# Gender, Educational Reform, and Instructional Assessment: Part II 

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# Do men outperform women in college physics? 

If so, what can we do about it?

## Our study

Examine FCl scores and grades by gender and high school background

Data from eight introductory courses ( $N=2777$ )

Sample includes wide range of students, classroom settings, pedagogy

Do men outperform women in college physics?
YES (on average)

Possible sources:

## Culture

High school physics
College course pedagogy
Instructor gender

## Why is there a gender gap?

## Possible sources:

## Culture

High school physics
College course pedagogy
Instructor gender

Gap exists between men and women with same physics background

## Why is there a gender gap?

Possible sources:

## Culture

High school physics
College course pedagogy

## Instructor gender

Gap exists before class starts

## Why is there a gender gap?

Possible sources:

## Culture

High school physics
College course pedagogy

## Instructor gender

Reform effort offers opportunity!

## Why is there a gender gap?

Does pedagogy affect observed gap?

Classify courses as traditional, hybrid, or fully interactive

Courses use Tutorials, Peer Instruction, Studio Physics, Coop. Group Prob. Solving

## Traditional courses



## Traditional courses



## Hybrid courses



## Hybrid courses



## Fully interactive courses



## Fully interactive courses



## FCI summary:

Women score lower on posttest Harvard (fully interactive) and TTU (hybrid) show greater gain for women

Others show comparable gain (and lower <g>) for women

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Pedagogy may help, but no simple answers

## Harvard calculus-based, 1990-1997



## Harvard calculus-based, 1990-1997



Results

What about grades?

## Purdue grade distribution



Similar results from all schools

## Open questions

## What differentiates courses within groups?

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Female-friendly pedagogy:
Cooperative class environment
Opportunities to ask and explain
Hands-on experience with equipment

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Female-friendly pedagogy:
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Participation matters!

## Open questions

What differentiates courses within groups?

Is assessment part (or all) of the problem?

What is the role of instructor gender?

## Conclusions

Gender gap in FCI posttest and grades seen at all eight schools

Gap begins before college
Pedagogy may help, but needs further study
Reform effort has an opportunity!

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For a copy of this talk and additional information:
http://mazur-www.harvard.edu

## Traditional courses



## Harvard grade distribution



