

Clark County School District

Clark County School District Pathways to STEM Initiative

DID THE PATHWAYS TO STEM INITIATIVE (PSI) HAVE AN IMPACT ON STUDENT SCIENCE ACHIEVEMENT?

Project Overview

THE INTERVENTION

THE PROBLEM: What Challenge Did the Program Try to Address?

Clark County School District (CCSD) in Nevada implemented the Pathways to STEM Initiative (PSI) using Project Lead the Way's (PLTW) Gateway To Technology (GTT) curriculum in science classes in four participating middle schools. PSI is designed to increase access to STEM curricula for students with disabilities and English language learners with the goal of improving science achievement.

THE PROJECT: What Strategies Did the Program Employ?

To improve student science achievement, CCSD used its 2012-2015 i3 development grant¹ to implement its PSI. The comprehensive approach included project-based science, technology, engineering, and mathematics (STEM) coursework; and extra-curricular opportunities for students to explore STEM including working with STEM professionals. In addition, PSI incorporated teacher professional development (PD), with a focus on working with students with disabilities and English language learners. PSI is focused on improving teacher STEM instruction, including their attitudes, preparedness, and efficacy. During Years 1 and 2, PLTW's GTT curriculum was used in all middle school science classes. However, in Year 3, the curriculum was modified for 6th grade and offered only as an elective. The study was evaluated using a quasi-experimental design in which baseline equivalency between treatment and comparison groups was generated through matching.

¹ The Clark County School District received an i3 development grant supported by the U.S. Department of Education's Investing in Innovation program through Grant Number U411C120052. Development grants provide funding to support the development or testing of novel or substantially more effective practices that address widely shared education challenges. All i3 grantees are required to conduct rigorous evaluations of their projects. The quality of evidence required to demonstrate a project's effectiveness depends on a project's level of scale or grant type.

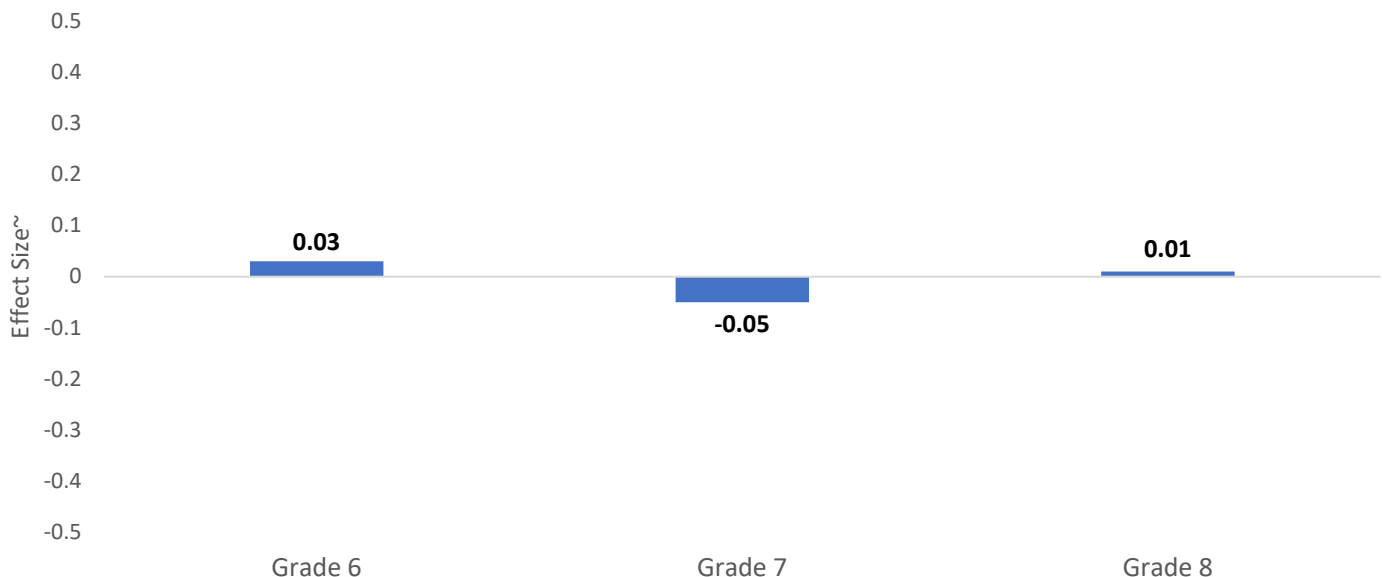
THE CCSD PSI MODEL

- **Teacher Professional Development.** Teachers participate in PLTW Readiness Training Modules and Core Training, in addition to other elective sessions.
- **CCSD and PLTW Curricula.** Teachers include lesson plans with learning objectives that are tied to the CCSD and PLTW curriculum.
- **Classroom Technology.** Classrooms receive high-functioning computers.
- **Weekly Sessions with STEM Professional.** Teachers and students attend a weekly meeting with STEM professionals.
- **STEM Club.** Teachers serve as support for STEM Club activities.
- **STEM Summer Camp.** Teachers offer STEM instruction to students at a STEM summer camp.
- **Science and Math Tutoring.** Teachers provide math and science tutoring to students.

Summary of Results

DID PSI IMPACT STUDENT SCIENCE ACHIEVEMENT?

PSI versus Comparison Group Achievement on the PASS*



*Partnership for Assessment of Standards-Based Science assessment.

~ Education researchers generally interpret effect sizes as follows: 0.2 = small, 0.5 = medium, and 0.8 = large. If the impact does not have an effect size of 0.2 or greater, it is not meaningful, even if it is statistically significant.²

² Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159.

- **SCIENCE ACHIEVEMENT BY GRADE LEVEL.** Sixth graders who participated in PSI for one year, as well as 7th and 8th graders who participated in PSI for two years did not have different science achievement outcomes than students from schools without PSI.
- **TEACHER RESPONSES.** After receiving PSI professional development and participating in PSI activities, PSI teachers did not respond differently to attitudinal survey questions regarding STEM instruction compared to teachers at schools without PSI. Both groups of teachers responded similarly to survey questions about their beliefs, attitudes, and efficacy regarding STEM instruction.
- **SUBGROUP ACHIEVEMENT.** Subgroups (English learner status, ethnicity, and gender) who participated in PSI did not have greater science outcomes compared to the same subgroups of students who attended schools without PSI.

The CCSD PSI did not impact student science achievement.

Please see Appendices B and C for information about the evaluation's design and the quality of the evidence, respectively.

OTHER CONSIDERATIONS

The evaluation report shared additional considerations, summarized below:

- **STEM SUMMER CAMP.** Student participation in STEM summer camp was high, particularly relative to other program offerings.
- **STUDENT ACHIEVEMENT.** Students participating in two years of the program showed increases in the state assessment, but the gains were not statistically significant. Students participating in just one year of the program did not.

For More Information

Evaluation Reports

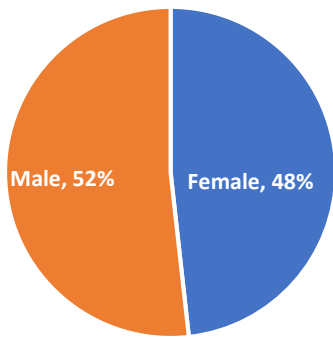
[Pathways to STEM Initiative \(PSI\): Evaluation Report for an Investing in Innovation \(i3\) Development Grant³](#)
(WestEd, 2017)

³ The information and data for this result summary was collected from the most recent report as of 02/10/2020: WestEd (2017). *Pathways to STEM Initiative (PSI): Evaluation Report for an Investing in Innovation (i3) Development Grant*. Retrieved from <https://files.eric.ed.gov/fulltext/ED573965.pdf>

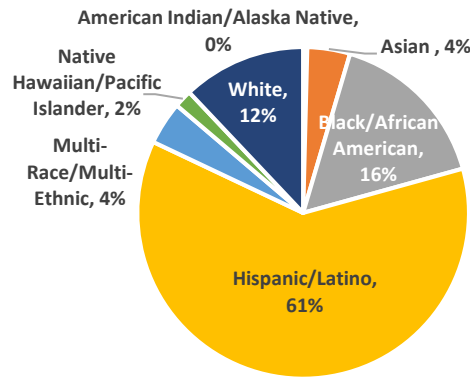
Appendix A: Students Served by the Project⁴

GRADE(S)													
PK	K	1	2	3	4	5	6	7	8	9	10	11	12

GENDER



RACE/ETHNICITY



COMMUNITY

Not Reported

HIGH-NEED STUDENTSⁱ

Free/Reduced-Price Lunch	English Learner	Students with Disabilities
Not Applicable/Not Reported	23.5%	11.6%

⁴ These data reflect the entire student population served by the intervention, not just the evaluation sample used in the impact study.

Appendix B: Impact Evaluation Methodology⁵

RESEARCH DESIGN:

Design:	Quasi-Experimental Design
Approach:	<ul style="list-style-type: none"> ▪ A multivariate matching algorithm selected the comparison schools. ▪ The comparison schools provided an estimate for what would have happened in the intervention schools without the treatment. ▪ The matching process allowed for baseline equivalency.
Study Length:	Three years

DATA COLLECTION AND ANALYSIS:

Study Setting:	Clark County School District, Nevada – middle schools (6 th -8 th grade)
Final Sample Sizes:	<ul style="list-style-type: none"> ▪ <i>Intervention Group:</i> four schools ▪ <i>Comparison Groups:</i> eight schools (6th and 7th grade); 16 Schools (8th grade)
Intervention Group Characteristics:⁶	<ul style="list-style-type: none"> ▪ English Language Learner: 18.1% ▪ Special Education: 12.1% ▪ Female: 48.9% ▪ Male: 51.1% ▪ White: 11.4% ▪ Black: 23.8% ▪ Hispanic: 54.6% ▪ Asian: 3.9% ▪ American Indian/Alaskan Native: 0.4% ▪ Native Hawaiian/Pacific Islander: 1.3% ▪ Multi-Race/Multi-Ethnic: 4.6%
Comparison Group Characteristics⁷	<ul style="list-style-type: none"> ▪ English Language Learner: 22.4%; 23.8% ▪ Special Education: 11.9%; 11.3% ▪ Female: 47.3%; 48.5% ▪ Male: 52.7%; 51.5% ▪ White: 12.7%; 12% ▪ Black: 15.4%; 14.5% ▪ Hispanic: 61%; 64% ▪ Asian: 4.7%; 4% ▪ American Indian/Alaskan Native: 0.5%; 0.4% ▪ Native Hawaiian/Pacific Islander: 1.4%; 1.1% ▪ Multi-Race/Multi-Ethnic: 4.3%; 4%

⁵ These data reflect only the evaluation sample in the impact study, not the entire population served.

⁶ Page 15 of final evaluation report, Exhibit 9.

⁷ Two comparison groups were used. The first numbers represent the PASS comparison group students (eight schools focused on test results for 6th and 7th grade). The second numbers represent the CRT comparison group students (16 schools focused on test results for 8th grade).

Investing in Innovation (i3) Grantee Results Summary

Development, 2013-2016

Data Sources:

- Nevada's Criterion Referenced Test (CRT) for 8th grade science, math, and reading scores
- Partnership for the Assessment of Standards-Based Science (PASS) for 6th and 7th grade for science scores
- Student transiency rate
- Percentage of students qualifying for free or reduced-price lunch
- Percentage of White, Black/African American, and Hispanic/Latino students for the 2011-12 school year

Key Measures:

- Nevada's CRT for 8th grade
- PASS for 6th and 7th grade

Appendix C: Quality of the Evidence

WHAT WORKS CLEARINGHOUSE REVIEW⁸

STUDY	RATING
Not reviewed as of 02/10/2020	N/A

EVIDENCE FOR ESSA REVIEW⁹

STUDY	RATING
Not reviewed as of 02/10/2020	N/A

NATIONAL CENTER ON INTENSIVE INTERVENTIONS REVIEW¹⁰

STUDY	RATING
Not reviewed as of 02/10/2020	N/A

⁸ <https://ies.ed.gov/ncee/wwc/FWW>

⁹ <https://www.evidenceforessa.org/>

¹⁰ <https://intensiveintervention.org/>

Investing in Innovation (i3) Grantee Results Summary

Development, 2013-2016

The [*Investing in Innovation Fund \(i3\)*](#), established under section 14007 of the American Recovery and Reinvestment Act of 2009, is a Federal discretionary grant program at the U.S. Department of Education within the Office of Elementary and Secondary Education (OESE). i3 grants help schools and local education agencies work in partnership with the private sector and the philanthropic community to develop and expand innovative practices that improve student achievement or student growth, close achievement gaps, decrease dropout rates, increase high school graduation rates, and/or increase college enrollment and completion rates for high-need students.

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ⁱ “High-need student” refers to a student at risk of academic failure or otherwise in need of special assistance and support, such as students who are living in poverty, attend high-minority schools, are far below grade level, who have left school before receiving a regular high school diploma, at risk of not graduating with a diploma on time, who are homeless, in foster care, have been incarcerated, have disabilities, or who are English learners. For more information see: [*Applications for New Awards; Investing in Innovation Fund-Development Grants, 81 FR 24070 \(April 25, 2016\)*](#).