

IDEA Research Report #10 • Summary

The Effects of Instructor Gender and Discipline Group on Student Ratings of Instruction

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This study investigated whether IDEA Student Ratings of Instruction (SRI) differ based on the instructor's gender and, if so, whether these differences are more prevalent in STEM (science, technology, engineering, and mathematics) disciplines than in non-STEM fields. The authors analyzed the IDEA SRI data of 13,732 female and 11,511 male college and university instructors to examine the effects of instructor gender and academic discipline group on student overall summary ratings and perceptions of teaching methods. These statistical analyses revealed extremely weak and practically negligible effects of instructor gender and its interaction with academic-discipline group. The main effect of discipline group was more pronounced: Students gave higher ratings to non-STEM instructors ($n = 21,310$) than to STEM instructors ($n = 3,933$) on overall summary measures and on use of teaching methods known to be positively correlated with ratings. Together, these findings suggest that student ratings vary meaningfully by academic discipline but not by instructor gender.

Research Questions

1. After controlling for students' course motivation and work habits, do student ratings on overall measures of teaching effectiveness (i.e., progress on relevant learning objectives, the overall excellence of the teacher and course) differ by instructor gender in STEM and non-STEM discipline groups?
2. After controlling for students' course motivation and work habits, do student ratings of teaching methods differ by instructor gender in STEM and non-STEM discipline groups?

Method

Data were collected through the IDEA Legacy SRI online platform (<http://www.ideaedu.org/Resources-Events/>

[Support-For-Current-Clients/IDEA-Legacy-Online-and-Paper-Platform](#)) from 2002 to 2015. The analytic sample included 25,243 instructors from 256 U.S. institutions. Among the instructors who taught in non-STEM fields, females outnumbered males (58% vs. 42%). Among instructors in STEM fields, the proportion of males was nearly twice that of females (63% vs. 37%).

The dependent variables measuring teaching effectiveness were operationalized by three overall summary measures on IDEA SRI. Progress on Relevant Objectives (PRO) is a weighted mean of average student ratings on instructor-identified relevant learning objectives. The other two summary measures are "Overall, I rate this instructor an excellent teacher" (excellence of teacher) and "Overall, I rate this course as excellent" (excellence of course). Seven of IDEA's teaching methods are significantly related to students' overall ratings and thus were also included in the analysis (Benton, Li, Brown, Guo, & Sullivan, 2015).

Because the IDEA SRI does not ask demographic questions, we inferred instructor gender, an independent variable, from first names. We predicted instructor gender using an R package "gender" (Mullen, 2015), which analyzes historical data to calculate the gender proportion of individuals with a given name and a birth year within a given range (Blevins & Mullen, 2015). To mitigate ambiguities introduced by gender-neutral names, we retained only courses where the predicted proportion of one gender was at least 90%. We then assigned the predominant gender as the prediction.

The other independent variable was discipline group. Instructors indicated the course's academic discipline, using a four-digit record similar to the Classification of Instructional Programs (CIP) created by the National

Center for Education Statistics. For the purpose of this study, we grouped courses into STEM and non-STEM.¹

Key Findings

The results of the current study can be summarized as follows. First, instructor gender has no practically meaningful effects on student ratings of either overall summary measures or instructor use of teaching methods, in neither STEM nor non-STEM fields. Students rated their overall progress, the quality of the teacher and course, and the frequency of teaching methods very similarly regardless of whether they were taught by a man or a woman. Second, non-STEM instructors tend to receive higher student ratings than their STEM peers on overall summary measures and on use of effective teaching methods. Third, course motivation and work habits are important covariates that should be taken into account when measuring learning outcomes.

In conclusion, the effects of instructor gender and its interaction with academic-discipline group do not exert meaningful influence on overall IDEA SRI measures. The most telling difference in ratings is observed not between men and women but between STEM and non-STEM instructors. When properly used as one of multiple sources of evidence, mean class scores on IDEA SRI are a meaningful measure of student perceptions of teaching effectiveness and suggest more gender equality than differences in teaching quality and behaviors. Nonetheless, IDEA users may want to examine this issue on their own campuses. At local levels, some differences could be meaningful, particularly if ratings are used exclusively in making summative decisions about teaching effectiveness.

References

Benton, S. L., Li, D., Brown, R., Guo, M., & Sullivan, P. (2015). *IDEA Technical Report No. 18: Revising the IDEA Student Ratings of Instruction system, 2002-2011 Data*. Manhattan, KS: The IDEA Center.

Blevins, C., & Mullen, L. (2015). Jane, John ... Leslie? A historical method for algorithmic gender prediction. *Digital Humanities Quarterly*, 9(3). Retrieved from <http://www.digitalhumanities.org/dhq/vol/9/3/000223/000223.html>

Mullen, L. (2015). gender: Predict gender from names using historical data (0.5.1) [Computer software]. Retrieved from <https://cran.r-project.org/web/packages/gender/index.html>

¹ STEM courses included science (agriculture, physical sciences, and biological sciences); technology (computer and information sciences); engineering (engineering, engineering technologies, and engineering-related fields); and mathematics (mathematics and statistics). Non-STEM courses included all other disciplines.