Istation Reading Growth Study: Nationwide Data For Pre-Kindergarten and Kindergarten June 2014

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Abstract

Istation Reading is a computer-based supplemental and intervention reading program that teachers Pre-K through 8th-grade students to read fluently with comprehension. This study was completed to answer three research questions: (a) Do students who have used Istation curriculum make greater gains in early literacy skills than students who have not used Istation curriculum; (b) Do students who have used more Istation curriculum make greater gains in early literacy skills than students who have used less Istation curriculum; and (c) Do students at risk for reading failure (Tier 3 students) make greater gains in early literacy skills with a sufficient amount of Istation Reading curriculum usage? The ISIP (Istation Indicators of Progress) Early Reading assessment scores for Pre-Kindergarten and Kindergarten students across the United States are used in this study. Each student had at least two assessment points consisting of ISIP scores from September 2013 and April 2014. Based on usage and implementation criteria, student growth is computed by subtracting September scores from April scores across each grade. Large sample sizes across the United States were used. Results showed that: (a) students who have used the Istation Reading curriculum show greater growth in early literacy skills than students who have not used Istation Reading curriculum; (b) students who have used more Istation Reading curriculum experienced greater growth in early literacy skills than students who have used less Istation Reading curriculum; and (c) students at risk for reading failure (Tier 3 students) make greater gains with a sufficient amount of Istation Reading curriculum usage.

Introduction

Research on language and literacy provide overwhelming evidence that quality preschool language and early literacy experiences have far-reaching effects (Bowman, Donovan, & Burns; NELP, 2008; NICHD, 2000; Strickland & Shanahan, 2004). These studies identify the key language and literacy skills that young children need to learn, environments that facilitate skills development, and interventions that support later academic success. The convergence of evidence provides clear direction for preschool programs, teachers, and curriculum developers. Children with strong skills in oral language, alphabetic code (alphabetic knowledge, phonological awareness, and invented spellings), and print concepts are those most likely to become successful in school (NELP, 2008; Strickland & Shanahan, 2004).

Effective interventions - those that show statistically significant positive effects in early literacy outcomes - include the teaching of letters and sounds, opportunities for children to make sense of print, read-alouds and sharing books, as well as intentional efforts to teach oral language. Istation Reading delivers explicit, systematic instruction in the early literacy skills that are most predictive of future reading success. Istation's early literacy instruction is strengthened by the infusion of highly engaging curriculum and technology within the classroom.

Istation Reading provides independent, computer-assisted instruction that promotes student engagement. Animated instruction and practice activities provide numerous opportunities for student interaction with the curriculum. Engaging instruction is developed by merging best practices in literacy learning with research on effective gaming practices. As Druin et al., (1999) reported, "Kids want a multi-sensory experience. Not only do they find it more entertaining, but they also find it a more engaging environment." Istation Reading's cutting-edge technology uses multiple forms of media (audio, text, graphics, and animation) to

maintain student attention and to promote learning in print-rich and language-enriched lessons. Istation Reading, developed using scientifically based reading research, delivers computer-based effective supplemental and intervention reading instruction that teaches Pre-K through 8th-grade students to read fluently with comprehension. Aligned to the federal No Child Left Behind Act (NCLB) and the findings of the National Reading Panel (2000) and National Early Reading Panel (2008), the curriculum content provides systematic and explicit instruction in the essential reading areas of phonological and phonemic awareness, phonics, vocabulary, fluency and comprehension. Results from ISIP and curriculum-embedded assessments provide continual data to place students in developmentally appropriate skills and individualized lessons to meet student needs.

Istation's Indicators of Progress, also known as ISIP, is a sophisticated Internet- and web-delivered Computer-Adaptive Testing (CAT) system that provides Continuous- Progress Monitoring (CPM) assessment in the critical reading domains in Pre-K through Grade 8. ISIP results are used in recursive assessment-informing, instruction-decision loops within Istation Reading. First, ISIP identifies students potentially at risk of reading failure. ISIP gathers and reports frequent information about student progress in these critical domains throughout, and even across, academic years (e.g., Patarapichayatham, Fahle, and Roden, 2013). ISIP accomplishes this by delivering short tests, at least monthly, that target critical areas to inform instruction. These results are then used by Istation Reading to create a scope and sequence for each student. Student results from Istation Reading's interactive curriculum are combined with ISIP continuous progress monitoring to develop a deeper student profile of strengths and weaknesses. Istation Reading uses these ongoing assessment results to further individualize instruction based on student need and ability.

While there is some research to confirm the quality of ISIP Early Reading (Pre-K through Grade 3) and ISIP Advanced Reading (Grades 4-8) and two technical reports to demonstrate students' growth, there is minimal research to confirm how students perform in response to using the Istation Reading curriculum - particularly for the youngest readers. For this reason, this study aims to answer three different research questions in terms of Pre-Kindergarten and Kindergarten students' growth by using Istation products across the United State of America. They are (a) Do students who have used Istation curriculum make greater gains in early literacy skills than students who have not used Istation curriculum? (b) Do students who have used more Istation curriculum make greater gains in early literacy skills than students who have used less Istation curriculum?, and (c) Do students at risk of reading failure (Tier 3 students) make greater gains in early literacy skills with a sufficient amount of Istation Reading curriculum usage? The samples were taken from Pre-Kindergarten and Kindergarten across the United State of America, for the 2013 – 2014 school year.

Methods

Measures

Results from ISIP Early Reading for Pre-Kindergarten and Kindergarten for the 2013 – 2014 school year are used in this study. For Pre-Kindergarten, the Overall Reading Ability scores, the Letter Knowledge scores, and the Vocabulary scores are used. For Kindergarten, the Overall Reading Ability scores, the Letter Knowledge scores, the Phonemic Awareness scores, and the Vocabulary scores are used.

Samples

This sample consisted of students in Pre-Kindergarten and Kindergarten across the United States of America. The large sample size was used to compute the students' growth under

this current study. Istation has its own rigorous student selection criteria for the growth study. Istation researchers studied and developed the criteria based on their preliminary analyses. This study followed this criteria. First of all, students who used Istation curriculum from 1 minute up to 4,000 minutes from September 2013 to April 2014 were selected for this study. As we wanted to see the impact of Istation curriculum, the time spent in ISIP assessments was not included in these usage totals. Second of all, the campus-level curriculum usage was computed by aggregating the Istation curriculum usage of all students in Grades Pre- Kindergarten and Kindergarten on each campus. Although Istation has clear usage recommendations for campuses about how to implement Istation Reading, each campus implements Istation products differently. In other words, some campuses use Istation products as recommended, whereas some campuses do not use the products as recommended. In order to be able to measure the impact of Istation products, the researchers selected subjects from campuses with good implementations. For this reason, researchers developed criteria to select a sample. The criteria were determined by a "Good Implementation Campus". A "Good Implementation Campus" is a campus-level criterion. Campuses were selected that met this criteria in terms of Istation curriculum usage from September 2013, to April 2014, by grade. Based on preliminary analyses, researchers determined how many minutes of Istation curriculum usage were needed to identify good implementation campuses. Campuses that had 250 minutes or more of Istation curriculum usage were selected. Because each campus has a different implementation and a different number of students enrolled in the Istation program per grade, the criteria is used in these scenarios: Campus A uses Istation products for Pre-Kindergarten and Kindergarten students, but only Kindergarten met our criteria. All Kindergarten students from Campus A are included in this study. Campus B uses Istation products for Pre-Kindergarten and Kindergarten students. The

Istation curriculum usage for both grades were under 250 minutes, none of them are included in this study. This procedure was used to measure the growth and impact of Istation products accurately. Researchers can ensure that a representative sample was selected for each grade and each Tier. In other words, there was not over sampling in particular Tiers. Researchers have found that students in each Tier spend quite different amounts of time on Istation curriculum. Therefore, the campuses that had 250 minutes or more of Istation curriculum usage are selected into this study. Finally, students who had both September scores and April scores are selected in this study.

Table 1 represents the sample size for this study by Grade, Sub-Skill, and Tier. For Pre-Kindergarten, there were 7,151 students for Overall Reading, 6,878 students for Letter Knowledge, and 7,915 for Vocabulary. For Kindergarten, there were 27,267 students for Overall Reading, 70,970 students for Letter Knowledge, 21,635 students for Phonemic Awareness, and 20,437 for Vocabulary. For Pre-Kindergarten, the majority of students were in Tier 1 for Overall Reading Ability and both two sub-skills. The majority of Kindergarten students were also in Tier 1 except the Letter Knowledge sub-skill.

From this sample, we consider his/her Istation curriculum usage. Students are classified into 2 sub-groups; "No Istation Curriculum Used" and "Some Istation Curriculum Used". Students who have used Istation curriculum less than 30 minutes from September 2013 to April 2014 are considered to have only taken the ISIP assessments for benchmark or progress monitoring periods and are classified as "No Istation Curriculum Used", as we do not believe that Istation Reading has an impact on students' learning from spending less than 30 minutes in the curriculum for a 7-month period. On the other hand, students who have used Istation curriculum for more than 30 minutes from September 2013 to April 2014 are considered as

"Some Istation Curriculum Used". The "No Istation Curriculum Used" functioned as a pseudo control group under this study.

We have tested two different models with the same sample under this current study; "300 Minute Istation Curriculum Usage Model" and "400 Minute Istation Curriculum Usage Model". Under the 300 Minute Istation Curriculum Usage Model, students are classified into 2 sub-groups; "300 Minutes or Less of Istation Curriculum Usage" and "300 Minutes or More of Istation Curriculum Usage". Similarly, the 400 Minute Istation Curriculum Usage Model, students are classified into 2 sub-groups: "400 Minutes or Less of Istation Curriculum Usage" and "400 Minutes or More of Istation Curriculum Usage". The selected sample size is shown in Table 2. Table 2 represents the number of the selected sample.

Analysis

The Overall Reading Ability scores, the Letter Knowledge scores, the Phonemic Awareness scores, and the Vocabulary scores of ISIP Early Reading are used. The students' growth is computed by subtracting the mean of the each sub-skill scores in September 2013from the mean of each sub-skill scores in April 2014. It is called the delta in this study. Researchers did the analysis by Grade, by Tier, and by Istation Curriculum Usage, as they strongly believe that students in each Tier are different in terms of their achievement, their growth, and their Istation Curriculum Usage. To be more specific, each model was run separately. Next, the deltas are compared with each sub-skill's Istation expected growth from September 2013 to April 2014. Student growth was then evaluated as to whether it met the expected growth or not.

Istation has its own expected growth by Grade and by Tier for each Sub-Skill and Overall Reading Ability scores. The Istation expected growth is derived from national norms. As shown

in Table 3, for Pre-Kindergarten, the expected growth for the Overall Reading Ability is 19, 16, and 13 for Tiers 1, 2, and 3. For Letter Knowledge the expected growth is 23, 20.5, and 18 for Tiers 1, 2, and 3. The expected growth for Vocabulary is 11, 8.5, and 6 for Tiers 1, 2, and 3. For Kindergarten, the expected growth for the Overall Reading Ability is 16, 16.5, and 17 for Tiers 1, 2, and 3. For Letter Knowledge the expected growth is 7, 7, and 7 for Tiers 1, 2, and 3. The expected growth for Phonemic Awareness is 7, 7.5, and 8 for Tiers 1, 2, and 3. The expected growth for Vocabulary for is 11, 11, and 11 for Tiers 1, 2, and 3.

Results

There are three research questions to be answered in this study. For the first research question, the researchers determined students who used Istation curriculum made greater gains in early literacy skills than students who did not use Istation curriculum. For Pre-Kindergarten, results show that fewer than 30 students used less than 30 minutes of Istation curriculum with measures in Overall Reading ability and Letter Knowledge. The researchers decided not to report the results of those 30 students in each category, as there were concerns about the representation of that small portion of the sample. As seen in Figure 1, it is clear that Pre-Kindergarten students who used Istation curriculum made greater gains in Vocabulary than students who did not use Istation curriculum. For Kindergarten students, results show that fewer than 30 students used less than 30 minutes of Istation curriculum with measures in Overall Reading ability and Phonemic Awareness. The results were not reported here. As seen in Figure 2, Kindergarten students who used Istation curriculum made greater gains in Letter Knowledge and Vocabulary than students who did not use Istation curriculum. The findings show that Istation products have a positive impact on students' early literacy skill growth. If students spend some time using Istation curriculum, those students will do better on Istation assessments than those who do not.

For the second research question, results show that students who used more Istation curriculum made greater gains in early literacy skills than students who used less Istation curriculum. The growth patterns are slightly different between each sub-skill and Overall Reading Ability, but they provide similar patterns in general. As can be seen from the combined model on Figures 1 and 2, findings show that students who used Istation curriculum 400 minutes or more made greater gains in early literacy skills than students who used Istation curriculum 300 minutes or more. Also, students who used Istation curriculum 300 minutes or more made greater gains in early literacy skills than students who used some Istation curriculum. Finally, students who used some Istation curriculum made greater gains in early literacy skills than students who did not use some Istation curriculum. In summary, the findings confirm that the more students use Istation curriculum, the more students will grow in early literacy skills. In other words, students who used more Istation curriculum made greater gains than students who used less Istation curriculum.

In response to the third research question, as to whether students at risk of reading failure (Tier 3 students) make greater gains in early literacy skills with a sufficient amount of Istation Reading curriculum usage, results show that at-risk students (Tier 3 students) make greater gains in early literacy skills with a sufficient amount of Istation curriculum usage than Tiers 1 and 2 students (*Figures* 1 – 2 and Table 3). To be more specific, Tier 3 students make greater gains with more Istation curriculum usage, especially at 300 minutes or more and 400 minutes or more across grades and subtests. These results are evidence to support the growth and impact of Istation Reading products. The researchers strongly believe that if campuses implement Istation products as recommended students will make greater gains in early literacy skills.

Conclusions

This study provides evidence of Istation Reading's growth and impact with early literacy learners. The researchers believe, based on findings, that if campuses implement the ISIP Early Reading assessment and Istation curriculum with fidelity, students will experience growth in early literacy skills. The Istation assessment, ISIP Early Reading, is proven to be a valid and reliable assessment of early literacy skills (e.g., Mathes, Toregson & Herron, 2011). Istation Reading curriculum was designed and developed using scientifically-based reading research, specifically in the skills most predictive of future reading success. Using the assessment and intervention curriculum together allow teachers to identify student weaknesses and immediately provide data-informed instruction specific to each child's needs. The findings confirm that Istation products have a significant impact on students' early literacy growth, meaning the more students spend time on Istation curriculum, the more students will grow and show gains in early literacy skills.

Although this study provides important evidence of the growth and impact of Istation products on students, this study focuses only within one year's growth - from September 2013, to April 2014. A growth study for the complete 2013 – 2014 academic year (e.g., September 2013 to June 2014) should be the next step for further study. Future research should include a longitudinal growth study across years to investigate the lasting impact of Istation products on student growth. Also, this study only takes into account Istation curriculum usage and analysis by Grade and by Tier. Further research to explore other factors that might affect students' growth such as student engagement, interaction between teacher and students, or the number of assessments students take should be considered as well.

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Table 1

Sample Size by Sub-Skill and Tier

Grade	Sub-Skill	Tier			n
		1	2	3	
Pre-Kindergarten	Overall Reading	4,418	1,133	1,600	7,151
	Letter Knowledge	4,040	1,174	1,664	6,878
	Vocabulary	5,024	1,043	1,848	7,915
Kindergarten	Overall Reading	11,036	7,319	8,912	27,267
	Letter Knowledge	23,673	16,750	30,547	70,970
	Phonemic Awareness	9,111	5,281	7,243	21,635
	Vocabulary	9,390	4,445	6,602	20,437

Table 2

Sample Size by Grade, by Sub-Skill, by Tier, and by Istation Curriculum Usage

		Tier											
		1				2				3			
Grade	Sub-Skill	No Curriculum Used	Some Curriculum Used	300 Minutes or More	400 Minutes or More	No Curriculum Used	Some Curriculum Used	300 Minutes or More	400 Minutes or More	No Curriculum Used	Some Curriculum Used	300 Minutes or More	400 Minutes or More
Pre-K	Overall Reading	24	4,394	3,899	3,568	8	1,125	989	895	8	1,592	1,394	1,266
	Letter Knowledge	20	4,020	3,597	3,296	8	1,166	1,037	943	8	1,656	1,453	1,316
	Vocabulary	112	4,912	4,210	3,831	56	987	797	729	103	1,745	1,376	1,243
K	Overall Reading	28	11,008	9,841	9,118	17	7,302	6,554	6,101	15	8,897	8,032	7,548
	Letter Knowledge	107	23,566	20,808	19,244	19	16,731	15,233	14,236	52	30,495	28,146	26,495
	Phonemic Awareness	22	9,089	8,142	7,557	13	5,268	4,735	4,409	8	7,235	6,529	6,152
	Vocabulary	217	9,173	8,154	7,634	121	4,324	3,804	3,578	108	6,494	5,602	5,198

Table 3

Students' Growth and Istation Expected Growth by Sub-Skill and Tier

Grade	Sub-Skill	Tier	Actual Growth	Istation Expected Growth
Pre-Kindergarten	Overall Reading	1	14	19
		2	19	16
		3	28	13
	Letter Knowledge	1	18	23
		2	26	20.5
		3	39	18
	Vocabulary	1	7	11
		2	13	8.5
		3	21	6
Kindergarten	Overall Reading	1	15	16
		2	17	16.5
		3	22	17
	Letter Knowledge	1	15	7
		2	22	7
		3	32	7
	Phonemic Awareness	1	14	7
		2	18	7.5
		3	24	8
	Vocabulary	1	11	11
		2	13	11
		3	15	11

Figure 1: Combined Model of Pre-Kindergarten Growth

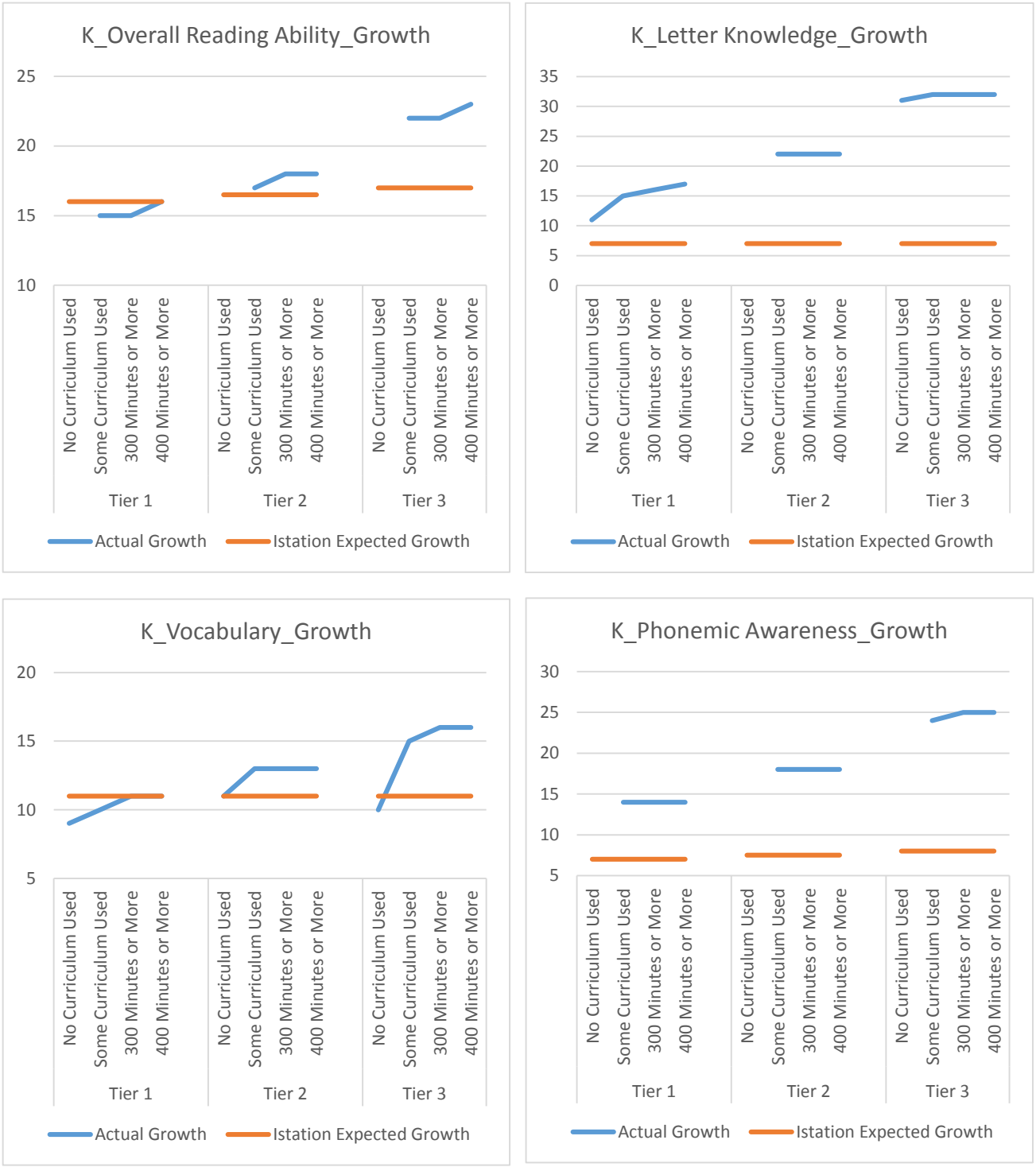

Figure 2: Combined Model of Kindergarten Growth