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RESEARCH BRIEF
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ABCmouse Prevents Summer Slide for Rising First Graders in Miami-Dade County Public Schools

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Abstract

Summer learning loss can have a major and cumulative impact on academic achievement gaps, disproportionately affecting children from low-income households with less access to learning resources over the summer. Approximately two-thirds of the ninth-grade reading achievement gap between children from high- and low-income backgrounds could be attributed to summer learning loss in the first five years of school.¹

The purpose of this study was to test the impact of an online curriculum, ABCmouse.com® *Early Learning Academy*, on “summer slide”: the loss of previously learned skills in reading and mathematics. A diverse sample of 999 rising first graders enrolled in Miami-Dade County Public Schools (M-DCPS) participated in the study; 608 were randomly assigned to the treatment group and were given free home access to ABCmouse over the summer with a weekly minimum usage requirement of 45–60 minutes and 15 completed ABCmouse Learning Activities. The 391 students randomly assigned to the control group were not given ABCmouse. To examine summer slide, we compared district-provided i-Ready assessment data in reading and mathematics from spring 2016 and fall 2016, and we evaluated subgroups based on spring 2016 Stanford Achievement Test-10 (SAT-10) scores in reading and mathematics.

ABCMouse helped prevent summer slide and contributed to a net gain in reading for children who completed at least 208 Learning Activities over the 12 weeks of summer (approximately 17 Learning Activities or 70 minutes of ABCmouse use per week), compared to the control

group. The subset of treatment group children who met this usage threshold demonstrated significantly greater gains—approximating the benefits of one month of instructional time—during the summer, compared to the control group children ($p < .05$, Cohen’s $d = 0.13$). Children in the treatment group who started the study scoring lower in reading (below the M-DCPS median score) at the end of kindergarten benefited more—approximating 1.3–1.6 months of academic instruction—from using ABCmouse than low-scoring peers in the control group ($p < .001$, $d = 0.23$).

Participants

In summer 2016, 1,176 children were consented by their parents or guardians to participate in the study from the entire M-DCPS population of 23,490 rising first graders. This sample (49% girls, 51% boys) was predominantly Hispanic (66%), 23% Black, 8.5% White, 1% Asian, and 1% Mixed or other. Across all M-DCPS elementary schools, 78.4% of children were eligible for a free/reduced lunch during the 2015–2016 school year. Eligibility criteria for the study were that participants must be enrolled in a M-DCPS kindergarten class in spring 2016 and have access to the Internet and a device for regular weekly use over the summer.

Of the consented sample, 788 children were randomly assigned to the treatment group, with 608 families redeeming their ABCmouse codes, and 426 were randomly assigned to the control group, with 11 families subsequently deciding not to participate. After a search of the ABCmouse database at the end of summer, 24

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¹ Alexander, K. L., Entwisle, D. R., & Olson, L. S. (2007). Lasting consequences of the summer learning gap. *American Sociological Review*, 72(2), 167–180.

children in the control group were identified as having some summer usage of the online program (completing at least one Learning Activity) and were excluded from the final analytic sample.

There were no statistically significant differences across any demographic variables in the final analytic sample ($N = 999$), the consented study sample ($N = 1,176$), and the overall M-DCPS population ($N = 23,490$). In the final analytic sample, initial mean differences on spring SAT reading scores ($p < .01$) and spring SAT math scores ($p < .05$) were slightly but statistically significantly higher in the treatment group compared to the control group. However, differences in i-Ready scores were not statistically different ($p > .10$).

Design and Procedure

Rising first-grade children who were randomly assigned to the treatment group were provided with free home access to ABCmouse over the summer with a weekly minimum usage requirement of 45–60 minutes and 15 completed Learning Activities, preferably at Level 7 (early first-grade content). Parents received weekly feedback on their children’s usage via email. If usage fell below recommended levels, a reminder to encourage children’s usage was included in the email. In addition, parents in both the control and treatment groups completed brief online technology diaries each week to report children’s use of technology. At the end of the summer, all parents were asked to complete a 20-minute online survey about their views of the use of educational technology and the impact of technology on their children’s learning over the summer. All parent correspondence and surveys were available in Spanish. Parents received a \$20 gift card for their participation in the survey. Control group children received free home access to ABCmouse for three months after fall i-Ready assessments were completed (September 30, 2016).

M-DCPS uses i-Ready assessments in kindergarten and first grade and provided i-Ready scores in reading and mathematics for spring 2016 and fall 2016, as well as spring 2016 SAT-10 scores in reading and mathematics.

The i-Ready assessment data served as the primary outcome measure for the study, and SAT-10 scores provided descriptive information on the achievement levels of the study samples to create subgroups of children (high scorers and low scorers) for analyses.

Overall, the 608 children who redeemed their ABCmouse codes spent an average of 985 minutes on ABCmouse ($range = 0–10,523$ minutes; $SD = 1,082$; $M = 82$ minutes per week), and completed on average a total of 203 ABCmouse Learning Activities ($range = 0–2,472$; $SD = 246$; $M = 16.9$ per week) from June 1, 2016 through August 22, 2016. Of those activities completed, an average of 158 were Level 7 activities ($range = 0–1,270$; $SD = 196$). Overall, participants completed three times more reading activities on ABCmouse each week during the summer ($Median = 41$) than math activities ($Median = 9$).

M-DCPS assessment data for the entire rising first-grade population revealed that a large percentage of students experienced a slide in their i-Ready scores; 44% of entering first graders had summer reading loss and 54% had math loss. On average, children gained 2.26 points on i-Ready reading scores and lost 3.35 points on i-Ready math scores from spring 2016 to fall 2016. A loss of 4–5 points on i-Ready from spring to fall is approximately equivalent to one month of instruction during a nine- or 10-month academic year (30 weeks of instruction). National studies find that, on average, children have a loss of about one month of instruction over the summer (RAND, 2011).²

Because the spring i-Ready assessment was not given at the very end of the school year and the fall i-Ready assessment was not given at the very beginning of the next school year, these scores are a rough measure of summer slide. There could have been meaningful learning gains from school instruction that occurred in the final weeks of the spring semester and/or the first few weeks of the fall semester, “dampening” the measurable effects of summer slide. In addition, it is possible that children in the control group accessed ABCmouse during the prior kindergarten year and/or over the summer in public libraries, summer learning programs, or at home through ABCmouse accounts that we were not able to identify.

² RAND (2011). Making summer count: How summer programs can boost children’s learning. RAND, Inc., <http://www.rand.org>.

Results

Finding 1. ABCmouse helped prevent summer slide in reading for children who regularly used ABCmouse over the summer period, compared to the control group.

ABCMouse helped prevent summer slide in reading for children who completed an average of at least 17 Learning Activities per week—or 208 Learning Activities in total—over the 12 weeks of summer (an average of at least 70 minutes per week of ABCmouse usage), as compared to the control group ($N = 207$ for treatment group, $N = 231$ for control group). As seen in *Figure 1*, children who met this usage threshold of ABCmouse showed significantly greater gains over the summer compared to the control group, an average of 3.8 points more than the control group children, approximating the benefits of one month of academic instruction.³ Multilevel regression models controlling for spring pretest reading scores, age, gender, race, and Spanish language at home confirmed this finding, with predicted score differences between groups of 4.7 points ($p < .05$, Cohen’s $d = 0.13$).⁴

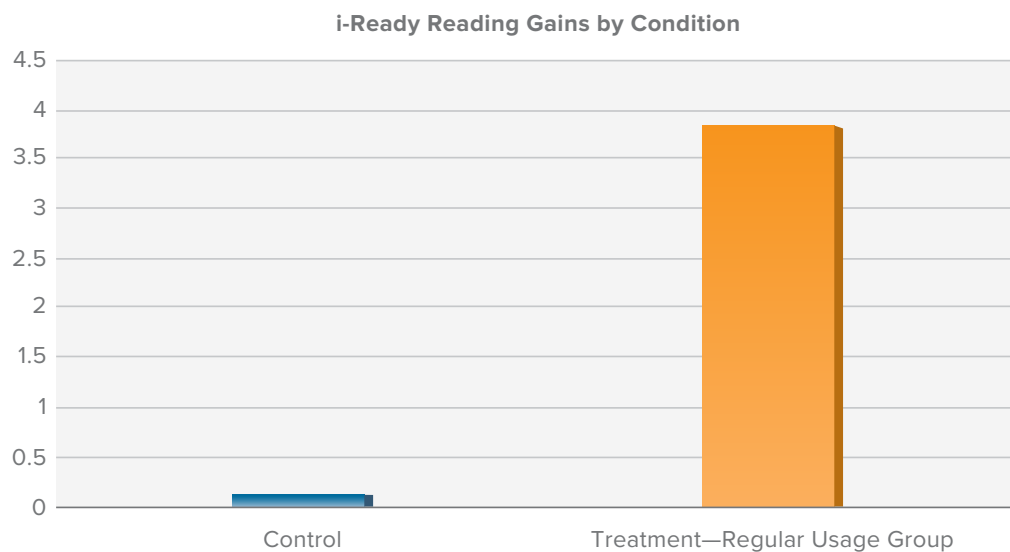


Figure 1. Gains in reading by treatment group children who completed at least 208 ABCmouse Learning Activities over the summer and control group children who did not use ABCmouse

In addition, treatment group children in the higher usage group were less likely to experience a summer slide of one month or more (greater than 5 points loss) in reading (control = 40%, treatment = 33%).⁵

An intent-to-treat analysis was conducted of all children who were randomly assigned to the treatment group and redeemed their ABCmouse codes or to the control group. Treatment group children showed a trend toward greater gains in reading compared to the control group ($p = .16$, $d = 0.10$). No differences were found in mathematics outcomes.

³ There were no significant differences in spring scores between this smaller, higher-usage group and the original treatment sample.

⁴ Not all children completed both spring and fall assessments. Any missing data points were dealt with in the multilevel models through the use of Full Information Maximum Likelihood (FIML) estimation, a preferred method for handling missing data that uses all available data for each case when estimating parameters and is appropriate for handling the level of missing data in this study (Enders & Bandalos, 2001; McCartney, Burchinal, & Bub, 2006).

⁵ In the final analytic sample ($N = 999$), 50% of the control group children “slid” in reading compared to 44% of the treatment group children.

Finding 2. Children “at risk” for greater summer learning loss benefited more from ABCmouse than their similarly low-scoring peers in the control group.

Treatment group children who completed at least 208 Learning Activities and scored below the median of the M-DCPS population at the end of kindergarten (spring 2016 median SAT reading score = 508, median mathematics score = 515) were less likely to slide in reading than comparable low-scoring children in the control group (48% control vs. 40% treatment). As seen in *Figure 2*, in this lower-scoring group, children who used ABCmouse achieved significantly greater reading gains over the summer compared to children in the control group: 6.6 points or approximating the benefits of 1.3–1.6 months of academic instruction ($p < .001$, $d = 0.23$).

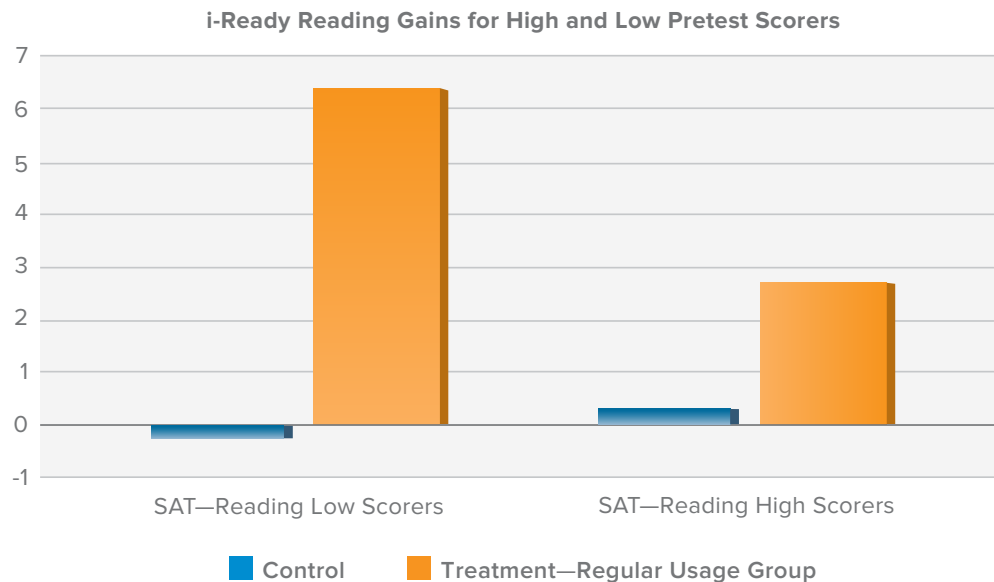


Figure 2. Gains in reading from treatment group children who completed at least 208 Learning Activities and control group children who did not use ABCmouse

Finding 3. The more children used ABCmouse over the summer, the greater their learning gains.

A multiple regression analysis confirmed that the total number of ABCmouse Learning Activities completed over the summer positively contributed to gains in reading scores, controlling for spring pretest reading scores, age, gender, race, and Spanish language at home ($p < .05$).

In mathematics, while there were no significant differences between regular ABCmouse users and the control group, within the treatment group a higher level of usage was associated with positive math gain trends. Despite fewer completed math activities than reading activities, as seen in *Figure 3*, the difference in math scores between treatment group children who used ABCmouse the most and treatment group children who used ABCmouse the least indicated a meaningful positive trend associating ABCmouse usage with math learning, and approached significance: 3.2 points higher or approximating the benefit of several weeks of academic instruction ($p = .08$, $d = 0.16$). This positive trend in math might have reached statistical significance had children completed more math activities during the study; there was also a steeper “slide” in math overall.

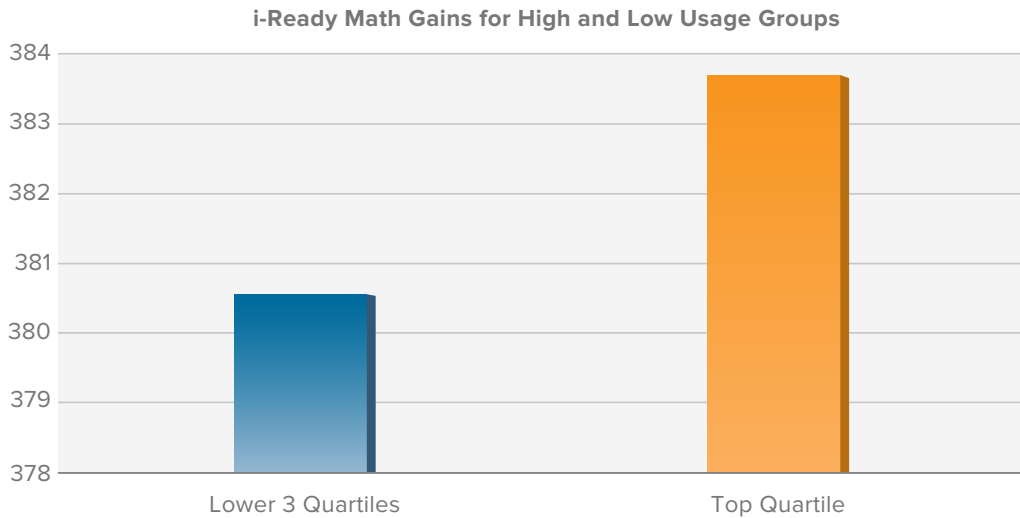


Figure 3. Gains in math from treatment group children in the top quartile of ABCmouse usage compared to children in the lower three quartiles of usage, controlling for spring scores and demographics

Finding 4. A large majority of parents reported that ABCmouse had a meaningful impact on children’s learning and that they support the use of ABCmouse in first grade.

In a survey completed at the end of the summer, the majority of all parents (89%) reported being supportive or very supportive of the use of educational technology in elementary school. Of the treatment group parents, 82% reported that ABCmouse had a meaningful impact on their children’s overall learning, and 89% said they would support the use of ABCmouse during first grade. The majority (81%) were very likely or likely to recommend ABCmouse to parents of other children to help them prepare for first grade.

Conclusion

Overall, rising first-grade students in M-DCPS experienced a moderate amount of summer loss in reading and math during the summer of 2016. However, children in the treatment group with regular usage of ABCmouse experienced less summer slide and a net gain in reading as compared to the control group. These gains approximated the benefits of one month of instructional time. Gains were greater for treatment group children who

scored below the M-DCPS kindergarten median reading score in spring 2016. They benefited more, approximating 1.3–1.6 months of academic instruction, from their regular use of ABCmouse during the summer months. The survey results indicate that the majority of parents support the use of technology for their first-grade children, and treatment group parents specifically recommend the use of ABCmouse.