

ZMATH 2008f.00542

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Pedagogical utilization and assessment of the statistic online computational resource in introductory probability and statistics courses.

Comput. Educ. (Exeter) 50, No. 1, 463-473 (2008).

Summary: The NSF-funded Statistics Online Computational Resource (SOCR) provides a number of interactive tools for enhancing instruction in various undergraduate and graduate courses in probability and statistics. These resources include online instructional materials, statistical calculators, interactive graphical user interfaces, computational and simulation applets, tools for data analysis and visualization. The tools provided as part of SOCR include conceptual simulations and statistical computing interfaces, which are designed to bridge between the introductory and the more advanced computational and applied probability and statistics courses. In this manuscript, we describe our designs for utilizing SOCR technology in instruction in a recent study. In addition, present the results of the effectiveness of using SOCR tools at two different course intensity levels on three outcome measures: exam scores, student satisfaction and choice of technology to complete assignments. Learning styles assessment was completed at baseline. We have used three very different designs for three different undergraduate classes. Each course included a treatment group, using the SOCR resources, and a control group, using classical instruction techniques. Our findings include marginal effects of the SOCR treatment per individual classes; however, pooling the results across all courses and sections, SOCR effects on the treatment groups were exceptionally robust and significant. Coupling these findings with a clear decrease in the variance of the quantitative examination measures in the treatment groups indicates that employing technology, like SOCR, in a sound pedagogical and scientific manner enhances overall the students' understanding and suggests better long-term knowledge retention.

Classification: U55 R25 C75 K15

Keywords: stochastics; online resources; teaching with technology; effectiveness; educational research
doi:10.1016/j.compedu.2006.06.003