

Interactive Science

Elementary Summative Research Overview

Interactive Science (Elementary) Summative Research Overview

Pearson strongly believes that its programs should be proven through scientific research to increase student achievement. As such, it contracted with independent research group Magnolia Consulting, LLC to conduct a randomized control trial (RCT) of its *Pearson Interactive Science* program. The study was conducted in fourth- and fifth-grade classrooms over the 2010-2011 school year. This report summary presents the evaluation design and methods, an assessment of program usage and implementation, student performance results, and a discussion of findings.

Interactive Science (Elementary) Randomized Control Trial

The purpose of this study was to assess the effectiveness of the *Interactive Science* program in helping students attain critical science skills and document the usage and implementation of the *Interactive Science* program with their students (also referred to as the “treatment” group) or refrain from using the *Interactive Science* program (also referred to as the “comparison” condition). Teachers assigned to the comparison condition continued usage of their current core science program.

The study addressed the following overarching evaluation questions:

1. Did teachers implement the *Pearson Interactive Science* curriculum according to the implementation guidelines and with a high level of fidelity?
2. What were teachers’ perceptions and experiences with the *Pearson Interactive Science* materials and components?
3. Does science ability improve as a result of participation in the *Pearson Interactive Science* Program?
4. Do changes in science performance among *Pearson Interactive Science* students vary by types of students and levels of implementation?
5. Does using *Pearson Interactive Science* result in increased student achievement as compared to other types of science programs?
6. Did students using *Pearson Interactive Science* demonstrate significant gains in their interest and attitudes toward science during the study period?
7. How did changes in interest and attitudes toward science among students using *Pearson Interactive Science* compare to those of students in the comparison group?

Participants and Setting

Magnolia Consulting recruited seven schools across six districts to participate in the study, including schools in CA, MO, NJ and NY. The final analytical sample was comprised of 61 classrooms and 1,133 students. The study schools were members of public school districts located in rural, suburban, and urban areas. The study demonstrated variation in ethnicity, socioeconomic status as evidenced by eligibility for free/reduced lunch status, as well as a wide range of science ability levels as evidenced by previous year state assessment data. Figure 1 presents the full study sample demographics broken out by site. Figure 1 presents the full study sample demographics broken out by school.

Figure 1: Magnolia Consulting Pearson Interactive Science (Elementary)
RCT Sample Demographic Information

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Geographic location and city description*	Midwest; Suburb, Large	Northeast; Suburb, Large	West; City, Large	Northeast; City, Large	Northeast; Rural, Fringe	Midwest; Suburb, Large
Total student enrollment	18,837	1,709	667,807	27,445	1,768	1,713
Percent qualifying as low-income	52.74%	2.75%	76.56%	85.20%	28.22%	53.30%
Ethnic breakdown						
Caucasian	27.85%	89.70%	8.83%	1.21%	81.00%	73.32%
African American	69.21%	1.35%	10.20%	85.67%	7.30%	22.83%
Asian	1.19%	6.32%	5.84%	1.53%	0.74%	0.41%
Hispanic	1.61%	2.52%	73.73%	11.13%	3.39%	3.04%
Other	0.13%	0.12%	1.38%	0.45%	7.58%	0.41%
Past performance on statewide science assessments	Below Average	Above Average	Average	Average	Average	Below Average

Note. Site 3 is a public charter school and the demographic data reflects the district in which it is located; * City description as defined by the National Center for Education Statistics at <http://nces.ed.gov/ccd/commonfiles/localedescription.asp#NewLocale>

Measures

Multiple measures were used to assess student achievement, program implementation and student attitudes.

Evaluators used the *Stanford Achievement Test*, Tenth Edition (SAT-10) to assess students' science skills. The SAT-10 is a norm-referenced, group-administered assessment that measures a number of content areas, including science, reading, and mathematics. The assessment uses a multiple choice format and is appropriate for administration in the fall and spring. Primary 3 is appropriate for the beginning of fourth grade, Intermediate 1 is appropriate for the end of fourth grade and the beginning of fifth grade, and Intermediate 2 is appropriate for the end of fifth grade. Each of these levels includes a Science subtest with cluster scores including Earth Science, Life Science, Physical Science, Nature of Science, Basic Understanding, and Thinking Skills. All three test levels—Primary 3, Intermediate 1, and Intermediate 2—consist of 40 test items.

In order to measure program implementation and teacher perceptions, evaluators collected data through observations, surveys and interviews with science teachers. Pearson Interactive Science teachers also completed weekly implementation logs. The biannual classroom observations and interviews with classroom teachers provided critical insight into the nature of use and effect of the science materials used with treatment and comparison classrooms.

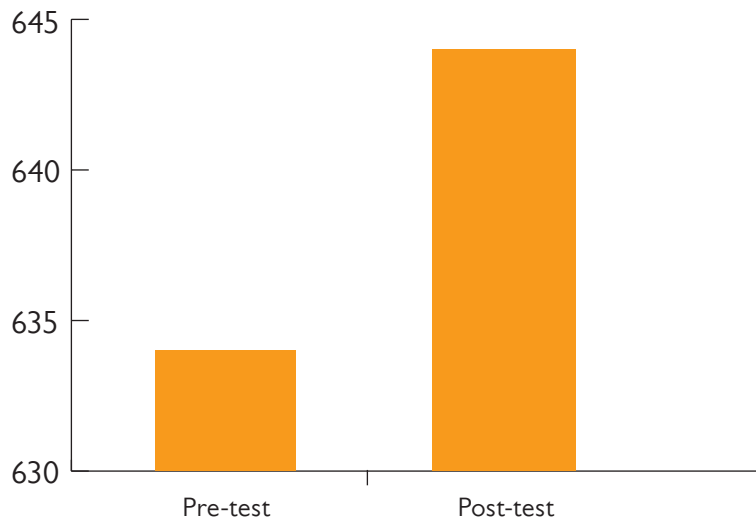
Additionally, a student science attitude survey was administered in the fall of 2010 and spring 2011. The attitude survey, developed by Magnolia Consulting, included 18 questions that assessed student attitudes toward science. Twelve questions pertained to science interest and six related to science efficacy.

Performance Results

Results for all Pearson Interactive Science Users

Evaluators conducted analyses to examine how *Pearson Interactive Science* students performed over the course of the school year. Results showed on average students in the *Pearson Interactive Science* program had a statistically significant gain from pretest to posttest (see Figure 2). This gain equals a moderate effect size of .33 which translates to a student moving from the 50th to the 63rd percentile.

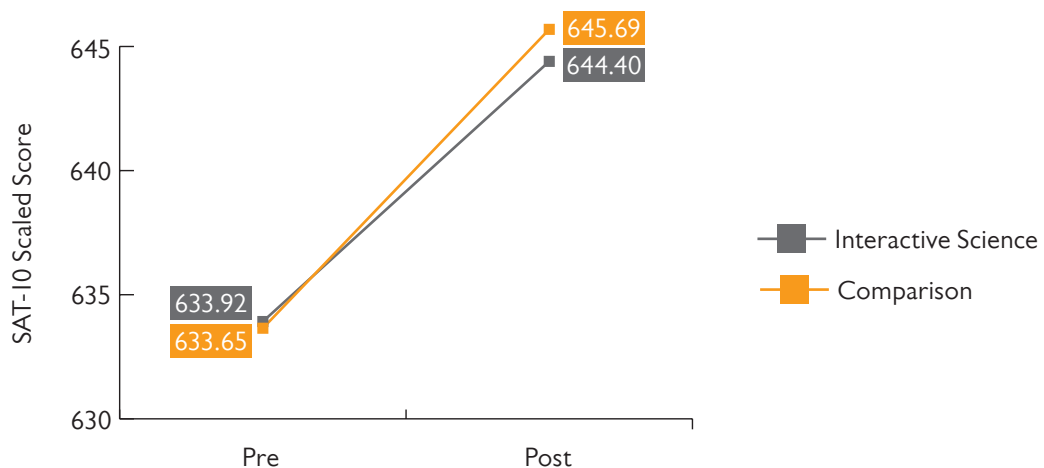
Figure 2: Percent of Pearson Interactive Science Students Above and Below Average Relative to Control Students: TerraNova and Developed Science Tests



Results for all Pearson Interactive Science Users versus other Core Science Programs

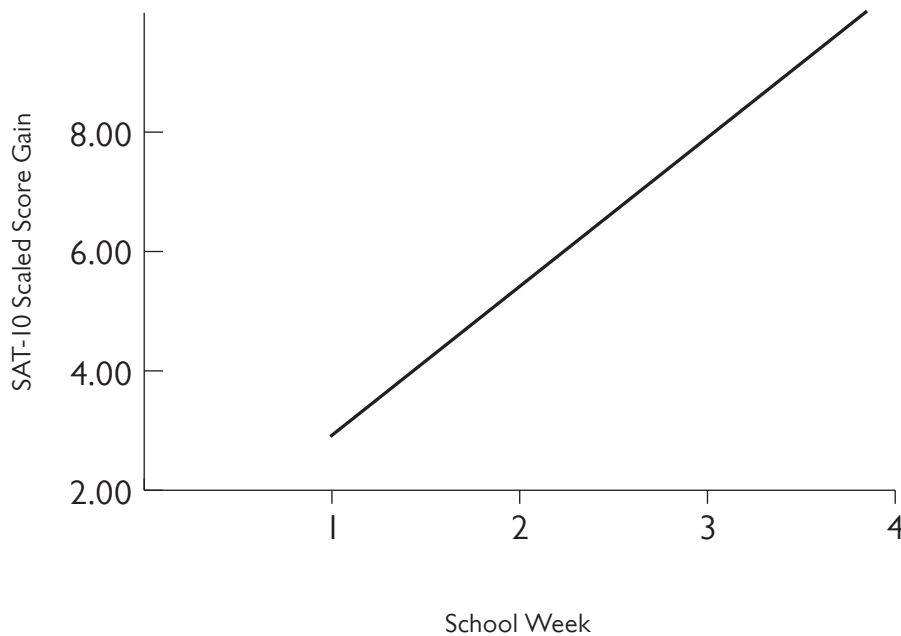
Evaluators conducted analyses to examine how *Pearson Interactive Science* students performed over the course of the school year in comparison to students in other core science programs. Results showed that Interactive Science classrooms, which had only been using the program for one year, performed as well as comparison classrooms, which had been using high-quality science programs for several years (see Figure 3).

Figure 3: Interactive Science Students vs. Comparison Students: SAT-10 Scaled Scores



Additionally, evaluators analyzed whether *Pearson Interactive Science* student achievement gains differed by total school days spent in *Interactive Science*. Evaluators found a statistically significant relationship between total school days in *Interactive Science* and gain scores such that more days spent in science instruction related to greater SAT-10 science gain scores (see Figure 4). Specifically, on average every additional two weeks (i.e., 10 days) of *Interactive Science* lessons translates to a gain of approximately 5 points on the SAT-10. (Note: the current finding should be interpreted with caution. The analysis did not include comparison groups, so it is unclear whether the relationship was because of greater exposure to *Interactive Science* or to science instruction over the course of the school year.)

Figure 4: *Interactive Science* Students SAT-10 Scaled Score gains with each additional instruction week



Results for Subgroups: Pearson Interactive Science versus other Core Science Programs

Evaluators examined if there were differences in performance between different subgroups of *Pearson Interactive Science* students and students using other science programs. Evaluators ran subgroup analyses when the subgroup had at least 150 students. For this reason, evaluators did not conduct separate impact analyses for the following subgroups: ELL and Special Education. Overall, there was not a statistically significant impact of the *Interactive Science* program within the following subgroups: Caucasian, African American, Hispanic, Free or Reduced Price Lunch (FRL) Eligible, or FRL Ineligible students. As a result, the *Interactive Science* program and comparison programs showed comparable effects on student science achievement within each student subgroup.

Pearson Interactive Science *Implementation*

Pearson Interactive Science teachers implemented the program during core science instruction in grades four and five over the course of one school year. Three levels of implementation (low, moderate and high) were assigned for teachers' implementation of key *Pearson Interactive Science* components. Overall, 91% of teachers implemented the program with high fidelity and 9% implemented the program with moderate fidelity (see Table 1).

Table 1: Implementation fidelity level of Interactive Science teachers

	Fourth Grade (n=12)	Fifth Grade (n=11)	Overall (n=23)
High Fidelity (80% or higher)	11	10	21
Moderate Fidelity (60% to 79%)	1	1	2
Low Fidelity (59% or lower)	0	0	0

Participant Feedback

Student Attitudes

In addition to providing evidence of efficacy, Magnolia Consulting investigated other outcomes associated with the use of the *Pearson Interactive Science* program. Magnolia developed a student survey to measure student attitudes before and after using Interactive Science. Specifically, the survey measured students' interest and efficacy in science.

Over the course of the study, *Interactive Science* students reported consistently positive science attitudes with no statistically significant change over time. Student science interest did not significantly change over the study, but science efficacy did statistically significantly increase. There were no statistically significant differences in overall science attitudes between Interactive Science and comparison students; both groups had comparably high levels of science attitudes at posttest.

In their spring attitude surveys, students answered an open-ended question concerning what they liked most about *Interactive Science*. Students' top three categories of interest were experiments, science content and technology. Students liked the different science experiments and activities; they enjoyed specific science content such as lessons on the human body, space, and animals; and they appreciated the program's science videos and online resources.

Teacher Attitudes

While teachers noted a variety of specific program components they liked best, three emerged as favorites among teachers: 1) consumable student edition, 2) lab activities, and 3) digital path videos. Overall, teachers believed the labs and experiments were easy to use and helped students to acquire content knowledge. Teachers also found the hands-on learning component to be vital in helping students engage with content at a deeper level. Teachers thought the write-in components helped students to process the information at a deeper level and to build comprehension. The text also allowed teachers to quickly assess student understanding. Ultimately, teachers believed the write-in text helped teachers to integrate literacy into the science block.

Overall, teachers thought the program worked well for on-level and above-level students, with the content, leveled readers, and higher-level thinking questions supporting these students. However, teachers thought the leveled readers, vocabulary cards, pictures, and activities all helped below-level readers to engage with the content. Though both *Interactive Science* and comparison teachers had similar perceptions of student learning related to science vocabulary, lesson objectives and science inquiry, *Interactive Science* teachers believed their curriculum materials were more adequate in meeting student needs than comparison group teachers. In their final weekly log, *Interactive Science* teachers said they found the program to be more comprehensive, organized, accessible, and hands-on compared to previous science programs.

Conclusion

The breadth and depth of research that supports this program provides evidence that *Pearson Interactive Science* is effective at increasing student science achievement. Independent evaluators found that *Interactive Science* classrooms, which had only been using the program for one year, performed as well as comparison classrooms, which had been using high-quality science programs for several years. Teachers and students using *Pearson Interactive Science* reported satisfaction with the program. In sum, scientific research indicates that the *Pearson Interactive Science* (Elementary) program is an effective and useful science program for both teachers and students.

About Magnolia Consulting, LLC

Magnolia Consulting is a woman-owned, small business with headquarters in central Virginia and a network of consultants throughout the country. Together, their team offers more than 60 years of evaluation experience and represents a broad range of fields including education, human services, and social science. With their expertise, they help clients achieve their goals in PK-20 education, adult education, organizational change and development, community and school-based programs, and informal education and public outreach. They cultivate learning and positive change by meeting clients' specific needs with timely, relevant, and useful information. Learn more at www.magnoliaconsulting.org.

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