IES Institute of Education Sciences

STUDY SNAPSHOT
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Regional Educational Laboratory Southeast
At Florida State University

Effects of an Inquiry-Oriented Curriculum and Professional Development Program on Grade 7 Students' Understanding of Statistics and on Statistics Instruction

In the 2018/19 school year—eight years after the state adopted the current curriculum standards—Florida students, on average, earned only half of the points possible in the statistics content area of the state's annual mathematics assessment. Broward County Public Schools (BCPS) has identified low student achievement in statistics in the middle grades as a critical concern. It has also expressed concern that statistics instruction does not meet the level of cognitive complexity described in the state curriculum standards. This randomized controlled trial in 40 BCPS middle schools analyzed the extent to which the Supporting Teacher Enactment of the Probability and Statistics Standards (STEPSS) program—a 20-day curriculum unit designed to support teaching and learning of the state curriculum standards in probability and statistics at grade 7, along with four days of professional development for teachers—affects student understanding of statistics and statistics instruction compared with practice as usual.

Key findings

- **Students in STEPSS program schools scored higher on the Levels of Conceptual Understanding in Statistics test than students in practice-as-usual schools.** Students in STEPSS program schools had higher statistical understanding scores than students in practice-as-usual schools. The mean difference in scores is equal to an effect size of 0.23, which indicates that the STEPSS program is likely to increase an average student's understanding of statistics by about 9 percentile points—for example, from the 50th percentile of student achievement to the 59th percentile.
- **Statistics instruction in STEPSS program schools received higher scores on the Instructional Quality Assessment than statistics instruction in practice-as-usual schools.** Classroom observers scored the probability and statistics instruction in STEPSS program schools higher on the Instructional Quality Assessment than they scored the probability and statistics instruction in practice-as-usual schools. The Instructional Quality Assessment is an observational tool for measuring the cognitive complexity of student tasks and classroom discourse. The mean difference in scores is equal to an effect size of 0.80, which indicates that the program increased cognitive complexity and classroom discourse in probability and statistics. A higher percentage of teachers in STEPSS program schools than in practice-as-usual schools allowed the study team to observe their classrooms, so these results should be interpreted with caution. It is possible that teachers in practice-as-usual schools who did not agree to have their classroom observed were delivering statistics instruction at high levels.
- **Statistics instruction in STEPSS schools consistently involved the program's lessons provided in the statistics replacement unit.** Teachers used lessons from the STEPPS program curriculum in 95 percent of the classrooms observed in STEPSS program schools. Lessons from the STEPSS program curriculum were never observed in practice-as-usual schools, though teachers in more than half of the observed classrooms in practice-as-usual schools used lessons from sources other than the district-adopted mathematics curriculum.