EDUCATIONAL METHODS FOR INVERTED-LECTURE COMPUTER SCIENCE CLASSROOMS TO OVERCOME COMMON BARRIERS TO STEM STUDENT SUCCESS

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ALL OF WRIGHT STATE UNIVERSITY
Motivation and Interest
Opportunity
Psychosocial Skills
Cognitive Skills
Academic Preparation
3 GROUPS

ALE (95)  Flipped (56)  Flipped++ (28)

The amount of active learning.
Homework
• Read Text

Classroom
• 2-3 point Quiz
  • 1500 pts total
  • Lecture ½ Class
  • Activity ½ Class
FLIPPED

Homework
• Read Text
• Assigned ungraded problems
• Optional Videos
• Pre Quiz

In Class

Classroom
• Activity
• Process Activity
• Mondays/Wednesdays Activity
• Friday Post Quiz
Homework

- Watch Videos

Classroom

- Activity
- Process Activity
- Activity
- Post Quiz, 4 questions
  - Time executed varied
- Barrier Interventions
Barrier One –
Motivation and Interest

• Real World Activities
• Open Ended Projects

+ Define Computer Science, what a computer scientist does, and how it is different from programmers.
+ Discussed sub categories within computer science and computer engineering.
Barrier Two — Opportunity

• Activities
  • realistically compare themselves to their peers
  • prepare for interview experiences

+ Job Opportunities (Current & Expected)
  + Stated skills from activities used in interviews
  + different types
Barrier Three – Psychosocial Skills

• Activities
  • Advocate position
  • Interpersonal interaction skills
  • Prepare for interview experiences
  • Realistically compare themselves to their peers.

+ Cognitive Bias
+ Cultural Competencies
Barrier Four – Cognitive Skill

• Activities
  • Communication – Work in Teams
  • Problem Solving – They are solving problems
  • Reasoning – Discuss why they believe that is the answer
  • Decision Making – Must choose a method for solving
  • Critical Thinking – Compare their solutions to other solutions
Barrier Five –
Academic Preparation

- Frequent Low impact quizzes
- Pre-posted Video Lectures
Grade Distribution

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CLASS TIME WELL SPENT
- 92% 5/5
- 8% 4/5
- 4% 28
Grade Distribution

ALE  Flipped  Flipped ++

Grade Distribution

SOME NEXT STEPS

• Fall Semester
• Under represented groups
• Retained Knowledge
• Student retention
• Continuous impact when applied to subsequent courses
THANK YOU

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QUESTIONS?

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