

Paper 1 Title: Results from the Zoology One Multi-Site Randomized Experiment

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Background/Context: A growing body of empirical research suggests that science engagement helps build young children’s general knowledge, vocabulary, and motivation to learn—all of which have been demonstrated to predict long-term achievement across multiple domains (Grissmer et al., 2010; Strickland & Riley-Ayers, 2006; French, 2004). Zoology One builds on this prior evidence by combining intensive engagement with science content and research-based best practices in literacy instruction in a comprehensive integrated curriculum for kindergarten. Its primary goal is to accelerate all students’ progress in reading. Increasing students’ writing skill and science content knowledge are secondary goals.

Purpose/Objective/Research Question: This paper will share the impact findings from the RCT evaluation of Zoology One in multiple subject areas at the end of the school year as well as one and two years after. Specifically we answer the question: Do students in kindergarten classrooms using an integrated literacy and science curriculum outperform students in business-as-usual control classrooms in reading? In writing? And in science?

Setting: School District of Philadelphia, Pennsylvania

Population/Participants/Subjects: The Zoology One study includes approximately 2000 students attending kindergarten in the School District of Philadelphia, where 77 percent of students are from historically underserved racial groups and more than 90% qualify for free lunch.

Intervention/Program/Practice: *Zoology One* is a year-long curriculum that fully integrates literacy and science learning in kindergarten. It consists of a 90-minute instructional block that adheres to a balanced literacy framework, including morning meeting, readers’ and writers’ workshops using science-based texts and materials, small-group instruction, and hands-on science exploration activities. In the current study, *Zoology One* is implemented in place of regular literacy instruction in kindergarten. To guide implementation, teachers receive startup professional development and ongoing classroom-based coaching from professional coaches employed by the program’s developer, American Reading Company. The program emphasizes independent reading in leveled texts, home reading, ongoing formative assessment, and daily writing and science instruction.

Research Design: The evaluation design for the IES-funded efficacy trial of *Zoology One* includes a rigorous experimental research design (i.e., a multi-site cluster randomized controlled trial) that supports strong causal inferences about program impacts. Cluster randomization was selected because *Zoology One* is a whole-class intervention. Randomization was conducted at the classroom level with entire classrooms—including teacher and all students—in September in each year, after students and teachers have been assigned to classrooms.

Data Collection and Analysis: To assess program impact, students were assessed using the Woodcock Reading Mastery Test; Math and Writing subtests of the Kaufman Test of Educational Achievement, Third Edition (KTEA-3); and Early Life Science Assessment. Treatment-control differences are estimated using a three-level hierarchical linear model (Raudenbush & Bryk, 2002), with students nested within classrooms and classrooms nested within schools. This HLM includes pretest scores as a covariate, along with random effects for classroom, a random effect for overall school performance (i.e., random school intercepts), and a random effect for the impact of Zoology One (i.e., random treatment effects across schools). The primary impact analyses utilizes subscales from the Woodcock Reading Mastery Test as the confirmatory posttest outcome measure and Readiness subscale scores as the pretest covariate.

Findings/Results: Baseline equivalence was confirmed for gender, race, and prior reading level. End of year impacts on reading, writing, science and math are presented. Analyses revealed overall significant effects of Zoology One, including a treatment effect of .28 standard deviations for the WRMT passage comprehension subscale. No other outcome measures produced statistically significant differences between groups.

Conclusions: This paper presents results for the very first time from this large federally funded evaluation. Findings will be useful to policymakers, practitioners, and researchers interested in the relationship between achievement in science and literacy, and the effects of engaging students in integrated literacy and science programming from the earliest days of school.