Gender Differences in High School Preparation for University Introductory Physics

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PHYSICS FOR SCIENCE & ENGINEERING:

Data sample – Fall term, 5,636 students (1,261 female, 4,375 male) from 40 different classes with 22 different instructors.
Average enrollment/term 800 students
Average class size 200 students.
Average dropout rate 7%, average D/F rate 3%
3 lecture/week
2 hours lab/week – average 16 sections
1 hour discussion session/week – same students & TAs as lab

Lab and discussion sessions taught by TAs emphasize problem solving using Cooperative Group Problem Solving using context-rich problems.

The Force Concept Inventory (FCI) Exam given during the first and last week. It does not count in the grade. Only revised FCI (1997-2007) included in this analysis.

Females make up 22% of these classes.

Average course grade 73.8±0.2% (males) 72.0±0.3% (females)

FCI GENDER GAP

PREVIOUS PHYSICS

MATH TEST 2005-2007

MATH BY GENDER

GRADE PREDICTORS

CALCULUS MATH DIAGNOSTIC

CONCLUSIONS

1. There is a significant gender difference in average FCI scores for both populations of students when they enter introductory university physics.
2. There is essentially no gender difference in math skills in either population of students.
3. Neither math skills nor FCI scores account for enough variance in the course grade to be used for screening students.
4. Males and females make equal and significant gains on the FCI in both populations. Instruction is gender neutral so gender gap remains essentially the same.
5. The FCI gender gap remains whether females are the minority or the majority in the class.
6. Although initial FCI performance does depend on high school physics background, the gender gap does not.

PHYSICS FOR BIOLOGY & PRE-MEDICINE:

Data sample – Fall term, 1,266 students (743 female, 523 male) from 7 different classes with 5 different instructors.
Average enrollment/term 400 students
Average class size 200 students.
Average dropout rate 5%, average D/F rate 3%
4 lecture/week
2 hours lab/week – average 16 sections
1 hour discussion session/week – same students & TAs as lab

Lab and discussion sessions taught by TAs emphasize problem solving using Cooperative Group Problem Solving using context-rich problems.

The Force Concept Inventory (FCI) Exam given during the first and last week. It does not count in the grade. Only revised FCI (2003-2007) included in this analysis.

Females make up 60% of these classes.

Average course grade 74.5±0.5% (males) 72.4±0.4% (females)