



ABCMouse Use at Home Accelerates Kindergarteners' Academic Growth— A Randomized Controlled Trial

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Abstract

This randomized, double-blind experimental study examined the impact of home use of ABCmouse.com *Early Learning Academy*, a comprehensive supplemental early learning resource, on literacy and math skills. The 13-week study included a diverse sample of 281 kindergarten-aged children in Southern California. Half the children were randomly assigned to use ABCmouse for an average of 45 minutes per week at home (Treatment group), while the other half did not use ABCmouse (Control group). Every four to five weeks, participants completed onsite standardized tests that are widely used in schools (DIBELS and CBM). While all outcome measures showed significant improvements from Time 1 to Time 4, children who used ABCmouse showed 25% higher growth on a composite of key early literacy skills than children in the Control group ($p = .01$, Cohen's d effect size = .30). The gains from using ABCmouse were even greater for children who scored below the sample median at pre-test: 33% higher in literacy skills ($p < .05$, $d = .38$) and 48% higher in math skills ($p = .01$, $d = .49$) compared to similarly scoring peers in the Control group. These

findings are especially notable because the intervention occurred at home rather than in a classroom setting and was of a relatively short duration (13 weeks).

Participants

In October 2014, 371 Southern California families with children in kindergarten were recruited through advertisements in local parenting media and email outreach. All families were screened for study eligibility requirements: high-speed Internet access on either a computer or tablet at home, a kindergarten-aged child with some comfort using computers or tablets, and no prior ABCmouse exposure at home or school. The sample (46% boys, 54% girls) was ethnically diverse (approximately 15% African American, 15% Asian American, 23% Latino/Hispanic, 48% White). Approximately two-thirds of participants (66%) had at least one college-educated parent, and about half (48%) had a household income over \$100,000 per year.¹ Participants' assessment scores at the beginning of the study were not significantly different from the norms for those assessments established with a large and nationally representative sample of students.²

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¹ Participating families' education and income levels were somewhat higher than those of the overall U.S. population, see National Center for Children in Poverty (2015; available: http://www.nccp.org/publications/pub_1097.html) and U.S. Census Bureau (2014; available: <https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf>), but similar to the education and income levels of U.S. families with high-speed Internet access, see Pew Research Center (2015, 2013; available: <http://www.pewresearch.org/fact-tank/2015/04/20/the-numbers-behind-the-broadband-homework-gap/> and <http://www.pewinternet.org/2013/08/26/home-broadband-2013/>).

² DIBELS Next Recommended Benchmark Goals (2012). University of Oregon Center on Teaching and Learning. Available: <https://dibels.uoregon.edu/docs/DIBELSNextRecommendedBenchmarkGoals.pdf>; Saven, J. L., Tindal, G., Irvin, P. S., Farley, D., & Alonzo, J. (2014). EasyCBM Norms 2014 Edition. University of Oregon Behavioral Research and Teaching. Available: https://dibels.uoregon.edu/docs/techreports/Math_TechRpt1409_easyCBM_Norms.pdf.

The final sample included 281 children (128 in the Treatment group and 153 in the Control group); attrition was primarily due to failure to meet the 45-minute per

week ABCmouse usage requirement in the Treatment group, use of ABCmouse in the Control group, and voluntary withdrawal from the study.³

Design & Procedure

Before the first assessment, children were randomly assigned to either the Treatment or Control group. Trained educators who were blind to condition administered the DIBELS (Dynamic Indicator of Basic Early Literacy Skills) Next Assessment⁴ and the CBM (Curriculum Based Measurement Solutions) Lite Numbers and Operations⁵ individually to each child at four time points between October 2014 and January 2015 at a market research facility.

In order to maintain fidelity of the instruments, children were given a different version of each DIBELS and CBM Benchmark and Progress Monitoring assessment at each

time point. At the conclusion of each assessment, all families received a gift card.

Table 1 shows the skills assessed. Because of differences in scale of the literacy variables, an average of the standardized scores (z scores) of LNF, FSF, PSF, and NWL-CLS were used as the DIBELS Literacy Composite. To calculate the z scores, each literacy score was centered at the mean of the sample at Time 1 to preserve changes in scores over time, enabling direct comparison of the Treatment and Control groups at each time point and on their learning gains over time.⁶

Table 1. Skills Assessed by the DIBELS and CBM Benchmark and Progress Monitoring Assessments

Assessment	Skills Assessed
DIBELS Literacy	Letter Naming Fluency (LNF)
	First Sound Fluency (FSF)
	Phoneme Segmentation Fluency (PSF)
	Nonsense Word Fluency – Correct Letter Sounds (NWF – CLS)
CBM	Numbers and Operations

After the Time 1 assessment, Treatment group families received a 20-minute training session with instructions for their child to use ABCmouse for 45 minutes per week

during the 13-week study. Although all children in the final sample used ABCmouse for an average of at least 45 minutes per week, no child met the usage requirement

³ Attrition occurred for the following reasons: Treatment group—insufficient ABCmouse usage (46 children), voluntary withdrawal from study (8), refusal to take assessment (2); Control group—ABCMouse usage during study (19), voluntary withdrawal from study (12), refusal to take assessment (3). Importantly, the Treatment and Control groups in the final sample were baseline equivalent, with similar demographics and no significant differences in literacy or math scores at the beginning of the study (Time 1).

⁴ Good, R. H., & Kaminski, R. A. (Eds.) (2007). *Dynamic Indicators of Basic Early Literacy Skills* (6th ed.). Eugene, OR: Institute for the Development of Educational Achievement. Available: <http://dibels.uoregon.edu/>.

⁵ Hosp, Michelle K. (2007). *The ABCs of CBM: A practical guide to curriculum-based measurement*. New York: Guilford Press.

⁶ A child's Literacy Composite (z score) at Time 1 shows their relative place within the sample. A child at the mean of the full sample at Time 1 would have a score of 0 and a child below the mean would have a negative score. Literacy Composite scores at other time points represent changes in standard deviation units from the mean at Time 1. A child with a score of 0.5 at Time 4 performed 0.5 standard deviations higher at Time 4 than the mean of the full sample at the beginning of the study.

every week of the study. Treatment group children in the final sample used ABCmouse for an average of 82 minutes per week, with over three-quarters averaging more than 60 minutes per week and half averaging

more than 75 minutes per week. Control group families completed a weekly survey documenting their child's online activities.

Results

Finding 1

Children who used ABCmouse achieved significantly greater gains on key early literacy skills than children who did not use ABCmouse.

While all outcome measures showed statistically significant improvement over the 13-week study period (Time 1 to Time 4), children who used ABCmouse showed 25% higher growth on the DIBELS Literacy Composite than children in the Control group ($d = .30$; Figure 1). Intent-to-treat analyses including the Treatment group children who did not meet the required ABCmouse usage threshold confirmed this result ($p < .05$, $d = .29$).

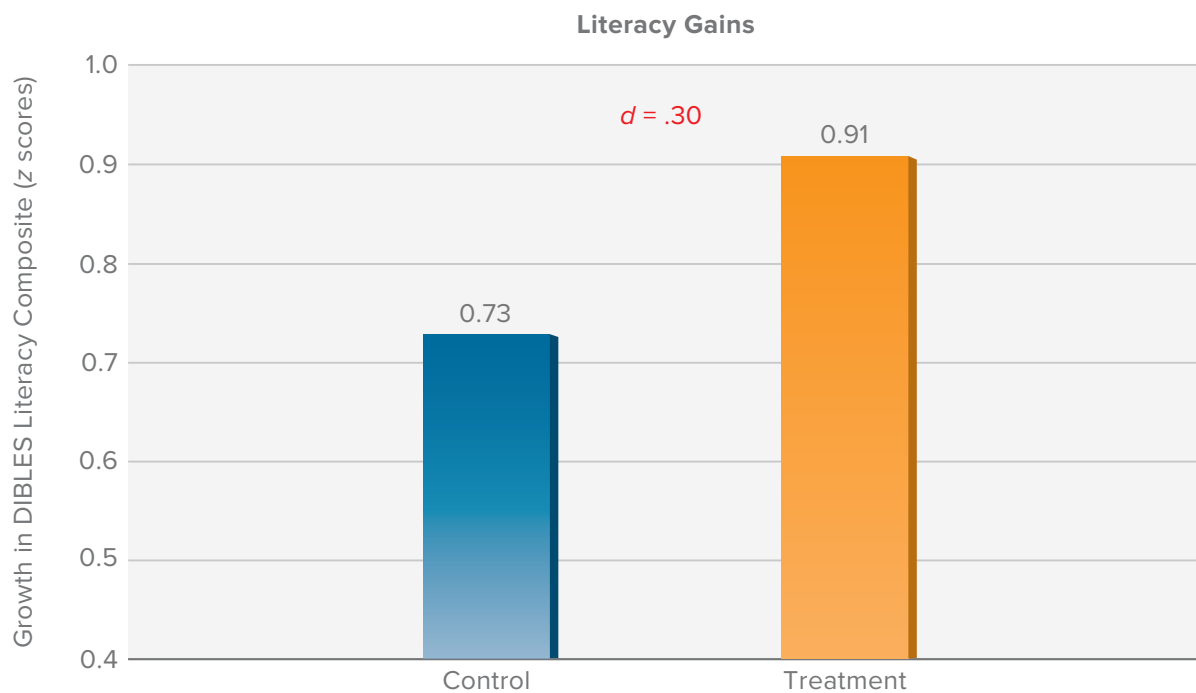


Figure 1. Growth in DIBELS Literacy Composite from Time 1 to Time 4. On gain score, $t(277) = 2.56$, $p = .01$, $d = .30$. An analysis of covariance (ANCOVA) on the gain score with Time 1 as a covariate also confirmed this main effect of condition, $F(1,276) = 4.78$, $p < .05$.

Finding 2

ABCmouse particularly helped lower-performing children improve their literacy and math skills.

The ABCmouse Treatment group children who scored below the sample median at Time 1 achieved 33% higher gains in literacy ($d = .38$; Figure 2) and 48% higher gains in math ($d = .49$; Figure 3) by Time 4 than their peers in the Control group who also scored below the median at Time 1.

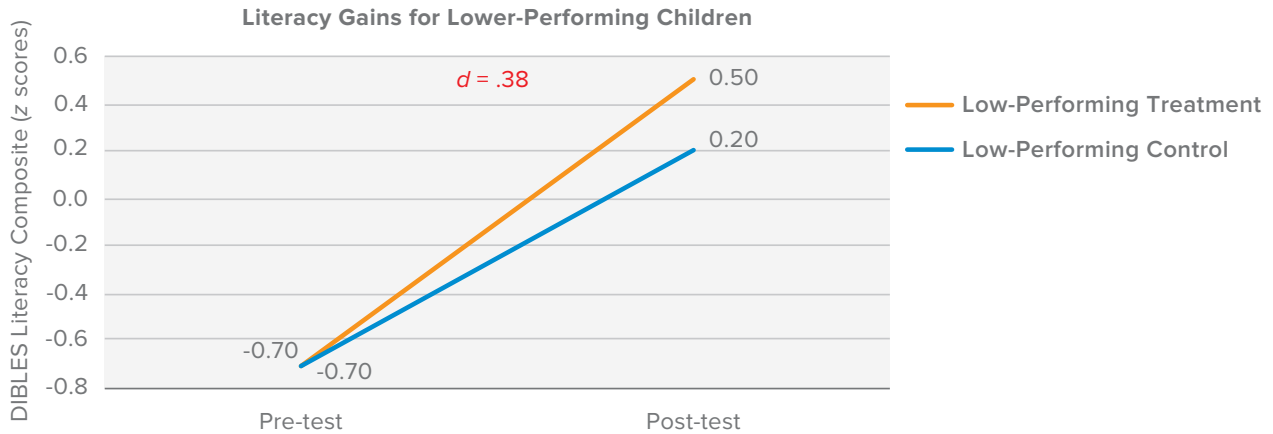


Figure 2. Time 1 and Time 4 scores on the DIBELS Literacy Composite for children who scored below the median at Time 1 ($N = 139$). On gain scores, $t(137) = 2.21, p < .05, d = .38$.

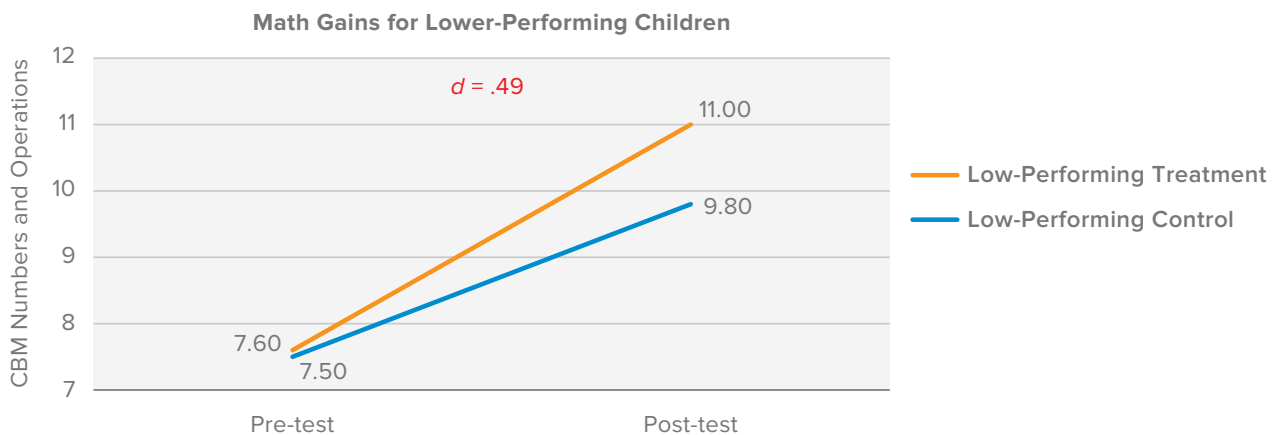


Figure 3. Time 1 and Time 4 scores on the CBM Numbers and Operations for children who scored below the median at Time 1 (not z scores, $N = 103$). On gain scores, $t(101) = 2.50, p = .01, d = .49$.

Conclusion

This randomized controlled trial demonstrates that the use of ABCmouse at home can significantly accelerate the academic growth of kindergarten-aged children. With a 13-week intervention, the Treatment group achieved 25% higher growth on a composite of important early literacy skills than the Control group. Notably, the literacy

and math gains were even greater for Treatment group children who underperformed at pre-test (33% and 48% higher, respectively). Using ABCmouse at home can help these struggling students improve, providing parents a way to supplement other remedial classroom work.