

SUMMARY

Improving the ability of at-risk children to read and comprehend text has been a high priority in education policy over the last two decades. Low levels of reading achievement have been related to low academic performance, and one critical factor in reading achievement is adequate vocabulary knowledge. Children from disadvantaged backgrounds often lack general and academic vocabulary to enable them to acquire knowledge and comprehend text when they learn to read.

State education departments, in discussions with Regional Educational Laboratory (REL) Southeast, identified low reading achievement as a critical issue for their students and expressed an interest in identifying effective strategies to promote the foundational skills in young students that might improve reading achievement. The Mississippi State Department of Education has focused specifically on interventions that might enhance students' vocabulary knowledge. The Mississippi state legislature established a high priority on meeting the early education needs of students in or near the Delta, a primarily rural area of the state with a high level of poverty and historically low performance on reading achievement. To address these concerns, the current study tests the impact of a kindergarten vocabulary instruction program on students' expressive vocabulary when used across a range of districts and schools in the Mississippi Delta by kindergarten teachers as a supplement to their regular instructional program. Previous research on the program showed that a preschool version of the curriculum was associated with improved student vocabulary acquisition but did not provide a test using methodologies that can establish causal relationships.

Kindergarten PAVEd for Success (K-PAVE) was selected to be tested in Mississippi for three reasons. First, there were only a small number of vocabulary interventions appropriate for this age group to be considered. Second, among these, PAVE—the preschool version of the intervention—was the only one for which an impact study had been completed that provided some evidence of effects. Third, K-PAVE was the only curriculum that had developed teacher training materials and a training protocol, which meant that it could be implemented with sufficient fidelity across a variety of districts and school settings. The experimental design of this evaluation addresses limitations of earlier research and ensures a valid basis for estimating the effect of K-PAVE, implemented across a range of settings in the real world, on vocabulary knowledge of students in kindergarten.

K-PAVE is built around three components that support the acquisition of vocabulary in young students: instruction on a large set of thematically related target words through provision of definitions, examples, and visual images and through embedded instruction using storybook reading, extension activities, and teacher conversation; Interactive Book Reading to build vocabulary and comprehension skills; and Adult-Child Conversations to build vocabulary and oral language skills.

K-PAVE was implemented as a supplement to the regular classroom literacy instruction. Teachers were given broad latitude to choose how to integrate K-PAVE into their classroom instruction, including conducting K-PAVE activities in multiple curriculum areas across the classroom day and week. Fidelity of K-PAVE implementation was evaluated using a rating system provided by the program developer and administered based on classroom observation. Results showed that there was substantial variation in fidelity of implementation across

classrooms, which is typical of interventions implemented across a range of settings in the real world. At the same time, most classrooms were observed to be implementing K-PAVE with sufficient fidelity to support impacts on students.

The primary research question for the study addressed the impact of K-PAVE on kindergarten students' expressive vocabulary. Secondary research questions addressed the impacts on kindergarten students' academic knowledge and listening comprehension. Although the study was concerned primarily with the impacts of K-PAVE on students, impacts on intermediate classroom instruction outcomes were also assessed to provide context for understanding potential impacts on students. The study addressed research questions about impacts on classroom instruction in vocabulary and comprehension support, instructional support, and emotional support. Finally, the study examined whether the introduction of K-PAVE had the unintended consequence of reducing the time spent on areas of literacy instruction other than vocabulary and comprehension (such as phonological awareness, alphabet knowledge, print concepts, and decoding).

The experimental design of this evaluation addresses limitations of earlier research and provides a valid basis for estimating the effect of K-PAVE on the vocabulary knowledge of kindergarten students. The study employs a cluster random assignment design that randomly assigned schools to an intervention or control condition. Two kindergarten classrooms in each school were randomly selected to be in the study. The final sample included 65 schools, 130 kindergarten teachers, and approximately 1,300 kindergarten students distributed across 35 districts in the Mississippi Delta region and surrounding area. All districts, schools, teachers, and students volunteered to participate in the study and were not randomly sampled from the universe of eligible schools in the region.

The study sample did not differ significantly from all eligible schools in the Mississippi Delta and surrounding areas on a set of measured characteristics (including region, percentage of students eligible for free and reduced-price meals, and school accountability measures relating to school performance classification and meeting annual expectations for growth in achievement). Study schools did differ from eligible schools on two characteristics: study schools had a greater percentage of African American students and were more likely to be located in small towns and less likely to be located in rural areas.

To be eligible for the study, schools had to have at least two kindergarten classes, at least two consenting kindergarten teachers willing to be selected for data collection, and at least 40% of students eligible for free and reduced-price meals. The random assignment produced two groups of schools that did not differ significantly on pre-intervention measures of socioeconomic mix, state classifications of school-level student achievement, reading initiatives, racial composition of student body, region, and locale. In addition, students in the two groups of schools did not differ significantly on pre-intervention measures of expressive vocabulary, academic knowledge, listening comprehension, and other characteristics, including socioeconomic status, race, age, special education status, and gender.

After receiving training on the K-PAVE intervention, kindergarten teachers in treatment schools implemented it in the 2008/09 school year. The K-PAVE program was designed as a 24-week supplement to the core language arts program used in each school. Kindergarten teachers in control schools also implemented their core language arts curriculum and received their district's regular professional development during 2008/09. Teachers in the intervention

condition received two days of initial group training in fall 2008 (one month into the school year), three follow-up telephone conference calls to discuss implementation issues and reinforce key aspects of the K-PAVE program, and two rounds of classroom observation and feedback on how to improve their implementation of K-PAVE—one immediately after the initial training and one two-thirds of the way through the 24-week intervention.

The impact of K-PAVE at the end of kindergarten was assessed for one primary student outcome—expressive vocabulary. The estimated impact of K-PAVE on expressive vocabulary was 1.60 points on a scale with a mean of 100 and a standard deviation of 15,² and the impact was statistically significant. The standardized effect size for this impact is 0.14. Translating this effect size into a difference in age-equivalent scores, students who received the K-PAVE intervention were one month ahead in vocabulary development at the end of kindergarten compared with students in the control group (See Chapter 4, p. 85, and Appendix W for a discussion of how impacts on students can be translated into differences in age-equivalent scores).

The impact of K-PAVE at the end of kindergarten was also assessed for two secondary student outcomes—academic knowledge and listening comprehension. The impact of K-PAVE on academic knowledge was found to be statistically significant, with a magnitude of 1.95 points³ on an item response theory-based scale with a sample mean of 455 points and standard deviation of 13.5 points in the control group. The standardized effect size for this impact is 0.14. Translating this effect size into a difference in age-equivalent scores, students who received the K-PAVE intervention were one month ahead in academic knowledge at the end of kindergarten compared with students in the control group. K-PAVE did not cause a statistically detectable impact on kindergarten listening comprehension.

The impact of K-PAVE at the end of kindergarten was also assessed for three classroom instruction outcomes hypothesized to foster students' vocabulary development: vocabulary and comprehension support, instructional support, and emotional support. K-PAVE caused a positive and statistically significant impact on vocabulary and comprehension support, which includes the introduction of vocabulary words throughout the school day and the use of comprehension supports and open-ended questions during book reading. The magnitude of this impact, 0.82 standard deviations, is equivalent to providing comprehension support during book reading 12 more times, asking three more higher order questions during book reading, introducing three more words during book reading, and introducing one more word during other times of the day. K-PAVE did not cause a statistically detectable impact on instructional support or emotional support in the classroom.

K-PAVE did not cause a statistically detectable impact on the amount of instructional time spent on literacy in areas other than vocabulary and comprehension. Thus, K-PAVE did not cause teachers to provide more vocabulary and comprehension support at the expense of time spent on other areas of literacy instruction.

² The 95% confidence interval around the impact estimate is 0.4–2.8 points.

³ The 95% confidence interval around the impact estimate is 0.2–3.7 points.