
  - Reflective Podcasts

Concept Exploration
- Educator-Suggested
  - Video Lectures
  - Audio Lectures
  - Content-Rich Websites

What
- Learner-Generated
  - Tests
  - Online Chats

Demonstration & Application
- Learner-Generated
  - Reflective Podcasts
**MY FLIPPED CLASS DESIGN**

### VIRTUAL INSTRUCTION
- Read assigned materials
- View podcasts & take own notes
- Self-assess learning
- Review & reflect on success

### FACE-TO-FACE INSTRUCTION
- Assess preparation
- Group learning activities
- Discuss answers & problem-solving process as a class
IN-CLASS BREAKOUT SESSIONS

Cohort A
Tues am (150)

AM SECTION
MIBO3500
PM SECTION

Cohort B
Thurs am (150)

Cohort C
Tues pm (150)

Cohort D
Thurs pm (150)
FACE TO FACE INSTRUCTION USAGE

- **Review**: 20 min
- **Quiz/Feedback**: 10 min
- **Group Activity**: 35 min
- **Activity Review**: 10 min
TOP HAT MONOCLE RESPONSE SYSTEM

- Easier to use than clickers for short free response
- More flexible choices for students

Functions/Uses
- Quizzing/Polling:
  - MC, short answer, sorting, matching, etc.
- Collaborative Work Response Postings:
  - Allows real-time detection of misconceptions
  - Can be set up for anonymous submissions
- Live Review Session Discussions:
  - Can be set up for anonymous posting
MY FLIPPED CLASSROOM MODEL

Learning Goals

Case Studies

Blogs, Quizzes & Discussions

Podcasts
RESULTS: BIO-CLASS SURVEY

- Biology - Colorado Learning About Science Survey
  - Done at beginning and end of each term

- Survey asks for level of agreement with 32 beliefs:
  - Overall
  - Real-World Connections
  - Enjoyment
  - Problem-Solving Effort
  - Problem-Solving Strategies
  - Problem-Solving Difficulty
  - Reasoning
  - Conceptual Connections/Memorization
RESULTS: BIO-CLASS SURVEY

- **Overall**
  - No significant differences between beginning and end of term for either instruction style

- **Conceptual Connections/Memorization**
  - Traditional: Students shifted towards a belief that memorizing facts is key to successfully solving biology problems (p= 0.017)

- **Problem-Solving Strategies**
  - Traditional: Students shifted to believing that thinking through the problem from different perspectives is key to solving biology problems (p= 0.038)
RESULTS: BIO-CLASS SURVEY

- **Enjoyment**
  - Flipped: Students reported increased enjoyment and deeper interest of biology topics \((p=0.016)\)

- **Problem-Solving Difficulty**
  - Flipped: Students shifted to a belief that based on their level of understanding biology concepts, they could apply that information to a biology problem to solve it \((p=0.014)\)
RESULTS: STUDENT PERCEPTIONS

Traditional (Activity 2)  Traditional (Activity 9)
RESULTS: ACTIVITY BENEFITS

From reflective blogs – only traditional course shown

Activity 9
RESULTS: MY OBSERVATIONS

- Far less disengagement
- More questions & discussions
- More connections between content & current events
- Study groups persist
Blogs show increased satisfaction
Lecture is now a discussion
Lowers student to instructor ratio
Attendance increased
Takes advantage of peer instruction
MIBO3500 students: Fall 2011 & Spring 2012

MIBO Graduate Teaching Assistants:
- Crystal Austin, Dave Samuels, Claire Edwards, Deanna Colton, Angela Pack & Lisa Kuhns

EPIT Collaborators: Dr. Michael Orey, Erkan Er & Lu Ding

Office of STEM Education Small Grants Program