NMPED Science Curriculum Review of Evidence

Curriculum Name: New Mexico Miller & Levine Biology ©2010 (Mainstream and Foundations editions)

Publisher: Pearson Education, publishing as Prentice Hall
Number of Studies Submitted: 2
Number of Studies Reviewed: 2
Grade(s) of Studies Reviewed: 9-12

Average Rubric Ratings:

Criteria	Average Rating Across All Studies
Experimental Design	1
Sample	1.5
Methodology	2
Measures	2
Studies	1
Reporting Results	1
Investigators	2
Total Score	10.5
Average Subscale Score	1.5

Narrative:
Pearson Education hired Claremont Graduate University to conduct a pilot study of the *Miller & Levine Biology ©2010* curriculum. One purpose given to the pilot study was to establish instruments and procedures in preparation for a randomized control trial (RTC) experiment led with the same principal investigator through Cobblestone Applied Research & Evaluation, Inc. During Spring 2009, eight teachers in four schools across three states covered one unit on cells content (a total of four chapters) using either the Mainstream or Foundations textbooks with limited training on the textbook components, online resources, and ancillary materials. (The Foundations textbook version is similar to the Mainstream version with the following differences: written at an 8th grade level, reduced quantity of text, specific changes to graphics for comprehension, and vocabulary support.) The pilot study did not include a control group of teachers.

Researchers administered three instruments to students: (1) pretest and posttest of the science section of the Stanford Achievement Test (SAT-9), a standards-based science assessment; (2) pretest and posttest of a cells assessment constructed from released life science items from state education departments; and (3) self-reported survey on attitudes, parental involvement, classroom environment, meta-cognitive strategies, and product satisfaction to test reliability of individual items to reflect underlying constructs and factors related to student achievement. The study systematically tracked use of components of the program with an online log and observed teachers and students using the program. Researchers also conducted teacher and student focus groups to gain information about specific features of the textbook.

The study design used a paired-samples *t*-test to investigate differences from pretest to posttest on the content assessments. Results for the cells assessment indicated there were significant increases from pretest to posttest ($p<.001$) for all students regardless of the text type. There were no significant differences on the SAT-9 assessment given the short duration of the study. Researchers conducted a repeated-measures ANOVA to compare differences in textbook (Mainstream and Foundation) and gender. Both textbook users significantly improved their scores on the cell assessment while neither group had significant change in SAT-9 scores. However, students using the Mainstream textbook performed significantly better on pretests and posttests than those using the Foundations textbook. There were no significant differences between males and females on either of the assessments, but females using the Foundations text significantly increased their scores to show a

greater benefit than their male counterparts. The sample size for ethnicity was not sufficient to conduct appropriate analyses.

Overall Quantity and Quality of Evidence:
The studies submitted for review provide some evidence for the effectiveness of the science program. A pilot study cannot offer definitive answers to the effectiveness of *Miller & Levine Biology ©2010* to the extent that it cannot be generalized beyond the pilot sites. The purpose of the pilot study was to obtain feedback from teachers and students on the program, observe the program in classrooms, and finalize all instruments and protocols for the RCT study to be conducted during the 2009-2010 school year. These results were not submitted for review. There are statistically significant positive results from the pretest/posttest data. Studies did not report effect size as a result of the use of the science program. Based on this study, there is good evidence of program efficacy for *Miller & Levine Biology ©2010*.

References of Submitted Studies:
Claremont Graduate University (June 2009). The Effects of *Miller & Levine Biology* on Student Performance: Pilot Study.
Cobblestone Applied Research & Evaluation (2010). Use and Satisfaction of the *Miller & Levine Biology ©2010* Foundation Textbook.