THE STATE OF COMPUTING IN INTRODUCTORY STATISTICS COURSES IN THE UNITED STATES

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INTRODUCTION

Including more computational practices in the introductory statistics curriculum is critical for providing students opportunities to prepare them for modern data analysis and work. But what is the current state of computing in introductory statistics courses? To measure the extent to which computational practices—specifically data, simulation, and coding practices—are being included in the introductory statistics curriculum, we developed the COMputational Practices in Undergraduate TEaching of Statistics (COMPUTES) instrument.

METHODOLOGY

Items for COMPUTES were written based on a taxonomy of computational skills identified in the literature. The items were reviewed by experts in statistics and data science education and administered to tertiary-level instructors in the U.S.. A psychometric analysis of the 293 responses was undertaken to understand the latent structure of instructors' responses and to examine whether computational emphasis differed between two-year colleges, four-year colleges, and universities.

RESULTS

The COMPUTES items are multidimensional with three correlated factors. The data practices and coding practices factors were highly related, and both are less related to the simulation practices factor. In general, we found that computing practices are often not emphasized in introductory statistics courses. The biggest difference across institutional settings was in the emphasis on coding practices, which were less emphasized at the two-year college level.

IMPLICATIONS AND IMPORTANCE

Measuring the level of instructional emphasis of computational practices is important to evaluate the state of computing within introductory statistics courses and to inform potential curricular revision. This is important since computation has been linked to increased opportunities for employment, especially in STEM. Future research could focus on the type and level of computational practices appropriate for different audiences. This work could also be extended to include instructors from other countries or other educational levels (e.g., secondary).

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