Gender Differences in both Force Concept Inventory and Introductory Physics Performance

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INTRODUCTION

The first-semester of calculus-based physics for scientists & engineers (mechanics) at the University of Minnesota has an average fall term enrollment of 800 students with an average class size of 185. The course meets three hours per week in lecture, two hours in lab, and one hour discussion session. The lab and discussion sessions average 16 students per class (3-4 students per group) and are taught by teaching assistants using Cooperative Problem Solving [1,2] with closed-ended problems (Context-rich) appropriate for group work.

The Force Concept Inventory (FCI) Exam is routinely given in laboratory. From 1993-1996 the old version of the FCI was given, and from 1997-2007 the new FCI was administered. Only the latter will be included in this analysis.

PRE & POST FCI BY CLASS 1993-2007

PRE-TEST BY YEAR

POST-TEST BY YEAR

SELECTION CRITERIA

• Total enrollment for 1997-2007 is 7,408
• Match pre-post scores on the FCI Exam (762 thrown out; post-test scores but no pre-test because fall term begins on a Tuesday)
• Exclude classes for which matched FCI data is less than half the final enrollment (10 classes cut from 50 total for 1997-2007)
• Exclude a student's score if no gender reported (14 students thrown out)
• Exclude a student's score if >3 questions blank (60 students thrown out)
• Exclude a student's score if abnormally high negative gain (higher than -5 points) indicating they were not serious about the test (42 students thrown out)

AVERAGE FCI SCORES BY GENDER

PRE-TEST BY GENDER

POST-TEST BY GENDER

GAIN BY GENDER

PRE-TEST BY ITEM

POST-TEST BY ITEM

FEMALES PRE & POST

MALES PRE & POST

PRE-TEST BY ITEM

REFERENCES