

ABSTRACT

Traditional Lecture Versus an Activity Approach for Teaching Statistics:
A Comparison of Outcomes

by

Jennifer L. Loveland, Doctor of Philosophy
Utah State University, 2014

Major Professor: Dr. Kady Schneiter
Department: Mathematics and Statistics

Many educational researchers have proposed teaching statistics with less lecture and more active learning methods. However, there are only a few comparative studies that have taught one section of statistics with lectures and one section with activity-based methods; of those studies, the results are contradictory. To address the need for more research on the actual effectiveness of active learning methods in introductory statistics, this research study was undertaken.

An introductory, university level course was divided into two sections. One section was taught entirely with traditional lecture. The other section was taught using active learning methods and a minimal amount of lecture. Both sections were taught by the same instructor during the same semester. The experiment was repeated the next semester.

Students' exam scores were analyzed to determine if the activity-based teaching approach led to higher student comprehension and understanding of statistical concepts, and the ability to apply statistical procedures. Surveys were also administered to students to ascertain if the lecture or activity-based approach led to higher, more positive student attitudes toward statistics.

Analysis of the data did not show that the activity-based teaching method led to higher student comprehension or procedural ability. Neither teaching method led to significantly higher student attitudes. Student comments indicated a positive response to the activity-based methods, but the responses also indicated a student desire for more teacher-centered time in the activity course.

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Many educational researchers have proposed teaching statistics with less lecture and more active learning methods. However, not enough research has been done to show that teaching a statistics course with active learning methods is actually effective. This research study was undertaken to provide evidence that the active learning methods are effective in teaching introductory statistics.

An introductory, university level course was divided into two sections. One section was taught entirely with traditional lecture. The other section was taught using active learning methods and a minimal amount of lecture. Active learning methods included group work, hands-on activities to gather data, and periods during which the instructor acted as a guide to lead the students to discovering statistical concepts. Both sections were taught by the same instructor during the same semester. The experiment was repeated the next semester.

Students' exam scores were analyzed to determine if the activity-based teaching approach led to higher student comprehension and understanding of statistical concepts, and the ability to apply statistical procedures. Surveys were also administered to students to ascertain if the lecture or activity-based approach led to higher, more positive student attitudes toward statistics.

Analysis of the data did not show that the activity-based teaching method led to higher student comprehension or procedural ability. Neither teaching method led to significantly higher student attitudes. Student comments indicated a positive response to the new activity-based methods. However, student responses indicated a desire for more teacher-centered time in the activity course. In particular, students wanted the teacher to introduce the topic at the beginning of each class before they started working in groups.