

Registry of Efficacy and Effectiveness Studies

Study Title:

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

Registry ID: 1637.1v2

Version History

Changes were published on August 9, 2021 12:39:16 PM EDT

Currently viewing this version.

Description of changes published:

This version updates "Supporting Teacher Enactment of the Probability and Statistics Standards (STEPSS)", 1637.1v1, with the final results and link to the published study.

The first version of this entry was published on November 26, 2018 11:29:27 AM EST

[Review this version.](#)

Section I: General Study Information

PI name: Robert Schoen

PI affiliation: Florida State University

Co-PI name: Sharon Koon

Co-PI affiliation: Florida State University

Primary Funding Source(s):

Institute of Education Sciences

National Center for Education Evaluation and Regional Assistance

Award Number(s):

ED-IES-17-C-0011

IRB Name:

Florida State University

IRB Approval Date:

2017-12-11

IRB Approval Number:

2017.21525

Other Registration Name:

School Board of Broward County

Other Registration Date:

2017-12-18

Other Registration Number:

RR988

Study Start Date:

2017-12-01

Study End Date:

2020-06-30

Intervention Start Date:

2019-02-01

Timing of entry:

Retrospective registration

Brief Abstract:

The purpose of this study was to examine the impact of the Supporting Teacher Enactment of the Probability and Statistics Standards (STEPSS) program on classroom instruction and student understanding of grade 7 statistics. This randomized controlled trial in 40 Broward County, Florida, middle schools compared the STEPSS program condition (a 20-day replacement curriculum unit designed to support teaching and learning of the probability and statistics standards in grade 7, along with four days of professional development for teachers) with practice-as-usual statistics instruction and teacher professional development. The initial study sample included 155 grade 7 mathematics teachers and 14,045 grade 7 mathematics students in the 40 schools. The STEPSS program improved student performance on a test of conceptual understanding of statistics and increased the levels of cognitive demand and classroom discourse in classroom statistics instruction. The magnitude of the effect on student performance was 23 percent of one standard deviation, which is comparable to an increase of 9 percentile points for an average student. In addition, the study found that teachers involved students in tasks involving higher levels of cognitive complexity and engaged their students in higher levels of reasoning and discussion about each other's ideas about probability and statistics in the schools where teachers participated in the STEPSS program. The results of this study suggest that school districts should consider implementing the STEPSS program as a way to improve student understanding of and instructional practice in grade 7 statistics. Mathematics programs that are subjected to randomized controlled trials rarely result in positive impacts on student test performance of the magnitude attained in this study.

Keywords:

statistics, grade 7

Comments:

-

Section II starts on the next page.

Section II: Description of Study

Type of Intervention:

Curriculum/Product, Professional Development

Topic Area of Intervention:

Mathematics and Science Education, Probability and Statistics

Number of intervention arms:

1

Target school level:

7

Target school type:

Rural, Suburban, Urban

Location of Implementation:

United States : South

Further description of location:

Broward County, Florida

Brief Description of Intervention Condition:

STEPSS includes two complementary components: four days of teacher professional development workshops in statistics, and implementation of 11 lessons designed to teach the grade 7 statistics and probability standards created by the American Statistical Association (Bridging the Gap and Statistics Education Web). STEPSS teachers replaced the current district-adopted textbook (HMH GO Math!) for the 20-day unit on statistics and probability with the 11-lesson unit.

Brief Description of Comparison Condition:

Teachers in the comparison condition did not participate in the teacher professional development workshops and used the district-adopted textbook (HMH GO Math!) for the 20-day unit on statistics and probability.

Comparison condition:

Business-as-usual

Comments:

-

Section III: Research Questions

Confirmatory research questions:

Question 1:

What is the effect of the STEPSS program on student understanding of statistics, as measured by the LOCUS test?

Question 2:

What is the effect of the STEPSS program on statistics instruction, as measured by the IQA?

Exploratory research questions:

No Questions added yet.

Comments:

-

Section IV-A: Study Design (Selection)

Study Design:

Randomized Trial (RT)

Comments:

-

Section IV-B: Study Design (Input)

Study Design: Input

Unit of random assignment of intervention:

School

Assignment within sites or blocks:

No

Probability of assignment to treatment:

.5

Unit outcome data measured:

Student

Intermediate clusters between unit of random assignment and unit of measurement:

Yes

Description of intermediate clusters:

Teacher

Comments:

-

Design Classification

Based on the responses above, this study has been classified as:

RT: 3-level Cluster Randomized Trial

Section V: Sample Characteristics

Approximate number of students per intermediate cluster (Teacher): 90

Approximate number of intermediate clusters (Teacher) per school: 4

Number of schools in the comparison condition: 20

Number of schools in the intervention condition: 20

Were there certain students that were targeted for the study?

No

Were there certain students that were excluded from the study?

No

Were there certain intermediate clusters (Teacher) that were targeted for the study?

No

Were there certain intermediate clusters (Teacher) that were excluded from the study?

No

Were there certain schools that were targeted for the study?

No

Were there certain schools that were excluded from the study?

Yes - Schools with fewer than two grade 7 mathematics teachers and 30 students were ineligible to participate.

Comments:

-

Section VI: Outcomes (Input)

Confirmatory question 1: Outcome Measure 1

Outcome domain: Teacher Outcome Domain - Instructional Quality

Minimum detectable effect size: .591

Outcome measure: Instructional Quality Assessment

Scale of outcome measure: Continuous

Normed or state test: No

Test-retest reliability: N/A

Internal consistency: N/A

Inter-rater reliability:

Same outcome measure in treatment and comparison groups: Yes

Confirmatory question 2: Outcome Measure 1

Outcome domain: Student Achievement- Probability and Statistics

Minimum detectable effect size: .203

Outcome measure: Levels of Conceptual Understanding in Statistics

Scale of outcome measure: Continuous

Normed or state test: Yes

Same outcome measure in treatment and comparison groups: Yes

Section VII: Analysis Plan

Baseline data collected prior to start of intervention:

Yes

Description of baseline data:

Student scores on the grade 6 Florida Standards Assessment in mathematics.

Covariates you plan to include in the model:

Regular or advanced course type., Race, Student Pretest

Covariates you plan to include in the model:

Aggregate of Baseline Scores, Aggregate of Individual Characteristics, Regular or advanced course type.

Covariates you plan to include in the model:

Aggregate of Baseline Scores, Aggregate of Individual Characteristics

Analytic model:

Analytic model is included in section VIII: Additional Materials.

Plan to handle cases with missing outcome data:

Delete cases with missing data for the outcome being analyzed

Comments:

-

Section VIII: Additional Information

Links:

<https://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=REL2021055>

Files:

No Files have been added yet.

Comments:

Please see the published report for details related to the sample and data analyses.
