

FLIPPING THE PRECALCULUS CLASSROOM

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THE FLIPPED CLASSROOM

“In a ‘Flipped Classroom,’ students’ initial exposure to content is shifted outside of the classroom via readings, instructional videos, individual or collaborative activities, or a combination of these. Then during class, rather than lecturing, all or a significant portion of the time is used for practice, application exercises, discussion-based activities, team-based learning, or other active learning techniques.”

The Eberly Center for Teaching Excellence and Innovation at Carnegie Mellon University

BENEFITS

- Shifts students from listeners to doers of math.
- Increases collaboration among students.
- Increases engagement.
- Increases student preparation.

CHALLENGES

- Developing resources requires time.
- It is difficult to ensure students watch the videos.
- Leading a flipped class requires a different set of skills than lecturing.

MATH 2450

- 5-credit Precalculus course.
- Most students need one or more semesters of calculus.
- Placement by UW System placement exam or successful completion of Intermediate Algebra.
- Almost all students have had most of this material in high school, but have not mastered it enough to place into calculus.

ACKNOWLEDGMENTS

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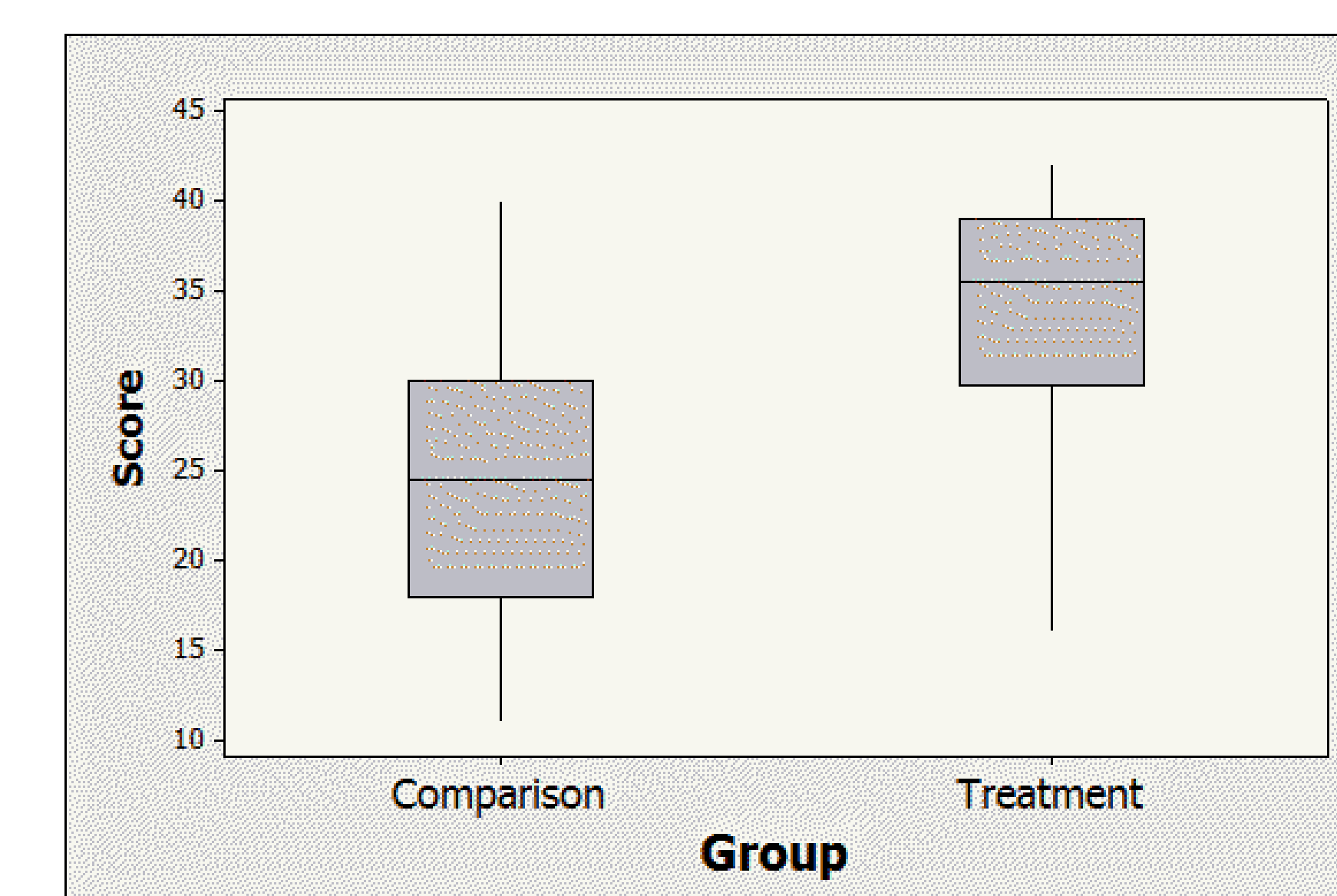
INTERVENTION

- New material was presented via videos made specifically for this class, which the students watched outside of class.
- During class time, students worked on problems in groups of 3-4. One or two problems were turned in that day, with the rest due the next class day.
- Once or twice a week, there was a Catch Up Day, where the instructor worked problems from previous homework, followed by a quiz.
- Each problem set was a mix of problems from the current section and review problems.
- Students got a small bonus on their homework for checking their answers to previously returned homework.



RESULTS

- All students in Math 2450 took a common final exam.
- Final exams from the treatment group were compared to those from a similarly-sized, randomly selected group of students from the other sections of Precalculus.
- Eleven problems were scored using a 4-point scale, with 0 being blank and 4 being essentially correct.
- Scoring was done by a student Research Assistant, who did not know which students were in which group.



The mean score for 54 students in the treatment group was 33.85 (out of 44). The mean score for 58 students in the comparison group was 24.57. The difference was statistically significant ($p < 0.0001$)