Developing Statistical Inferential Concepts in Introductory Courses

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Hypothesis testing and confidence intervals are recognized as difficult areas for students of introductory statistics, in part due to the fact that the traditional approach to teaching statistical inference is to rely on abstract mathematical concepts. Given the advances in computing power over the last decade, we are now able to harness new technologies and make use of computer intensive methods and use visual rather than mathematical approaches to develop students' understanding of statistical inference. Rising to George Cobb's challenge to place the logic of inference at the heart of the introductory statistics curriculum, a large collaborative project explored new ways of introducing final year secondary school and first year university students to inferential reasoning. The project involved using innovative dynamic visualizations using re-sampling techniques such as the bootstrap and randomization methods to teach statistical inference. Of interest was to establish whether this new approach, using hands-on activities and visualizations, facilitated students' conceptual access to the logic of inference. In this paper we provide a brief overview of the dynamic visualization software that has been developed. Using responses from student interviews and written assessment items we discuss some issues that have arisen as a result of teaching statistical inference in new and innovative ways.

Key Words: Uncertainty, bootstrap method, randomization method, dynamic visualizations