

Istation Reading Growth Study Grades 1 – 8
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Abstract

Istation Reading is a computer-based supplemental and intervention reading program that teaches prekindergarten through eighth grade students to read fluently with comprehension. In this study I sought to answer three research questions:

- Do students who have used the Istation Reading curriculum grow faster than students who have not used the Istation Reading curriculum?
- Do students who have used more of the Istation Reading curriculum grow faster than students who have used less of the Istation Reading curriculum?
- Do students at risk of reading failure (Tier 3 students) make greater gains in reading ability with a sufficient amount of Istation Reading curriculum usage?

This study used Istation's Indicators of Progress (ISIP™) Early Reading and ISIP Advanced Reading data from grades 1 – 8 and a large sample of students from across the state of Texas. Each student had at least three assessment points consisting of ISIP scores from September 2013 to May 2014. The results show that . . .

- Students who had used the Istation Reading curriculum grew much faster than students who had not used the Istation Reading curriculum.
- Students who had used more of the Istation Reading curriculum grew much faster than students who had used less of the Istation Reading curriculum.
- Students at risk of reading failure (Tier 3 students) made greater gains with a sufficient amount of Istation Reading curriculum usage.

Introduction

Istation Reading, developed using scientifically based reading research, delivers effective computer-based supplemental and intervention reading instruction that teaches prekindergarten through eighth grade students to read fluently with comprehension. Aligned to the federal No Child Left Behind Act (2001) and the findings of the National Reading Panel (2000), 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 individualized lessons focusing on developmentally appropriate skills to meet student needs.

Istation's Indicators of Progress (ISIP) is a sophisticated Internet- and Web-delivered computer-adaptive testing system that provides continuous progress monitoring assessments in the critical domains of reading in prekindergarten through eighth grade. ISIP results drive recursive assessment instructional-decision loops within Istation Reading. First, ISIP identifies students potentially at risk of reading failure. ISIP frequently gathers and reports information about student progress in these critical domains within and across, academic years (Patarapichayatham, Fahle, & Roden, 2014; Patarapichayatham and Roden, 2014). ISIP accomplishes this by delivering short tests, at least monthly, that target critical areas to inform instruction. The results of these tests then influence Istation Reading's creation of a scope and sequence for each student. Student results from Istation Reading's interactive curriculum combined with ISIP continuous progress monitoring make up a more thorough profile of student strengths and weaknesses. Istation Reading uses these ongoing assessment results to further individualize instruction based on student need and ability.

Istation has delivered ISIP Early Reading, developed in 2006, and ISIP Advanced Reading, developed in 2010, to more than 3.5 million students in more than 37 states and 6 countries. Many of these students are from the state of Texas and have been required to take the State of Texas Assessments of Academic Readiness (STAAR®) reading assessment.

Patarapichayatham, Fahle, and Roden (2014) studied the relationship between ISIP Reading and STAAR reading data by applying Pearson Product-Moment correlation analysis, multiple linear regression analysis, and multiple logistic regression for grades 3 – 8. They found that the ISIP end-of-the-year (EOY) scores were higher than the ISIP middle-of-the-year (MOY) scores for both the overall scores and each sub-skill score across grades, indicating that students' reading ability improved through the year. The very strong correlations between ISIP Reading and STAAR reading test scores across grades indicated that students who perform well on ISIP Reading are likely to perform well on the STAAR reading assessment. The researchers also found that ISIP Reading measures are highly predictive of STAAR reading scores. The same authors derived the ISIP cut scores to predict students' passing STAAR for grades 3 – 8.

Patarapichayatham and Roden (2014) studied the growth of students using Istation in prekindergarten and kindergarten across the U.S., using Overall Reading Ability and individual subtests. The researchers sought to answer three questions:

- Do students who have used the Istation Reading curriculum make greater gains in early literacy skills than students who have not used the Istation Reading curriculum?
- Do students who have used more of the Istation Reading curriculum make greater gains in early literacy skills than students who have used less of the Istation Reading curriculum?

- Do students at risk for reading failure (Tier 3 students) make greater gains in reading ability with a sufficient amount of Istation Reading curriculum usage?

Each student had at least two assessment points consisting of ISIP scores from September 2013 and April 2014. Results showed that . . .

- Students who had used the Istation Reading curriculum showed greater growth in early literacy skills than students who had not used the Istation Reading curriculum.
- Students who had used more of the Istation Reading curriculum experienced greater growth in early literacy skills than students who had used less of the Istation Reading curriculum.
- Students at risk for reading failure (Tier 3 students) made greater gains with a sufficient amount of Istation Reading curriculum usage.

The study findings confirmed that Istation Reading helps students grow in early reading skills. However, because Istation delivers products to students from prekindergarten through eighth grade, this study extended the research to grades 1 – 8. This study used the ISIP Overall Reading Ability scores from large samples of students across the state of Texas.

Through this study, I sought to answer three different research questions related to students' growth through use of Istation products:

- Do students who have used the Istation Reading curriculum make greater gains in Overall Reading Ability than students who have not used the Istation Reading curriculum?

- Do students who have used more of the Istation Reading curriculum make greater gains in Overall Reading Ability than students who have used less of the Istation curriculum?
- Do students at risk of reading failure (Tier 3 students) make greater gains in Overall Reading Ability with a sufficient amount of Istation Reading curriculum usage?

The samples were taken from students in grades 1 – 8 across Texas during the 2013 – 2014 school year.

Methods

Measures

This study used results from ISIP Early Reading for grades 1 – 3 and ISIP Advanced Reading for grades 4 – 8 during the 2013 – 2014 school year, specifically the Overall Reading Ability scores of ISIP Early Reading and ISIP Advanced Reading. This study used three data points: September scores as the beginning-of-the-year (BOY) data point, February scores as the MOY data point, and May scores as the EOY data point. Each student had at least those three data points.

Samples

This sample consisted of students in grades 1 – 8 across the state of Texas. Over the course of this study, this sample was used to determine student growth. Istation has its own rigorous criteria for selecting samples for growth studies. Istation researchers have studied and outlined the criteria based on preliminary analyses. This study followed these criteria. The program recorded curriculum usage for each student every time the student logged in to the Istation Reading curriculum. Students who used the Istation Reading curriculum for 1 minute to

4,000 minutes from September 2013 to May 2014 were selected to participate in this study. The usage totals do not include time spent in ISIP assessments.

Although Istation has clear usage recommendations for campuses about how to implement Istation Reading (see the Istation website for further information), each campus uses Istation products differently, and not all of them as recommended. In order to accurately measure the impact of Istation products, I selected only campuses with good-implementation to participate in this study. Istation researchers believe that if campuses implement Istation products as recommended, students will make greater gains in reading. For this reason, I established campus-level criteria, titled “Good Implementation Campuses,” to identify and select the best sample. Campuses that met these criteria were selected based on Istation Reading curriculum usage from September 2013 to May 2014 by grade.

Based on preliminary analyses, Istation researchers determined the number of minutes of Istation curriculum usage necessary to identify “Good Implementation Campuses,” and they selected campuses that had 250 minutes or more of Istation Reading curriculum usage for grades 1 – 5 and campuses that had 200 minutes or more of Istation curriculum usage for grades 6 – 8. Based on preliminary analyses, the researchers found that schools with students in grades 6 – 8 implemented Istation products differently, their students spending less time on Istation curriculum than schools with students in grades 1 – 5.

Because each campus implements Istation differently and has a different number of students enrolled in the Istation program per grade, the criteria can be used in these scenarios:

- Campus A students used Istation products in grades 1 – 8, but only grade 3 met the criteria, so the study included all grade 3 students from Campus A.

- Campus B students used Istation products in grades 3 – 5. The Istation curriculum usage for all three grades was under 250 minutes, so the study included none of Campus B’s students.
- Campus C students used Istation products in grades 3 – 8, but only grades 4 and 8 met the criteria, so the study included all students in grades 4 and 8 from this campus.

Using the criteria in this manner, I believed that I could accurately measure the impact of Istation products and selected representative samples from each grade and each tier so that any one tier was not overrepresented. As previous findings have shown, students in each tier spend different amounts of time on the Istation curriculum.

Next, as part of the criteria, I considered the Istation curriculum usage of individual students on these campuses.

Finally, students who had at least the three assessment points of September scores, February scores, and May scores participated in this study.

Students from this sample fell into two sub-groups: “No Istation Curriculum Used” and “Some Istation Curriculum Used.” The first sub-group, “No Istation Curriculum Used,” comprised students who had used Istation Reading curriculum for less than 40 minutes from September 2013 to May 2014 and were considered to have only taken the ISIP assessments for benchmark or progress-monitoring periods. Istation Reading has not been proven to have an impact on students who spend less than 40 minutes on the curriculum over an eight-month period. I classified students who had used the Istation curriculum for more than 40 minutes from September 2013 to May 2014 under “Some Istation Curriculum Used.” The “No Istation Curriculum Used” group functioned as a pseudo-control group in this study.

I tested two different models in order to answer the research questions posed at the beginning of the study: the “300 Minute Istation Curriculum Usage Model” and the “400 Minute Istation Curriculum Usage Model.” The first model had two 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” had two sub-groups: “400 Minutes or Less of Istation Curriculum Usage” and “400 Minutes or More of Istation Curriculum Usage.” Table 1 represents the sample for this study broken down by grade, tier, and Istation curriculum usage.

Analysis

The study used Overall Reading Ability scores of ISIP Early Reading and ISIP Advanced Reading for grades 1 – 8. This study used two sets of models: “BOY and MOY” and “BOY and EOY.” For the “BOY and MOY” model, I calculated students’ growth by subtracting the mean of the Overall Reading Ability scores of BOY from the mean of the Overall Reading Ability scores of MOY. For the “BOY and EOY” model, I calculated students’ growth by subtracting the mean of the Overall Reading Ability scores of BOY from the mean of the Overall Reading Ability scores of EOY. It is called the *delta* in this study. I then conducted analysis by grade, by tier, and by Istation Reading curriculum usage, since students in each tier differ in terms of achievement, growth, and Istation curriculum usage. Next, I compared the deltas with the Overall Reading Ability Istation expected growth. Using this comparison, I evaluated students’ growth and determined whether students met Istation’s expected growth.

Istation has its own standards for expected growth by grade and by tier for each sub-skill and Overall Reading Ability score. The Istation expected growth is derived using the national norm. For the “BOY and MOY” model, the expected growth of the Overall Reading Ability for grade 1 is 13, 12, and 11 for Tiers 1, 2, and 3, respectively. The expected growth for grade 2 is 7,

7.5, and 8 for Tiers 1, 2, and 3, respectively. The expected growth for grade 3 is 5, 4, and 3 for Tiers 1, 2, and 3, respectively. The expected growth for grade 4 is 66, 55, and 44 for Tiers 1, 2, and 3, respectively. The expected growth for grades 5 and 6 is 35, 30.5, and 26 for Tiers 1, 2, and 3, respectively. The expected growth for grade 7 is 18, 17.5, and 17 for Tiers 1, 2, and 3, respectively. The expected growth for grade 8 is 17 for all three tiers.

For the “BOY and EOY” model, the expected growth of the Overall Reading Ability for grade 1 is 21, 20.5, and 20 for Tiers 1, 2, and 3, respectively. The expected growth for grade 2 is 14, 13.5, and 13 for Tiers 1, 2, and 3, respectively. The expected growth for grade 3 is 10, 9, and 8 for Tiers 1, 2, and 3, respectively. The expected growth for grade 4 is 101, 88, and 71 for Tiers 1, 2, and 3, respectively. The expected growth for grade 5 is 56, 48.5, and 41 for Tiers 1, 2, and 3, respectively. The expected growth for grade 6 is 27, 26.5, and 26 for Tiers 1, 2, and 3, respectively. The expected growth for grade 7 is 25, 29, and 33 for Tiers 1, 2, and 3, respectively. The expected growth for grade 8 is 44, 34, and 24 for Tiers 1, 2, and 3, respectively. (See the Istation website for more information on Istation expected growth.)

Results

This study addressed three research questions. For the first research question, results show that students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than students who had not used the curriculum. As shown in Figures 1 – 4, students who had spent some time using the Istation Reading curriculum made greater gains in Overall Reading Ability than students who had not used the curriculum. This was true across grades and across tiers for both the “BOY and MOY” and “BOY and EOY” models, with the exception of Tiers 2 and 3 of grades 6 and 7 in the “BOY and MOY” model and Tiers 2 and 3 of grade 6 in the “BOY and EOY” model. Across tiers, first grade students in the “BOY and MOY”

model who used the Istation Reading curriculum made greater gains in Overall Reading Ability than first grade students who had not used the curriculum. Across tiers, first grade students who had not used the Istation Reading curriculum performed under Istation's expected growth, whereas students who had used the curriculum performed above Istation's expected growth. Second grade students in Tiers 2 and 3 who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than students in Tiers 2 and 3 who had not used the curriculum. Second grade students in Tiers 2 and 3 who had not used the Istation Reading curriculum performed under Istation's expected growth, whereas students in these tiers who had used the curriculum performed above Istation's expected growth. Across tiers, third grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. All third grade students performed above Istation's expected growth. Across tiers, fourth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. Only Tier 3 students performed above Istation's expected growth. Across tiers, fifth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading ability than their peers who had not used the curriculum. All fifth grade students performed above Istation's expected growth except Tier 1 students who had not used the Istation Reading curriculum.

Across tiers, sixth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than students who had not used the curriculum. All sixth grade students grew but less than Istation's expected growth. Seventh grade students in Tier 1 who had used some Istation Reading curriculum grew more than their peers in Tier 1 who had not used the curriculum, but both groups failed to achieve Istation's expected growth. Students in

Tiers 2 and 3 who had used some Istation Reading curriculum did not perform better than their peers in these tiers who had not used the curriculum. Across tiers, eighth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. All eighth grade students except those in Tier 2 who used some Istation Reading curriculum grew but less than Istation’s expected growth.

For the “BOY and EOY” model, overall, it is clear that grades 1 – 4 shared a similar growth pattern, and grades 5 – 8 shared a similar growth pattern. First grade students in Tiers 2 and 3 who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers in these tiers who had not used the curriculum. Students who had not used the Istation Reading curriculum performed below Istation’s expected growth, whereas students in Tiers 2 and 3 who had used the Istation Reading curriculum performed above Istation’s expected growth. Across tiers, second grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. Across tiers, third grade students who had not used the Istation Reading curriculum performed below Istation’s expected growth, whereas students who had used the curriculum performed above Istation’s expected growth. All students performed above Istation’s expected growth except students in Tier 3 who had not used the curriculum. Across tiers, fourth grade students who had used Istation curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. Only students in Tier 3 performed above Istation’s expected growth.

Across tiers, fifth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. All fifth grade students performed above Istation’s expected growth. Sixth grade students in Tier 1

who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers in Tier 1 who had not used the curriculum. All sixth grade students grew but less than Istation's expected growth. Across tiers, seventh grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. All seventh grade students achieved Istation's expected growth. Finally, across tiers, eighth grade students who had used the Istation Reading curriculum made greater gains in Overall Reading Ability than their peers who had not used the curriculum. All eighth grade students achieved Istation's expected growth except students in Tier 1 who had not used the curriculum.

In summary, the results of this study show that Istation products make an impact on students. It is clear that if students spend some time using Istation curriculum, they will do better on Istation assessments. This means that those students will make greater gains in Overall Reading at a faster rate than students who do not spend time on the Istation curriculum.

For the second research question, the results show that students who use more of the Istation Reading curriculum make greater gains in Overall Reading Ability than students who use less of the curriculum. As is evident in Figures 1 – 4, students who used the Istation curriculum for 400 minutes or more generally made greater gains in Overall Reading ability than their peers who used the curriculum for 300 minutes or more. Students who used the curriculum for 300 minutes or more made greater gains in Overall Reading Ability than students who used only some of the Istation curriculum. Students who used some of the Istation curriculum made greater gains in Overall Reading Ability than students who had not used the curriculum. In short, the growth patterns can be categorized into three groups: (a) positive growth trajectory, (b) flat growth trajectory, and (c) negative growth trajectory. Figures 1 – 4 show that the majority of our

students have positive growth trajectories, which means that the more students use Istation curriculum, the faster they will grow. Only second grade students in Tier 1 in the “BOY and MOY” model and first grade students in Tier 1 in the “BOY and EOY” model have a flat growth trajectory. Only sixth grade students in Tier 2 in the “BOY and EOY” model have a negative growth trajectory.

In summary, the findings confirm that the more students use Istation curriculum, the more they will grow in Overall Reading ability. In other words, students who have used more Istation curriculum will make greater gains at a faster rate than students who have used less Istation curriculum.

For the third research question, results show that at-risk students (students in Tier 3) made greater gains in Overall Reading Ability with a sufficient amount of Istation curriculum usage than students in Tiers 1 and 2. Figures 1 – 4 confirm this finding. To be more specific, students in Tier 3 made greater gains in Overall Reading Ability with more Istation curriculum usage, especially 300-minute usage and 400-minute usage across grades for both the “BOY and MOY” and “BOY and EOY” models. In this study, I found that Tier 3 students spend more time using Istation curriculum than students in Tiers 1 and 2. The results of this study demonstrate the positive impact of Istation Reading products on students. If campuses implement Istation products as recommended, it is very likely that their students will make gains in reading ability. The “BOY and MOY” and “BOY and EOY” models confirm these findings and serve as a testament to the high quality of Istation products. Overall, the findings are consistent with those of Patarapichayatham and Roden (2014)

Conclusions

This study provides evidence of reading growth among students using Istation Reading in grades 1 – 8 across the state of Texas. I believe, based on these findings, that if campuses properly implement the ISIP Early Reading and ISIP Advanced Reading assessments and Istation Reading curriculum, students will experience growth in reading skills. The Istation assessments, ISIP Early Reading and ISIP Advanced Reading, are proven to be a valid and reliable assessment of literacy skills (Mathes, Torgeson, & Herron, 2011). The 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 allows teachers to identify student weaknesses and immediately provide data-informed instruction specific to each student's needs. The findings confirm that Istation products have a significant impact on students' literacy growth. The more time that students spend on the Istation Reading curriculum, the more they will grow in Overall Reading Ability.

Although this study provides important evidence of the impact of Istation products on students, it focused on only three assessment points in one school year of data. Three points of data are sufficient to show student growth, but more data points may reveal more information about growth over time. This study determined the impact of Istation Reading curriculum using the delta to find students' growth. It is reasonable because the Istation expected growth numbers are derived in the same way to directly compute and compare those values. It would be interesting to apply other psychometric modeling techniques — for example, non-linear growth modeling, latent class analysis, growth mixture modeling, latent growth analysis, and longitudinal growth analysis — to study students' growth. A longitudinal growth study across years would be interesting to explore as well and expand upon these findings.

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Table 1

Sample Size by Grade, by Tier, and by Istation Curriculum Usage

Grade	Tier											
	1				2				3			
	1	2	3	4	1	2	3	4	1	2	3	4
1	391	29,682	25,540	23,542	115	17,206	15,527	14,516	188	28,644	26,058	24,607
2	233	27,728	23,497	21,351	113	17,769	15,834	14,772	124	28,362	25,526	23,888
3	175	34,577	27,709	24,148	57	20,793	17,888	16,076	202	34,667	30,228	27,568
4	144	12,925	10,036	8,510	75	11,349	9,262	8,083	114	20,915	17,700	15,741
5	200	7,760	5,669	4,673	88	7,591	6,041	5,166	92	14,577	12,161	10,789
6	461	5,358	2,812	2,068	192	5,620	3,726	3,033	151	8,393	6,340	5,545
7	284	1,653	841	767	151	1,801	1,197	1,062	181	2,932	2,087	1,790
8	418	2,109	1,062	847	103	1,847	1,279	1,072	75	2,921	2,213	1,893

Note: 1 = No Curriculum Used, 2 = Some Curriculum Used, 3 = 300 Minutes or More, and 4 = 400 Minutes or More

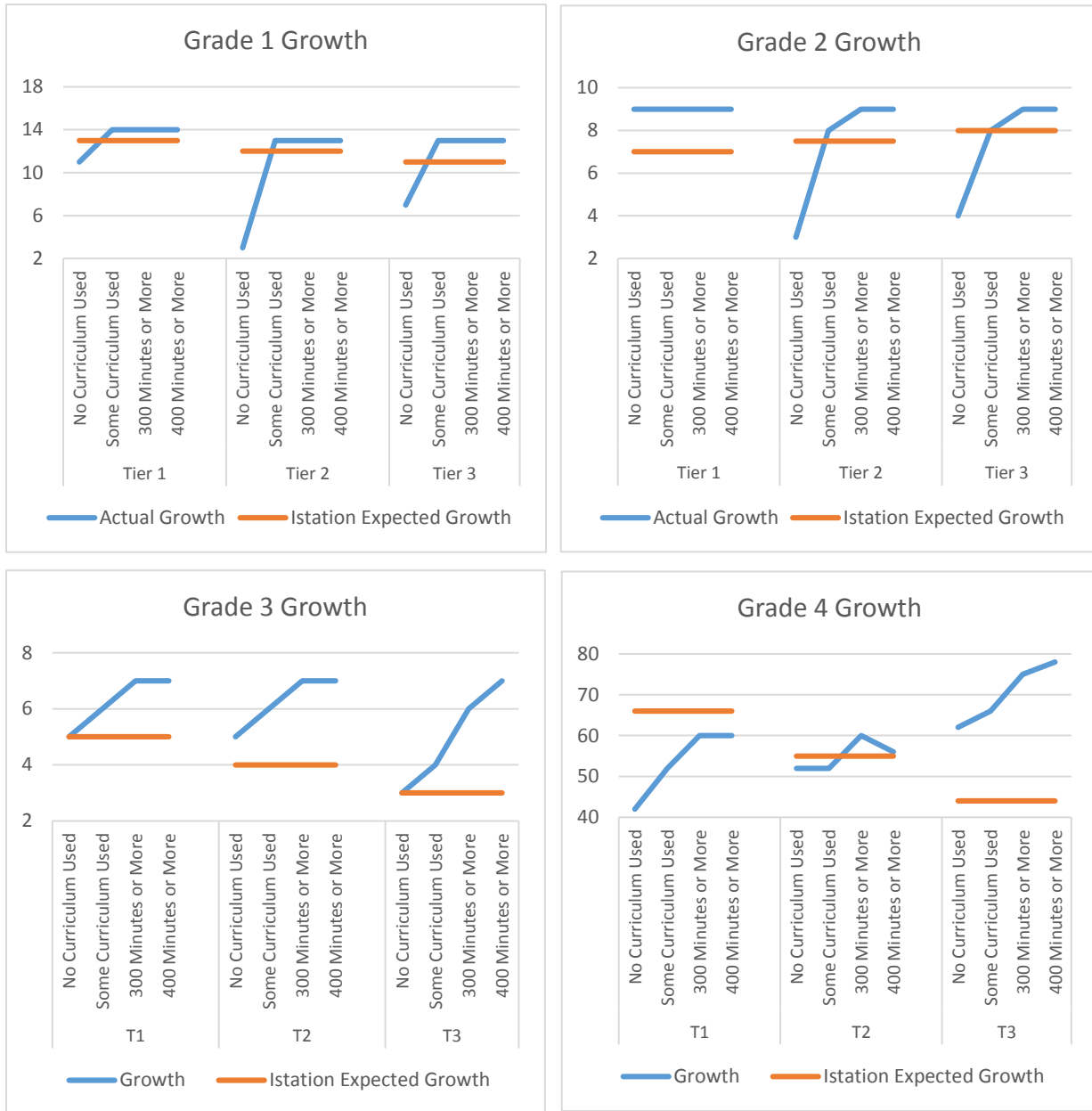


Figure 1: Grades 1 – 4 Growth of BOY and MOY, Combined Model



Figure 2: Grades 5 – 8 Growth of BOY and MOY, Combined Model



Figure 3: Grades 1 – 4 Growth of BOY and EOY, Combined Model

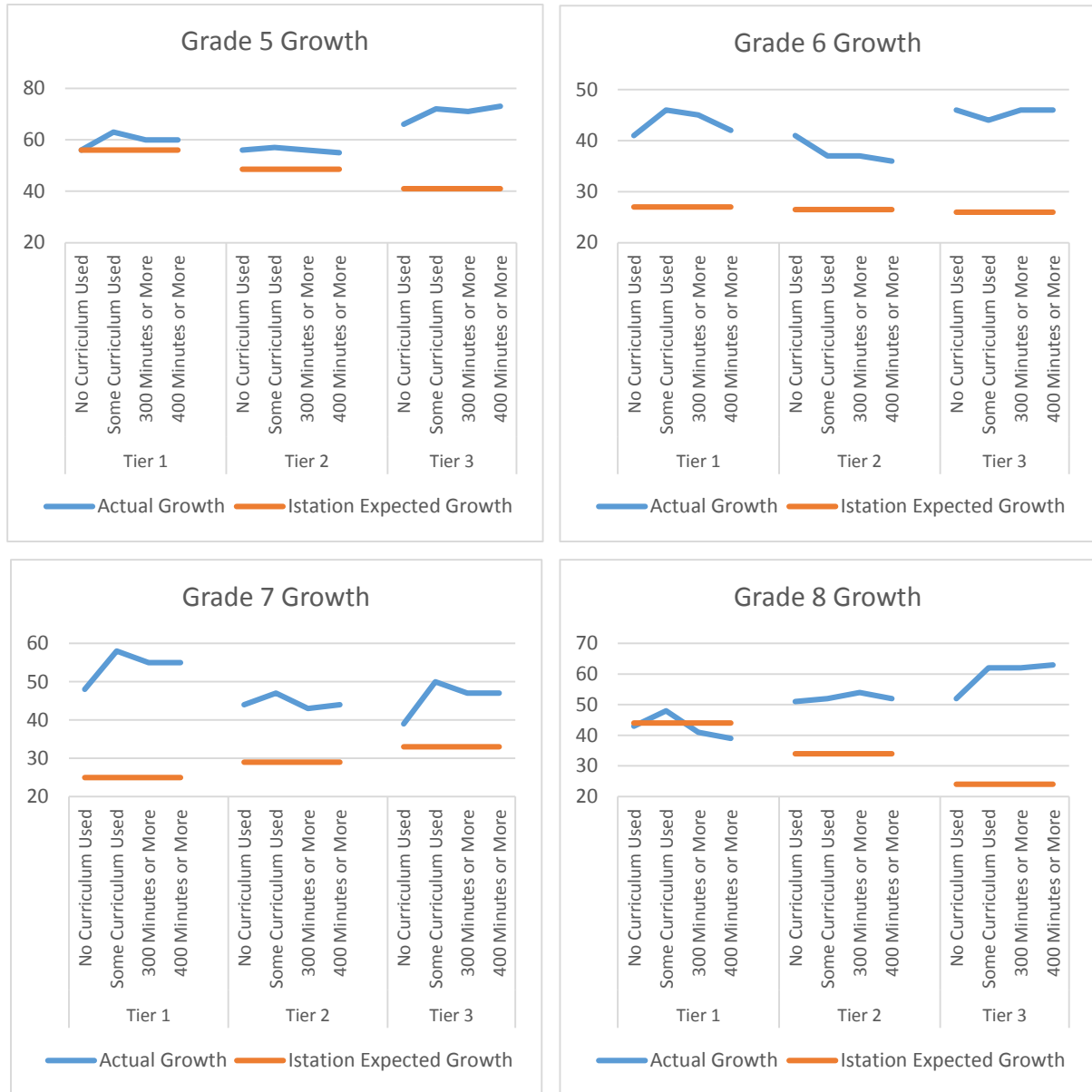


Figure 4: Grades 5 – 8 Growth of BOY and EOY, Combined Model