NCA Elementary School Improvement Plan

Submitted to:

State Public Charter School Authority

By:

Nevada Connections Academy
Board of Directors

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EXECUTIVE SUMMARY

The Board of Directors of Nevada Connections Academy (NCA) has taken steps to improve its performance rating on the Nevada Department of Education School Performance Framework (NSPF). Specifically, the Board has put in place a set of policies, programs, and interventions (detailed in this plan), starting in the spring of 2018, to improve the school's overall performance on the NSPF. The Nevada State Public Charter School Authority (the Authority) shared its concerns about NCA's performance rating through a Notice of Breach, received in March 2018.

This plan builds on the school performance initiatives previously adopted by the NCA Board for implementation during the 2017-18 school year, including a new K-5 curriculum in both English Language Arts (ELA) and mathematics. Based on strong evidence from independent research and results from other online schools serving similar subsets of students, the NCA Board believes that the new curriculum, combined with initiatives and programs put forth in this plan, will result in measurable improvement in student proficiency and growth over the next three years.

For each of the described steps of the plan, the following issues have been addressed (as requested by the Authority):

- A thorough description why these approaches were taken, and how NCA data supports these selections;
- How these approaches are different from those previously implemented;
- A thorough description of how these approaches will effectively serve all students across achievement levels, including those that are not proficient; and
- Solid evidence from independent research that meets the strong evidence standard set forth in section 8101 (21)(A) of the ESEA.

Additionally, the plan clearly outlines interim and annual performance and growth goals in order to meet or exceed SPCSA performance expectations under the NSPF including how the baseline performance was set, an explanation of how NCA will measure academic progress throughout the school year for all students and subgroups, and evidence as to how the primary interim academic assessment is strongly correlated with the predictive results of the Smarter Balance Assessment. NCA will consistently monitor the plan and adjust it as needed for it to remain effective. NCA is also working in consultation with a "Turnaround Specialist" on targeted interventions and expects to receive the Turnaround Specialist's preliminary findings at the end of May 2018. NCA will work with the Specialist to tailor this plan to achieve optimum results.

The plan detailed herein is not only a response to that Notice, but also an outline of efforts that have been ongoing for over a year as NCA has been making every effort to improve the overall performance of students (as calculated on the NSPF). A key part of that effort has been focused on better understanding how the high levels of student mobility potentially affects the overall measurement and outcomes.[1] Understanding the impact student mobility has on NCA's student population's overall performance is of elevated importance because NCA has the highest mobility rate of any school in Nevada. In 2015-16, the overall mobility rate at NCA increased from 47% to 73% (vs. 27% for the state and 26% for schools sponsored by the SPCSA). More information on the statistical effects of student mobility and its effects on academic growth measurement can be found in Appendix A.

The NCA Board thanks the Authority Board and Staff for its collaboration in developing this plan and for its assistance in helping NCA address the four-year cohort graduation rate issue. The NCA Board believes that this plan demonstrates challenging yet achievable goals for improving the performance rating on the NSPF and continuing to serve a highly mobile population.

2016-17 NEVADA PERFORMANCE FRAMEWORK RESULTS FOR NEVADA CONNECTIONS ACADEMY

In December 2015, the 1965 Elementary and Secondary Education Act (ESEA) was reauthorized as the Every Student Succeeds Act (ESSA). Under ESSA, states are tasked with the responsibility to create or revise their current accountability systems to ensure that states "meaningfully differentiate" schools based on:

- Academic Proficiency on State assessments
- Graduation rates for high school
- English Language Proficiency
- Growth or other state wide academic indicator for K-8 schools
- At least one other State set indicator of school quality or student success
- 95% assessment participation rate.

According to the SPCSA, NCA has received a 1 or 2 star rating for two consecutive ratings periods, based on the 2016-17 Nevada Department of Education School Performance Framework (NSPF). This determination was made based on four components: academic performance, growth, closing the opportunity gap, and student engagement.

[1] Alexander, K. L., Entwisle, D. R., Dauber, S. L. (1996). Children in motion: School transfers and elementary school performance. The Journal of Educational Research, 90, 3-12.

Academic Performance

Student Proficiency is the measure used to determine student academic performance. Students who earn a passing score on the state assessment are deemed proficient. Proficiency calculations will be determined based on the assessed population of students at each school. In order for student results to be included in the school's proficiency rate, students must be continuously enrolled at the school on or before validation day until the start of the state assessment window (YIS=1). Additionally, the testing conditions must have been regular, and the test score must not have been invalidated.

Growth

Student growth is a measure of student achievement over time. Student growth is sometimes more generally referred to as student progress. Nevada has adopted the Nevada Growth Model of Achievement (NGMA) to measure student progress. The NGMA yields two measures of student progress, a Student Growth Percentile (SGP) and an Adequate Growth Percentile (AGP). These measures require at least one score on a prior assessment and so are determined for grades four through eight. Since there are too few students who participate in the Nevada Alternate Assessments, growth is not calculated for this assessment. Growth will not be determined for high schools and so will not factor into the high school accountability model. Student Growth Percentiles are a norm-referenced measure which compares individual student achievement against the achievement of students with a similar score history. The median SGP for each school is the measure used for school accountability. Adequate Growth Percentile (AGP) is a criterion-referenced measure which compares the student's SGP against the percentile needed to become proficient or stay proficient on the state assessment in the next three years or by the end of the eighth grade.

In this way, the percentage of students who met their AGP target can be determined for each school. The AGP, therefore, is the percent of students meeting their SGP targets. In order to compute SGPs and AGPs, current year student performance on the state assessments must be matched to at least one prior year student performance record. Only students who are continuously enrolled in a school on or before validation day to the start of the state assessment window (YIS = 1) and who have a valid test administration for the current year are included in the growth calculation for an accountability school.

Closing the Opportunity Gap

Opportunity gaps will be measured for elementary and middle schools and are determined for students in need of improvement. Students in need of improvement are those who scored in the lowest two achievement levels (i.e. not proficient) on the state assessments from the previous year. The opportunity gap measure is the percentage of the students in need of improvement from the previous year who meet their Adequate Growth Percentile target for the current year.

Student Engagement

Student Engagement includes measures of chronic absenteeism, climate survey participation, academic learning plans, and high school readiness. Research shows that attendance matters and that chronic absenteeism places students at risk of negative academic consequences. Chronic Absenteeism is a measure showing the percentage of students missing ten percent or more of school days for any reason, including excused, unexcused and disciplinary absences. Students who are absent due to school sponsored activities are not considered absent for the purposes of this calculation.

Only students at the end of the school year that have been enrolled at the school for 30 days or more are included in the Chronic Absenteeism school rate. In the future, this methodology may be changed to agree with new federal Chronic Absenteeism reporting requirements.

The Climate Survey Participation measure is included in the Nevada Accountability System as a bonus. Schools meeting or exceeding the state participation threshold can receive up to two bonus points. Although most districts have opted to administer the State Climate Survey, there are some districts administering a district climate survey closely aligned to the State Climate Survey. Grade levels included in the administration of a climate survey vary by district.

Overall Assessment of NCA Performance

In school year 2013-14, NCA's elementary school was rated as a 2 star school under the previous Nevada School Performance Framework. During that rating year, the school served 607 students including special populations of 6.8% of students with an IEP and 44.5% of students eligible for free and reduced lunch. The school was considered a Title I school for the period. The NCA transiency rate for the entire school was 47.6%. Understanding the impact student mobility has on NCA's student population's overall performance is of elevated importance because NCA has the highest mobility rate of any school in Nevada. In 2015-16, the overall mobility rate at NCA increased from 47% to 73% (vs. 27% for the state and 26% for schools sponsored by the SPCSA).

NCA's elementary school in school year 2016-17 was rated as a 1 star school under the new Nevada School Performance Framework. During the rating year, the school served 760 students and was considered a Title 1 school for the period. In school year 2016-17, 56.1% of NCA students in grades 1-5 were new students. The transiency rate for the elementary school was 63.5% in 2016-17. This constitutes the highest transiency rate for a school in Nevada during the time.

One ongoing challenge for virtual schools like Connections is the high level of student mobility or transiency rates as calculated in Nevada. Research indicates that "even one non-promotional school move [transferring to a different school] both reduced elementary school achievement in reading and math and increased high school dropout rates."[2] Studies showed that "the more often students moved, the lower they scored on both the state standardized math test and on teacher observations of the students' critical thinking."[3] In like manner, when students transfer into a school, there is an impact on that student's performance on standardized tests.

More information on the statistical effects of student mobility and its effects on academic growth measurement can be found in Appendix A. While NCA is diligently working to improve performance and outcomes for all of its students NCA respectfully requests to work collaboratively with SPSCA to ensure that school performance measures consider the student's growth while at NCA and avoid penalizing a school for serving a highly mobile population.

[2] Rumberger, Russell W. (2015). Student Mobility: Causes, Consequences, and Solutions. Boulder, CO: National Education Policy Center. Retrieved 4/27/2018 from http://nepc.colorado.edu/publication/student-mobility.
[3] Alexander, K. L., & Entwisle, D. R. (1996). Children in motion: School transfers and elementary school performance. The Journal of Educational Research, 90(1), 3- 12.

Ratings Calculation Breakdown for NCA

The ratings on the framework for the elementary school are primarily based on the performance on the state assessments in grades 3-5—either proficiency ratings or growth ratings (requires a state assessment score from the previous year). Of the available 100 points, only ten points plus an additional two bonus points are not related to performance on state assessments. Of the 90 points related to state assessments, ten points are specific to the assessment for English Learners measuring English Proficiency (NCA did not have enough students so this measurement was not used.). Another 25 points are based on straight proficiency scores, while 55 points are based on various growth measures.

Grade 3 ELA is counted in two different ways for proficiency. Due to the way growth is calculated, students that scored non-proficient last year are also counted an additional time under Closing Opportunity Gap.

The school did not meet the 55% target for participation in the climate survey which means the two bonus points were lost. For the 2016-17 school year, NCA achieved 47% participation in the survey. For the 2017-18 school year, the survey will be administered and additional communications/efforts to increase participation to meet the required 75% mark will be implemented by the school.

Finally, there were also a number of instances where the school's performance fell just short of where it needed to be in order to reach the next level of points. A slight increase in performance, along with earning the bonus points from survey performance would have easily gotten the school to a 2 star rating. For example, increasing the grade 3 ELA by 1.4 percentage points and meeting the survey participation rate would have been enough to go from a 1 star to a 2 star rating.

The following breaks down the rating points in detail.

Academic Achievement

NCA received 6 out of a possible 25 points. There are two components to this rating:

- **The pooled average (same as weighted average) on the grade 3-5 state assessments.** <u>This item is worth 20 points.</u> The pooled proficiency rating was 34.8% which earned 4 of 20 points. The number of points is based on a table established by NDE. With a proficiency rating of 60% all 20 points are received and one point is lost for every 2 to 3 percentage points below 60%. If NCA had a pooled proficiency rating of 35% instead of 34.8% they would have earned 5 points, and then 1 more point for every 2 to 3 percentage points increased after that.
- **The percent of students proficient on the grade 3 ELA test.** <u>This item is worth 5 points.</u> This means grade 3 ELA gets counted twice, once for the pooled average and once for this measure. The grade 3 ELA proficiency was 36.6% which earned NCA 2 points. This is based on a table established by NDE as follows:
    - >= 63%: 5 points
    - >=51% but < 63%: 4 points
    - >= 38%, but < 51%: 3 points
    - >= 25%, but < 38%: 2 points
    - < 25%: 1 points

Growth

NCA received 5 out of a possible 35 points. There are four components to this rating:

- **Math SGP.** This item is worth 10 points. This is based on the median value of the student growth percentile for those students where growth can be calculated (i.e. state has previous year state assessment score). Thus, growth scores are limited to students in grades 4 and 5 that had a NCA state assessment score the previous year, a measurement that is greatly impacted by a high student mobility rate.[4] NCA has a value of 31% which resulted in 1 point. A value of >= 65 gets 10 points, and the points go down based on an NDE table. To earn 2 points, NCA would have had to have a value of >= 35%
- **ELA SGP.** This item is worth 10 points. This works exactly like the math SGP, including the table mapping values to points. NCA had a value of 38.5% which earned 2 points. NCA would have had to receive at least 40% to get to 3 points.
- **Math AGP.** This item is worth 7.5 points. This is another growth percentile that is based on students having sufficient growth in the past year to be on track to eventually be proficient. NCA had a value of 18.0% which earned the school 0.5 points. Again, there is a table assigning values, and to get 1 point, NCA would have had to earn at least 23.0%. A value of 52% earns the maximum points.
- **ELA AGP.** This item is worth 7.5 points. This works similar to the math AGP, but the table mapping percentages to points is different. For ELA 63% is required for the maximum points. NCA had a value of 40.7% which earned 1.5 points. A value of 41% would have received 2 points.

English Language Proficiency

This area is worth 10 points but NCA did not have sufficient students to be rated in this area. The ratings are based on English Learners and a growth measure (AGP) based on the performance of the state assessment measuring English proficiency for English Learners.

Closing Opportunity Gap

NCA received 2 out of a possible 20 points. There are two components to this rating:

- **Math growth of non-proficient students.** This item is worth 10 points. This is another growth measure, specifically the AGP for those students that did not score proficient last year. NCA had a value of 14.0% which earned 1 point. NDE developed a table to convert percentile to points. A value of 42% gets all 10 points. To get at least 2 points, NCA would have had to have a value of 16%.
- **ELA growth of non-proficient students.** This item is worth 10 points. This is the same as the math ratings except the table values have changed with 52% being required for 10 points. NCA had a value of 26.2% which earned 1 point. A value of 27 would have received 2 points.

[4] Dunn, M. C., Kadane, J. B., & Garrow, J. R. (2003). Comparing harm done by mobility and class absence: Missing students and missing data. Journal of Educational and Behavioral Statistics, 28, 269-288.

Student Engagement

NCA received 9 out of 10 points. There are two components to this rating:

- **Chronic Absenteeism.** This is worth 10 points. This is based on the percentage of students that are considered chronically absent. If less than 3% are chronically absent, then all 10 points are earned. NCA had a value of 4.3% which earned 9 points.
- **Participation in climate survey.** This is worth 2 bonus points. In order to earn the bonus points participation has to be at least 55%. For the 2016-17 school year, NCA achieved 47% participation in the survey. For the 2017-18 school year, they survey has been added to additional communications and efforts to increase participation to meet the required 75% mark to achieve these points.

Overall Rating

The total points earned by NCA was 22 of 90 points. This was translated to a 100 point scale since the school didn't qualify for an English Proficiency rating. The translated valued was 24.4 points. The minimum value for two stars is 27 points, so slight improvements should get the school to the 2 star rating. The minimum score for a 3 star rating is 50 points (or 45 out of the 90 points NCA is expected to qualify for again in 2017-18). Very slight improvements would have likely earned 6.5 more points and meeting the survey participation rate another 2 points.

1. PROPOSED ACADEMIC CHANGES

1.1 School Improvements – Programs

NCA has implemented numerous strategies tied to school improvement efforts including additional teacher training on the use of data to inform math instruction and implementing multiple student engagement efforts. In addition, our curriculum provider, Pearson Online and Blended Learning K-12 USA (Pearson OBL), is also modifying its curriculum to better meet students' needs. Pearson OBL has rebuilt its K-5 math and ELA curriculum, utilizing the McGraw Hill Wonders ELA and enVisionMATH curricular models. Each of these models were chosen based on considerable research containing base alignment with the Smarter Balance standardized testing protocol.

NCA is committed to utilizing evidence-based interventions as defined in Sec. 8101(21)(A) of the Elementary and Secondary Education Act. Under the changes by ESSA to the ESEA, interventions for school improvement should be supported by evidence from studies or through a demonstrated rationale.[5] The school has chosen a variety of interventions based on research that demonstrates improved student outcomes in key core subjects.

New Math Curriculum (enVisionMATH)

The Math Performance Improvement Project (enVisionMATH) for grades K-5 included modifications to grades 3-5 for the 2017-18 school year. In order to more fully prepare students with the skills they need to become successful in higher level math courses, as well as their futures, Pearson released enVisionMATH (2016). Aligned to curriculum focal points suggested by the National Council of Teachers of Mathematics (NCTM), this core elementary math curriculum incorporates a blended approach of traditional and investigative learning techniques that emphasizes problem-based interactive learning opportunities, visual learning strategies, embedded assessment, and data-driven remediation.

Differentiation from Previous Approach

While the previous math curriculum was aligned to the standards set forth by the Common Core initiative, the enVisionMATH curriculum was chosen based on considerable research containing base alignment specific to the Smarter Balance standardized testing protocol. As part of this project, NCA and Pearson OBL:

- **Created introductory units** for math courses that prepare students for success in the course.
- **Added reflection questions** to math courses that encourage students to think about and rate their attitudes toward and self-confidence in math, as well as consider their work and study habits.
- **Updated Portfolio assessments** for math courses to ensure they are project-based, hands-on, and aligned to Standards for Mathematical Practice.
- **Revised practice** and instruction and added virtual practices to math courses to promote mastery of skills.
- **Modified course scope** to allow students to focus on fundamental skills and concepts.

[5] Non-Regulatory Guidance: Using Evidence to Strengthen Education Investments. US Department of Education. Sept. 16, 2016. https://www2.ed.gov/policy/elsec/leg/essa/guidanceuseseinvestment.pdf

- **Added interactive reviews** that simulate Next Generation Assessment functionality and provide guided, specific feedback.
- **Added a review unit** that allows teachers to reteach areas that have been identified by benchmark testing as areas of deficiency for students.

Levels Served

All NCA students in grades K-5 will utilize the enVisionMATH curriculum.

Rationale for Initiative

It is important that programs such as enVisionMATH be examined carefully to determine the extent to which they help students attain critical math skills. Planning, Research, and Evaluation Services (PRES) Associates, Inc. conducted a two-year study designed to examine the effectiveness of the enVisionMATH program in helping elementary students improve their math skills and understanding. This national randomized control trial (RCT), which commenced in the Fall of 2007, was conducted in the grade 2 and grade 4 during the 2007-08 school year and followed these students through the grade 3 and grade 5 in 2008-09.

Results showed significant growth over the two-year period in math knowledge and skills among enVisionMATH students across all grade levels and assessments. EnVisionMATH students showed significant improvement in math concepts and problem-solving, math computation, and math vocabulary. Moreover, there is evidence of accelerated growth rates during the second year of usage of enVisionMATH in the areas of math concepts and problem solving, and math vocabulary skills. This suggests that the cumulative effects of enVisionMATH are getting stronger over time.

In response to student performance on NSPF and to better serve the students of NCA, the school has worked with Pearson OBL to integrate enVisionMATH with the new Pearson OBL curriculum, which is more aligned to the Smarter Balance assessment tool. The new curriculum was introduced to NCA students for the 2017-18 school year.

Please see Appendix C for the study.

MATH, We Got This!

NCA is implementing a new program to foster a comprehensive culture shift in how students view math. This multi-faceted approach is called, “Math, We Got This!”. NCA student survey data shows that for many students, math is intimidating, difficult, and causes a struggle. The vision is to create a full-scale cultural shift toward math acceptance that leads to math love.

Differentiation from Previous Approach

For the 2018-19 school year, NCA will be implementing the facets of the “Math, We Got This!” campaign, which:

- Expands work on student engagement;
- Focuses on a culture of learning;
- Begins to create a cultural shift in how students, teachers, and Learning Coaches think about math; and
- Unveils the hidden math in the world and put its power in students’ hands.

Specific Math, We’ve Got This! initiatives to support students, teachers, and Learning Coaches include the following:

- **Math Curriculum Enhancements** – Grade 3-5 course enhancements are based on the latest learning science research in the areas of practice, feedback, student reflection and engagement, and intervention.[6] Course enhancements focus on students’ oral and written communication of math thinking, reasoning, and problem solving.
- **Additional Math Instructional Resources** – NCA will provide ImagineMath (an intervention resource previously known as Think Through Math) to elementary school students who have been identified through the ItR process as a Tier 2 or 3, based on formative assessment. Imagine Math is an evidence-based intervention shown in research to increase math proficiency.[7]
- **Teachers** – Pearson OBL will provide teachers with professional learning related to math through Brown Bag meetings, trainings, and sessions focused on math mindset, resources, and teaching practices.
- **Students** – NCA will provide students with targeted activities and discussions focused on math in our day-to-day lives and a growth mindset toward math, including increased math awareness in the Connections Speaker Series, Fireside Chats, and Student Clubs and Activities experiences, which will be new initiatives for the 2018-19 school year.
- **Learning Coaches** – NCA will provide Learning Coaches with targeted activities and discussions conducted throughout the year focused on math in our day-to-day lives and a growth mindset toward math, which will be new initiatives for the 2018-19 school year. We encourage all Learning Coaches to attend these optional sessions.

Levels Served

All NCA students in grades 3-5 will participate in the “Math, We got This!” Initiative.

[6] Shute, V. J. (2008). Focus on formative feedback. Review of Educational Research, 78(1), 153-189.
[7] Imagine Math users were over three times more likely than non-users to be categorized as proficient on a statewide mathematics assessment. Snyder, M., Eager, K., Juth, S., Lawanto, K., Williams, T. (2016). STEM Action Center Grant Program Annual Evaluation Report: 2015-2016. Logan, UT: Utah State University, Department of Psychology. https://stem.utah.gov/wp-content/uploads/2016/03/STEM-Action-Center-Annual-Report-FINAL-2015-16.pdf

Rationale for Initiative

Grade 3-5 course enhancements are based on the latest learning science research in the areas of practice, feedback, student reflection and engagement, and intervention.[8] Course enhancements focus on students' oral and written communication of math thinking, reasoning, and problem solving. NCA will provide ImagineMath (an intervention resource previously known as Think Through Math) to elementary school students who are struggling. Imagine Math is an evidence-based intervention shown in research to increase math proficiency.[9]

Math Time to Talk

Math Time to Talk is a synchronous math session that encourages students to engage in math discourse, discussion and problem solving. Math Time to Talk consists of small group LiveLesson® sessions that appear in student courses approximately every seven lessons. NCA data demonstrates a need to focus on increasing students' ability to engage in math discourse in such a way that promotes an increase in conceptual understanding.

Differentiation from Previous Approach

For the 2018-19 school year, NCA will be implementing the Math Time to Talk program as part of the new Pearson OBL curriculum. When students get to the Time to Talk lesson component they will move to a virtual classroom for a 30-minute Time to Talk session focused on increasing students' ability to engage in math discourse in such a way that promotes an increase in conceptual understanding. Research has identified that "talking about math" is a key activity to support students' active engagement in math thinking, reasoning, and problem solving.[10]

When students talk about math and exchange ideas with teachers and other students, it helps them deepen their understanding, take ownership of their math knowledge, and improve their math confidence

The tasks used during Time to Talk LiveLesson sessions are specially designed to reinforce key math skills, improve problem solving, and strengthen math vocabulary and communication skills. Trained Math Specialists will pose a task that has either multiple solutions, or multiple solution paths, and give students 3-5 minutes to work through the problem. The remainder of the 30-minute session involves students sharing their solutions and methodology while engaging each other with questions that seek clarity or understanding of the variety of approaches to the task. After each Time to Talk session, students will complete a brief reflection activity within their math course.

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[8] Shute, V. J. (2008). Focus on formative feedback. Review of Educational Research, 78(1), 153-189.

[9] Imagine Math users were over three times more likely than non-users to be categorized as proficient on a statewide mathematics assessment. Snyder, M., Eager, K., Juth, S., Lawanto, K., Williams, T. (2016). STEM Action Center Grant Program Annual Evaluation Report: 2015-2016. Logan, UT: Utah State University, Department of Psychology. https://stem.utah.gov/wp-content/uploads/2016/03/STEM-Action-Center-Annual-Report-FINAL-2015-16.pdf

[10] Thompson, Lindsey, "The Effects Improving Student Discourse Has on Learning Mathematics" (2007).Action Research Projects. 23. http://digitalcommons.unl.edu/mathmidactionresearch/23

Math Time to Talk includes:

- Trained Math Specialists to facilitate thirty-minute discourse sessions throughout the semester;
- Participation grade added directly to the student Grade Book by the Math Specialist;
- Monthly attendance updates; and
- General information, guidance, and support throughout the program to include best practices for program promotion amongst parents/guardians and students.

Teachers will receive training from Pearson OBL in effective strategies for promoting math discourse and understand that students make most sense of math when they participate in the sense making process through conversation.

Levels Served

All NCA students in grades 3-5 will participate in the “Math, We got This!” Initiative.

Rationale for Initiative

Research has identified that “talking about math” is a key activity to support students’ active engagement in math thinking, reasoning, and problem solving.[11] During the 2016-17 school year, students in grades 3-5 at two Connections Academy schools participated in a pilot of the Math Time to Talk Program. The outcomes of this pilot were closely studied and verified in order to decide whether the program was successful and should be used in other schools. The program was a success. The following outcomes were discovered.

- Among students who participated in the sessions regularly, their belief that math learning and ability can grow over time with practice significantly increased
- Students’ math confidence and self-efficacy increased as well (but did not reach statistical significance).
- This pattern was true for both the fall and the spring semesters. After controlling for final Math course scores in the previous year, grade level, and engagement level, it was discovered that students that participated in at least six sessions of Math Time to Talk had significantly higher final math course scores than the group that did not (see Figure 1).

[11] Thompson, Lindsey, "The Effects Improving Student Discourse Has on Learning Mathematics" (2007).Action Research Projects. 23. http://digitalcommons.unl.edu/mathmidactionresearch/23

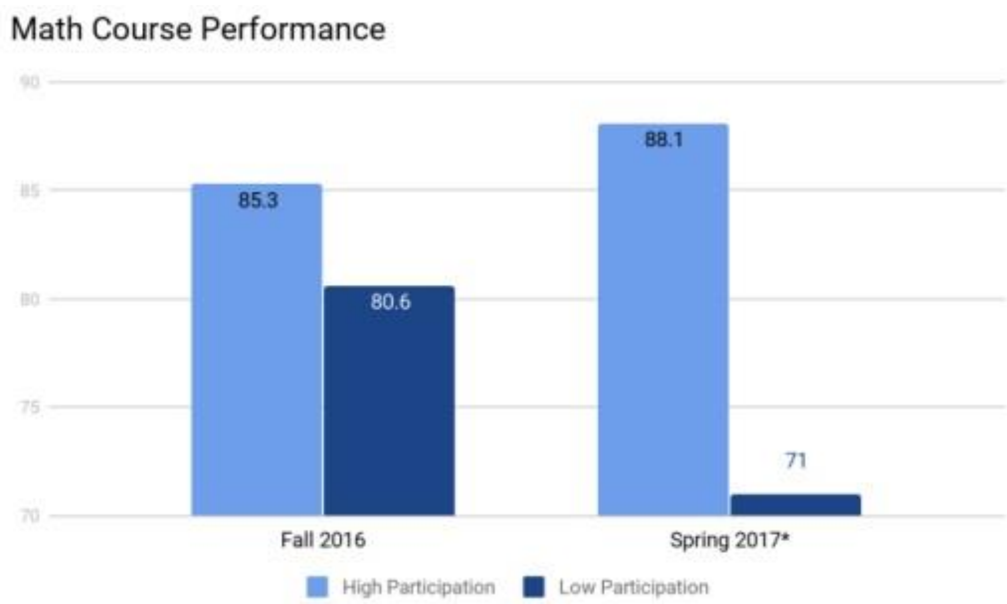

Figure 1. Math Course Performance for Math Time to Talk Students

In response to student math performance on NSPF, the school has worked with Pearson OBL to integrate Math Time to Talk with the new Pearson OBL math curriculum, which is more aligned to the Smarter Balance assessment tool. Math Time to Talk will be administered to all students in Grades 3-5 for the 2018-19 school year and beyond.

NEW ELA Curriculum

In response to the needs of NCA and its continuous efforts to improve elementary student proficiency, Pearson OBL revamped its ELA courses (McGraw Hill Wonders) for students in grades K-5 for the 2017-18 school year.

Differentiation from Previous Approach

While the previous math curriculum was aligned to the standards set forth by the Common Core initiative, the Wonders curriculum was chosen based on considerable research containing base alignment specific to the Smarter Balance standardized testing protocol.

These new courses align to four research-based design principles:

- The learning environment for students must be engaging.
- Students must have the opportunity to practice, review, and revisit concepts.
- Assessments must be varied, relevant, and frequent.
- Course and lesson structure must be consistent to facilitate optimal student learning.

New animated Learning Buddies guide students through lessons, review key concepts, and encourage students to apply their new knowledge in a variety of ways. All five literacy components (reading, writing, language, speaking, and listening instruction) are blended together. In grades 3, 4 and 5, the curriculum builds on this foundation with weekly phonics, spelling, and fluency instruction.

- Writing assignments include analytical writing opportunities and long-term genre writing portfolios. Units are written around a common theme or topic and include a balance of engaging informational and literary texts from different subject areas and cultures.
- Assessments in the ELA courses are designed to familiarize students with the more rigorous, technology-enhanced item types found on next generation assessments and there is increased support for assessment follow-up and re-teaching opportunities.

Although these are already being implemented, the results and improvement to be gained are not yet reflected in the performance data that was considered in issuing the Notice of Breach. Continued implementation will result in improvement of student performance.

Levels Served

All NCA students in grades K-5 will utilize the Wonders curriculum.

Rationale for Initiative

In an effort to find the most effective reading instruction for elementary students online, it is worth noting that NCA and Pearson OBL opted to utilize curriculum from a Pearson competitor, McGraw Hill, based on research and the best option for Nevada students.

NCA is incorporating this highly-regarded ELA program, supported by the Common Core State Standards to incorporate evidence-based practices and content extracted from the most academically rigorous models across the state to ensure that students possess the literacy skills necessary for success.

It is vital that existing curricula incorporate the rigorous content and knowledge encapsulated within the Standards. The majority of presented research was obtained from the following sources:

- **Developing Early Literacy: Report of the National Early Literacy Panel (NELP).**[12] This study synthesizes research on the development of early literacy skills for children from birth to age five. It was conducted by the National Center for Family Literacy under the auspices of the Partnership for Reading (a collaborative effort of the National Institute for Literacy, the National Institute for Child Health and Human Development, the U.S. Department of Education, and the U.S. Department of Health and Human Services). The purpose of NELP was to provide information to help teachers and parents support young children's early literacy development and to contribute to educational policy decisions (National Early Literacy Panel, 2008). The report examines the early correlates of later reading achievement, and meta-analyzes the data on instructional studies focused on young children.

[12] Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, DHHS. (2010). Developing Early Literacy: Report of the National Early Literacy Panel (NA). Washington, DC: U.S. Government Printing Office.

- **Report of the National Reading Panel: Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and its Implications for Reading Instruction—Reports of the Subgroups (National Institute of Child Health and Human Development [NICHHD], 2000).[13]** The National Reading Panel was appointed by the Secretary of Education and the Director of the National Institute of Child Health and Human Development at the request of the U.S. Congress to determine what research had to say about the teaching of reading. The NRP report presents an extensive, detailed research review related to phonemic awareness, phonics, vocabulary, reading comprehension, and oral reading fluency.
- **Preventing Reading Difficulties in Young Children, A Review of Research on Early Childhood Reading Commissioned by the National Research Council (Snow, Burns, & Griffin, 1998).[14]** This source represents a broad-ranging research summary and review, but without inclusion of specific details of the research. It is aimed at identifying those school factors that would allow for the successful prevention and remediation of reading problems.
- **Reading for Understanding: Toward an R& D Program in Reading Comprehension (2002).[15]** This review of the research on reading comprehension instruction was conducted by the Reading Study Group for the U.S. Department of Education's Office of Education Research and Improvement.
- **Writing to Read: Evidence for How Writing Can Improve Reading. A Report from the Carnegie Corporation of New York (Graham & Herbert, 2010).[16]** This document provides a meta-analysis of research on the effects of specific types of writing interventions found to enhance students' reading skills.
- **Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools. A Report from the Carnegie Corporation of New York (Graham & Perin, 2007).[17]** This report provides a review of research-based techniques designed to enhance the writing skills of 4th to 12th grade students.
- **Improving Reading Comprehension in Kindergarten Through 3rd Grade: A Practice Guide. (Shanahan, Callison, Carriere, Duke, Pearson, Schatschneider, & Torgesen, 2010).[18]** This publication contains recommended instructional practices in reading, based upon a review of research evidence by the What Works Clearinghouse of the U.S. Department of Education's Institute of Education Sciences.

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[13] Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, DHHS. (2000).
Report of the National Reading Panel: Teaching Children to Read: Reports of the Subgroups (00-4754).
Washington, DC: U.S. Government Printing Office.

[14] Catherine E. Snow, M. Susan Burns, and Peg Griffin, *Editors* Committee on the Prevention of Reading Difficulties in Young Children. Commission on Behavioral and Social Sciences and Education National Research Council. NATIONAL ACADEMY PRESS Washington, DC 1998

[15] Snow, C. (2002). Reading for Understanding: Toward an R&D Program in Reading Comprehension. Santa Monica, CA: RAND.

[16] Graham, S., and Hebert, M. A. (2010). ***Writing to read: Evidence for how writing can improve reading. A Carnegie Corporation Time to Act Report.*** Washington, DC: Alliance for Excellent Education.

[17] Graham, Steve; Perin, Dolores, *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools*

[18] Shanahan, T., Callison, K., Carriere, C., Duke, N. K., Pearson, P. D., Schatschneider, C., & Torgesen, J. (2010). *Improving reading comprehension in kindergarten through 3rd grade: A practice guide* (NCEE 2010-4038). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from whatworks.ed.gov/publications/practiceguides.

In response to student performance on NSPF and to better serve the students of NCA, the school has worked with Pearson OBL to integrate Wonders with the new Pearson OBL ELA curriculum, which is more aligned to the Smarter Balance assessment tool. The new curriculum was introduced to NCA students for the 2017-18 school year and is another important resource that is part of NCA's improvement strategy which it began working on last summer when results first came out under the new standards.

Please see Appendix D for the complete study.

Lexia Reading Core5

Lexia Reading Core5 provides a personalized, data-driven approach through a system of student-driven learning online, and targeted instruction by a teacher or paraprofessional. It empowers students of all abilities in grades K-5 to build their fundamental literacy skills through technology and direct instruction.

NCA data shows a need to increase student proficiency in the six areas (phonological awareness, phonics/phonemic awareness, structural analysis, fluency, vocabulary, and comprehension) of reading instruction, including activities focused on academic vocabulary through structural analysis. This begins with oral language and listening comprehension, building to reading comprehension.

Differentiation from Previous Approach

Lexia Reading Core5 will be implemented for the 2018-19 school year. Lexia's assessment without testing technology provides teachers and administrators ongoing progress monitoring data without a test event. Student data monitoring helps support teacher effectiveness; predict students' overall likelihood of reaching end-of-year, grade-level benchmarks based on the students' monthly performance; as well as track performance on rigorous reading standards, such as the Common Core State Standards. The assessment system provides a universal screener to place students at their appropriate level of instruction as well as progress monitors as frequently as daily providing both norm-referenced and criterion referenced data that are highly correlated with DIBELS, AIMSweb and MAP. The assessment system is diagnostic and will pinpoint specifically where each student struggles and provides a profile of both strengths and weaknesses.

Levels Served

All NCA students in grades K-5 will participate in the Lexia Reading Core5 initiative.

Rationale for Initiative

In multiple studies published in peer-reviewed journals,[19] Lexia Reading Core5 has been found to accelerate the development of reading skills, improve standardized test scores for elementary school students and help close the reading gap for targeted populations such as students that have been identified as low performers as well as English Learners.[20] Please see Appendix B for the complete study.

[19] Lexia's Reading Core5 program is proven to improve learning outcomes in 15 externally-reviewed research studies including 8 studies under the "strong" standard of evidence in ESSA. https://www.lexialearning.com/why-lexia/research-proven.

[20] Students who used Lexia Reading in addition to core reading instruction showed greater gains than a control group in overall reading, phonological awareness, and word reading. The Group Reading Assessment and Diagnostic Evaluation (GRADE), Level K, was used as the reading measure. Macaruso, P., & Rodman, A. (2011). Benefits of computer-assisted instruction to support reading acquisition in English Language Learners. Bilingual Research Journal, 34, 301–315.

Learning Coach Training

Pearson OBL also provides a number of nationally-facilitated LiveLesson sessions to Learning Coaches throughout the school year to assist in supporting their students with language arts. Continued emphasis on use of these tools will be another helpful resource for improvement. Sample session titles include:

- Exploring the Six Traits of Writing
- Tips for Supporting Writing at Home
- Using Writing Strategies & Rubrics
- Taking Noteworthy Notes
- Reading Comprehension Strategies for Students in Grades 4-5

NCA data shows that only 34% of K-5 Learning Coaches took advantage of this training for the 2017-18 school year.

Differentiation from Previous Approach

In the past, these trainings have been available to Learning Coaches, but have not been promoted specifically to parents of K-5 students. NCA will promote these sessions through WebMail messages, home page announcements, and Learning Coach Link, the monthly newsletter for Learning Coaches.

Levels Served

All NCA Learning Coaches supporting students in grades K-5 will receive the appropriate communications regarding Learning Coach Training.

Rationale for Initiative

Research has shown that parents who fully understand the challenges and competencies of writing and how to best support their K-5 student at home provide students with a positive attitude toward the traits and components of writing in an academic setting.[21] In addition, qualitative feedback from Learning Coaches who have completed the training has been very positive.

Response to Intervention Model Training

Students who are in need of additional support may be identified using LEAP formative assessments and other data collection tools which enable teachers to better diagnose the greatest area of need (GAN). Teachers offer students whose performance on the universal screener indicates a need for intervention or who struggle with the core curriculum, appropriate research-based instructional interventions (including differentiated learning activities designed to reinforce key skills and concepts) that are progressively more intensive and targeted at the student’s identified GAN. The goal is to identify and begin supporting these students within the first 30 days of enrollment.

[21] U.S. Department of Education. Office of Educational Research and Improvement, Archived Information. "Help Your Child Learn to Write Well." http://www.ed.gov/pubs/parents/Writing/index.html.

Differentiation from Previous Approach

While NCA is already using multiple strategies to provide struggling students with effective and timely interventions, NCA is retraining all teachers on the multi-tiered instructional approach for the 2018-19 school year to make sure that all teachers are up-to-date on all strategies and available resources for students. NCA is retraining all teachers in the Response to Intervention (RtI) program/protocols and their role in helping students. NCA is also retraining teachers to interpret data to make instructional decisions, document their work with students as part of the Personal Learning Plan (PLP), implement strategies for differentiating instruction, identify the most appropriate SISPs for students, and support students who are not progressing, or not engaged, in the instructional program. Teachers also work closely with Learning Coaches to discuss the needs of their students, the RtI process, and any SISPs that might be assigned. Learning Coaches are our partners and are involved with their students throughout the school year.

Levels Served

All NCA teachers and staff members supporting students in grades K-5 will receive the appropriate Intervention training.

Rationale for Initiative

The data collection process can often take time to truly target specific areas of need and allow teachers to personalize intervention plans to the individual student's learning style, integrate academic instruction with appropriate behavioral supports. Progress monitoring (data collection) is continuous, on-going and an integral piece of the Response to Intervention (RtI) process. Monitoring growth on a specific area allows teachers to determine the effectiveness of an intervention and either continue (if growth is shown), change (if the intervention is not working) or stop if student has reached a level of mastery.

Student support and interventions may include enrollment in Supplemental Instructional Support Programs (SISPs) such as Study Island[22], Raz-Kids, Reading Eggs, Reading Eggspress, SuccessMaker Reading[23], Headsprout[24], Reading Plus[25], Math Whizz[26], and ImagineMath[27]. The intervention may also be in the form of targeted LiveLesson (synchronous virtual instruction) sessions.

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[22] Study Island is an evidence-based intervention that increases student outcomes. http://www.edmentum.com/sites/edmentum.com/files/resource/media/Study%20Island%20Quasi-Exp%20Executive%20Summary%20Web.pdf

[23] Strong evidence for significant growth in reading based on two studies by Gatti Evaluation, Inc. https://assets.pearsonschool.com/asset_mgr/current/201751/GFFly_581J064-ESSA-2pgsmread_MED.pdf

[24] Headsprout is an evidence based intervention that improves early reading skills. Huffstetter, M., King, J. R., Onwuegbuzie, A. J., Schneider, J. J., & Powell-Smith, K. A. (2010). Effects of a computer-based early reading program on the early reading and oral language skills of at-risk preschool children. Journal of Education for Students Placed at Risk, 15, 279-298. https://charts.intensiveintervention.org/chart/academic-intervention-chart/13829

[25] Reading Plus is an evidence-based intervention that improves reading comprehension and fluency. Reading Plus. (2008). Reading improvement report: Miami-Dade regions II and III. Huntington Station, NY: Taylor Associates/ Communications, Inc. https://eric.ed.gov/?id=ED511804

[26] Studies show math improvement for students who use Math Whizz. https://www.whizz.com/wp-content/uploads/2013/02/Math-Whizz-Proof-Pack.pdf

[27] Snyder et al., STEM Action Center Grant Program Annual Evaluation Report: 2015-2016.

NCA's RtI program also includes the use of a Student Support Team (SST) – generally comprised of teachers, administrators, counselors and reading/math specialists – to review and discuss student performance data. Once a teacher makes a recommendation for a student to move through the RtI tiers, the SST will evaluate the strategies that have been used to support the student, along with reviewing student progress monitoring data, to determine whether the student should receive increased Tier 2 or Tier 3 level intervention or continue with Tier 1 strategies. An SST member provides support to both the teacher and student by bringing together the collective knowledge of pedagogy and intervention effectiveness to determine the best way to help each student show growth.

1.2 School Improvements – Structures

Implementing Improvement Specific Professional Learning Communities (PLC)

All teachers at NCA participate in a Professional Learning Community (PLC). Teachers in each PLC will spend their initial meetings digging into the most recent student test data. This deep data dig highlights areas of success and areas of weakness. Teachers will use this information to decide where they need to focus for the upcoming year (Are there areas where students performed well? Are there areas that need more concentration?). This leads to creating SMART goals. SMART goals focus on standards with which our students struggle and allows the PLC to measure the success of their work throughout the year; determining if changes in strategy or action are needed during the year, rather than after the year is complete, and are a critical component to success.

Differentiation from Previous Approach

For the 2018-19 school year, these PLCs will focus on two main areas: Elementary Math achievement and Elementary English Language Arts achievement. Teachers in the PLCs will also develop common grading practices, assignment expectations, and re-teaching and relearning policies. All students should have multiple opportunities to learn the material and to demonstrate their knowledge. Teachers understand that not all students learn at the same rate or pace, and it is acceptable to allow students to retake tests to show their mastery. The teachers' job is to reteach students the material in the learning method that works best for them. This takes time and planning for effective differentiation, and is a non-negotiable expectation for all staff members, per their annual evaluation competencies.

For the 2018-19 school year, NCA is planning to use professional development funds to have more teachers trained in how to create, work in, and get academic achievement from Professional Learning Communities. NCA is committed to making this a priority as part of this plan.

Levels Served

All NCA teachers and staff members supporting students in grades K-5 will focus on two main areas: Elementary Math achievement and Elementary English Language Arts achievement in their Professional Learning Communities.

Rationale for Initiative

Considerable research has been completed on the benefits of PLCs and the benefits of teachers being properly training to collaborate through the use of SMART goals to analyze targeted student data. Empirical studies explore the impact on teaching practice and student learning[28]. The collective results of these studies suggest that well-developed PLCs have positive impact on both teaching practice and student achievement. Implications of this research and suggestions for next steps in the efforts to document the impact of PLCs on teaching and learning are included as part of this overall plan.

[28] Roberts, Mindy L., "Improving Student Achievement Through Professional Learning Communities" (2010).Educational Administration: Theses, Dissertations, and Student Research.

2. INTERIM AND ANNUAL PERFORMANCE GROWTH GOALS

2.1 Annual Performance Goals

Annual Performance and Growth Goals

NCA is committed to meeting or exceeding the SPCSA performance expectations under the Nevada School Performance Framework. As outlined in the analysis portion of this plan, NCA received a calculation of 24.44 points for the 2016-17 school year.

Based on this four-year plan, NCA expects to increase its overall score on the NSPF by an average of 20% across the areas of Academic Achievement, Student Growth, Closing Opportunity Gaps and Student Engagement in each of the next four years, reaching the score necessary to achieve a Three Star rating by the 2020-21 school year.

YEAR	Star Calculation	Point Increase from Previous Year	% Increase from Previous Year	Star Rating
2016-17	24.44	BASELINE	BASELINE	ONE STAR
2017-18	29.32	4.88	20.0%	TWO STAR
2018-19	35.18	5.86	20.0%	TWO STAR
2019-20	42.21	7.04	20.0%	TWO STAR
2020-21	50.7	8.44	20.0%	THREE STAR

The baseline performance was set using the calculations and ratings from the 2016-17 NSPF results for NCA. While many of the initiatives outlined in this plan will not be introduced until the 2018-19 school year, sufficient improvements and efforts have been in place for the 2017-18 school year to support the initial year of this plan. Student data for the 2017-18 school year will have already been collected by the timeline provided by the SPCSA as part of the Notice of Breach.

2.2 Interim Performance Goals

Monitoring Subgroups for Proficiency and Growth

In the analysis of the NSPF data and results, NCA has identified three additional student sub-groups to monitor as part of the formative assessment, interim measurement process:

- **Lowest Performing –** students who have not been deemed proficient based on previous NSPF performance and (where available) previous formative assessment data.

- **Grade 3 Reading –** as this grade level is heavily weighted on the NSPF and NCA students have struggled to achieve sufficient ratings, this is an important subgroup on which to focus.

- **New to the School (current school year) –** Students will be identified as "New to the School" if they have enrolled as a new student to NCA at the start of or during the current school year. NCA has the highest mobility rate in Nevada. In 2015-16, the number jumped from 47% to 73% (vs. 27% for the state and 26% for the SPCS).

MAP Formative Assessment

Measures of Academic Progress (MAP) is a computer-adaptive assessment utilized to monitor student growth to inform and personalize instruction. MAP was officially adopted by the State Board of Education to assess Nevada students as a part of the Read by Grade Three (RBG3) program. SB 391, Nevada's Read by Grade 3 Act, became effective on July 1, 2015. This statute was designed to dramatically improve student achievement by ensuring that all students will be able to read proficiently by the end of the 3rd grade. NCA began offering MAP assessments for the 2017-18 school year at grades K-3 and will be expanding its use to include grades 4 and 5 for the 2018-19 school year.

NCA Grade-level teachers are responsible for the instruction and identification of students who need additional interventions based on various academic factors, and will work closely with NCA Administration to carefully monitor the academic growth of all students in all sub-groups. Subject-specific Professional Learning Communities (PLCs) will structure SMART goals that assist in the monitoring of the identified sub-groups (Lowest Performing, Grade 3 Reading, New to School) that have the greatest impact on the NSPF.

NDE has identified the 40th percentile rank on the MAP Growth Reading Assessments as its Read by Grade 3 Indicator. K-3 students who score at or below the 40th % mark on the MAP Reading assessment will be identified as “struggling readers” in Nevada’s Read by Grade 3 Program. The 40th percentile was already in use in some Nevada districts as the indicator for struggling readers and is a common threshold across the country for identifying students in need of additional reading support.

To measure Satisfactory Progress on this assessment we use the mean normative RIT scores and the expected growth measures provided by the testing company, NWEA. This is defined as students who make the expected RIT gain score from pretest to posttest or who score one standard deviation above the mean RIT score on the posttest. The cut-score chart by grade level is provided here.

LEAP Formative Assessment

NCA utilizes the Longitudinal Evaluation of Academic Progress (LEAP) as the school’s Pre-, Mid-, and Post-Assessment. All students in grades K–5 take the LEAP Math and English/Language Arts assessments. These assessments are given in the fall, winter, and again at the end of the school year. Kindergarten and first grade students take the online LEAP Math test and their teachers conduct separate reading assessments individually with these students.

LEAP is an invaluable assessment tool. It helps NCA teachers understand the academic strengths and weaknesses of each student, which will then be used to individualize students’ academic programs. After completing the pretest in the fall, teachers and parents have access to a report that provides academic information to assist in identifying skills, strengths, and weaknesses of their student. The report enables teachers and parents to develop and create a personalized instructional plan (i.e. the student’s PLP). The mid-test results provide teachers, parents, and students invaluable information on academic progress. The posttest results provide teachers and parents with additional information about students’ growth throughout the academic year. It also helps to plan for the next school year’s academic program. These tests have also proved very useful in identifying state standards and objectives that students may need to work on to be successful throughout the school year.

Teachers utilize the data provided by LEAP for use in their PLC analysis and goal setting. Teachers use this information to decide where they need to focus for the upcoming year (Are there areas where students performed well? Are there areas that need more concentration?). Teachers in the PLCs will also develop common grading practices, assignment expectations, and re-teaching and relearning policies. Teachers understand that not all students learn at the same rate or pace, and it is acceptable to allow students to retake tests to show their mastery.

In order to gauge student growth on the Formative Assessments, Connections Education has defined a measure of Satisfactory Progress for Math and English Language Arts Reading. The calculation of this measure varies based on the test that the student is assigned, which can differ by school and by grade. Here are the following definitions for each assessment that Connections uses in the Formative Assessment Cycle.

Students receive a score of percent correct on the pretest and posttest LEAP assessments. Students have made satisfactory gains if they score a minimum of 75% on the posttest assessment and/or if they increase their score from the pretest to the posttest by 10 percentage points.

NCA Grade-level teachers are responsible for the instruction and identification of students who need additional interventions based on various academic factors, and will work closely with NCA Administration to carefully monitor the academic growth of all students in all sub-groups. Subject-specific Professional Learning Communities (PLCs) will structure SMART goals that assist in the monitoring of the identified sub-groups (Lowest Performing, Grade 3 Reading, New to School) that have the greatest impact on the NSPF.

2.3 Independent Evidence of Correlation and Predictive Ability

Independent Research of LEAP

NCA and Pearson OBL utilized an independent assessment analysis of the effectiveness of the LEAP assessment in terms of the relationship between student achievement on a formative assessment and their proficiency on a state assessment, such as Smarter Balance. The analysis was done by grade (3-8), subject (reading and math) and test type (pre, mid and post). The aim of the analysis is to validate whether LEAP scores are predictive of the result a student ultimately achieves on the state assessment.

The analysis validates that there is a positive, statistically significant relationship between students' results of the LEAP assessment and the proficiency level they achieve on the State assessment.

In general, negative accuracy rates (the proportion of those who were "Unlikely to Succeed" in the LEAP assessment and ultimately "Below Proficient" in the state assessment) are higher than positive accuracy rates (the proportion of those who were "Likely to Succeed" in the LEAP assessment and ultimately "Proficient" in the state assessment), indicating that the LEAP assessment is more effective at predicting those who will not be proficient than those who will be proficient.

Overall (for students in all grades), negative accuracy rates range from 72 percent to 82 percent, while positive accuracy rates range from 55 percent to 76 percent for specific subjects and tests.

Overall accuracy rates (i.e. a combination of positive and negative accuracy rates) are typically lower due to the existence of the “May be Successful” category, which does not clearly predict the outcome of the state proficiency test and as such was not considered accurate for either proficient or not proficient. Overall accuracy rates range from 55 percent to 64 percent.

When considering the LEAP assessment band results, students who score in the “Likely to be Successful” or “May be Successful” range are significantly more likely to be “Proficient” than those who score in the “Unlikely to be Successful” range.

- This is true across all grades, tests, and subjects. In general, the effect sizes are larger for those who are “Likely to be Successful” than those who “May be Successful,” but there are exceptions (such as in the Grade 5 Math Pre Assessment).
- When controlling for demographic variables, students who score in the “Likely to be Successful” range are between 13 and 52 percent more likely to be “Proficient” than those who are “Unlikely to be Successful.”
- When controlling for demographic variables, students who score in the “May be Successful” range are between 11 and 32 percent more likely to be “Proficient” than those who are “Unlikely to be Successful.”

NCA uses LEAP as a tool to identify students who need additional assistance and are committed to maximizing the use of LEAP to provide support at all levels of intervention.

We have included the entire study in Appendix E.

3. SUPPORTING GOALS AND BENCHMARKS

3.1 Teacher and School Leadership Support

NCA Teacher Training and Professional Learning

Positive student outcomes rely on a qualified and dedicated teaching staff equipped with the right tools and training. Teaching in a virtual environment is a specific skill and NCA provides extensive initial and ongoing professional development. School leadership expects teachers to annually participate in ten professional development days and to complete assigned professional learning activities.

Research on effective professional development provides evidence that professional development should be intensive, ongoing, and connected to practice. Teachers are not effective when they are provided stand-alone professional development workshops. Teachers need to try out new ideas and strategies with their students and to reflect on the results of these strategies. Intensive professional development, especially when it includes application of knowledge to planning and instruction, has a greater chance of influencing teaching practices, and in turn, leading to gains in student learning. NCA provides teachers with ongoing professional development activities throughout the year. Presenters with various backgrounds and areas of content expertise conduct live tutorial sessions on a rotating basis throughout the school year. NCA provides a systematic approach to professional learning for all teachers. Topics for professional learning sessions support core standards for facilitating student learning, align to the school year cycle, and are driven by the belief that all students can and must learn.

Each series is:

- **Intensive –** Participants will identify the purpose of educational practices, examine how they can be implemented in the virtual or blended environment, and collaboratively discuss strategies that can be implemented with students.
- **Ongoing –** New instructional strategies and the latest learning research will be connected to topics presented and discussed in prior sessions to demonstrate how specific educational practices form the "big picture" of effective instruction. Further discussion and exploration at the school level strengthens these connections.
- **Connected to practice –** Following each session, participants will apply what they have learned to their professional practice. They will integrate precise, targeted strategies into their planning and instruction, and reflect on the outcomes through the Teacher ePortfolio Data View.

Through the utilization and monitoring of the benchmarks and assessments outlined in this plan, NCA will utilize a comprehensive teacher training and development offering from Pearson OBL to equip teachers with the following:

- Working knowledge of the Pearson OBL curriculum and how to facilitate student learning in a virtual environment
- Strategies and effective practices for virtual instruction
- Ability to effectively use the tools in Connexus®, the education management system (EMS), to communicate, monitor progress, and use data to support student learning
- Multiple forms of assessment and skills to interpret performance data to guide instruction, determine appropriate differentiation strategies, and develop personalized learning plans

- Guidance on how to use instructional resources and identify the appropriate intervention tools based on student needs
- Strategies for implementing the "instructional shifts" for increased rigor in state standards and next generation assessments
- Identification of at-risk students and instructional strategies to engage and motivate them
- Knowledge of required school year cycle teacher tasks, school processes, and policies
- Techniques to foster socialization and connectedness in a virtual school community

Teachers also value collaboration and learn from one another through PLCs. PLC meeting agendas, meeting notes, and to-do's are tracked in Connexus. The primary purpose of PLC work in the past was to identify and monitor the progress of at-risk students and to place those students in interventions. This year, we plan to revamp PLCs to focus on SMART goals focused on the components listed in this plan that can be tracked consistently throughout the school year.

PLCs will develop SMART goals to track students' successful attainment of the academic standards. Teachers access real-time data to see how many assessment items the student has completed for each objective and whether the student has demonstrated mastery. This allows the teachers to measure the success of their teaching and their SMART goals throughout the school year rather than waiting until the state assessment.

3.2 Additional Steps – Corrective Actions

NCA is confident that the coursework, interventions and initiatives outlined in this improvement plan will meet the needs of students at the elementary level and will lead to growth and achievement on the NSPF, as proposed by the outlined goals, targets and timeline. In the event that any of the improvement plan components result in underperformance for individuals or sub-sets of students, the school will utilize the following process:

- Identify the individual students or sub-groups within the most immediate and appropriate formative assessment timeframe.
- Identify the area(s) of underperformance for the identified individuals or sub-groups.
- Work closely with the "Turnaround Specialist" mandated by the Authority to create appropriate, targeted interventions.
- Create more frequent, customized formative assessments to ensure that the individuals or sub-groups are improving in the identified areas.

The appropriate grade-level teachers, working alongside the intervention specialists and the elementary and school administrators, are responsible for the identification, intervention and ultimate success of all students.

APPENDIX A – STUDENT MOBILITY, SEGREGATION, AND ACHIEVEMENT GAPS: EVIDENCE FROM CLARK COUNTY, NEVADA

Article

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Student Mobility, Segregation, and Achievement Gaps: Evidence From Clark County, Nevada

Richard O. Welsh[1]

Abstract

Student mobility and school segregation are two important issues with significant equity implications for urban school districts that are often addressed separately. This article examines the relationship between student mobility and school segregation. The findings indicate that more segregated schools typically have smaller within-school achievement gaps, a lower proportion of proficient students, a higher proportion of low-income and minority students, and higher nonstructural mobility rates (especially within-year mobility) than less segregated schools. The results also suggest that, regardless of the timing of school changes, high levels of achievement segregation are a significant predictor of student mobility. Policy implications are discussed.

Keywords

student mobility, school segregation, achievement gaps, urban school districts, educational equity

In the past decade, increasing focus has been placed on education in urban contexts (Milner & Lomotey, 2014).[1] Racial, ethnic, income, and achievement segregation is a critical concern in urban school districts nationwide.

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Even though the 1954 landmark *Brown v. Board* decision resulted in the desegregation of schools in the 1970s, there has been persistent resegregation (Frankenberg, Lee, & Orfield, 2003; Orfield, 1983; Orfield & Yun, 1999). Moreover, court decisions in recent decades have made it more challenging for districts to maintain integrated schools (Condron, Tope, Steidl, Freeman, & Colleges, 2013; Orfield & Lee, 2007). Student mobility, or the sorting of students across schools, is also an important issue facing urban school districts. Although student mobility is pervasive across the United States, it is especially prevalent in urban school districts (Institute of Medicine & National Research Council, 2010; U.S. Government Accountability Office, 2010). Frequent student mobility is most common and has adverse educational outcomes for low-income and minority students (Hanushek, Kain, & Rivkin, 2004; Reynolds, Chen, & Herbers, 2009; Schwartz, Stiefel, & Chalico, 2009; Xu, Hannaway, & D'Souza, 2009). Student mobility has acquired greater importance in recent decades as districts have expanded open enrollment options. School choice policies provide an alternative way of assigning students to schools by giving parents the freedom to choose which schools their child attend and is viewed as a potential mechanism for promoting integration in school districts (Finn, 1990).

Both student mobility and school segregation concern the equality of educational opportunity. Segregation in urban districts is a prominent educational equity issue (Orfield, 1983). School segregation and student mobility may be a cause and consequence of each other. Students may switch schools because of school segregation, and student mobility may maintain or expand segregation. This has significant policy implications as prior research has highlighted the benefits of desegregation for all students. Moreover, the organizational perspectives of student mobility, or how changing schools shape how learning occurs in schools and districts may help policymakers utilize student mobility to promote desegregation. Student mobility and segregation are particularly concerning in light of ongoing demographic shifts. The influx of minority students in urban school districts has had adverse effects on desegregation (Bifulco & Ladd, 2007; Frankenberg et al., 2003; Orfield & Lee, 2007). Although there is much to learn about how student mobility and segregation phenomena interact and how both affect education equity in urban school districts, the relationship between school segregation and student mobility in urban school districts has been largely overlooked by researchers and policymakers. The resegregation of American schools coupled with the growth of school choice policies nationwide make it important to learn more about the relationship between educational inequality, student mobility, and school segregation.

Clark County School District (CCSD) in Nevada provides an exemplary case study. Clark County is one of 16 counties in Nevada and consists of five major cities (Las Vegas, North Las Vegas, Boulder City, Henderson, and Mesquite) and a number of surrounding smaller jurisdictions. Currently, Clark County has the largest population in Nevada with more than 2 million people, and CCSD has 70% of Nevada's public school students. CCSD is similar to most urban districts with a traditional governance structure (a locally elected school board operating most public schools), low-performing schools, and a high concentration of low-income and minority students. In recent decades, there has also been a marked demographic shift characterized by the growth of English language learner (ELL) and Hispanic students. Whether defined by size or the presence of economic and educational inequality, CCSD meets the criteria of an "urban" school district. The geographically diverse nature of the district—the interesting mixture of central-city, suburban, and rural schools, coupled with the presence of attendance zones—makes CCSD a rich setting to explore the relationship between student mobility and school segregation.

This article examines the relationship between student mobility and school segregation across racial, achievement, and income groups within CCSD. This study employs the dissimilarity index and school-level indicators to provide a descriptive analysis of racial, income, and achievement school segregation. The analysis moves beyond the Black–White comparisons and includes several racial and income groups to reflect the multiethnic nature of an urban school district. The association between school-level mobility rates across the timing of school changes and school segregation is also analyzed. Following this, I use linear probability models to predict the likelihood of making a school change based on prior schools' segregation. This is one of the first studies to examine the relationship between intradistrict student mobility and school segregation. Specifically, I ask the following research questions:

Research Question 1: How does school segregation and schools' characteristics differ by schools' student mobility rates?
Research Question 2: To what extent does school segregation affect the likelihood of making a school change?

The focus of this study fits nicely with the sociological perspectives and the policy and reform areas of urban education (Milner & Lomotey, 2014). This article contributes to an expanding literature examining the relationship between student assignment and segregation. The findings provide a critical and empirical assessment of the challenges faced by urban school districts by examining the intersection of two prevalent and important phenomena. A better understanding of the relationship between student mobility and school segregation offers valuable insights about the educational equity. The results may also help shape effective strategies to improve urban schools. The rest of the article proceeds as follows. I first provide a brief overview of the literature on student mobility and school segregation. Following this, I describe the data and methodological approach employed in this study. Next, I present results and conclude with a discussion of policy implications and directions for future research.

The Causes and Consequences of Student Mobility and School Segregation

Student Mobility

Intradistrict student mobility is important for three main reasons.[2] First, the majority of student mobility occurs within the same school district as opposed to switching to schools in a different school district (Hanushek et al., 2004; Kerbow, 1996; Pribesh & Downey, 1999; Xu et al., 2009). Second, intradistrict mobility is generally limited to poor and minority students who tend to switch schools frequently within an urban school district (Alexander, Entwisle, & Dauber, 1996; Hanushek et al., 2004; Mao, Whitsett, & Mellor, 1997; Xu et al., 2009). Alexander et al. (1996) found that lower income students transferred within the school district more often while rich, White students were more likely to move across districts (Alexander et al., 1996). Hanushek et al. (2004) highlighted that African American and Hispanic students were at least twice as likely to switch schools within a district than White students and attributed some of the difference to the concentration of minority students in large urban districts (Hanushek et al., 2004). Third, intradistrict student mobility, especially for frequent movers, is typically not linked to improvements in school quality (Hanushek et al., 2004; Xu et al., 2009).

Although student mobility can be initiated by families or schools, the majority of school changes is initiated by families (Rumberger, 2015). Student mobility is driven by a confluence of social and economic factors, including residential mobility, family circumstances and income, economic opportunity, or the preferences for higher quality or better matched schools (Kerbow, 1996; Kerbow, Azcoitia, & Buell, 2003; Pribesh & Downey, 1999; Rumberger, 2003; Rumberger & Larson, 1998; Rumberger, Larson, Ream, & Palardy, 1999; Swanson & Schneider, 1999). Although students may change schools for many different reasons, the majority of student mobility overlaps with residential mobility (Institute of Medicine & National Research Council, 2010; Reynolds et al., 2009; Rumberger, 2003). Historically, this is largely due to the presence of attendance zones that link school assignment to a student's residence. In urban areas and densely populated cities, residential mobility is even more likely to result in student mobility (Temple & Reynolds, 1999). However, not all school changes are caused by residential mobility, and about 40% of student mobility is due to school-related factors (Kerbow, 1996; Rumberger et al., 1999). Typically, administrative data provide little information about the exact reasons why students change schools (Grigg, 2012; Hanushek et al., 2004; Institute of Medicine & National Research Council, 2010; Xu et al., 2009). A substantial proportion of intradistrict student mobility is generally associated with negative reasons such as job loss or family disruption ("reactive") rather than transferring to a higher quality or a better fit school ("strategic"; Alexander et al., 1996; Hanushek et al., 2004; Rumberger et al., 1999; Xu et al., 2009).

Nonstructural mobility may occur at different points throughout the course of a given school year. For instance, students may switch schools between school years (in the summer) or during the academic year. Student mobility during the school year may be more disruptive than moves between academic years (Alexander et al., 1996; Burkam, Lee, & Dwyer, 2009; Grigg, 2012; Hanushek et al., 2004; Schwartz et al., 2009). The timing of school changes may reflect the reasons for student mobility. It is presumed that strategic school changes are more likely to occur in the summer whereas reactive school changes are more likely to occur during the school year. In addition, some school policies such as student discipline policies may also induce school changes.

Student mobility has consequences at the student (for mobile and nonmobile students), school, and district level. Although changing schools is typically associated with lower test scores, increased grade retention, and higher rates of school dropout (Institute of Medicine & National Research Council, 2010; Mehana & Reynolds, 2004; Reynolds et al., 2009; U.S. Government Accountability Office, 2010), changes to higher quality schools may result in positive effects (de la Torre & Gwynne, 2009; Engberg, Gill, Zamarro, & Zimmer, 2012; Hanushek et al., 2004; Rumberger et al., 1999; Temple & Reynolds, 1999). Student mobility affects schools by influencing the school climate and creating burdens in the classrooms of both sending and receiving schools. For instance, teachers may be overwhelmed by the demands of providing attention to both movers and nonmovers, resulting in "reteaching," "backtracking," and reduction in the pace of instruction to accommodate mobile students (Kerbow, 1996; Lash & Kirkpatrick, 1990; Rumberger et al., 1999). Student mobility may maintain or expand stratification within a school district as students of different achievement levels and racial and income groups are increasingly unevenly distributed within a district and have less interactions with each other. Although the lack of a formal definition of segmentation makes it difficult for one to determine how differentiated an educational system has to be to label it as "segmented," evidence of differential mobility patterns imply changing schools may lead to unintended consequences over time, such as maintaining or expanding segmentation of student populations by students' backgrounds, achievement, or school quality (Kerbow, 1996; Welsh, Duque, & McEachin, 2016).

School Segregation

Although there are various conceptualizations and operationalizations, segregation refers to the physical separation of different racial, ethnic, income, and achievement groups (Massey & Denton, 1988; Reardon, Yun, & Kurlaender, 2006). Racial segregation across schools within an urban school district is significantly higher than racial segregation within schools (Conger, 2005). School segregation separates children and stratifies the type of school they attend, leaving minority children in inferior schools (Orfield & Yun, 1999). Orfield and Lee (2005) also found that Black or Hispanic students are more likely to attend urban and high-poverty schools compared with White and Asian students (Orfield & Lee, 2005). Although White students are the most racially isolated racial/ethnic group, segregation is rising for African American and Latino students (Frankenberg et al., 2003). Prior studies have highlighted the isolation of Black students in segregated schools (Berends & Penaloza, 2008; Vigdor & Ludwig, 2008).

The causes of school segregation can be broadly classified into two categories: structural and systemic inequities, and preferences. Structural reasons include economic conditions, residential segregation, and student assignment policies. Segregation is caused by institutional mechanisms such as lending discrimination, restrictive zoning, and mortgage redlining (Meyer, 2001). Differences in location preferences based on race or class lead to segregation in housing, schools, and churches (Saporito, 2003). Prior research has shown that school choice increases in racial school segregation in urban districts (Bifulco & Ladd, 2007; Sohoni & Saporito, 2009). Sohoni and Saporito (2009) found that public schools are more segregated than the neighborhoods in their attendance zones as White students attend private schools outside the area and exit integrated neighborhood public schools at a greater rate than non-White children (Sohoni & Saporito, 2009).

There is a growing body of research evaluating the effect of racial segregation on student and school performance (Bifulco & Ladd, 2007; Logan, Minca, & Adar, 2012). The Coleman report, published in 1966, highlighted the prevalence of school segregation in the United States and its adverse effects on the equality of educational opportunity and students' educational outcomes (Coleman, Campbell, & Hobson, 1966). Coleman and colleagues (1966) found a negative association between the concentration of poverty within a school and student performance, which has been confirmed by several studies in recent decades (Coleman et al., 1966). Numerous studies indicate that racial integration has direct and independent effects on student performance (Kahlenberg, 2001; Logan et al., 2012). Racial isolation of minorities in majority-minority school concentrations are associated with lower academic achievement and inferior educational opportunities (Coleman et al., 1966; Logan et al., 2012). There is evidence of the positive influence of desegregation on educational and labor market outcomes of minority as well as nonminority students (Johnson, 2011; Kurlaender & Yun, 2001; Wells & Crain, 1994). Johnson (2011) found desegregation's impact on racial equality to be deep, wide, and long-lasting (Johnson, 2011). Black Americans who attended schools integrated by court order were more likely to graduate, go on to college, and earn a degree than Black Americans who attended segregated schools (Johnson, 2011). Desegregation also had a positive impact on labor market and other lifestyle outcomes (Johnson, 2011). Overall, the majority of studies have found that desegregation is helpful for students of all races, especially disadvantaged subgroups.

Educational Inequality, Sorting, and the Distribution of Students Within a School District

Figure 1 provides a conceptual framework of the relationship between educational inequality, student mobility, and school segregation. Both student mobility and segregation are largely influenced by out-of-school factors and represent the intersection of society and schooling. Economic opportunity and the intersection of race and poverty may play a pivotal role in explaining student mobility and segregation. Similarly, residential segregation plays an important role in both phenomena. The majority of school changes are accompanied by changes in residences (Reynolds et al., 2009). Income residential segregation has increased in the past decades (Reardon & Bischoff, 2011); thus, it is plausible that schools have become more segregated by income over time. Segregation and student mobility are widely regarded as critical issues in education policy as both phenomena partly explain the racial achievement gap (Bifulco & Ladd, 2007; Card & Rothstein, 2007; Condron et al., 2013; Hanushek et al., 2004; Hanushek & Rivkin, 2009; Rumberger & Palardy, 2005). The achievement gap between Black and White students is an important component of Black/White economic inequality (Condron et al.,

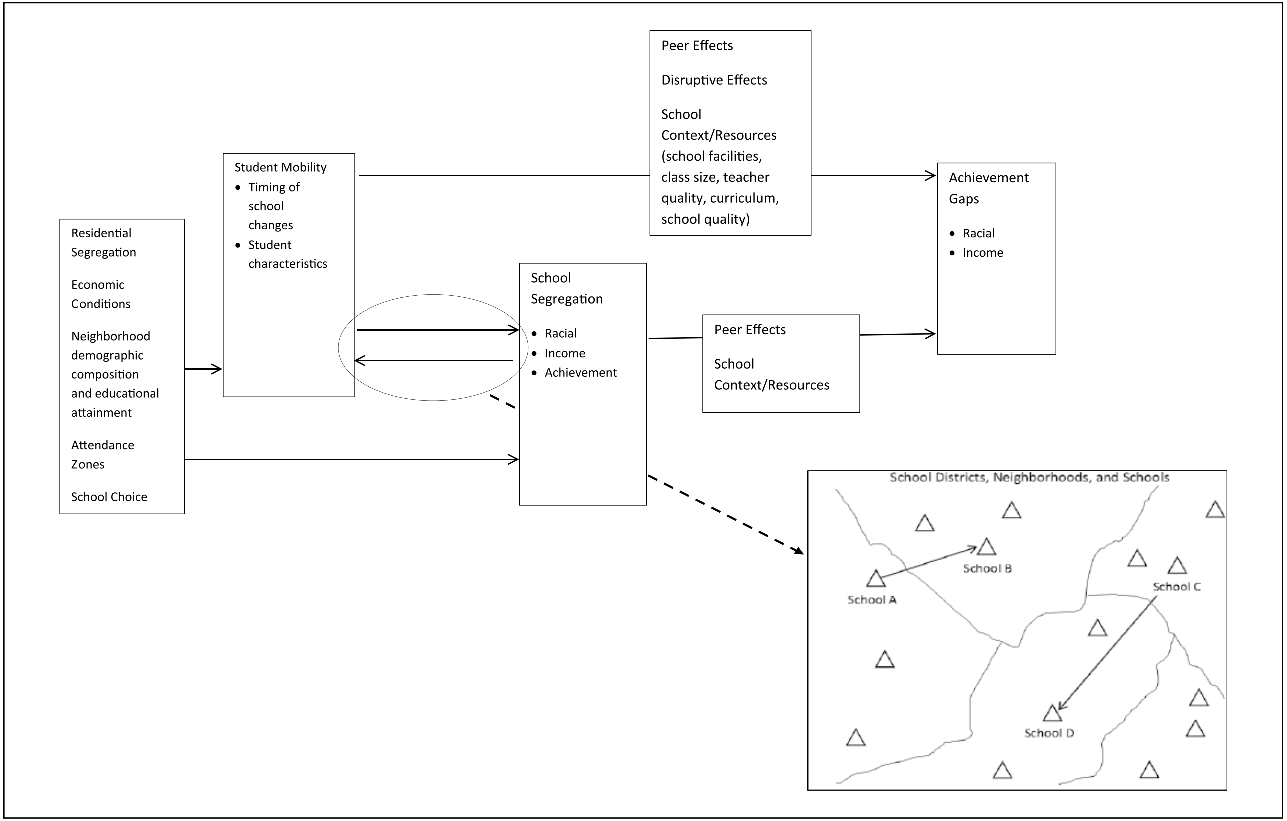

Figure 1. Educational inequality, student mobility, and school segregation.

2013; Jencks & Phillips, 2011). There are several possible ways that desegregation and student mobility impact students, schools, and districts. Presumably, the central impact of desegregation comes from the peers of students' or the peer effect. Simply put, it is advantageous to attend a school where students are more successful (Hanushek, Kain, Markman, & Rivkin, 2003). However, Owens (2010) found that the educational attainment of students from poorer neighborhoods is adversely affected when they attend schools with more White and high socioeconomic status (SES) counterparts (Owens, 2010). Peer effects are not the only consideration as school context and characteristics may also be crucial factors. Segregated schools typically are unequally resourced; thus, attending such schools may adversely affect achievement, especially for low-income and minority students (Condron et al., 2013). Johnson (2011) posited improvement in access to school resources as one of the mechanisms through which desegregation benefits students (Johnson, 2011). Similarly, the impact of changing schools on student achievement is dependent on school quality.

Differential mobility patterns imply that the sorting of students between schools may maintain or expand the uneven distribution of students in an urban school district. Notwithstanding, school segregation may be a motivating factor for student mobility. For instance, as Figure 1 demonstrates, changing from School C to D may maintain, decrease, or increase segregation in a school district; however, a student may change from School A to School B because of school segregation. Prior research suggests that the demographic composition of schools and intragroup solidarity play an important role in families' decision to switch (Hastings, Kane, & Staiger, 2006). Low-achieving, low-income, and minority students may be more likely to exit segregated schools, experience disruptive effects on achievement, and attend similarly segregated and/or lower quality schools. Segregated schools with high turnover may also face a range of school organization issues such as teacher expectations, safety, and offering rigorous courses that adversely affect student achievement (Rumberger & Palardy, 2005).

Little attention has been paid to the relationship between student mobility and school segregation. The majority of the extant literature on student mobility has examined changing schools from the students' perspective and focused primarily on how student mobility affects student achievement (Institute of Medicine & National Research Council, 2010; Reynolds et al., 2009; Welsh, 2017). Few studies consider student mobility from the perspective of schools and districts (Nelson, Simoni, & Adelman, 1996; Rumberger et al., 1999) even though schools and districts grapple with student turnover. The vast majority of studies on segregation has focused on the Black–White dichotomy even though Asian and Hispanic students account for an increasing part in the racial composition of the U.S. student population (Frankenberg et al., 2003; Logan et al., 2012; Orfield & Lee, 2007). The majority of the extant literature also tends to focus on segregation in school choice contexts or states with districts with court-ordered desegregation plans (Bifulco & Ladd, 2007; Condron et al., 2013; Johnson, 2011). Although researchers also conceptualize and measure segregation in a myriad of ways, the most oft-used indicator is a measure of the proportion of minority students in a school, which may not accurately capture segregation between groups within a district (Condron et al., 2013). The relationship between segregation and achievement gaps is also understudied (Condron et al., 2013).

This study provides a descriptive analysis of the complex relationship between segregation and student mobility and its relation to educational disparities. This article builds on the extant literature in a few ways. First, the context of this study is a "traditional" school district with attendance zones and limited open enrollment options rather than a choice-based district or a district undergoing mandated desegregation efforts; thus, the findings offer insights on how student mobility as opposed to purposeful desegregation efforts interact with school segregation within urban school districts. Second, this article analyzes separate but interrelated dimensions of school segregation. The conceptualization and operationalization of school segregation have been broadened from Black/White racial comparison to include other racial/ethnic combinations, income, and achievement student subgroups as well as the intersection of race, income, and achievement that characterizes the contemporary urban school district. Third, no prior study has examined whether racial, income, and achievement school segregation predicts student mobility across the timing of school changes. Local, state, and federal policies aiming to reduce achievement gaps can benefit from a better understanding of the nuanced relationship between school segregation, student mobility, and educational inequality in urban school districts. In the next section, I describe the data and methodological approach employed in this study.

Data and Method

Data

I use a 6-year panel of student-level data for all students in the CCSD from 2007 to 2008 through to 2012 to 2013. The data contain students' demographic characteristics and annual test scores from the Nevada Proficiency Examination Program. Demographic data include indicators for students' gender, race/ethnicity (Black, Hispanic, Asian, White), free and reduced priced lunch (FRPL), ELL, and special education statuses. Students are tested in reading and math in Grades 3 to 8 and take the High School Proficiency Exam (HSPE) in Grade 10. I standardize test scores for students in Grades 3 through 10 by grade and year, relative to the school mean, as well as relative to the district mean. Detailed longitudinal data that track the dates and sequence of school changes allow for in-depth classification of the timing of student mobility across a range of grades (K-12). Unique student and school identifiers in the data link students to schools in each year and across multiple school years. I assume that all school changes between school years in Grades 6 and 9 are transitions from elementary to middle and middle to high schools, respectively, with the exception of students enrolled in combination schools, of which there are relatively few. I complement the student-level data with publicly available school-level accountability data. I use a sample of students that have been continuously enrolled in a CCSD school for at least 2 consecutive academic years (in other words, students need at least two observations to be included and students with only one observation were dropped from the sample). This sample includes 1,826,170 student-years with 428,247 unique students.[3]

Method

Categorizing student mobility. I categorize nonstructural movers by the timing of school changes: between-year switcher or a student who made a nonstructural move between school years, within-year switcher or a student who switched schools at least once during the school year, and "ultra-mover" or a student who changed schools both between and during the school year in the same academic year. To examine student mobility at the school level and better understand the variation in nonstructural mobility across the timing of school changes in CCSD, I focus on the percent of students leaving each school or the average school turnover across the timing of nonstructural school changes. Entry mobility rates (students entering schools) are almost identical to exit rates across the timing of school changes; thus, exit rates can be interpreted as the overall churn in schools. Discipline-related mobility is classified as all school changes to and from behavior or continuation schools or juvenile detention centers based on data reported by the schools. I also categorize schools' characteristics into quintiles.

Measuring segregation. I use the dissimilarity index to evaluate segregation between schools in CCSD over time. The dissimilarity index captures unevenness or the distribution of racial groups (Massey & Denton, 1988). The dissimilarity index measures what percentage of the racial group's population would need to change schools for the racial groups to be evenly distributed within the school district. Generally, a dissimilarity index below .3 is low segregation, between .3 and .6 is moderate segregation, and above .6 is high segregation (Massey & Denton, 1988). I calculate the dissimilarity index for multiple combinations of four racial categories (Black, White, Asian, and Hispanic), one income category (FRPL students), and two achievement categories (whether the student was below math in the district or proficient in math) using the following formula:

$$\mathrm{DI}_{dt} = \tfrac{1}{2} \sum \left| \left(a_{st} / A_{dt} \right) - \left(b_{st} / B_{dt} \right) \right|. \tag{1}$$

where DI_{dt} is the dissimilarity index of district d at time t, a_{st} is the number of "a" students in school s at time t, and A_{dt} is the number of "a" students in all schools in district d at time t. Then b_{st} is the number of "b" students in school s at time t, and B_{dt} is the number of "b" students in all schools in district d at time t. First, I calculate indices for the entire district that include mixing schools of different levels into one analysis. Next, similar to prior research (Sohoni & Saporito, 2009), I disaggregate schools by level and calculate the index separately for elementary, middle, and high schools, which allows for comparison of racial, income, and achievement segregation across multiple school levels.

I also create several school-level racial, income, and achievement segregation indicators. I focus on intensely segregated, extreme-poverty and intensely low-achieving schools to illustrate how the relationship between student mobility and school segregation offers useful insights about educational inequality in urban districts. The indicators include the following: (a) predominantly minority (Black and Hispanic students)—greater than 50% of students in a school are non-White, (b) intensely segregated minority schools—more than 80% of student body are minority, (c) multiracial schools—schools with at least 10% of students from four racial groups (Black, White, Hispanic, and Asian), (d) high-poverty schools—greater than 50% of students in a school are FRPL recipients, (e) extreme-poverty schools—more than 80% of student body are FRPL recipients, (f) predominantly low achieving—greater than 50% of students in school are achieving below district average, (g) intensely low achieving—more than 80% of student body are achieving below the district average, and (h) intensely segregated, high poverty—greater than 80% minority and FRPL recipients.

Achievement gaps. Consistent with prior research (Condron et al., 2013), at the school-year level, I compute achievement gaps in both math and reading across various racial and income combinations. For example, to compute the White–Black achievement gap, I subtract the standardized mean math achievement of Black students from that of White students (mean of White students − mean of Black students / standard deviation of subject test scores in a school). School-level achievement gaps are then aggregated to the district level. The achievement gaps measure the extent to which Black students' test scores lag behind White students relative to the standard deviation of the distribution.

Predicting student mobility using school segregation. To examine the relationship between exiting patterns and school segregation, I use the following linear probability model:

$$Y_{ist} = \beta_0 + \beta_1 \mathbf{T}_{ist} + \beta_2 \mathbf{Z}_{\mathrm{st}} + \beta_3 \mathbf{N}_{st} + \pi_t + \gamma_g + e_{it}. \quad (2)$$

where Y_{ist} is a dichotomous outcome variable that is equal to 1 if student i in school s at time t made a nonstructural school change. I estimate the probability of changing schools separately for the aforementioned three categories of mobile students. $\mathbf{T}_{ist}$ is a vector of student-level characteristics including lagged student achievement (relative to the district), gender, racial/ethnic categories (White is the reference group), FRPL, ELL, and special education statuses. $\mathbf{Z}_{st}$ is a vector of school-level characteristics including school quality (measured by the percentage of students in a school scoring proficient or above on state accountability tests) and the percentage of Black, Hispanic, Asian, FRPL, ELL, Special Education, and male students in the school. $\mathbf{N}_{st}$ is a vector of the aforementioned school-level segregation indicators. β_3 is the coefficient of interest that illustrates whether students in more segregated schools are more likely to switch schools relative to students in less segregated schools across the timing of school changes. In all models, I utilize grade (γ_g) and year (π_t) fixed effects to control for unobservable differences across time and between grades and use robust standard errors clustered at the school level.

Results

CCSD is a large, diverse school district with average annual enrollment of more than 300,000 students. On average, roughly 42% of students are Hispanic, 32% are White, 13% are African American, 8% are Asian, 11% are special education students, 17% are ELL, and 50% are FRPL students. Over the period of study, CCSD experienced an increase in low-income (47% to 56%), Hispanic (41% to 44%), and special education status (10% to 12%) students. Conversely, the proportion of African American (14% to 12%), White (35% to 29%), Asian (9% to 7%), and ELL (20% to 16%) declined.

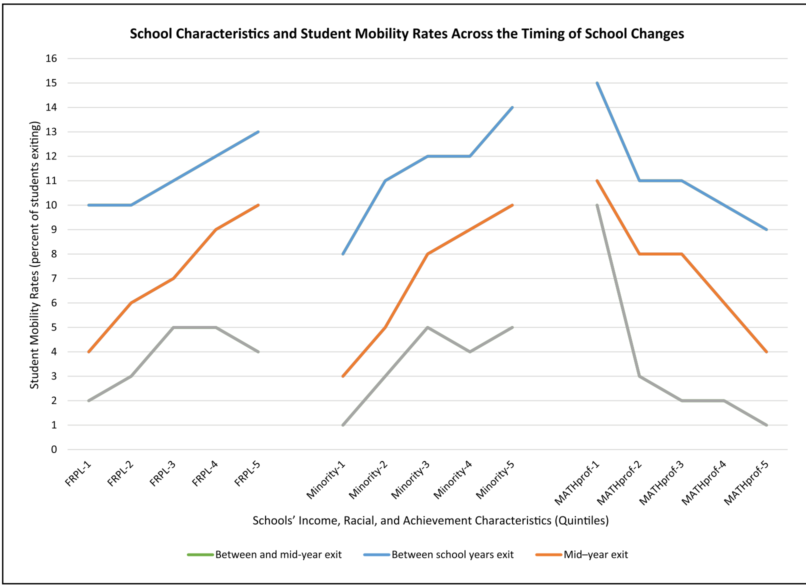

Figure 2. School characteristics by mobility rates across the timing of school changes.
Note. FRPL = free and reduced priced lunch.

About 16% of students changed schools annually: 7% switched schools between school years, 6% changed schools during the school year, and 3% changed schools both in the summer and midyear in the same academic year. Black, Hispanic, low-income, special education status, and ELL students had higher mobility rates, especially for midyear school changes, whereas White and Asian students had lower mobility rates. For instance, 26% of Black students changed schools, with 11% being midyear movers and 5% being ultra-movers, compared with 12% for White students, with only 4% being midyear movers and 2% being ultra-movers. Mobile students also had math achievement about a quarter of a standard deviation below their schools' average and a third of a standard deviation below the district average.

Student Mobility and Segregation From the Schools' Perspective

Figure 2 illustrates that there is a strong relationship between schools' demographic and achievement characteristics and student mobility rates across the timing of school changes. This association is particularly apparent when one considers within-year student mobility (midyear and ultra-movers). As the

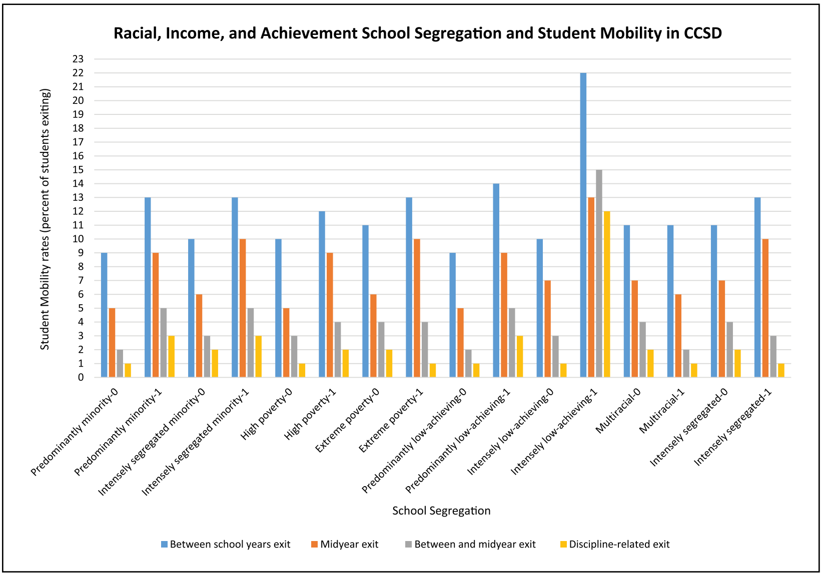

Figure 3. School segregation and student mobility rates.
Note. CCSD = Clark County School District; FRPL = free and reduced priced lunch.

proportion of low-income and minority students in schools increases, within-year mobility rates also increase. For instance, schools in the bottom quintile of proportion of low-income students (0%-27% of FRPL students) had an average midyear exit rate of 4% compared with 10% for schools in the top quintile (greater than 79% of FRPL students). Schools in the bottom quintile of proportion of minority students (between 4% and 31% of Black and Hispanic students) had an average midyear exit rate of 3% relative to 10% for schools in the top quintile (greater than 82% of Black and Hispanic students). Conversely, there is a negative relationship between nonstructural exit rates and school quality: Schools with higher mobility rates typically have a lower proportion of math proficient students. Schools in the bottom quintile of proportion of math proficient students (less than 46% of proficient students) had a midyear exit rate of 11% and an ultra-mover exit rate of 10% compared with 4% and 1%, respectively, for schools in the top quintile (greater than 75% of proficient students).

Figure 3 shows that there is also an apparent relationship between nonstructural mobility rates and school segregation. The results suggest that more segregated schools typically have a higher nonstructural mobility rate (midyear and ultra-moves are especially prevalent in highly segregated schools).

For instance, intensely segregated minority schools had a midyear exit rate of 10% and an ultra-mover rate of 5% compared with 6% and 3% for schools that were not intensely segregated minority. Extreme-poverty schools had a midyear exit rate of 10% relative to 6% for schools that were not classified as extreme poverty. Intensely segregated, low-achievement schools had a midyear rate of 13% and a ultra-mover rate of 15% compared with 7% and 3%, respectively, for schools that were not categorized as intensely segregated, low-achieving schools. In addition, more segregated schools typically have a lower proportion of proficient students than less segregated schools.

School discipline partly explains the relatively high within-year mobility rates of low-achieving, high-minority, and poverty schools. School discipline is an important yet overlooked example of school policies and practices that may induce student mobility. Although the average discipline-related exit rate in CCSD was roughly 2%, the lowest achieving schools and schools with a high proportion of Black and male students had high discipline-related exit rates. For instance, the discipline-related exit rate for schools in the top quintile for proportion of Black students (19%-92% of Black students) was 6% or 3 times the district average. Lower quality schools typically have higher discipline-related mobility rates. Schools in the bottom quintile of proportion of proficient students had a discipline exit rate of 8% or 4 times the district average. In addition, alternative schools including behavior and continuation schools as well as schools in the Clark County Juvenile Justice System had some of the highest nonstructural mobility rates that were largely driven by within-year mobility (midyear and ultra-movers). There is also a strong correlation between ultra-mover exit rate and discipline-related exit rate (0.9) that suggests that the majority of ultra-moves are school-initiated midyear mobility. The striking relationship between the lowest achieving schools in the district and school discipline may be attributed to various reasons. It is plausible that the lowest achieving schools also serve the student population that provides the greatest behavioral management challenges in urban school districts. Another reason may be that these schools are responding to accountability pressure by placing certain students in alternative schools. Schools classified as “in need of improvement” had the highest within-year exit rate (midyear and ultra-movers), and schools classified as “high-achieving and above” had the lowest within-year exit rate.

The relationship between student mobility, schools’ characteristics, and school segregation may also be explained by the level of schooling. In elementary and high schools, the between-year rate was higher than the within-year exit rate (especially for high schools where the between-year rate was more than twice that of the within-year rate). The within-year exit rate in middle schools was slightly higher than midyear exit rates in high schools.

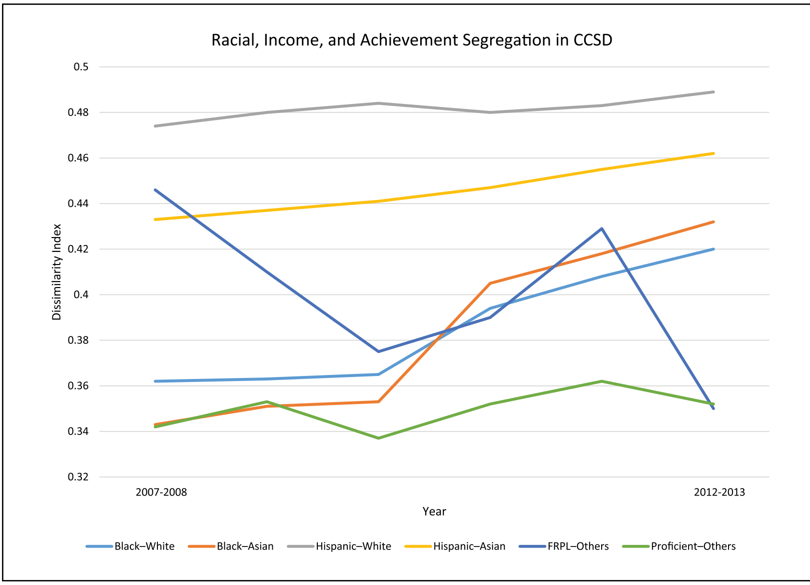

Figure 4. School segregation in CCSD, K-12, dissimilarity index.
Note. CCSD = Clark County School District; FRPL = free and reduced priced lunch.

Interestingly, in middle schools, the within-year (midyear and ultra-movers combined) exit rates were higher than the between-year exit rates. This suggests that midyear moves are especially relevant in middle schools. Furthermore, the discipline-related mobility rate in middle schools is slightly higher than that of high schools. The results also draw attention to school discipline in middle schools.[4]

Segregation, Student Mobility, and Achievement Gaps

Figure 4 shows segregation among schools in CCSD from 2007 to 2008 through to 2012 to 2013 using the dissimilarity index. The results indicate that although overall racial segregation in CCSD was moderate, unevenness in the distribution of students by race/ethnicity in the district increased over the period of study.[5] The results indicate that Hispanic students were the most highly unevenly distributed racial group. Unlike racial segregation, income segregation decreased over the period of study. The distribution of proficient students between schools grew slightly more uneven over time, whereas the distribution of below average students did not increase over the period of study. The results suggest that the segregation of high-achieving students is increasing in CCSD.

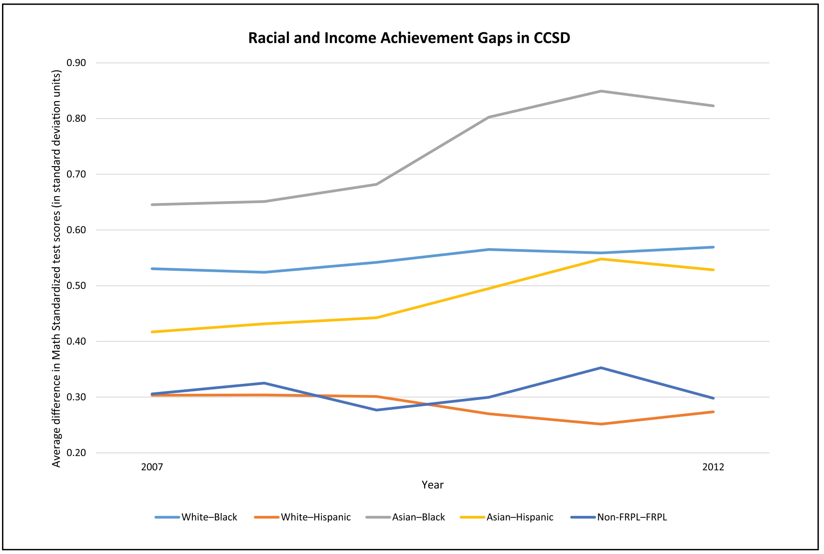

Figure 5. Racial and income achievement gaps in CCSD.
Note. CCSD = Clark County School District; FRPL = free and reduced priced lunch.

Overall, the results imply that there is increasing stratification within the district as racial and achievement segregation rose over time.[6]

Figure 5 presents district-level achievement gaps over the period of study. The results indicate sizable achievement gaps between racial groups that increased over time. For instance, the achievement gap between White and Black students increased from 0.53 *SD* in 2007 and 2008 to 0.57 *SD* in 2012 and 2013. The achievement gap between White and Hispanic students decreased over the period of study and was smaller than the White–Black achievement gap. The Asian–Black achievement gap increased over time and was the largest in CCSD, with Asian students performing about four fifths of a standard deviation above Black students. The Asian–White (on average 0.19 *SD*) and the Hispanic–Black (on average 0.27 *SD*) were the smallest gaps in test scores in CCSD. Non-FRPL recipients outperformed FRPL students by about a third of a standard deviation. However, the income achievement gap remained fairly constant over time. In addition, the results also indicate that racial and income achievement gaps are lower in more segregated schools. Overall, the White–Black, White–Hispanic, Asian–Hispanic, and the non-FRPL–FRPL within-school achievement gaps were lower, whereas the Asian–White, Asian–Black, Hispanic–Black gap was higher in intensely segregated minority and high-poverty schools. The results imply that the achievement gap is smaller in more segregated schools because of the presence of similar low-achieving students regardless of race/ethnicity, whereas larger achievement gaps in less segregated schools suggest minority students in these schools tend to be low-achieving, and nonminority students are higher achieving, resulting in considerable achievement gaps. From the district's perspective, this is not a beneficial trend given that prior research demonstrates that high-achieving peers improve the student achievement of all students in a school.[7]

I also examine the segregation levels of origin and destination schools across the timing of school changes. The results indicate that regardless of the timing of school changes, high levels of racial, income, and achievement school segregation may spur students to change schools. For example, 45% of between-year movers and 43% of midyear movers in intensely segregated minority schools switch to schools that were not classified as intensely segregated schools. The trends are similar for mobile students in extreme-poverty and intensely segregated achievement schools. There are interesting differences in exit and destination patterns by the degree of segregation in schools. Regardless of the timing of school changes, the majority of students in predominantly minority or low-achieving and high-poverty schools tended to transfer to similar segregated schools. For instance, 75% of between-year movers and 80% of midyear movers in predominantly minority schools transferred to another predominantly minority schools. However, a nontrivial proportion of students in schools that are not categorized as predominantly minority or low achieving or high poverty switched to more segregated schools at a greater extent than students in predominantly minority, high poverty, or low achieving switched to lesser segregated schools. For example, 25% of between-year movers and 37% of midyear movers in schools that were not predominantly minority school switched to predominantly minority schools, whereas 21% of between-year movers and 19% of midyear movers left predominantly minority schools for schools that were not classified as predominantly minority. Similarly, roughly half to two thirds of movers in multiracial schools transferred to schools that were not classified as multiracial across the timing of school changes. The findings imply that student mobility patterns in relatively less segregated schools may increase overall segregation in the district, whereas exiting from the most segregated schools may decrease overall segregation. In the next section, I present the empirical results on whether school segregation predicts the probability of student mobility.

Does School Segregation Predict the Likelihood of Student Mobility?

Table 1 presents the likelihood of switching schools across the timing of school changes based on student, schools' demographic, and achievement

Table 1. Estimating the Likelihood of Student Mobility (N = 774,211).

	Between	Midyear	Ultra-movers
Prior Achievement	−0.009*** (0.000)	−0.014*** (0.000)	−0.014*** (0.000)
Black	0.021*** (0.001)	0.025*** (0.001)	0.027*** (0.001)
Hispanic	−0.004*** (0.001)	−0.001 (0.001)	−0.006*** (0.001)
Asian	−0.001 (0.002)	−0.003** (0.001)	−0.005*** (0.001)
Male	−0.001 (0.001)	0.008*** (0.001)	0.007*** (0.000)
Special Education	−0.007*** (0.001)	−0.006*** (0.001)	−0.003** (0.001)
ELL	−0.010*** (0.001)	−0.001 (0.001)	−0.007*** (0.001)
FRPL	0.013*** (0.001)	0.016*** (0.001)	0.017*** (0.001)
School Quality	−0.028 (0.024)	−0.025** (0.008)	−0.008 (0.011)
Black_sch	0.084* (0.041)	−0.007 (0.021)	−0.022 (0.021)
Hispanic_sch	0.038 (0.037)	−0.030 (0.019)	−0.065** (0.020)
White_sch	−0.010 (0.036)	−0.026 (0.018)	−0.050* (0.019)
Asian_sch	0.086 (0.055)	0.012 (0.021)	−0.042 (0.025)
Male_sch	0.145 (0.080)	0.104*** (0.022)	0.203** (0.069)
SpecEd_sch	−0.110* (0.047)	0.008 (0.014)	−0.067 (0.043)
ELL_sch	−0.045** (0.016)	0.016 (0.009)	0.019 (0.011)
FRPL_sch	−0.000 (0.018)	0.012 (0.008)	0.024* (0.009)
Predominantly Minority	−0.006 (0.005)	−0.001 (0.002)	0.003 (0.003)
Intensely Segregated Minority	0.005 (0.005)	0.000 (0.002)	0.004 (0.002)
High Poverty	−0.002 (0.005)	0.002 (0.002)	−0.002 (0.002)
Extreme Poverty	0.004 (0.004)	0.003 (0.002)	0.004 (0.003)
Predominantly Low Achieving	0.008* (0.004)	−0.002 (0.002)	−0.001 (0.002)
Intensely Segregated Low Achieving	0.096* (0.037)	0.026 (0.014)	0.135*** (0.033)
Multiracial	−0.001 (0.003)	0.001 (0.001)	−0.000 (0.001)
Intensely Segregated, Extreme Poverty	−0.007 (0.006)	0.000 (0.002)	−0.003 (0.003)
Constant	0.922*** (0.063)	−0.040 (0.023)	−0.058 (0.044)

Note. ELL = English language learner; FRPL = free and reduced priced lunch.
*p < .05. **p < .01. ***p < .001.

characteristics and school segregation. The results indicate that high levels of achievement segregation are a strong predictor of student mobility across the timing of school changes. Students in intensely segregated achieving schools were roughly 10 percentage points more likely to switch schools between school years than students in schools that were not intensely segregated achieving schools. Students in predominantly low-achieving schools were less than 1 percentage point more likely to change schools in the summers than students in schools that were not predominantly low achieving. The results for racial and income segregation, irrespective of the degree of segregation, were insignificant for between-year school changes.

Achievement segregation is not as strong a predictor of midyear school changes. Students in intensely segregated, low-achieving schools were 3 percentage points more likely to switch schools during the year than students in schools that were not intensely segregated achieving schools (*p* value of .06). However, the results for ultra-movers were similar to those of between-year movers. Students in intensely segregated achieving schools were about 14 percentage points more likely to make ultra-moves. The results of racial and income segregation were also insignificant for both midyear and ultra-movers.

I conduct a few specification checks to examine the sensitivity of the results. First, I estimate Equation 2 separately for all segregation indicators. The results are qualitatively similar except in two instances. There is weak suggestive evidence that income segregation predicts midyear mobility and racial segregation predicts ultra-moves. Students in extreme-poverty schools were less than 1% more likely to switch schools during the year (*p* value of .08), and students in intensely segregated minority schools were less than 1% more likely to make ultra-moves (*p* value of .08). Next, I rerun the models excluding open enrollment options (charter and magnet schools). The results remain qualitatively similar when charter schools are excluded. Following this, I rerun the models excluding discipline-related mobility. For between-year school changes, high levels of achievement segregation were no longer a significant predictor; however, students in predominantly low achieving were more likely to exit. For midyear school changes, achievement segregation was a significant predictor but the directions of the coefficient reversed. Students in predominantly low-achieving and intensely segregated schools were less likely to exit schools during the school year when discipline-related mobility was excluded. This suggests that the role of achievement segregation as a predictor of midyear school changes is largely driven by discipline-related mobility. For ultra-movers, the results remain qualitatively similar when discipline-related mobility was excluded. These findings imply that students who switch schools based on achievement segregation, who are not subjected to school-initiated discipline mobility, are between-year or ultra-movers. In separate models, interactions of student characteristics and segregation indicators suggest that higher achieving students are more likely to exit achievement segregated schools and White students are more likely to exit racially and income segregated schools across the timing of school changes.

Finally, I also estimated Equation 2 separately by the levels of schooling. The results vary the levels of schooling and the timing of school changes. In elementary schools, for between-year movers, achievement segregation is no longer a significant predictor, and there is suggestive evidence that students in extreme-poverty schools are more likely to switch schools in the summer. For midyear movers, achievement segregation is not a significant predictor, and there is evidence to suggest that students in intensely segregated minority schools are more likely to switch schools. For ultra-movers, the results indicate that students in intensely segregated, minority and extreme-poverty schools were more likely to be ultra-movers, but students in intensely segregated, extreme-poverty schools were less likely to be ultra-movers. The findings imply that for elementary school students, racial and income segregation predict changing schools at different times. These students appear to change schools between school years due to income segregation and switch schools midyear due to racial segregation. Ultra-movers change schools for both racial and income segregation but not due to "double segregation" as they are less likely to exit schools with both high levels of racial and income segregation. For middle school students, high levels of achievement segregation remained a significant predictor but only for between-year and ultra-movers. Between-year movers in middle schools were also less likely to exit multiracial schools. For midyear movers in middle schools, there is evidence that students in high- and extreme-poverty schools are more likely to exit, whereas students in predominantly low-achieving schools were less likely to exit. The findings also suggest that ultra-movers in middle schools are less likely to exit high-poverty schools. These results suggest that between-year and ultra-movers in middle schools are exiting schools with high levels of achievement segregation, whereas midyear movers appear to be driven by income segregation. The findings also imply that for ultra-movers in middle schools, the role of achievement segregation in exit patterns is partly related to school discipline. For high schools, the results are qualitatively similar across the timing of school changes.

Concluding Discussion

This study offers new insights into the relationship between school segregation and student mobility in urban school districts. The results indicate that racial, ethnic, and achievement segregation persists in CCSD, whereas income segregation is declining. This article adds to a growing number of studies that have found that segregation is a pervasive and concerning phenomenon (Rumberger & Palardy, 2005). The results highlight an important mechanism linking student mobility to school segregation and achievement gaps, namely, the demographic and achievement characteristics of schools.

More segregated schools typically have smaller within-school achievement gaps, a lower proportion of proficient students, a higher proportion of minority students, and higher nonstructural mobility rates (especially within-year mobility) than less segregated schools. The findings are similar to prior research that found that as Black–White dissimilarity increased, racial achievement gaps also increased (Condron et al., 2013).

Rising racial and achievement school segregation raises serious concerns about educational equity and the equality of educational opportunity in urban school districts. Historically, the segregation of African American children has been the main focus for educators and policymakers. The results of this article highlight that in 21st-century urban school districts, uneven distribution is multiracial, and desegregation is no longer only a Black–White issue. The findings imply that the segregation of Hispanic students, the fastest growing demographic group, is a pertinent concern. The importance of achievement segregation is particularly noteworthy, and this form of segregation is just as or even more important than racial and income segregation. The patterns in student mobility and segregation suggest the evolution of a tiered system of schooling, as low-achieving students are concentrated in the same schools and vice versa for high-achieving students.

The results indicate that high levels of achievement segregation are a significant predictor of student mobility. The findings imply that some parents are actively seeking less achievement segregated schools, especially those switching schools in the summer. School discipline is a significant reason why high levels of achievement segregation predict within-year mobility (midyear and ultra-movers). Overall, the results raise equity concerns as there seem to be centers of educational inequality in urban districts, or highly segregated, low-quality schools with a high proportion of minority and low-income students and considerable rates of discipline-related student mobility.

This study has a few limitations. First, the data do not capture student mobility from public to private schools and vice versa. This may affect the relationship between student mobility and school segregation. Nevertheless, a relatively small proportion of students in CCSD attend private schools—about 11% (Sohoni & Saporito, 2009). Second, although CCSD is a large, countywide, and highly diverse district, it is important to note that CCSD does not resemble a stereotypical "inner-city" school district; thus, there are some limitations of generalizing the findings.

Policy Implications

A few policy implications emerge from this study. First, the findings support the call for renewed investment in desegregation. However, in the wake of the 2007 Supreme Court decisions on desegregation that deemed the majority of voluntary desegregation programs by school districts unconstitutional, there is a need to consider feasible options within the law to attain integrated schools (Orfield & Lee, 2007). Given the unconstitutionality of assignment policies based on race, student mobility is a possible policy lever to affect desegregation that warrants further consideration. Districts may explore the use of students' income and prior achievement as opposed to race to attain balanced schools in addition to providing information and incentives for low-income, low-achieving, and minority students to switch to more integrated schools. Considering SES and academic background as the key factors in student assignment policies may promote school integration and reduce school segregation (Potter, Quick, & Davies, 2016). Districts may also explore incorporating stratification limits into transfer policies that prohibit school changes that will add to achievement segregation.

Second, policymakers should pay greater attention to reforming schools with an eye to segregated schools with high-mobility rates and provide additional support to these schools. As states revise funding formulas, increased funding to highly segregated schools with substantial student churn should be a priority and key component of focusing education policy to address educational inequality in urban districts. It would be prudent to focus on factors such as class size and teacher quality in these high-mobility schools that may contribute to achievement gaps in urban school districts. Greater curricular and pedagogical focus for schools with high rates of during-the-year student mobility may help improve student achievement in urban school districts. Policymakers should find ways to ensure greater instructional continuity and mitigate the adverse effects of turnover on students and schools. This may entail resources for personalized instruction for mobile students especially those in middle schools where midyear school changes are relatively prevalent. Districts may also create a student mobility office that bridges the communication gap between sending and receiving schools to better coordinate curriculum and pedagogy. Receiving schools would then have detailed information on mobile students to tailor curriculum and teaching techniques.

Third, policymakers may also consider targeting different types of segregation at different levels of schooling using varying initiatives. Student mobility and racial and income segregation is typically higher in elementary schools, whereas achievement segregation is higher in high schools. Programs fostering and incentivizing racial and income desegregation may pay the biggest dividends at the elementary level where younger students are affected. Desegregation initiatives at the high school level such as adjusting attendance zones may target the clustering of low-achieving students of all races. Combination schools present a special challenge as they are afflicted with racial, income, and achievement segregation and tend to serve an at-risk student subgroup. The findings suggest policymakers should closely rethink the operation of alternative schools and how learning and student remediation takes place in these highly segregated and mobile environments.

Directions for Future Research

The findings also provide some directions for future research. First, a better understanding of families' preferences that may influence the relationship between student mobility and school segregation and how this may vary with the timing of school changes is needed. A complementary qualitative study may provide better insights on how segregation levels of origin schools affect mobility decisions and a sense of how the segregation level of destination schools may affect the impact of student mobility on student achievement. Similar to switching to schools of higher quality, transfers to less segregated schools may result in net positive effects of changing schools, and thus segregation may be a key determinant of the overall impact of student mobility.

Second, studies with classroom-level data that allow for estimation of within-school segregation may provide a stronger link between segregation, student mobility, and achievement gaps at the school level. These investigations will further illuminate how segregation and student mobility affect educational inequality at a granular level. Finally, differences in neighborhoods in urban school districts may play an important role in explaining the relationship between student mobility and school segregation. Future studies should incorporate the location of schools and neighborhood characteristics to gain a better understanding of patterns in student mobility and school segregation. A better understanding of the interaction of school and neighborhood contexts has important policy implications such as whether student mobility is more appropriately addressed by the coordination of education, housing, and economic policy.

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Notes

1. There is an "identity crisis in urban education" evidenced by the challenges in conceptualizing and defining "urban" education (Milner & Lomotey, 2014).

Although the conceptualization of urban education is multifaceted, urban districts can be generally defined by size or the prevailing social and economic conditions. For instance, urban school districts may be defined as being located in cities with a population greater than 250,000 and student enrollments of more than 35,000 (Council of the Great City Schools, 2013). The implicit implications of this definition is that urban school districts are the melting pot of cultures and communities—densely populated epicenters of commerce that attract a diverse set of people of varying ethnic, racial, linguistic, and geographic origins. Darling-Hammond (2014) posited that urban school districts can also be defined by the concentration of inequality and evolving economic conditions characterized by poverty, segregation, and underresourced schools (Milner & Lomotey, 2014).

2. In this article, I am primarily interested in *nonstructural* mobility that occurs when students change schools of their own volition (e.g., switching elementary schools) rather than *structural* moves that occur after the completion of a terminal grade (e.g., elementary to middle school transitions). Nonstructural movers are the student subgroup that mobility policies in school districts may target and influence.
3. As of 2012 to 2013, there are 352 schools in this sample (219 elementary schools, 59 middle schools, 53 high schools, and 21 combination schools, that is, middle/high or elementary/middle). The number of schools increased from 321 in 2007 to 2008. In all, 13 charter schools were opened in 2012 to 2013, and 18 new schools opened over the period of study (2008-2009: 7; 2009-2010: 6; and 2010-2011: 5). Schools with less than 25 students (12) and schools that closed over the period of study (2) were excluded from the school-level analysis. Roughly 72% of schools were located in Las Vegas, 11% were in Henderson, and 10% in North Las Vegas. The rest were scattered in outlying areas such as Boulder City and Mesquite. Similar to previous mobility studies, I present results for mathematics achievement as math is predominantly learned in school rather than the home (especially starting in the elementary years) and mobility effects may be more detectable using math as opposed to reading (Hanushek, Kain, & Rivkin, 2004; Rumberger, Larson, Ream, & Palardy, 1999; Xu, Hannaway, & D'Souza, 2009).
4. About half of all schools in Clark County School District (CCSD) are predominantly minority, and about a quarter of schools are intensely segregated. In total, 14% of schools were multiracial; however, the number of multiracial schools decreased significantly from 63 in 2007 and 2008 to 25 in 2012 and 2013. Roughly half of all schools are high poverty, and about a fifth of schools are extreme-poverty schools. About half of schools are predominantly low achieving and 7% were intensely low achieving. About 16% of schools are intensely segregated and high poverty, and these schools increased from 15% to 20% from 2007 and 2008 to 2012 and 2013. Overall, the number of income and racial segregated increased over the period of the study. The results also indicate that racial segregation was higher in lower levels of schooling and decreased as one progressed from elementary to high schools. For instance, about 57% of elementary schools

were predominantly minority compared with 48% of high schools. Racial segregation was highest in combination schools, which are mainly alternative schools such as behavior and continuation schools (e.g., more than two thirds of these schools were predominantly minority). The trends across the level of schooling were starker for income segregation. For example, 58% and 27% of elementary schools were classified as high poverty and extreme poverty, respectively, relative to 27% and less than 1%, respectively, of high schools. Income segregation was generally below the district average for combination schools. Conversely, achievement segregation was prevalent across all levels of schooling but increased with the level of schooling and was especially high in combination schools. For instance, about half of elementary and high schools were predominantly low achieving compared with 90% of combination schools. About 2% of elementary and middle schools were intensely low achieving relative to 15% of high schools and 57% of combination schools. Elementary schools had the highest average of intensely segregated, extreme-poverty schools. In sum, the results imply the racial and income segregation is particularly pervasive in elementary schools whereas achievement segregation is specifically concerning in high and combination schools.

5. Given that segregation across all racial categories is increasing and the majority of the changes in the dissimilarity index over time are modest, for brevity's sake, I do not report results for every combination of racial and ethnic groups. The results for all groups are available upon request.
6. Prior research has found that school choice increases racial segregation; thus, I estimate the dissimilarity index while excluding open enrollment options—magnet and charter schools—in the CCSD to examine the sensitivity of the results. First, I excluded the 13 charter schools in 2012 to 2013, and the results changed. In particular, racial and income segregation was lower across all groups when charter schools were excluded. Achievement segregation also decreased. The results were similar when magnet schools were separately excluded. Similar to prior research, the results imply that charter schools partly explain the rise in racial and income segregation in urban school districts. Notwithstanding, the segregation levels in CCSD remained moderate and increased over time with or without open enrollment options.
7. The White–Black achievement gap is similar across the levels of schooling, whereas the White–Hispanic and Asian–Hispanic gaps increase with the level of schooling. The Hispanic–Black, Asian–Black, and income achievement gaps are smallest in high schools.

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Author Biography

Richard O. Welsh is an assistant professor of Educational Administration and Policy at the University of Georgia. His research focuses on the economics of education, K-12 education policy (such as school choice policies), and key mechanisms (such as student mobility).

APPENDIX B – LEXIA READING CORE5 RESEARCH REPORT

Lexia Reading Core5 Research Report

2016/17 School Year Results for over 22,600 Students in Charter Schools USA

Prepared by the Research Team (research@lexialearning.com)

C H A R T E R S C H O O L S

Introduction

An analysis of more than 22,600 K–5 students within the Charter Schools USA (CSUSA) network found that incorporating recommended use levels of the Lexia Reading Core5® program into instruction resulted in substantial growth in reading skills during the 2016/17 school year, over and above that achieved with non-Core5 instruction. Among students who regularly reached their usage targets with Core5, the percentage working on skills in or above their grade level increased from 44 percent to 91 percent – an improvement of 47 percentage points. In fact, students' reading growth was so impressive that CSUSA increased the number of schools using Core5 from 5 to 48 within the school year.

Implementation Description

In most CSUSA schools, Core5 is used grade-wide for K–2 students, but the program is used only for intervention purposes for grades three through five. CSUSA assessed students' reading abilities in the fall, winter and spring using the computer-administered, adaptive screening tool, NWEA™ MAP®. Performance was captured with RIT (Rasch unIT) scores, which measure student achievement on an equal-interval scale across all grades, and researchers compared students' fall and spring levels in Core5 to their fall 2016 and spring 2017 MAP RIT scores. The remainder of this report focuses on the 8,700 students who used Core5 as recommended for the entire school year.

"We found a statistically significant correlation between MAP and Core5," said Lexia President Nick Gaehde. "In other words, students' levels in Core5 at the beginning and end of the year closely matched their MAP RIT scores in the corresponding time periods. Best of all, Core5 students who met their Core5 usage targets had higher gains in MAP across all grades."

PROGRAM FIDELITY

Students received weekly usage targets that updated monthly, based on their likelihood of reaching benchmark in Core5.

Students used the program as recommended if they met their weekly usage targets for at least 50% of the weeks they used the program (e.g., 10 weeks out of 20).

PROGRESS EXAMPLE

A 3rd grader who started the year working in a 2nd grade level (1 Grade Below) and then completed all of the 2nd and 3rd grade material ended the year in 4th grade material (Reached EOY Benchmark).

Overall Comparisons for All Students

In addition to the increase in students working at or above grade level, the percentage of students working on skills two or more grade levels below their grade decreased from 19 percent to only 2 percent. Students who met their usage targets in Core5 increased their RIT scores by an average of 15.6 points. In comparison, students in the non-Core5 schools increased their RIT score by 12.3 points on average.

Results and Comparisons for Students in Grades K–2

Among K–2 students, the percentage working on skills at or above grade level in Core5 increased from 46 percent to 95 percent, leaving less than one percent working on skills two or more grade levels below (Figure 1). Early elementary students also significantly increased their RIT scores by 16.8 points, on average, compared to the students in the non-Core5 schools who increased their RIT score by an average of 15.5 points (Figure 2).

Figure 1. Progress in Core5 (Grades K-2; N=2,784)

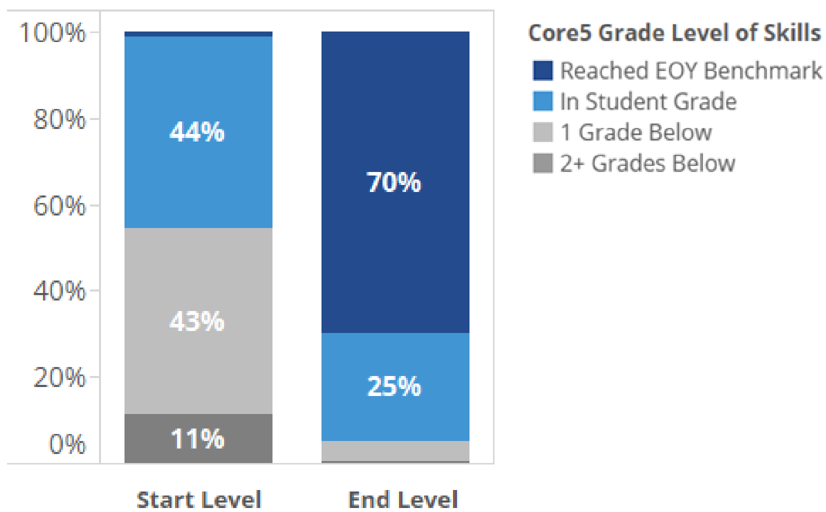
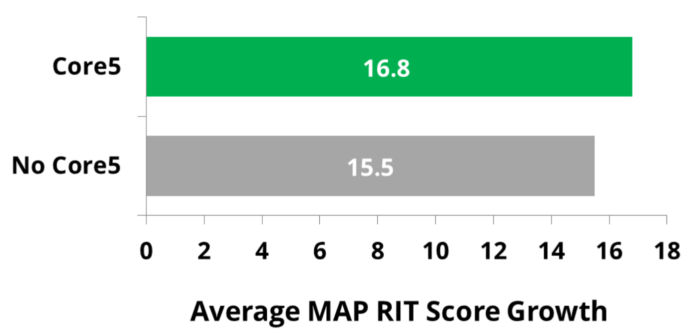


Figure 2. Gains on MAP (Grades K-2; N=8,500)



Results and Comparisons for Students in Grades 3–5

Among students in grades 3–5, the percentage working on skills in or above grade level increased from 38 percent to 75 percent (Figure 3). Half of students began the school year reading 2+ grades below grade level (dark grey), and most gained more two or more years of material in Core5 by the end of the year. More than half ended the year past their end-of-year, grade level benchmark. This acceleration of growth substantially contributed to Core5's overall impact. Core5 students in grades 3–5 significantly increased their RIT scores by 10.3 points, on average, compared to the students in the non-Core5 schools who increased their RIT score by an average of 8.8 points.

Figure 3. Progress in Core5 (Grades 3-5; N=1,365)

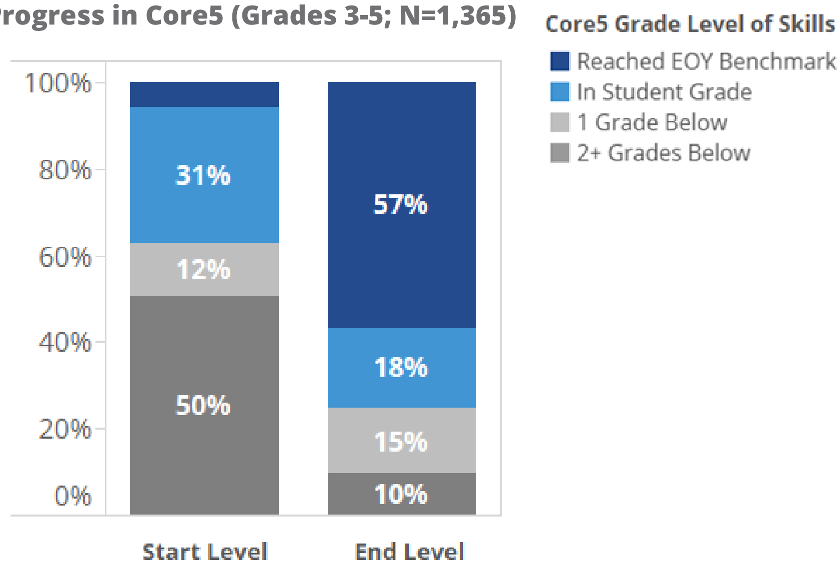
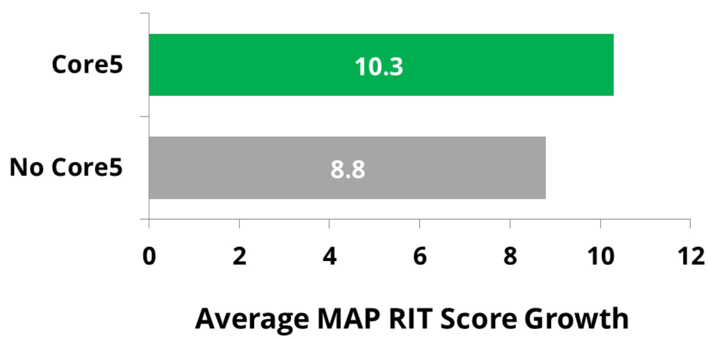


Figure 4. Gains on MAP (Grades 3-5; N=3,910)



"We are very pleased with the gains we are seeing in our schools using Lexia Reading Core5," said Michael Braggiotti, data analyst, innovations, CSUSA. "The engagement features in the program keep students motivated to learn, and the robust reporting features allow teachers and administrators to monitor student progress closely. Engagement with the program, by both students and staff, has helped close the gap for many students. We look forward to using the findings from this research to motivate 100 percent of our students to meet their usage targets!"

"We believe that a strong implementation leads to strong results. This successful partnership between Lexia and CSUSA is based on the schools' commitment to working with our implementation team to ensure that their use of the program provided teachers with the greatest opportunity to accelerate student outcomes," said Gaehde.

About Lexia Reading Core5
Lexia Reading Core5 is a research-proven, technology-based program that accelerates the development of fundamental literacy skills for students of all abilities in grades pre-K–5. Following a rigorous scope and sequence built for college and career ready standards, Core5 provides explicit, systematic instruction through personalized learning paths in six areas of reading. Core5 seamlessly adapts with student performance, targeting skill gaps as they emerge and equipping teachers with the data and instructional resources they need to personalize instruction for every student. Embedded assessment technology predicts students' year-end performance and provides ongoing norm-referenced and actionable data to help teachers prioritize and plan instruction with the offline instructional materials.

About Charter Schools USA
Charter Schools USA, founded by Jonathan Hage in 1997, is the first education management company to earn corporation system-wide accreditation through AdvancED and is one of the nation's leading charter school management companies. CSUSA currently manages 84 schools in seven states serving more than 70,000 students in pre-kindergarten through 12th grade. CSUSA's innovative educational advantages include advanced technology, meaningful parental involvement, student uniforms, consistent and fairly-enforced discipline policies, highly qualified and motivated staff, community focus, integrated character education and high academic growth and performance.

About Lexia Learning
Lexia Learning, a division of Rosetta Stone, empowers educators through adaptive assessment and personalized instruction. For more than 30 years, the company has been on the leading edge of research and product development as it relates to student reading skills. With a robust offering that includes solutions for differentiated instruction, personalized learning, and assessment, Lexia Learning provides educators with the tools to intensify and accelerate literacy skills development for students of all abilities. For more information, visit www.lexialearning.com.

About Rosetta Stone
Rosetta Stone Inc. (NYSE: RST) is dedicated to changing people's lives through the power of language and literacy education. The company's innovative digital solutions drive positive learning outcomes for the inspired learner at home or in schools and workplaces around the world.

Founded in 1992, Rosetta Stone's language division uses cloud-based solutions to help all types of learners read, write, and speak more than 30 languages. Lexia Learning, Rosetta Stone's literacy education division, was founded more than 30 years ago and is a leader in the literacy education space. Today, Lexia helps students build fundamental reading skills through its rigorously researched, independently evaluated, and widely respected instruction and assessment programs.

APPENDIX C – ENVISIONMATH STUDY

Evidence Explained

ESSA emphasizes “evidence-based” approaches that have demonstrated a statistically significant positive effect on student outcomes. ESSA identifies four levels of evidence: strong, moderate, promising, and evidence that demonstrates a rationale. The levels are defined by the research study design.

enVisionMATH meets ESSA’s “Strong” evidence criteria

Strong Evidence Criteria	Alignment to Requirements	
Experimental study (e.g. a randomized control trial)	**Meets**	A randomized control trial design was used where individual students were randomly assigned to either the treatment or control condition.
Show a statistically significant and positive effect on student outcomes	**Meets** +9 PERCENTILES	Overall, students significantly outperformed the comparison group on the **Metropolitan Achievement Test, 8th edition (MAT8)**. • **Third grade students** grew by 9 more percentiles than the average comparison student Additionally, high math ability students and females significantly outperformed their comparison group peers on the MAT8.
Have a large sample and multi-site sample	**Meets**	*enVisionMATH* was studied across 6 school districts in 6 different states. The study sample was large with 708 students.

What does the What Works Clearinghouse say about *enVisionMATH*?

In 2013, the What Works Clearinghouse found that *enVisionMATH* meets WWC version 2.1 evidence standards without reservations. The WWC later revised their study standards in 2014.

For more information, visit:
pearsonschool.com/evidencebased

Pearson

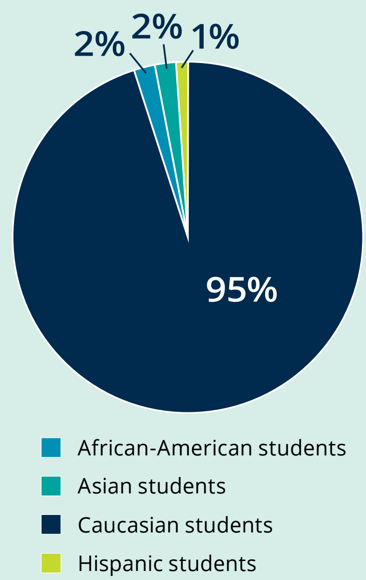
Scott Foresman-Addison Wesley
enVisionMATH

Study completed by:
PRES Associates, Inc.
Available here.

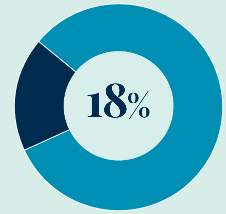
Year: 2007-09

Study description: The study focused on improving third and fifth grade students’ critical mathematics skills using a core elementary mathematics program. Teachers implemented *enVisionMATH* every day for the course of the school year for core mathematics instruction. Results were analyzed for 708 participating students taught by 44 teachers across 6 schools in 6 states, with matched pretest/posttest scores.

The final sample included:



Additionally:



qualified for free/reduced lunch

APPENDIX D – MCGRAW HILL WONDERS RESEARCH BASE ALIGNMENT

Wonders

Research Base Alignment

A Summary of Key Research and Demonstration of Program Alignment

McGraw Hill Education

Introduction

If reading opens the door of opportunity, will all children be able to cross the threshold to reading success? At McGraw-Hill Education we have always answered *Yes* to this question. It is our tradition to help every child learn to read, and to help every instructor teach reading in the most effective manner possible – a practice that continues today with the *Reading Wonders Reading/Language Arts* program.

The *Reading Wonders* program will guide children across the literacy threshold to mastery of the Common Core State Standards to become successful in college and in the workforce – because *Reading Wonders* is anchored in salient and consequential research about what works. We know that learning to read and teaching reading is work that requires the most effective materials because reading is foundational for all other learnings. In fact, The National Institute for Literacy's Partnership for Reading (2000) states that "Success in school starts with reading." Increasingly, federal, state, and local requirements in every area focus on the need for research-verified instructional strategies, methods, and approaches, and research is now available that suggests how to give each child a good start toward achieving success in reading. McGraw-Hill has stepped up to the challenge by incorporating highly-regarded research related to effective reading instruction during the development of the *Reading Wonders* program.

The teaching of reading has steadily evolved over the years, and the most recent initiative designed to 'raise the bar' for literacy is found within the *Common Core State Standards* in *English Language Arts*. Developed by experts in collaboration with researchers, leaders from states' education departments, teachers and school administrators, the *Common Core State Standards* incorporate evidence-based practices and content extracted from the most academically rigorous models across the state to ensure that students possess the literacy skills necessary for success in college and in workforce training programs.

It is important to note that the *Common Core State Standards* (referred to as the *Standards* throughout the document) are meant to provide only a description of target outcomes. They represent what can and should be accomplished, but leave implementation to states and school districts. Elementary teachers have always worked hard to motivate their students to read and understand text, build knowledge, effectively communicate both verbally and in written form, and acquire advanced vocabulary; however, many teachers have limited resources to devote to helping students acquire these skills, or they struggle to find appropriate resources to meet the needs of students. With the advent of the *Standards* and the enhanced vision toward refining and strengthening literacy instruction, teachers and administrators are no doubt further challenged to meet these goals of excellence. McGraw-Hill's *Reading Wonders* comprehensive reading program was designed to not only satisfy the *Standards* but also to incorporate high-quality research about what works.

Common Core State Standards in English Language Arts: A Summary of Key Points

Reading: Students should demonstrate the ability to extract deep meaning and critically analyze information from texts of increasing complexity. Text should include a diverse genre of classic and contemporary literature, and incorporate content deemed critical for achieving high standards of literacy.

Writing**:** Students should demonstrate the ability to produce written arguments based on substantive claims, sound reasoning, and relevant evidence. The ability to conduct research, synthesize information, and report findings through a written analysis is critical.

Speaking and Listening**:** Students should demonstrate the ability to evaluate and present ideas and evidence through listening and speaking as well as through media. Additionally, students should develop skill in engaging in formal and informal academic discussion.

Language**:** Students should increase academic vocabulary. Students should use formal English while writing, but must also be able to make informed choices among the various ways to express themselves through language.

Media and Technology**:** Skills related to media use and production of media are interwoven throughout the *Standards* (http://www.corestandards.org/about-the-standards/key-points-in-english-language-arts)

It is vital that existing curricula incorporate the rigorous content and knowledge encapsulated within the *Standards.* This paper provides a user-friendly summary of key research findings across components of reading, and adds a sample demonstration of alignment to the *Standards* by providing research and specific examples from *Reading Wonders*. The majority of presented research was obtained from the following sources:

- *Developing Early Literacy: Report of the National Early Literacy Panel* (NELP). This study synthesizes research on the development of early literacy skills for children from birth to age five. It was conducted by the National Center for Family Literacy under the auspices of the Partnership for Reading (a collaborative effort of the National Institute for Literacy, the National Institute for Child Health and Human Development, the U.S. Department of Education, and the U.S. Department of Health and Human Services). The purpose of NELP was to provide information to help teachers and parents support young children's early literacy development and to contribute to educational policy decisions (National Early Literacy Panel, 2008). The report examines the early correlates of later reading achievement, and meta-analyzes the data on instructional studies focused on young children.
- *Report of the National Reading Panel: Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and its Implications for Reading Instruction -- Reports of the Subgroups* (National Institute of Child Health and Human Development [NICHHD], 2000). The National Reading Panel was appointed by the Secretary of Education and the Director of the National Institute of Child Health and Human Development at the request of the U.S. Congress to determine what research had to say about the teaching of reading. The NRP report presents an extensive, detailed research review related to phonemic awareness, phonics, vocabulary, reading comprehension, and oral reading fluency.
- *Preventing Reading Difficulties in Young Children*, a review of research on early childhood reading commissioned by the National Research Council (Snow, Burns, & Griffin, 1998). This source represents a broad-ranging research summary and review, but without inclusion of specific details of the research. It is aimed at identifying those school factors that would allow for the successful prevention and remediation of reading problems.

- *Reading for Understanding: Toward an R& D Program in Reading Comprehension* (2002). This review of the research on reading comprehension instruction was conducted by the Reading Study Group for the U.S. Department of Education's Office of Education Research and Improvement.
- *Writing to Read: Evidence for How Writing Can Improve Reading. A Report from the Carnegie Corporation of New York* (Graham & Herbert, 2010). This document provides a meta-analysis of research on the effects of specific types of writing interventions found to enhance students' reading skills.
- *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools.* A Report from the Carnegie Corporation of New York (Graham & Perin, 2007). This report provides a review of research-based techniques designed to enhance the writing skills of 4th to 12th grade students.
- Improving Reading Comprehension in Kindergarten Through 3rd Grade: A Practice Guide. (Shanahan, Callison, Carriere, Duke, Pearson, Schatschneider, & Torgesen, 2010). This publication contains recommended instructional practices in reading, based upon a review of research evidence by the What Works Clearinghouse of the U.S. Department of Education's Institute of Education Sciences.

Elements of Literacy Instruction

Literacy programs must be based on scientific evidence related to elements that have been identified as essential in literacy instruction:

1. Phonological awareness
2. Phonics
3. Fluency
4. Vocabulary and Language
5. Text Comprehension
6. Writing

Comprehension of Literature and Informational Text

"Good instruction is the most powerful means of developing proficient comprehenders and preventing reading comprehension problems"

-Rand Reading Study Group, 2002, p 29.

What is text comprehension?

The National Assessment of Educational Progress (2010) defines reading as, "an active and complex process that involves: understanding written text; developing and interpreting meaning; and using meaning as appropriate to type of text, purpose, and situation" (p iv). The Common Core State Standards (National Governors Association Center for Best Practice, Council of Chief State School Officers, 2010, p. 7), which has been adopted by more than 40 states, and is used as a resource in several others, goes even further, indicating that readers need to "work diligently to understand precisely what an author…is saying, but they also question the author's…assumptions and premises and assess the veracity of claims and the soundness of reasoning…. Students cite specific evidence when offering an oral or written interpretation of a text.

Comprehension is often identified as the fundamental goal of reading: children and adults read to understand. If children can "read" words but cannot understand them, they are merely decoding. Real reading requires understanding. Over the past 30 years, reading researchers have recognized that comprehension is the result of active involvement on the part of the reader. Reading comprehension requires mental processes or actions including the ability to locate and recall information, integrate and interpret text, and critique and evaluate (National Center for Education Statistics, 2011, p 5).

"Strong reading comprehension skills are central not only to academic and professional success, but also to a productive social and civic life." (Shanahan, Callison, Carriere, Duke, Pearson, Schatschneider & Torgesen, 2010, p. 5) The ability to comprehend text is central to learning concepts within content areas, such as science, social studies, and mathematics, and also later in life as students enter the workforce.

Text Comprehension and Text Complexity

A notable shift in the *Standards* is the expectation that students become independent and proficient readers of increasingly complex text. Traditionally, educators have attempted to limit text complexity to ensure that students could understand what they were reading. However, having students read relatively easy texts is not sufficient for enabling them to independently and successfully negotiate the demanding texts they will encounter in college, training programs, and in the workforce. To illustrate the importance of text complexity, the *Standards* summarize the 2006 ACT Inc. research report, *Reading Between the Lines*, which revealed that:

> *What chiefly distinguished the performance of those students who had earned the benchmark score of better from those who had not was not their relative ability in making inferences while reading or answering questions related to particular cognitive processes, such as determining main ideas or determining the meaning of words and phrases in context. Instead, the clearest differentiator was the students' ability to answer questions associated with complex texts (NGAC, the Standards, Appendix A, p. 3).*

The findings from this study demonstrate that comprehension skills and strategies, in isolation, are not sufficient for fostering students' comprehension skills. Students must be learn to apply these skills and strategies to complex text, and the Common Core Standards specify particular levels of difficulty that students must be able to negotiate successfully at each grade level; text levels that are somewhat higher than those usually associated with these grades in the past. The Common Core establish text complexity bands within which students of each grade level (2-12) must be able to read if they are eventually to reach the college and career readiness goals.

The Common Core determines the degree of complexity of texts by considering text readability as estimated by various research-based formulas (e.g., ATOS, Degrees of Reading Power, Flesch-Kincaid, Lexiles, Reading Maturity, SourceRater). These formulas estimate or predict the likelihood that a text will be comprehended, and place texts on a continuum of difficulty. However, the Common Core standards also recognizes the limitations of these quantitative measures and suggests that readability estimates should also consider qualitative aspects of text challenge (e.g., levels of meaning, structure, language, and knowledge demands), as well as reader variables (e.g., motivation, knowledge and experiences, purpose), all factors that play a role in text comprehension (Rand Reading Study Group, 2002). Thus, it is crucial to teach students to make sense of texts at the levels of difficulty specified in the standards.

There is no question that text difficulty, as measured by these various readability measures, either limits reading comprehension or requires readers to work harder to comprehend what they read. The more challenging a text, the less likely readers will understand it. So, if the point is to ensure that as many people as possible understand a particular message, then making sure that the text is easy makes a lot of sense. But what if the idea is to maximize student learning—either of the specific text or of reading in general? Then, the answer is a bit more complicated.

Various studies have reported that challenging text actually can, under certain circumstances, lead to both better comprehension and longer lasting memory for the text information (Einstein, McDaniel, Owen, & Coté, 1990; Kintsch, 1987; Mannes & Kintsch, 1987; McDaniel, Einstein, Dunay, & Cobb, 1986; McNamara, Kintsch, Songer, & Kintsch, 1996; O'Brien & Myers, 1985). The explanation for this learning phenomenon is that with more challenging texts the reader has to engage in deeper processing of the information, including more inferencing, in order to understand it, and that this leads to deeper learning. When text is easy to understand, the reader may comprehend it, but not at as deep a level as they would if they had to think more about it. However, amount of reader knowledge about the topic or the availability of external support and guidance appear to be integral to whether this deeper processing takes place; in other words, just assigning the reading of challenging text will not necessarily improve comprehension or learning.

Contrary to this, reading educators since the 1940s have championed the idea that students needed to be taught from text that was matched to their instructional level. The claim has been that students would make the greatest learning gains – in learning to read, not necessarily with regard to learning the information from the text – if taught from books that they could read with 75-89% comprehension (Betts, 1946), claims that were attributed to research, but that, in fact, have been shown to have no basis in research (Shanahan, 1983). About two-thirds of fourth and fifth grade teachers in the U.S. indicate that they teach students at their reading levels, rather than at their grade levels, and this is true of more than one-third of middle school teachers (Shanahan, 2013). This lowering of reading demands suggests to some that some students will make less learning progress (Adams, 2010-2011; Chall, Conrad, & Harris, 1991; Hayes, Wolfer, & Wolfe, 1996).

Research evidence has been accumulating that suggests the idea of placing students in instructional level texts is too simplistic to enhance reading achievement, and that, at least under some circumstances, more challenging texts coupled with supportive teaching, can improve reading achievement. Some early studies didn't challenge the "instructional level" idea as much as they argued for setting instructional levels higher than in the past; these studies were finding greater amounts of reading progress when students were placed in relatively harder texts (e.g., Powell, 1968). In the only well-designed experimental studies of the impact of student-text match on learning to read, it was found that there was no benefit to placing students in easier texts (O'Connor, Swanson, & Geraghty, 2010) or that students who were placed in markedly harder texts were the ones who made the greatest reading gains (Kuhn, Schwanenflugel, Morris, Morrow, et al., 2006; Morgan, Wilcox, & Eldredge, 2000)

Even if matching students to texts at their instructional level had some benefit, it is not the only way that instructional level performance can be accomplished. A considerable body of research shows that with appropriate scaffolding and support, students can read more challenging texts *as if* they were at the instructional level (Bonfiglio, Daly, Persampieri, & Andersen, 2006; Burns, 2007; Burns, Dean, & Foley, 2004; Carney, Anderson, Blackburn, & Blessings, 1984; Daly & Martens, 1994; Eckert, Ardoin, Daisey, & Scarola, 2000; Faulkner & Levy, 1999; Gickling & Armstrong, 1978; Hall, Sabey, & McClellan, 2005; Levy, Nicholls, & Kohen, 1993; McComas, Wacker, & Cooper, 1996; Neill, 1979; O'Shea, Sindelar, & O'Shea, 1985; Pany & McCoy, 1988; Rasinski, 1990; Reitsma, 1988; Rose & Beattie, 1986; Sanford & Horner, 2013; Sindelar, Monda, & O'Shea, 1990; Smith, 1979; Stoddard, Valcante, Sindelar, O'Shea, et al., 1993; Taylor, Wade, & Yekovich, 1985; Turpie & Paratore, 1995; VanWagenen, Williams, & McLaughlin, 1994; Weinstein & Cooke, 1992; Wixson, 1986).

Another aspect of the role of text complexity has to do with the role of text in influencing student language development. The language that one is exposed to is an important factor in children's comprehension development. Children who listen to and read books with quality language are better able to interpret such language when they read on their own (Bus et al. 1995; Hoffman et al. 2004; Koskinen et al. 2000; Leinhardt et al. 1981; NELP 2008). More complex text is usually more sophisticated text and improved language usually means improved reading comprehension (Dickinson, Griffith, Golinkoff, & Hirsh-Pasek, 2012; NELP, 2008).

Reading Comprehension and "Close Reading"

The Common Core State Standards emphasize more than a list of skills or abilities that students must master at each grade level. It also promotes the idea of close reading. Close reading is an old idea drawn from literary criticism, but which has wide utility (Adler & Van Doren, 1940; Brooks & Warren, 1938; Richards, 1925; 1942). According to close reading proponents, meaning resides in a text, and to gain access to this meaning, readers must read the text closely and repeatedly, weighing the author's words and ideas, and relying heavily on evidence drawn from the text (rather than from the reader's background knowledge or from external sources, such as the teacher). It is not a teaching technique per se, though its proponents believe that students should be engaged in this practice by their teachers regularly in order to establish it as a habit of mind.

Close reading refers specifically to an active process that involves the careful and thorough analysis and evaluation of the key ideas and details of a text, along with a consideration of the text's craft and structure (Piercy, 2011), and, perhaps, its connection with other texts (Adler & Van Doren, 1940). Close reading requires a deep, thorough, and critical analysis of the ideas in a text and the ways that the text conveys those ideas. As such, readers –to engage in close reading successfully--must be able to paraphrase and summarize text information, to identify main points and key supporting details, and to evaluate both the meaning and tone of an author's choices with regard to vocabulary, text structure, use of literary devices, and graphic elements, considering a text's clarity, precision, accuracy, relevance, significance, and logic (Elder & Paul, 2004, p 37). Analytical reading, deep reading, and critical reading are all at least partial synonyms for the ideas inherent in close reading.

What impact does close reading have on the development of reading comprehension? Given that it isn't really a teaching procedure as much as an approach to reading, that is it is more goal than method, its impact on learning has not been studied directly. However, many instructional practices consistent with close reading have been studied and with positive results. For example, instructional procedures that encourage students to pay especially close attention to what a text says have positive impacts on reading comprehension—both of the specific text of in terms of promoting higher reading comprehension achievement: careful summarization of text improves reading comprehension especially during the elementary grades (Graham & Hebert, 2010; NICHD, 2000), and this is true as well for graphic and structural summaries with both stories and informational texts (NICHD, 2000; Williams et al., 2005; Williams, et al., 2007), and even for reenactments of the text by younger students (Marley et al., 2007). Similarly, focusing reader attention on specific kinds of text information, such as causal relationships or character motivation, improves comprehension, too (Casteel, 1993; Goldman & Varnhagen, 1986; Shannon et al, 1988; Trabasso & Nickels, 1992; van den Broek, 1990). Research has shown that rereading text has a powerful impact on comprehension and learning for both higher and lower skilled readers, though its long term learning benefits in reading are still unexplored (Amlund et al., 1986; Barnett & Seefeldt, 1989; Bromage & Mayer, 1986; Glover & Corkill, 1987; Krug, Davis, & Glover, 1990; Mayer, 1983; Meyer & McConkie, 1973; Rawson, Dunlosky, & Thiede, 2000; Rothkopf, 1968).

Even just focusing all student attention on a text's meaning – as opposed to dividing this emphasis between the text and the skills or strategies – has been found to lead to stronger reading comprehension for elementary students (McKeown et al. 2009). Furthermore, opportunities to engage in intellectually rigorous analysis, synthesis, and evaluation of texts also appear to be related to reading progress (Rowan & Correnti, 2009). Students demonstrate stronger reading comprehension in classrooms in which teachers more frequently use higher-order questions (Andre 1979; Taboada & Guthrie 2006; Taylor et al. 2000), which is certainly consonant with close reading approaches, though studies have not made explicit whether these more rigorous questions were text-based or not.

Text Comprehension and Quality of Text

The *Standards* emphasize not only the use of complex text, but also the quality of text. That is, texts must have recognized value, be worth reading, and include the variations of form documented to enhance comprehension (e.g. lexical quality). Texts that have recognized value include "classic or historically significant texts as well as contemporary works of comparable literary merit, cultural significance, and rich content" (NGAC, The *Standards*, Appendix B, 2010, p. 2). Lexical quality refers to the "extent to which the reader's knowledge of a given word represents the word's form and meaning constituents and knowledge of word use that combines meaning with pragmatic features" (Perfetti, 2007, p. 359). High quality lexical representations are precise, redundant, and flexible (Perfetti, 2007, p. 360). Research has shown that high lexical quality positively affects reading skill, including comprehension (Andrews & Bond, 2009; Dickinson, et al., 2012; Hoffman, et al., 2004; Perfetti, 2007).

Text Comprehension of Literary and Informational Text

One of the implications of the Common Core Standards is that students are required to read and comprehend a variety of text types. According to the common core, elementary curricula should reflect an equal emphasis on literary and informational text, and incorporate reading in English Language Arts, science, social studies, and the arts. "Literary texts include narratives which portray a story, or sequence of related fictional or nonfictional events involving individuals or fictional characters, and poetry. Informational texts analyze or describe factual information about the natural or social world" (Shanahan, et al., 2010, p. 31).

While similar processes are employed while reading texts of *any* type, literary and informational texts include different features, and structures that students must become knowledgeable about. For instance, the abstraction found in poetry requires the reader to comprehend metaphors, personification, and imagery, critical thinking skills that are often not required for comprehending other types of text (NAEP Reading Framework, 2011, p. 9). A novel includes structural elements such as characters, setting, plot, theme, conflict, and resolution. The text structure of informational or expository text can vary, according to the text's purpose. For example, expository text may present cause and effect relationships, while a descriptive text may provide attributes or information that describes the topic (NAEP Reading Framework, 2011, p. 9). Even text formatting features (e.g., bullets, italics, bold print, footnoting) can differentiate literary and informational texts, and there are marked differences in the nature of vocabulary, too (Hiebert & Cervetti, 2011).

Much concern has been raised about past imbalances in the amount of informational text reading in which elementary students are engaged in the U.S. (Duke, 2000; Venezky, 1982). A multivariate analysis of data from the Progress in International Reading Literacy Study (PIRLS), examined the factors associated with the relative performance on U.S. children on informational and literary texts. U.S. students read literary texts better than they read informational texts, and this disparity was related to the amount of reading of informational texts evident in the classrooms (Park, 2008).

A related concern has to do with what children know about their world. Reading comprehension requires the integration and use of the reader's prior knowledge (that is, what the reader knows before he or she reads something) to interpret text. Readers with extensive knowledge about the world and knowledge of the words representing that world understand more of what they read than readers with limited knowledge and vocabularies (Nagy & Hiebert, 2011). Teaching can facilitate comprehension by ensuring that students develop background knowledge for reading a wide variety of content and texts and learning important content and concepts (Beck & McKeown, 1991; 2007). The explicit teaching of vocabulary has been found to improve reading comprehension (Blachowicz and Fisher 2007; Carlisle and Rice 2002; NICHD 2000), as has instruction that increases the amount of exposure children have to the meanings of words (Pressley 2000). Students need have sufficient and substantial reading experiences both with literary and informational texts, if they are to develop the range of necessary literacy skills and abilities, and the academic knowledge that will allow them to successfully implement these literacy skills in the content subjects.

Comprehension and Comprehension Strategies

The common core standards do not specify that students must develop particular reading comprehension strategies. The reason for this omission is that such strategies are not outcomes of the same caliber as being able to read text with critical understanding, which is the focus of the common core. Someone might use strategies to accomplish such reading, but the use of such strategies is not the point.

Why include strategies in comprehension instruction? In examining research on reading comprehension instruction, the National Reading Panel (NRP) identified seven strategies as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42)– demonstrating that comprehension can be improved through explicit, formal instruction in such strategies. More recently, the U.S. Department of Education's What Works Clearinghouse verified that several of these strategies were effective, even in the primary grades (Shanahan, et al., 2010), confirming the results of an earlier review commissioned by the National Research Council (NRC) concluded that "Explicit instruction in comprehension strategies has been shown to lead to improvement" (Snow, Burns, & Griffin, 1998, p. 322).

Teaching students to summarize or retell, ask questions, visualize, monitor their comprehension, and draw inferences have all been found to give students a leg up on reading comprehension. Strategy teaching aims at teaching students to take intentional mental actions during reading to improve comprehension and recall. According to the NRP, research "favors the conclusion that teaching of a variety of reading comprehension strategies leads to increased learning of the strategies, to specific transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension" (NICHHD, 2000, p. 4-52). Such teaching needs emphasize student thinking processes without distracting too much from an emphasis on the texts being read (Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown, 1992). Thus, sometimes students should be engaged in close reads, without overt instruction in strategies, and other times the focus might be more on strategies, but even then it is essential that students engage the meaning of the texts being read.

Who benefits from text comprehension instruction?

Grade Levels. The NRP's review of research verified the effectiveness of some methods of text comprehension instruction as early as the second- or third-grade level and ranging up to ninth grade (Snow, Burns, & Griffin, 1998, p. 323). More recently the What Works Clearinghouse released a review (Shanahan, et.al., 2010) indicating that reading comprehension could be improved through explicit teaching in grades K-3, consistent with earlier research reviews. A study conducted by Lever and Senechal (2011) found that dialogic reading, or a discussion of text through elaborative questioning, was found to have positive impacts on the structure and content of Kindergarten children's narratives, and the National Literacy Panel found that dialogic reading improved the oral language skills and cognitive functioning of preschoolers and

Kindergarten children (NELP, 2008). The *Standards* emphasize text comprehension at all grade levels, both through listening and reading.

ESLStudents. August and Shanahan (2006) state that "instruction in the key components of reading is necessary—but not sufficient—for teaching language-minority students to read and write proficiently in English" (p. 4) and that, "literacy programs that provide support in oral language development in English, aligned with high-quality literacy instruction are the most successful" (p. 4).

Low-Achieving Students. A review of research on the effects of reading interventions for struggling readers (Gersten, Compton, Connor, Dimino, Santoro, Linan-Thompson, & Tilly, 2008) reveals that when provided with explicit instruction, students demonstrated positive effects in five of seven studies that measured reading comprehension. Repeated readings have demonstrated positive effects for students with learning disabilities (Nelson, Alber, & Gordy, 2004).

Common Core State Standards in English Language Arts: Standard for Reading Literature and Informational Text: Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Examples by Grade

Kindergarten: **Informational Text**

- With prompting and support, ask and answer questions about key details in a text.
- Identify the front cover, back cover, and title page of a book.
- With prompting and support, identify the reasons an author gives to support points in a text.

Grade 3: Literature

- Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.
- Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.
- Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).

Research Recommendations on Comprehension

Range and scope of instruction

Early Grades. According to the NRC report recommendations for reading instruction in kindergarten through third grade, "Throughout the early grades, reading curricula should include explicit instruction on strategies such as summarizing the main idea, predicting events and outcomes of upcoming text, drawing inferences, and monitoring for coherence and misunderstandings. This instruction can take place while adults read to students or when students read [to] themselves" (Snow, Burns, & Griffin, 1998, p. 323). More recently, What Works Clearinghouse released a review (Shanahan et.al, 2010) citing "strong research evidence" demonstrating that reading comprehension is improved through explicit teaching in grades K-3.

Instructional methods and features

Methods that were identified by the NRP as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42) and that were used by third grade in the research studies included the following:

- Question answering (17 studies, mostly grades 3–5), in which teachers ask questions about the text
- Question generation (27 studies, grades 3–9), in which students "generate questions during reading" (NICHHD, 2000, p. 4-45)

- Story structure (17 studies, grades 3–6), in which students are instructed in the "content and organization of stories," including use of graphic organizers in conjunction with story content and structure (NICHHD, 2000, p. 4-45)
- Comprehension monitoring (22 studies, grades 2–6), in which students learn how to monitor their own understanding of texts using procedures such as think-aloud
- Cooperative learning (10 studies, grades 3–6), in which "peers instruct or interact over the use of reading strategies" (NICHHD, 2000, p. 4-45)

As stated, a notable shift in the *Standards* is the focus on reading informational text and building content knowledge. Informational text is "expository writing, pieces that argue in favor of one position or another, and procedural texts and documents" (Shanahan, et.al, 2010 p 17). Text-focus teaching has found to be successful in enhancing student learning (McKeown, Beck, & Blake, 2009). Methods identified by Shanahan, et.al, (2010) as having 'strong evidence' include:

- Activating prior knowledge, or predicting (5 studies)
- Questioning (4 studies) when taught in conjunction with other strategies
- Visualization (2 studies)
- Monitoring and clarifying (3 studies)
- Inference training (1 study)
- Retelling (4 studies).

Methods identified by Shanahan, et.al, (2010) as having 'moderate evidence' include:

- Identifying text structure (5 studies, 3 using narrative text, 2 using informational text), in which students were taught to understand text structure through story-mapping, paying attention to story structure during retelling, using cause-effect statements and related clue words, for example.
- Cooperative learning (10 studies)

Many studies have found that repeated readings indirectly impact reading comprehension by facilitating fluency (National Reading Panel, 2000). For example, students' oral reading fluency rates at the beginning of second- and third-grade has been found as the predominant predictor to later reading comprehension achievement (Kim, Petscher, Schatschneider, & Foorman, 2010).

Multiple strategies

In looking at 36 studies featuring instruction that combined a variety of different comprehension methods, the NRP concluded that "Considerable success has been found in improving comprehension by instructing students on the use of more than one strategy during the course of reading" (NICHHD, 2000, p. 4-47). One particular advantage of this approach is its ability to guide students through the kind of "coordinated and flexible use of several different kinds of strategies" that is required for skilled reading (NICHHD, 2000, p. 4-47).

Regular assessment

According to the NRC report, "Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom, permitting timely and effective instructional response where difficulty or delay is apparent" (Snow, Burns, & Griffin, 1998, p. 323).

The Reading Framework for the 2011 National Assessment of Educational Progress specifies that assessment questions measure three cognitive targets for both literary and informational texts:

- Locate and Recall. Students may identify explicitly stated main ideas or may focus on specific elements of a story

- Integrate and Interpret. Students may make comparisons, explain character motivation, or examine relations of ideas across the text.
- Critique and Evaluate. Students view the text critically by examining it from numerous perspectives or may evaluate overall text quality or the effectiveness of particular aspects of the text (National Assessment Governing Board, U.S. Department of Education, 2011, p 40)

The *Standards* emphasize that a significant portion of tasks and questions are text-dependent; that is, the majority of tasks and questions are based solely on the text. "Rigorous text-dependent questions require students to demonstrate that they not only can follow the details of what is explicitly stated but also are able to make valid claims that square with all evidence in the text" (Coleman & Pimentel, 2012, p. 6).

Text Comprehension Research Recommendations	Demonstration of Alignment in Reading Wonders
Students engage in repeated readings to build fluency and comprehension.	Throughout the grades, students engage in repeated readings of different types of texts. In kindergarten and grade 1, teachers read aloud and reread literature and informational Big Books and Interactive Read Aloud selections. Teachers model how to go back into the text to find text evidence to answer text-dependent questions. Students also read and reread the Shared Read selections in the Reading/Writing Workshop. They apply foundational skills and begin to build the foundation for close reading of text. Students reread the Shared Read texts to build their fluency skills as well. Grade 1 Teacher's Edition, Unit 2 pages T10-T11, T31; T16-T17, T26-T27 At grades 2 through 6, students reread the Shared Read selections in the Reading/Writing Workshop as part of the close reading routine. The weekly minilessons in the Reading/Writing Workshop provide focused rereadings of the text to help students dig deep for meaning. The Shared Read selections are reread for modeling and practice of fluency. Grade 4 Teacher's Edition, Unit 1 pages T16-T17, T18-T19, T20-T21, T22-T23, T24-T25, T27 Students reread their Literature Anthology selections and the Leveled Readers to answer text-dependent questions. Grade 4 Teacher's Edition, Unit 1 pages T25A-T25R; T40-T41,T48-T49, T52-T53, T56-T57

Students and teachers discuss the meaning of text by utilizing discussion.	*Reading Wonders* provides many opportunities for rich, grade-appropriate, and meaningful discussion of complex texts every week. Teachers lead students in a close reading routine of the Shared Read in the Reading/Writing Workshop, and the selections in the Literature Anthology. They read short, complex texts and stories multiples times and are prompted to ask and answer questions; visualize; reread; make, confirm, and revise predictions; summarize; or make inferences. The teacher models (Talk About It and Teacher Think Aloud), and then guides students as they reread and answer text-dependent questions. Grade 1 Teacher's Edition, Unit 3 pages T16-T17 The meaning of text is further discussed using graphic organizers. Kindergarten through grade 6 graphic organizers are used for note taking and provide another opportunity for students to reread, search for, and organize text evidence in both literature and informational texts. Kindergarten Teacher's Edition, Unit 7 page T196 Grade 3 Teacher's Edition, Unit 1 pages T89, T93C, T93E, T93G, T93I, T93K, T93M, T93P, T93R, T93T, T240 Students in all grades also discuss, summarize and synthesize ideas during whole and small group lessons. Teachers can focus students' attention on text evidence and/or provide scaffolding instruction using Access Complex Text activities, Collaborative Conversations, Make Connections boxes, and Respond to Reading questions during Whole Group lessons. They can also use Leveled Readers, Focus on Genre boxes, Gifted and Talented activities, and Literature Circles in Small Group lessons. Grade 3 Teachers Edition, Unit 1 pages T16, T85 T16, T19, T25S, T109, T121-T123, T338-T339 After reading, Wrap Up the Week activities offer ways for students to collaborate and discuss text. These include Research and Inquiry, Text Connections, and Write About Reading activities. Grade 3 Teacher's Edition, Unit 1 pages T162-T163 Students in all grades have the opportunity every

	week to discuss genre, use comprehension strategies, and summarize by listening to the teacher read stories aloud using Interactive Read Aloud cards. Grade 3 Teacher's Edition, Unit 1 pages T210-T211
Students identify and use texts' organizational structure to facilitate close reading.	All students read multiple stories each week in both the Reading Writing Workshop and Literature Anthology. Kindergarten students participate in Literature Big Book lessons, as well. Through meaningful instruction using complex texts, students identify and use a variety of genres and text structures to find meaning in the informational texts and stories they read. In kindergarten, this instruction is introduced on Days 1 and 2 during the Listening Comprehension lesson using the Big Book, and is taught on Day 3 using the Interactive Read Aloud; and on Day 4 using a second Big Book. Grade 1 students also use the Literature Big Book. Kindergarten Teacher's Edition, Unit 7 pages T22-T26, T30-T31, T44-T45 Students in grades two through six identify and use their texts' organizational structure throughout each week during Interactive Read Aloud lessons, Comprehension Skill and Strategy, and Genre lessons. On Days 2, 3, and 4, students focus on organization in many of the Access Complex Text activities during the close reading of the main selection in the Literature Anthology. Grade 3 Teacher's Edition, Unit 4 pages T18-T21, T22-T23, T25A-T25R All grades also use Leveled Readers, Your Turn Practice Book comprehension and genre pages, Workstation Cards, student resources on www.connected.mcgraw-hill.com, and the Tier 2 Comprehension Intervention book to help them identify and use organizational structure of the texts they are reading. Grade 3 Teacher's Edition, Unit 4 pages T10, T12, T14, T18, T20, T22, T,24, T26, T30, T34, T38, T52, T203, T250-T251

Students identify and utilize text-based evidence to support interpretations and analysis of text.	Identifying and evaluating text based-evidence is emphasized as students respond to and generate text-dependent questions. Each of the minilessons in the Reading/Writing Workshop models for students how to find and use text evidence to answer questions and support statements or conclusions made about the text. After modeling, students have the opportunity to engage in guided practice with the teacher to find and interpret text-based evidence. The Your Turn Practice book provides additional texts for students to practice identifying and using text-based evidence to support their responses. Grade 3 Teacher's Edition, Unit 2 pages T16-T17, T18-T19, T20-T21, T22-T23, T24-T25 The Respond to Reading Text Evidence questions in the Literature Anthology and the Leveled readers provide additional opportunities for students to apply finding text-based evidence to support their interpretations and analysis of text. Grade 3 Teacher's Edition, Unit 2 pages T27T , T42-T43, T50-T51, T54-T55, T60-T61 At the end of each week, students are asked to use the evidence they have cited to write an analysis or opinion of the various texts they have read. Grade 4 Teacher's Edition Unit 1 pages T93, T157
Students generate questions during reading to gather evidence and build knowledge.	During the Shared Read in the Reading/Writing Workshop on Day 1, students in grades 2 through 6 discuss the story as they read and reread, and are reminded by the teacher to use comprehension strategies to gather evidence and build knowledge. The Make Connections box at the end of the Shared Read and the Comprehension passage in the Your Turn Practice Book are other places where students can generate questions and practice using the strategies they are learning. Grade 3 Teacher's Edition, Unit 1 page T217 Grade 3 Your Turn Practice Book pages 33-34 On Days 2, 3, and 4, students in grades 2 through 6 generate questions during their close reading of the selections in the Literature Anthology. They also gather evidence and build knowledge during the Stop and Checks, Access Complex Text activities, and Make Connection discussions. Using the Extended Complex Text routines found

	in the Teacher's Edition, students are asked to generate questions and take notes on parts of the text they find difficult to understand. Grade 3 Teacher's Edition, Unit 4 pages T25A-T25V, T273, T356-T361 Kindergarten students and first graders read, reread, and discuss Literature Big Books, as well as Shared Reads. Kindergarten Teacher's Edition, Unit 7, pages T12-T13, T22-T26 Grade 1 Teacher's Edition, Unit 3 pages T10-T11 Kindergarten Teacher's Edition Unit 7 pages T30-T31, T48-T49 Grade 1 Teacher's Edition, Unit 3, pages T16-T17 Students in all grades use Leveled Readers, digital activities such as Interactive Texts, Activities, and eBooks, Workstation Cards, and interactive group projects to gather evidence and build their knowledge. Grade 3 Teacher's Edition, Unit 1 pages T137, T162-T163, T148, T240-T263
Students engage in a variety of writing tasks (narrative, informational, or arguments) and discourse to demonstrate comprehension of complex text.	Students in all grades write every day. On Days 1 and 2, students in grades 2 through 6 read, reread, and then work collaboratively with a partner to write about the Shared Read as part of the Comprehension Skill lesson in the Reading Writing Workshop. On Days 2, 3, and 4, they respond to the close reading of the main selection in the Literature Anthology by writing a summary of the text. Grade 3 Teacher's Edition, Unit 4, pages T16-T17, T20-T21, T25T Every week, during the Wrap Up the Week activities, students work together to research and write a report. They also analyze to share an opinion, inform, or explain what they have read during the week. With this activity, students use a model in their Your Turn Practice Books. Grade 3 Teacher's Edition, Unit 4, pages T162-T163 Grade 3 Your Turn Practice Book, page 29

	On Day 4, students in Kindergarten and first grade work together on a Research and Inquiry project that relates to the week's readings. There are also writing opportunities – Extend and Independent Study - during Beyond small group lessons. Kindergarten Teacher's Edition, Unit 1 pages T52-T53 Grade 1 Teacher's Edition, Unit 3 pages T44-T45 Grade 3 Teacher's Edition, Unit 1 pages T253-T255
Students use procedures such as think aloud to monitor their own understanding of text.	Beginning in kindergarten, students are taught to monitor their own understanding of text. The teacher uses think alouds to model how to use comprehension strategies throughout the Shared Read in the Reading Writing Workshop on Day 1. Here students in grades 2 through 6 are taught to monitor comprehension of complex text. The Your Turn Practice Book is another place where students can practice using the strategies they are learning to monitor their understanding of text. Grade 4, Teacher's Edition, Unit 3 pages T16-T17 Grade 4 Your Turn Practice Book pages 3-4 Grade 3 Teacher's Edition, Unit 1, pages T225L, T225N On Days 2, 3, and 4, students in grades 2 through 6 use think alouds during their close reading of the selections in the Literature Anthology Grade 4, Teacher's Edition, Unit 3, pages T25A-T25P Kindergarten students and first graders use think alouds during reads of the Literature Big Books, as well as Shared Reads. Kindergarten Teacher's Edition, Unit 1, pages T22-T26 Grade 1 Teacher's Edition, Unit 3, pages T10-T11
Teachers expose younger students to complex information text by using read-aloud.	Every week, students in Kindergarten are exposed to complex information text in a few ways. Literature Big Books are used on Days 1 and 2, and then again on Day 4, to teach concepts of print, genre, the comprehension skill and strategy, and text features. Kindergarten Teacher's Edition, Unit 1 pages T22-T26

	On Day 3, students hear and discuss an Interactive Read Aloud. Kindergarten Teacher's Edition, Unit 1, page T35 First graders listen to a Literature Big Book on Days 1 and 3. The teacher uses this read aloud to teach concepts of print, genre, and the comprehension skill and strategy. Then they have a listening comprehension lesson on Day 2, when they discuss the Interactive Read Aloud with the teacher. Grade 1 Teacher's Edition, Unit 3 pages. T10-T11, T31
Students engage in collaborative reading activities to build knowledge and motivation.	At the beginning of every week, students in all grades build background by talking about the Essential Question and Weekly Opener. There are Build Background videos and/or additional photographs each week to Essential Question and Weekly Opener: Grade 3 Unit 1 Week 3: p. T142-143 Every day, students in Kindergarten to grade 6 engage in Collaborative Conversations where they engage in partner, small-group, and whole-class discussions to encourage them to build knowledge and motivation. Other collaborative reading activities include responding to the Interactive Read Alouds, making connections during the Close Read of the Shared Read, during guided practice activities during the close read of the SR where students are encouraged to discuss how they used the comprehension strategy during the read. They also do this for the skill, genre lesson. Grade 3 Teacher's Edition, Unit 1 pages T109, T117; T121; T127T142, T144-145, T148-151, T156-157, T159N, T159P
Teachers use a multiple-step instructional model	In all grades, the multiple-step instructional model is used during both Whole Group and Small Group instruction. In whole group lessons, the teacher uses an Explain, Model, and Guided Practice or Model, Guided Practice/Practice model to teach skills and strategies. Grade 3 Teacher's Edition, Unit 1 pages T104, T154

	A similar routine is used during Small Groups. For Approaching, On Level, and English Language Learners, the teacher uses an “I Do,” “We Do,” “You Do” model. For Beyond Level students, the teacher uses a “Model” and “Apply” model. Grade 3 Teacher’s Edition, Unit 1 pages T242, T251, T254 When students in grades 1 to 6 are doing a close reading, the teacher uses a multiple-step instructional model for teaching Think Alouds. First, the teacher models the Think Aloud. The second time it appears in the lesson, the teacher models and the student does a Think Aloud. The third time it appears, the student does the Think Aloud on his or her own. Grade 3 Teacher’s Edition, Unit 1 pages T159D, T159G, T159I
Readings contain a variety of text-structures and represent various genres according to guidelines provided in the Standards.	A wide range of genres and text structures are included at all grade levels. See Contents pages of the Reading/Writing Workshop books grades K-6 and the Literature Anthology books, grades K-6. Also see all Kindergarten and Grade 1 Big Book titles, Interactive Read Aloud selections, grades K-6, Time for Kids Online articles, grades k-6, as well as the classroom library titles, 1-6.
Readings adhere to the progression of text complexity as defined in the Standards.	In *Wonders***,** students become independent and proficient readers of increasingly complex text by reading literature and informational texts that are at appropriate Lexile score and become increasingly more difficult as the school year progresses. Close reads are short, complex, and worth reading. Lexile scores for Reading/Writing Workshop selections and literature Selections are noted in the Teacher’s Edition. Lexiles for Leveled Readers are noted on the back of the Leveled Readers covers. Grade 4 Teacher’s Edition, Unit 1 T130-T131
Conceptual knowledge and comprehension strategies are regularly assessed in the classroom.	Each week students investigate a different topic or concept, through discussions, reading, and writing activities. Through the lesson plan, teachers model applying important comprehension strategies as appropriate to the text to find text evidence to answer text dependent question or statements about the text. The weekly, unit and benchmark assessments, ask students to apply those strategies to reread text passages to answer multiple choice

	and short answer questions. Frequent informal observations during guided and independent practice of students applying the conceptual knowledge and the comprehension strategies throughout the week help teachers monitor students' need for additional support. Grade 4 Teacher's Edition, Unit 1 T202-T203, T204-T205, T210-T211, T216-T217, T217A-T217R, T256-T257, T340-T341
The majority of tasks and questions are text-dependent.	The majority of questions and tasks that students are asked to respond to about texts are text dependent. At Kindergarten and Grade 1 teachers model asking text dependent questions as they read aloud the Big Books and Interactive Read Aloud Cards. At grades 1-6, the minilessons in the Reading/Writing Workshop provide explicit instruction (modeling and guided practice) in responding to text-dependent questions and tasks. Prompts provided for the Literature Anthology selections, as well as the Leveled Readers, are text-dependent. The Text Evidence questions and Make Connections prompt at the end of both the Literature Anthology selections and the Leveled Readers provide additional text dependent questions and tasks. Kindergarten Teacher's Edition, Unit 7, pages T22-T27
Assessments measure cognitive targets (e.g., locate and recall, integrate and interpret, critique and evaluate) for literary and informational texts.	Weekly and Unit Assessments include literature and informational texts. Questions provided include a mix of cognitive level tasks in both multiple choice and short and extended response formats. The answer keys for each assessment item identify the alignment to a specific common core state standard for the grade and also rates the difficulty level of the item. See the Unit and Weekly Assessments and Answer Keys, Grades K-6

Foundational Skill: Phonological Awareness

"Phonological awareness is important because it strongly supports learning how the words in our language are represented in print."

– What Every Teacher Should Know About Phonological Awareness
(Torgesen & Mathes, 1998, p. 3)

What is phonological awareness?

Phonological awareness includes the ability to work with larger units in spoken language such as syllables and rhymes, which often include more than one phoneme. Children typically find it easier to work with these larger units (e.g., rhyming words) before proceeding to develop skills with individual phonemes (NICHHD, 2000, p. 2-10). Phonemic awareness is often described as part of the broader category, phonological awareness.

"Phonemic awareness is the ability to hear, identify, and manipulate the individual sounds – phonemes – in spoken words" (Armbruster, Lehr, & Osborn, 2003, p. 10). It is the foundation for reading. It is the ability to detect individual speech sounds within words. This ability is a requirement for developing accurate decoding skills and strategies (McShane, 2006, p. 13).

Why is phonological awareness important?

Strong phonological awareness is considered an early indicator of eventual success in beginning reading. Phonological awareness instruction helps children learn to read words, spell words, and comprehend text. Phonological awareness—in conjunction with phonics and fluency—is noted in the *Standards* as a "necessary and important component of an effective comprehension reading program". Solid phonological awareness is a foundational skill that facilitates independent mastery of complex text, one of the primary shifts presented in the Standards for grades K-2 (Coleman & Pimentel[1], 2011, p.1).

The National Reading Panel reached three conclusions about phonological awareness instruction in its Teaching Children to read document:

– Phonological awareness instruction has a positive overall effect on reading and spelling.
– Phonological awareness instruction leads to lasting reading improvement.
– Phonological awareness instruction can be effectively carried out by teachers.

Source: Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (National Institute of Child Health and Human Development [NICHHD], 2000).

Additionally, the National Early Literacy Panel (2008) reports that phonological awareness was one of six precursor literacy skills (e.g., alphabet knowledge, rapid automatic naming, phonological memory, writing name, rapid automatic naming of objects or colors) that had medium to large predictive relationships with later measures of literacy development (National Institute for Literacy, 2008, p vii.)..

Who benefits from phonological awareness instruction?

- **Readers do.** Phonological awareness instruction has been shown to have a positive impact on reading skills across many student categories and grade levels. The National Reading Panel cited that phonological awareness instruction benefits: normally developing readers, children at risk for future reading problems and (later research) specifically for kindergartners at risk for developing dyslexia (Elbro & Petersen, 2004), disabled readers, preschoolers, kindergartners through sixth graders, children across various SES levels, and children learning to read in English as well as in other languages. In a review of 97 studies on the achievement outcomes of various approaches for teaching struggling readers, "almost all successful programs have a strong emphasis on phonics" (Slavin, Lake, Davis, & Madden, 2011, p 19).

- **Spellers do**. Phonological Awareness instruction has been shown to have a positive impact on spelling skills across many student categories and grade levels. The Reading panel cited kindergartners, first graders, children at risk for future reading problems, normally developing readers, children across various SES levels, and children learning to spell in English as well as in other languages.

Components of phonological awareness

- Phoneme isolation– Recognizing individual sounds in words. E.g.: What sound do you hear at the beginning of pin? (/p/)

- Phoneme identification– Recognizing the common sound in different words. E.g.: What sound do you hear that is the same in sat, sun, and soup? (/s/)

- Phoneme categorization– Recognizing the odd sound in a set of words. E.g.: Listen to these words–hand, heart, sun. Which word begins with a different sound? (sun)

- Phoneme blending– Listening to a sequence of separately spoken sounds and then blending them naturally into a recognizable word. E.g.: What word is /b/ - /a/ - /t/? (bat)

- Phoneme segmentation– Breaking a word into its sounds by tapping out or counting the sounds. E.g.: How many sounds do you hear in cat? (three)

- Phoneme deletion– Recognizing the word that remains when a specific phoneme is removed. E.g.: What word do we have when we say smile without the /s/? (mile)

Common Core State Standards in English Language Arts: Standard for Phonological Awareness: Demonstrate understanding of spoken words, syllables, and sounds (phonemes).

Examples by Grade:

Kindergarten:

- Recognize and produce rhyming words
- Count, pronounce, blend, and segment syllables in spoken words

Grade 1:

- Distinguish long from short vowel sounds in spoken single-syllable words
- Isolate and pronounce initial, medial vowel, and final sounds in spoken single-syllable words

Research Recommendations

Range and scope of instruction

Grade Levels

Research summarized by the NRP suggests that Phonological Awareness (PA) instruction should be provided:

– At the kindergarten level
– At the first-grade level
– At elementary levels above first grade and as supplemental instruction for students with special needs.

The *Standards* explicitly include phonological awareness for Kindergarten and first-grade.

Instructional methods and features:
Spoken and written versus spoken only. Instruction that used letters to teach phoneme manipulation had a considerably greater impact on both reading and spelling than instruction that did not use letters but was limited to spoken sounds only.

Assessment for kindergarteners based on phoneme recognition. Findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students' PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.

Guidance by initial and ongoing assessment in the first and second grades. Based on the research findings, the NRP recommended a design in which assessment results drive PA instruction at the first- and second-grade levels, both initially and through ongoing formative assessments.

– Assessments conducted before PA instruction begins should "indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters" (NICHHD, 2000, p. 2-6).

– In order to determine the length of PA instruction, "What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds" (NICHHD, 2000, p. 2-42). The NRC research review argued that "intensity of instruction should be matched to children's needs" (Snow, Burns, & Griffin, 1998, p. 321).

Kindergarten
Kindergarten instruction is designed to provide practice with the sound structure of words and the recognition and production of letters. Phonological awareness tasks begin with skills such as "concept of a word," "rhyme," and "count syllables." The tasks then progress to "oral blending" (with continuous first sounds) and "oral segmentation" (with continuous first sounds–2 letter words, then 3-letter words). Finally, tasks progress to "oral manipulation" and more complex blending and segmentation with words beginning with stop sounds and longer words (4 or more phonemes).

Phonological Awareness Research Recommendations	Demonstration of Alignment in Reading Wonders
Sample of a Typical Kindergarten Lesson	An example of a typical week of phonological awareness lessons and the phonics lessons that directly follow them is Unit 3, Week 2, of Kindergarten. On Day 1, page T96, the teacher models the new sound /n/ using the Photo Card of a *nest.* Students then practice listening to the sound in the words of a song and in the names of objects pictured on Photo Cards. Then, on page T97, the teacher models the /n/*n* sound-letter relationship by displaying the *Nest* Sound-Spelling Card which shows the letter *Nn.* The children practice recognizing the letter *Nn* by identifying the letter in the words of the song. Students immediately produce the letter in the explicit

	handwriting lesson that follows on page T98. On Day 2, on page T110, children orally produce the sounds and blend them to say words with initial /n/*n*, and later on blend the letter-sounds to read words with /n/*n*. Explicit instruction and practice is provided throughout the week in blending the sound orally and then reading and writing words with the sound-letter.
Assessment for kindergarteners is based on phoneme recognition.	Phonological awareness and phonics skills are assessed together in Kindergarten. A new phoneme is introduced at the beginning of each week and instruction in sound-letter relationship immediately follows. At the end of the week, teachers assess these skills by using their Quick Check observations all week and the weekly Pencil and Paper Assessments for both phonological awareness and phonics in the *Your Turn Practice Book.* As an example, see page T165A of the Kindergarten Unit 3 Teacher's Edition. In this typical unit, Practice Book pages 85-86 and 88 are suggested as Pencil and Paper Assessment for /n/*n*.
First Grade *First-grade instruction is designed to provide explicit instruction and practice with sound structures that lead to phonological awareness.* Phonological awareness instruction and practice are incorporated into daily lessons.	Unit 2, Week 2—Identify and Generate Rhyme On Day 1 on page T90, the teacher models how to identify and generate rhyming words containing /u/. After modeling, the teacher guides students in whole group and small group practice (on pages T90 and T132) in identifying and producing rhyming words. Explicit instruction, practice, and review are provided in daily lessons throughout the week (on pages T100, T110, T118, and T126) in isolating and identifying the sound /u/, and orally blending sounds to form words with /u/. Manipulatives such as Response Boards and Photo Cards support the instruction each week.
Elementary Levels Beyond First Grade *At elementary levels above first grade, phonological awareness is provided as supplemental instruction for students with special needs, who may lack these skills.*	Grade 2, Unit 3, Week 2: Phonological awareness instruction for the long *i* sound is provided each day in whole group lessons, as well as in small group lessons that are appropriate for English Language Learners or students with special needs. On Day 1, on page T104, the teacher models listening for the long *i* sound in words and students then practice isolating the sound. On Day 2, on page T120, the teacher models substituting the long *a* sound for the long *i* sound in a word and students then practice the skill. On Days 3-5, on pages T132, T143, and T152, the teacher models, and students practice, blending and categorizing words with the long *i* sound. These four phonological awareness skills

	taught this week are then addressed in their own small group lesson for ELL students and students with special needs. The Tier 2 Intervention Guides provide additional support for students with special needs who may lack phonological awareness. As an example, the Tier 2 TE Phonemic Awareness Lessons 45-48 and the accompanying Practice Reproducibles pages 79, 81, 83, and 85 target medial long vowel sounds.
Phonological awareness instruction is a part of both reading and spelling.	Each week, the spelling words in Grades 1 and 2 *Reading Wonders* reflect the skills emphasized in the phonological awareness lessons. For example, in Grade 2, Unit 2, Week 1 the short *o* and long *o* sounds are the focus of the phonological awareness and phonics lessons each day, as on pages T12 and T13, Phonics Practice Activity on page T13, and the activities in the daily explicit lessons on Days 2, 4 and 5 using Word-Building Cards, on pages T29, T51, and T60, allow students to apply their knowledge of the short and long o letter-sound connection. Students read the Decodable Reader selection, At Home in Nome, in Small Group on page T69, and practice fluency when they reread the selection. On Day 1 of the daily spelling lessons, on page T14, fifteen spelling words are introduced and pre-tested. Ten of the words have the short o or long o sound. The other five words contain the previous week's phonetic element or they are previously taught high-frequency words. On Days 2-5, on pages T30, T41, T52, and T61, students sort the spelling words using the Spelling Words Cards and also build fluency in reading the words. Daily, independent practice with the spelling words are also provided in the Phonics/Spelling Reproducibles every week.
Assessment results drive phonemic awareness instruction at the first- and second-grade levels, both initially and throughout ongoing formative assessments. The assessments in Reading Wonders are designed to inform phonemic awareness instruction in Kindergarten, first- and second-grade levels. Therefore, assessment is ongoing, varied, and rigorous. Teachers use results to modify instruction.	**Informal Assessment** Throughout the TE lessons in Grades K-2, students are observed informally. Because lessons are highly interactive, and the student response rates are high, teachers have ample opportunity to check each student's daily phonemic awareness progress. Daily "Quick Check" Observations in the Teacher's Guide remind teachers what to observe. If students encounter difficulties, immediate lesson modifications are provided via the "Corrective Feedback" suggestions. **Formal Assessment** In Grades K and 1, Weekly Assessments and Unit Tests are used as ongoing formative assessments

	to monitor students' phonemic awareness acquisition. Additionally, the Daily Quick Check Observations are compiled and compared with the Quick Check Rubric to assess student skills, diagnose, and prescribe additional lessons or intervention instruction if necessary. If additional phonemic awareness instruction and/or guided practice are required, explicit lessons are provided in Small Group Instruction. In Grades K and 1, there are Weekly Pencil and Paper Assessments for phonological awareness in the *Your Turn Practice Book.*
Throughout the lessons, students are observed informally. Because lessons are highly interactive, and the student response rates are high, teachers have ample opportunity to check each student's daily phonemic progress.	A typical example in Grades K-2 is Grade 1, Unit 3, Week 1. The daily phonological awareness lessons focus on the long a sound and the phonics lessons specifically target the a-*e* spelling for the sound. On Day 1, on page T12, the teacher models how to identify the same long vowel sound in three words. In Guided Practice/Practice the teacher does the first example with students, identifying the middle sound in a set of words. Students then practice with eight other set of words which allow the teacher to observe progress. The lessons on Days 2-5, on pages T22, T32, T40, and T48, follow a similar pattern, as the teacher models how to identify, blend, add, and substitute phonemes, and students then practice with several examples. Plentiful opportunities for assessing daily progress inform appropriate small group instruction.
Sample of a Typical Kindergarten Lesson	An example of a typical week of phonological awareness lessons and the phonics lessons that directly follow them is Unit 3, Week 2, of Kindergarten. On Day 1, page T96, the teacher models the new sound /n/ using the Photo Card of a *nest.* Students then practice listening to the sound in the words of a song and in the names of objects pictured on Photo Cards. Then, on page T97, the teacher models the /n/*n* sound-letter relationship by displaying the *Nest* Sound-Spelling Card which shows the letter *Nn.* The children practice recognizing the letter *Nn* by identifying the letter in the words of the song. Students immediately produce the letter in the explicit handwriting lesson that follows on page T98. On Day 2, on page T110, children orally produce the sounds and blend them to say words with initial /n/*n*, and later on blend the letter-sounds to read words with /n/*n.* Explicit instruction and practice is provided throughout the week in blending the sound orally and then reading and writing words with the sound-letter.

Foundational Skill: Phonics and Word Recognition

"Systematic and explicit phonics instruction significantly improves children's reading comprehension."

– Put Reading First (Armbruster, Lehr, & Osborn, 2003, p. 14)

What is phonics?

Phonics instruction teaches children the relationship between letters (graphemes) and the sounds in spoken language (phonemes) and how to apply that knowledge in reading and spelling words. Phonics instruction builds on phonemic awareness. Although it includes some types of phonemic awareness activities, in which students "use grapheme-phoneme correspondences to decode or spell words," it extends beyond such tasks to "include other activities such as reading decodable text or writing stories" (NICHHD, 2000, p. 2-11).

What is systematic and explicit phonics instruction?

Research recommendations favor phonics instruction that is "systematic and explicit." An explicit approach includes specific directions to teachers for teaching letter-sound correspondences. A systematic approach is one that incorporates a planned, sequential set of phonetic elements to master. These elements are explicitly and systematically introduced in meaningful reading and writing tasks.

Systematic and explicit phonics instruction includes teaching a full spectrum of key letter-sound correspondences: not just major correspondences between consonant letters and sounds, but also short and long vowel letters and sounds, and vowel and consonant digraphs such as oi, ea, ou, sh, and th.

Several different methods have been developed to teach phonics systematically and explicitly, including synthetic phonics, analytic phonics, embedded phonics, analogy phonics, onset-rime phonics, and phonics through spelling. Broadly speaking, these approaches are all effective (NICHHD, 2000, p. 2-89).

Why is phonics instruction important?

Phonics instruction leads to an understanding of the alphabetic principle–the set of systematic and predictable relationships between written letters and spoken sounds. For children to learn how to sound out word segments and blend these parts to form recognizable words, they must know how letters correspond to sounds. Three top-level examples:

– Phonics instruction has a positive overall effect on reading. A meta-analysis by the National Reading Panel (NRP) found that systematic and explicit phonics instruction had a significantly stronger effect on children's reading than every category of nonsystematic or non-phonics instruction that was studied.

– Phonics instruction has positive overall effects on specific skill areas. The NRP meta-analysis found that across grades K-6, phonics instruction was "most effective in improving children's ability to decode regularly spelled words . . . and pseudowords," but also helped students to read miscellaneous words (some of which were irregularly spelled) and read text orally (NICHHD, 2000, pp. 2-94, 2-159).

– Phonics instruction has a lasting impact on reading. Follow-up tests in the NRP meta-analysis found that the effects of phonics instruction were reduced, but still significant, several months after the instruction ended, "indicating that the impact of phonics instruction lasted well beyond the end of training" (NICHHD, 2000, pp. 2-113, 2-159, 2-161).

Who benefits from phonics instruction?

All Students. Phonics instruction has been shown to have a statistically significant positive impact across many student categories (NICHHD, 2000, p. 2-160). For example, Kindergarteners at risk of developing future reading problems; first-graders at risk; first-grade normally achieving readers and disabled readers; and children across various SES (socioeconomic status) levels.

Grade Levels. The NRP meta-analysis Students found that Kindergarten and first-grade students experienced significantly better improvement from phonics instruction than from other types of instruction in all six areas measured (decoding regular words, decoding pseudowords, reading miscellaneous words, spelling, reading text orally, and comprehending text) with a moderate to large effect size for all areas except reading text orally (NICHHD, 2000, p 2-159). Students in grades 2-6 also experienced significantly better improvement from phonics instruction in four out of six areas (decoding regular words, decoding pseudowords, reading miscellaneous words, and reading text orally), with effect sizes for the various areas ranging from small to moderate (NICHHD, 2000, p. 2- 159).

Low-Achieving Students. A best-evidence synthesis of 97 studies investigating the effects of reading interventions for struggling readers revealed that "almost all successful programs have a strong emphasis on phonics" (Slavin, Lake, Davis, and Madden, 2011, p 19). For example, one-to-one tutoring models that focus on phonics obtain much better outcomes than programs that do not emphasize phonics (Slavin et.al., 2011).

ESL Students. One of the major findings of the National Literacy Panel's report, Developing Literacy in Second-Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth, indicates, "Instruction that provides substantial coverage in the key components of reading—identified by the National Reading Panel (NICHD, 2000) as phonemic awareness, phonics, fluency, vocabulary, and text comprehension—has clear benefits for language-minority students (National Literacy Panel, 2006, p 3). For instance, research has demonstrated that phonics instruction enhances the reading and writing skills of children for whom English is a second language, and the positive effects remain a year later (Stuart, 1999; Stuart, 2004).

Common Core State Standards in English Language Arts
Standard for Phonics and Word Recognition: Know and apply grade-level phonics and word analysis skills in decoding words

Examples by Grade:

Kindergarten:

- Demonstrate basic knowledge of letter-sound correspondences by producing the primary or most frequent sound for each consonant
- Associate the long and short sounds with the common spellings (graphemes) for the five major vowels

Grade 3:

- Identify and know the meaning of the most common prefixes and derivational suffixes
- Read grade-appropriate irregularly-spelled words

Research Recommendations on Phonics

Range and scope of instruction

Grade Level. The NRP finding that phonics instruction benefited students in Kindergarten, first-grade, and grades 2-6 (the majority of which were disabled readers) suggests a value to including phonics instruction at the Kindergarten and first-grade levels and beyond, but in particularly for disabled readers. *The Standards* includes phonic standards for Grades K-5.

Level at which phonics instruction begins. The NRP meta-analysis found that phonics instruction in kindergarten and first grade was "much more effective" than phonics instruction that began in second grade or later, after students have learned to read independently.

Letter knowledge as precursor. Two developmental studies, drawing on and extending a body of existing research, suggest that knowledge of letter names and/or letter sounds is an important precursor to the earliest stages of reading knowledge. Muter et al. (2004) found that students' ability to identify letter sounds and/or names on entering schooling (average age 4 years, 9 months) was one of two significant predictors, together with phoneme sensitivity, of word recognition ability a year later (pp. 671–672).

Instruction over multiple years. Results of a few multi-year studies examined by the NRP "suggest that when phonics instruction is taught to children at the outset of learning to read and continued for 2 to 3 years, the children experience significantly greater growth in reading at the end of training than children who receive phonics instruction for only one year after first grade" (NICHHD, 2000, p. 2-118).

Instructional Methods and Features

Spelling Instruction. An analysis of research commissioned by the NRC claimed that spelling instruction, |in particular at the second-grade level, is important in building "phonemic awareness and knowledge of basic letter-sound correspondences" (Snow, Burns, & Griffin, 1998, p.212).

Phonics instruction as means to an end. Based on their interpretation of the research results, the NRP argued that phonics instruction (i.e., "the teaching of letter-sound relations") should not be pursued as an end in itself, but should be directed toward the goal of helping students in their "daily reading and writing activities" (NICHHD, 2000, p. 2-96). Students should understand that this is the goal of learning letter-sounds, and should have practice in putting their skills to use.

Variable, guided by assessment. Based on their interpretation of the research results, the NRP argued that, ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC research review argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

Phonics Research Recommendations	Demonstration of Alignment in Reading Wonders
Phonics instruction begins before reading is introduced.	In Kindergarten, explicit phonics instruction begins in the three-week Start Smart readiness lessons on page S8, when the teacher models recognizing the letter *Aa* on the Teaching Poster and Word-Building Cards, and the students practice letter recognition with the Big Book. Then beginning in Unit 1, Week 1, letter-sound relationships are taught, starting with /m/*m* on page T15. In Week 2, on page T110, the first vowel is introduced, /a/*a*, and the magic of reading begins when students decode the word *am* on page T111. Students learn additional letter sounds as phonics

	instruction continues each day throughout the year. The Reading/Writing Workshop phonics pages and pre-decodable stories, as well as the Practice Book pages, provide reinforcement and practice in letter-sounds and by Unit 4, on pages T30-T31, students read a decodable story chorally with the teacher, and then in small groups.
Letter names and sounds are taught to students early in Kindergarten.	Letter names are taught, beginning with the letter *Aa*, on the first day of Kindergarten in the Start Smart phonics lesson on page S8. In the Smart Start lessons which extend for the first three weeks of school, all of the letter names are taught and reinforced as students match letter cards to letters on the Teaching Poster and in the Big Book, for example on page S13. Students are exposed to a mnemonic that represent the initial sound for each letter, as well as words in a Big Book that begin with the letter-sound. Formal instruction in letter-sound relationships begins in Unit 1, with the sound-letter /m/*m* on page T15 and is reinforced and practiced in whole group, as well as retaught, practiced, and extended in small group on pages T64-T65, T71-T72, and T76. The *Animals in the Park* Big Book, Sound-Spelling Cards, Alphabet Teaching Poster, Response Boards, Letter Cards, and Letter Songs are resources used to reinforce letter-sound knowledge throughout Kindergarten.
Phonics instruction begins in Kindergarten and continues regularly for 3 years.	Explicit instruction in phonics begins with the letter identification lessons in Start Smart. In Unit 1 Week 1 instruction in letter-sound relationships begins with the continuous consonant *m*, in the daily whole-group and small group lessons. On Day 1 of a later and more typical week in Kindergarten, Unit 1, Week 3, (when enough letter-sounds have been taught to blend words) the teacher models, and students practice, connecting the new continuous sound /s/ with the letter *s* on page T179, using the Sound-Spelling Card. Students also write the letter *s*. On Day 2, on page T193, after teacher modeling, students blend with /s/s in the initial position in words, and on Day 3, on pages T201-T202, they review the letter-sound and sort pictures according to the beginning sound and letter. On Day 4, on pages T211 and T212, they practice blending, write s for words that begin with /s/s and write words the teacher dictates. On Day 5, on pages T220-T221, they review. All consonants and short and long vowel sounds are taught and practiced in Kindergarten, in both whole group and small group lessons.

	Explicit phonics instruction follows a similar pattern in Grades 1 and 2. As an example in Grade 1, the Unit 2 Week 4 phonics lessons target consonant digraphs *-th, -sh,* and *-ng.* On Day 1, on page T246, the teacher models, and students practice, connecting the sounds with the letters, and students blend the sounds to read words in the Phonics Practice Activity. On Day 2, on pages T256 and T257, the teacher first reviews the sound-letter relationships and models blending and then students practice blending and building words. On Day 3, on pages 266 and 267, the teacher models blending and the students practice blending in the Phonics Practice Activity. On Days 4 and 5, on pages T274 and T282, the teacher builds words for students to blend, and students also practice fluency. An example in grade 2 is Unit 3 Week 4 The long *e* lessons beginning on Day 1 on page T288 follow the same pattern as Grade 1, with teacher modeling and student practice in blending words with long *e.* A weekly lesson in phonics/fluency is provided in Grades 3-6 which ends with an activity to help students transition from reading one-syllable to multisyllabic words. An example of the weekly phonics/fluency lesson is Grade 4 Unit 2 Week 3, pages T154-T155.
Phonics instruction teaches students to convert letters into sounds and then to blend the sounds to form recognizable words.	The Phonics instruction follows a logical scope and sequence, beginning with the explicit teaching of letter names in the daily Start Smart readiness lessons in Kindergarten. Letter-sound relationships are introduced in Unit 1, Week 1, and are applied to simple VC and CVC words. As the sequence progresses though Kindergarten and into Grades 1 and 2, students encounter more sophisticated sound-spelling patterns and more complex words, including multi-syllabic words.. The weekly lessons in grades 3-6 help students read multi-syllabic words. <u>Example Lessons</u> Kindergarten, Unit 2, Week 2: In the Day 1 Phonics lesson on page T97 of this typical week, the teacher introduces the /t/*t* sound-letter relationship, using the Turtle Sound-Spelling Card. Students repeat the letter name and the sound it stands for, practice identifying the letter-

	sound at the beginning of words in the weekly phonics song, and write the letter. On Day 2, on pages T110-T111, the teacher reviews the sound-letter correspondence and students write the letter *t* on their Response Boards if a word the teacher says begins with /t/. The teacher models placing the letters *t, a, p* in the pocket chart and blending the sounds to read the word, and students then practice blending the word. Students apply their knowledge of /t/*t* when they read the story, on pages T112-T113, *We Like Tam!* in the Reading/Writing Workshop. On Day 3, on pages T119-T120, the teacher reviews /t/*t* and explains that the sound can also be at the end of a word. Students write the letter *t* if a word the teacher says ends with /t/ and practice blending more words with /t/*t* with the teacher. On Day 4, on pages T128 and T129, students practice blending more words, with the teacher and independently, and also write some words the teacher dictates. Then they apply their phonics knowledge as they read the story, on pages T130-T131, *I Like Sam*. On Day 5, on pages T138-T139, students read more words with /t/*t*, review the weekly phonics song, and also write words with /t/*t.* Grade 1, Unit 1, Week 3: In the Day 1 lesson of this typical week, on pages T168-T169, the teacher displays the Photo Card for *cloud* and models blending the consonants *cl* to form the beginning sounds. After teacher modeling in blending words with other *l*-blends, students practice blending in the Phonics Practice Activity. On Day 2, on pages T178-T179, *l*-blends are reviewed and children practice blending and building words with the teacher. On Day 3, on pages T188-T189, there is more modeling and practice in blending using the Phonics Practice Activity. On Days 4 and Day 5, on pages T196 and T204, the teacher builds more words for students to practice blending. Students also practice fluency in reading the words on Day 5. Grade 2, Unit 1, Week 5: Grade 2 follows the same pattern as Grade 1. On Day 1, pages T380-381, long *i* is introduced and after teacher modeling, students blend words with long and short *i*, such as *pig* and *ride,* in the Phonics Practice Activity. On Day 2, on pages T394-T395, words with long and short *i* are reviewed, blended, and built using letter cards, with more words blended or built on Days 3, 4, and 5, on

	pages T406, T417, and T426. Grade 4, Unit 3, Week 2: In the explicit lesson on pages T90-T91, the teacher explains that the spellings *gn* and *kn* contain silent letters and converts both of these spellings into the sound /n/. Additional silent letter spellings are introduced. The teacher models sounding out the word *knit*, and then guides students in identifying the silent letters in other words and pronouncing the words.
Spelling instruction is used to build phonemic awareness.	In *Reading Wonders,* spelling instruction is designed to raise students' awareness of the sounds in words by isolating and enunciating the sounds as a natural tool in helping them spell the words. Grade 1, Unit 2, Week 5 On Day 1, on page T326, the teacher uses the Spelling Dictation Routine for the Pretest. The teacher pronounces each spelling word and then reads a sentence containing the word. Students say each word softly and stretch the sounds, which reinforces the phonemic awareness skill of segmenting. Then the child writes the word. On Day 2, on page T336, the child reads the words, listening for the consonant digraph at the beginning of each word, which builds the phonemic awareness skill of isolation. On Day 3, on page T346, students blend the sounds in the word, emphasizing the initial consonant digraph, which builds phoneme isolation, and then sort the words according to initial sounds, which builds phoneme categorization. On Day 4, on page T353, one partner reads the words while the other partner segments the word, a key phonemic awareness skill. On Day 4, as well as on Day 5 on page T361, students sort the words by initial sound. Grade 2, Unit 1, Week 3 Day 1, on page T198, student stretch the sounds in the words (as in Grade 1) which builds the skill of segmenting. On Day 2, on page T214, and on Day 3 on page T225, students sort words by initial and final sounds, which builds the skill of phoneme isolation. On Day 4, on page T236, one partner reads the words while the other partner segments the word, a key phonemic awareness skill. On Day 4, as well as on Day 5 on page T361, students sort the words by initial or final sounds. In Grade 3, Unit 4, Week 1, the Day 1 spelling lesson on page T36, on the /ü/ variant vowel, builds phoneme isolation and segmentation. The

	teacher extends and enunciates the /ü/ sound in each word and then models how to segment the word sound by sound, while attaching a spelling to each sound. Later in the week the teacher reminds students to segment a word sound by sound as they spell it.
Phonics instruction is directed toward the goal of helping students in their daily reading and writing activities.	In Grade 4, Unit 2, Week 4 the Phonics/Fluency lesson on pages T218 and T219 targets r-Controlled Vowels /är/ and /ôr/. The daily lessons will help students read the Shared Read selection in the Reading/Writing Workshop, which is read on page T208, as several words in the selection contain these vowel sounds, such as *horrible, marshes, warning, forest,* and *Florida.* These vowel sounds are also targeted in the daily Spelling lessons on pages T228 and T229. In the daily writing lessons on pages T224-T225, students will write about what an animal they choose needs to survive, and the phonics and spelling lessons this week and throughout the year will help them as they write. As an example, this week's writing could possibly contain words with the targeted phonics element, such as *harm, warm, warn, guard, target, smart, charge, dart, fortress, explore,* or *alarm.* In Grade 5, Unit 2, Week 1 the Phonics/Fluency lesson on pages T26 and T27 targets variant vowel /ô/ and diphthongs /oi/, /ou/. The daily lessons will help students read the Shared Read selection in the Reading/Writing Workshop, which is read on pages T16 and T17, as several words in the selection contain these vowel sounds, such as *crowd, Loyalists, points,* and *trouble.* These vowel sounds are also targeted in the daily Spelling lessons on pages T36 and T37. In the daily writing lessons on pages T32-T33, students will write about an historical event and why it was important, and the phonics and spelling lessons this week and throughout the year will help them as they write. As an example, this week's writing could possibly contain words with the targeted phonics element, such as *turmoil, foundation, renown, cautious, thoughtful,* and so on.
Phonics instruction is integrated with other reading instruction.	In the primary grades the Word Work lessons combine phonemic awareness, phonics and spelling (or dictation in Kindergarten). Selected spelling words in Grades 1-6 reinforce the phonics skill highlighted each week. Phonics instruction is also integrated in the other reading instruction in the weekly lesson.

	Grade 2, Unit 3, Week 5: The daily phonics lessons target long *u* spelled *u_e, ew, ue*, and *u*, which is also the focus of the daily spelling lessons. The vocabulary lesson on Day 1, on page T385, includes the word *music,* which contains the long *u* sound. The Shared Read selection in *Reading/Writing Workshop,* which is read on pages T386-T387, contains some long *u* words. In addition, the Literature Anthology selection, “Many Ways to Enjoy Music,” containing long *u* words, is read on Day 3 on pages T413A-T143B, and “A Musical Museum” is read on Day 4 on page T419B. The decodable reader story, “Luke’s Tune,” is read in Small Group on page T435 and reread for fluency. In addition, the targeted sound-spelling also appears in the Comprehension and Fluency passage on *Practice Book* page 143 which students reread for fluency. Grade 5, Unit 5, Week 1: The daily Word Study lessons target suffixes, which are also the focus of the daily spelling lessons. One of the suffixes taught is *–tion* and the vocabulary lesson on page T14 includes the word transition. The Shared Read selection in *Reading/Writing Workshop,* which is read on pages T16-T17, contains words with suffixes, such as *painful, hopeless,* and *truthful.* This selection is used to practice the fluency skill of expression. In addition, the Literature Anthology selection, “Ida B,” is read on Day 3 on pages T25A-T25L and contains words with suffixes such as *wonderful, conversation,* and *instruction.* Suffixes are also reinforced in the Comprehension and Fluency passage on *Your Turn Practice Book* pages 203-205 which students reread for fluency.
Phonics instruction is variable and is based on students’ needs as determined through assessments.	Weekly assessments, as well as Daily Quick Check Observations in Grades K-2, are used in determining the need for differentiated phonics instruction. In grades K-2, based on results of the Weekly Assessments and observed student performance, teachers are provided Small Group options (Approaching, On-Level) to appeal to students’ specific instructional needs. In Grade 1 Unit 4 Week 2, Quick Checks for the phonics skill, long *e* spelled *e, ee, ea* appear on Day 1, Page T93, Day Day 2, page T103, Day 3, page T1134, Day 4, page T119, and Day 5, page T127. There are Small Group lessons for Approaching and On-Level and the skill is assessed in the Weekly Assessment.

	In Grade 5 Unit 2 Week 5 The phonics skill, closed syllables, is taught on pages T282-T283. The teacher uses observations and informal assessments, such as the *Your Turn Practice Book* page 98, to determine students' needs for additional instruction and Small Group lessons for the Approaching Level are provided on pages T298-T299.

Foundational Skill: Fluency

"Reading fluency is indeed an important component of the reading process and it is essential that it be taught to developing readers"

–Fluency Instruction: Research Based Practices
(Rasinski, Blachowicz, & Lems, 2012, p. xi)

What is fluency?

Fluency is the ability to read text quickly, accurately, and with expression. It provides a bridge between word recognition and comprehension. "Fluency is vital to comprehension" (McShane, p. 14). Fluency includes word recognition, but extends beyond knowledge of individual words to reflect the meaningful connections among words in a phrase or sentence. Fluent readers are able to recognize words and comprehend them simultaneously.

Why is fluency instruction important?

Fluency is widely acknowledged to be a critical component of skilled reading. A study conducted by the National Assessment of Educational Progress (NAEP) found a "close relationship between fluency and reading comprehension" (NICHHD, 2000, p. 3-1, citing Pinnell et al., 1995). More generally, a National Research Council report stated that "Adequate progress in learning to read English beyond the initial level depends on . . . sufficient practice in reading to achieve fluency with different kinds of texts written for different purposes" (Snow, Burns, & Griffin, 1998, p. 223). Additional evidence of this link between fluency and the development of general reading ability, particularly reading comprehension, is provided by several studies that found student performance on fluency assessments was an effective predictor of their performance on other types of reading measures. In reviewing the research on fluency instruction, the National Reading Panel (NRP) found value in approaches that incorporated repeated oral reading, guided or unguided, as opposed to less focused attempts to encourage reading in general. Three findings:

Repeated oral reading instruction has a positive overall effect on reading. A meta-analysis by the NRP found that fluency instruction in the form of repeated oral reading (guided or unguided) "had a consistent, and positive impact on word recognition, fluency, and comprehension as measured by a variety of test instruments and at a range of grade levels" (NICHHD, 2000, p. 3-3). The weighted average of these effect sizes resulted in a moderate effect on student reading (NICHHD, 2000, p. 3-16).

Repeated oral reading instruction has a positive impact on specific skill areas. The NRP meta-analysis found that repeated oral reading had a moderate effect on reading accuracy, a somewhat less strong effect on reading fluency, and a smaller effect on reading comprehension (NICHHD, 2000, pp. 3-3, 3-18).

Who benefits from fluency instruction?

Grade Level. Analysis of grade levels covered by the studies in the NRP meta-analysis led to the conclusion that "repeated reading procedures have a clear impact" on reading ability among:

"Non-impaired readers at least through fourth grade" " (NICHHD, 2000, p. 3-17).

Low-Achieving Students. Studies in the NRP meta-analysis indicated that "Students with various kinds of reading problems throughout high school" (NICHHD, 2000, p. 3-17) benefit from fluency instruction

Common Core State Standards in English Language Arts:
Standard for Fluency

Examples by Grade:

Kindergarten:

- Read emergent-reader texts with purpose and understanding

Grade 1 – 5:

- Reading with sufficient accuracy and fluency to support comprehension

Research Recommendations for Fluency

Range and scope of Instruction:

Grade Levels. The *Standards* incorporates fluency as a foundational skill for grades K-5, with a particular emphasis on repeated oral readings for grades K-2. Instruction should capitalize on the connection between the processes of speaking and listening and the reading standards on fluency. Research has shown that individual differences in oral reading fluency growth rates during first- grade predict oral reading fluency in subsequent years. Further, students' oral reading fluency rates at the beginning of second- and third grade has been found as the predominant predictor to later reading comprehension achievement (Kim, Petscher, Schatschneider, & Foorman, (2010).

The NRP research findings suggest a value to including fluency instruction in the form of repeated oral reading procedures at least through the fourth-grade level, and possibly beyond in a supporting capacity for students with reading problems. A review of research on early childhood reading commissioned by the National Research Council (NRC) identified fluency instruction as a key component of first-grade instruction and argued that "Throughout the early grades, time, materials, and resources should be provided" for both daily independent reading and daily supported reading and rereading (Snow, Burns, & Griffin, 1998, p. 195).

Instructional methods and features

Some of the methods that produced "clear improvement"–albeit with small sample sizes within each category–(NICHHD, 2000, p. 3-15) included the following: .

Repeated readings (set number of repetitions, set amount of time, or until fluency criteria were reached) (NICHHD, 2000, p. 3)

Repeated readings "combined with other [guided] procedures such as a particular type of oral reading feedback . . . or phrasing support for the reader" (NICHHD, 2000, p. 3)

Practice of oral reading "while listening to the text being read simultaneously" (NICHHD, 2000, p. 3)

Oral reading practice. In the NRP's description of effective repeated oral reading programs, the NRP stated that many of these programs provided increased oral reading practice "through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means," compared to earlier approaches (NICHHD, 2000, p. 3-11).

Regular assessment. The NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies). Similarly, the NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

Validity of oral reading fluency measures. According to Hasbrouck and Tindal (2006), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, several studies have shown that third-grade tests of oral reading fluency from the DIBELS correlated well to high-stakes reading assessments from Arizona, Colorado, Florida, North Carolina, and Oregon.

Oral reading fluency norms. Based on analysis of assessment data from a pool ranging from approximately 3,500 to over 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (2006) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . with few exceptions." These new norms cover grades 1–8 and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings.

The researchers also provided specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress:

Screening. "Fluency-based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001).

Diagnosis. According to the authors, oral reading fluency norms "can play a useful role in diagnosing possible problems that are primarily fluency based."

Monitoring progress. Oral reading fluency measures "have been found by many educators to be better tools for making decisions about students' progress than traditional standardized measures which can be time-consuming, expensive, are only administered infrequently, and have limited instructional utility" (citing Good et al., 2001; Tindal & Marston, 1990).

Fluency Research Recommendations	Demonstration of Alignment in Reading Wonders
Fluency instruction is included in the form of repeated oral reading procedures through the fourth-grade level.	In the lower grades, students read each story repeatedly with varying degrees of 'scaffold' supports such as Choral Reading with the teacher providing modeling and corrective feedback; Partner Reading and Independent Reading with the teacher circulating and listening in to provide support and feedback; or Echo-Reading with the teacher modeling pronunciation and students reading back to the teacher one sentence at a time. Students also echo-read with a partner giving the partner feedback, such as, "sound out this word." Also struggling students have an opportunity to work in small groups on reading prose and poetry orally. Grade 1 Teacher's Edition, Unit 1 pages T17, T31, T35, T48, T60 In the upper grades, students echo-read the Shared Read in the Reading/Writing Workshop. They vary the intonation of their voices to make what is

	happening in the text clearer. For the same reason, they also pause at appropriate places. The teacher models reading an excerpt of the Shared Read, then reads one sentence at a time while students echo-read each sentence. Typically, students are divided into two groups to practice intonation and pausing with the teacher providing feedback. Also struggling students have an opportunity to work in small groups on reading prose and poetry orally. Grade 3 Teacher's Edition, Unit 1 pages T28-T29, T48
In Grades K-3, materials and resources are provided for daily independent reading as well as daily supported reading and rereading.	Students read multiple short passages and stories each week in the Reading/Writing Workshop and Your Turn Practice Books. Starting in the second half of grade 1 and continues through grade 6, Your Turn Practice Books include comprehension worksheets with Partner Read activities. In addition, the Literature Anthology and Leveled Readers provide rich independent reading sources. The Reading Workstation Activity cards include a Fluency card and a Reader's Theater card, both of which provide more opportunities for daily support reading and rereading. Grade 1 Reading/Writing Workshop pages 14-23 Grade 1 Your Turn Practice Book pages 155-157 Grade 1 Literature Anthology pages 6-19 Grade 1, Unit 1, Week 1 Leveled Readers (Approaching, On, Beyond, ELL) Grade 2 Teacher's Edition, Unit 6, pages T25, T30, T40 Grade 1 Workstation Activity Cards: Reading, cards 24, 25 Grade 3 Reading/Writing Workshop pages 102-107 Grade 3 Your Turn Practice Book pages 4-5 Grade 3 Literature Anthology pages 100-119 Grade 3, Unit 2, Week 1 Leveled Readers (Approaching, On, Beyond, ELL) Grade 3 Teacher's Edition, Unit 2 pages T28-T29, T48 Grade 3 Workstation Activity Cards: Reading, cards 24, 25
Repeated readings are a part of instruction.	In the lower grades, in a whole group setting students read each story multiple times with varying degrees of scaffolded support and with the teacher providing modeling and corrective feedback. For instance, in Grade 1 Day 3, the Literature Big Book is reread with fluency being modeled.

	Grade 1 Teacher's Edition, Unit 1, pages T31, T265 In the upper grades, the teacher models the weekly Reading/Writing Workshop selection in a whole group setting; students reread the selection in groups or with partners and then practices fluency with their Your Turn Practice Book. In addition, struggling students practice fluency in small groups. Grade 4 Teacher's Edition, Unit 4, pages T27, T46 Grade 4 Your Turn Practice Book pages 53-56 For teachers with Tier 2 students a lesson on Repeated Reading Routine is provided in the Tier 2 Fluency component: Grades K/3 pages 10-11; Grades 4/6 pages 10-11.
Fluency instruction includes oral reading feedback and phrasing support.	In the lower grades, word automaticity exercises allow teachers to give feedback on students' oral reading. Teachers can also give feedback as students Partner Read in the Shared Read on Day 1 as well as when teachers do a weekly oral fluency assessment. In addition, they can monitor and provide feedback to struggling students in the I Do/We Do/You Do routine of the weekly Fluency activity in Approaching Level/Small Group section. Phrasing support can be found as part of the modeling fluency activities in the Listening Comprehension lessons. Examples: Grade 1 Teacher's Edition, Unit 1, pages T17, T35, T60, T155A; G2U6 pp. T28, T70, T118, T265, T343 In the upper grades, oral reading feedback is part of the Practice/Apply section in the formal Fluency lessons. Phrasing support is found in Fluency lessons on phrasing. Grade 3 Teacher's Edition, Unit 2, pages T29, T95, T227, T291 In the Instructional Routine Handbook, detailed fluency strategies on pp. R36-R39 provide additional instructional support for the teacher. (www.connected.mcgraw-hill.com; Teacher Resources)

Students practice oral reading while listening to the text being read simultaneously. Increased oral reading practice is provided through use of one-to-one instruction, audiotapes, tutors, and peer guidance.	Oral reading can be practiced by students while they listen to the text being read via the audio support provided on the Student Workspace for all selections found in the Reading/Writing Workshops, Literature Anthologies, Leveled Readers, and, at grades K-1, the Big Books; audio support is also provided for passages found in the Your Turn Practice Book. www.connected.mcgraw-hill.com; Teacher Resources In addition, comprehension activities found in Your Turn Practice Book provide partner read activities in which students take turns reading a passage aloud and determining their Oral Reading Fluency Rates. Grade 1 Your Turn Practice Book pages 155-157 Grade 3 Your Turn Practice Book pages 4-5 Workstation Activity Cards for Reading also provide a fluency activity card which allows students the opportunity for daily practice. Included with these cards is a Reader's Theater card for week 6 of each unit which students use to practice for their reader's theater performance. Grade 1 Workstation Activity Cards/Reading, cards 24, 25 Grade 3 Workstation Activity Cards/Reading, cards 24, 25 For more practice, fluency passages and games are available on the Student Workspace at www.connected.mcgraw-hill.com. The Tier 2 Approaching Level activities in the Teacher Editions provide tutorial support for struggling students. Grade 1 Teacher's Edition, Unit 1 page T60 Grade 3 Teacher's Edition Unit 2 page T48
Students read text at the appropriate instructional level to supplement repeated oral reading.	Leveled Readers–Approaching Level, On Level, Beyond Level, and ELL Reader–highlight the weekly literature theme and genre and share the same theme, vocabulary, and comprehension skills. A database of these readers is available at www.connected.mcgraw-hill.com. In addition to the Leveled Readers, starting at the

	second half of grade 1 through grade 6 leveled Partner Read activities are provided in the leveled Practice Books (i.e.,Your Turn Practice Books, Approaching Reproducibles, Beyond Reproducibles, and ELL Reproducibles) to help students orally read at their appropriate instructional level. Grade 1 Your Turn Practice Book pages 155-157; Grade 3 Your Turn Practice Book pages 4-5 Note: the leveled reproducibles can be found on the Student Workspace at www.connected.mcgraw-hill.com.
Repeated oral reading occurs in the context of the overall program and not as a stand-alone intervention.	Throughout the grades, oral reading and repeated reading is an integral part of the instructional plan. In grade 1, students reread the Literature Big Book on Day 3's Listening Comprehension to model fluency; they also reread the weekly Reading/Writing Workshop selection for comprehension in Day 2. In grade 2, a fluency lesson on Day 3 has students rereading the Shared Read. Other opportunities to reread passages occur on Day 2 (Interactive Read Alouds, Reading/Writing Workshop selection). In the upper grades, students reread the weekly Reading/Writing Workshop selection to practice a specific fluency skill for that week. Examples: Grade 1 Teacher's Edition, Unit 1 pages T26-T27, T31 Grade 2 Teacher's Edition, Unit 6 pages T25, T30, T40 Grade 3 Teacher's Edition, Unit 1, page T28
Fluency is assessed regularly using formal and informal methods.	Formal Methods: One group of students per week is assessed using the timed oral reading fluency passages from the Fluency Assessment component. Approaching Level, On Level, and Beyond Level passages are featured for each Unit in Grades 2–6 (and Units 3–6 in Grade 1) to aid in monitoring student progress and verifying grouping decisions and assignments. Each student passage is accompanied by a teacher recording sheet that allows for tracking errors, registering number of words read, formulating the Words Correct per Minute (WCPM), and noting a student's Accuracy Rate percentage. Informal Methods: Students are regularly assessed in the classroom through informal reading inventories, miscue analyses, pausing indices,

	running records, and reading speed calculations. Leveled Practice Reproducibles are also used for fluency assessment. For example, in first grade, a fluency assessment strategy in an Approaching Level activity is for the teacher to read a passage from the Approaching Reproducibles with the students repeating each sentence after the teacher using the same intonation and phrasing (see Grade 1 Teacher's Edition, Unit 1 page.T48). Students also practice fluency assessment with partners using the Fluency Workstation Cards.
Students' oral reading fluency is assessed in terms of words correct per minute.	The Fluency Assessment component for Grades 1–6 features oral reading fluency passages (informational and literature)–not words from a list– to assess students' ability to read unfamiliar text with speed and accuracy as well as with prosody. Students read a passage aloud for one minute while their errors and total number of words are tracked. The recording sheet that comes with each passage features scoring tables that allow for ready tabulations of WCPM and the Accuracy Rate percentage. The 50th percentile WCPM for Fall, Winter, and Spring are featured on the recording sheet too. This allows for a quick comparison of student results with the benchmarks identified by Hasbrouck & Tindal in their work on oral reading fluency norms. One group of students is assessed each week. Approaching Level students are tested weeks 1, 3, and 5; On Level students are tested weeks 2 and 4; and Beyond Level students are tested in week 6. A fluency goal is noted for each week. For students who fall short of this goal—slightly or significantly—remediation is identified, such as lessons from the Tier 2 Intervention Fluency Teacher's Edition.

Writing

"Writing is essential to communication, learning, and citizenship. It is the currency of the new workplace and global economy. Writing helps us convey ideas, solve problems, and understand our changing world. Writing is a bridge to the future".

(National Writing Project, http://www.nwp.org/cs/public/print/doc/about.csp)

What are the processes involved in writing?

At the most basic level, writing by definition is the translation of thought into visual form; however, the process of writing is remarkably complex. The act of writing is rarely linear and requires the iteration of planning, drafting, and revising while simultaneously employing critical thinking skills to analyze, summarize, and evaluate. Writing is a language-based activity that naturally overlaps with other processes included elsewhere in the *Standards*, such as reading, expressive language, receptive language, vocabulary use, and writing mechanics.

What is instruction in writing?

Graham & Perin (2007) in their meta-analysis of research on writing instruction identified 11 key elements for writing instruction:

1. Writing strategies, including planning revising, and editing;
2. Summarization, which includes explicit and systematic teaching
3. Collaborative writing, where students work together to plan, draft, revise, and edit
4. Specific product goals
5. Word processing, using computers and word processors as supports
6. Sentence combining, where students are taught to construct complex sentences
7. Prewriting, which assists students in generating and organizing ideas
8. Inquiry activities, where students analyze concrete data to help develop ideas and content
9. Process writing approach, which utilizes a workshop environment stressing extended writing opportunities, authentic writing, personalized instruction, and cycles
10. Study of models, which allows student to read, analyze, and emulate good writing
11. Writing for content learning, which uses writing as a tool for learning content mateiral. (p. 4 – 5).

With the increased emphasis on technology, students are now called upon to move beyond traditional print media to include digital representations. As within the *Language* strand in the *Standards*, writing instruction includes activities that require students to employ a variety of technological tools to represent their work.

Why is instruction important?

Writing is a central form of communication. It requires a deep knowledge of subject matter and employs critical thinking skills. As students transition to high school and college, writing becomes one of the primary methods by which their work is judged.

When students increase their knowledge about writing processes, they become better writers. It has been demonstrated that students' knowledge of discourse writing—that is, knowledge about various genres of and schemas for writing, coupled with linguistic knowledge (e.g., grammar, procedures for constructing sentences, spelling)—are factors that uniquely contribute to student variation in writing performance. Olinghouse and Graham (2009) found the following five types of discourse knowledge significantly contribute to story writing quality, length, and vocabulary diversity:

- Substantive processes (role of process in good writing and carrying out the writing process;

- Production procedures (role of linguistic and mechanical factors in good writing, story writing, and carrying out the writing process);
- Motivation (role of effort in good writing and carrying out the writing process);
- Story elements (basic structural elements in a story);
- Irrelevant information (p 47).

Writing practices enhance students' reading achievement. In their meta-analysis examining the effects of various writing practices on reading performance, Graham and Herbert (2010) found that when students write about text, are explicitly taught writing skills and processes, and increase the amount of time spent writing, students demonstrate greater text comprehension.

Common Core State Standards in English Language Arts
Standard for Writing: Students write logical arguments based on substantive claims, sound reasoning, and relevant evidence. Students engage in short and long-term research projects and produce a written analysis and presentation of findings.

Examples by Grade:

Grade 1:
- Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.
- With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed.
- Participate in shared research and writing projects

Grade 5:
- Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- With some guidance and support from adults, use technology, including the internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.
- Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

Who benefits from instruction?

All Students. In Writing Next, the majority of research articles reviewed in Graham & Perin's (2007) meta-analysis included students across the full range of normal classroom variation. The 11 key elements of writing instruction were found to benefit a wide variety of learners.

Less skilled writers. Students who struggle with foundational writing skills, for example ESL students or students with a disability, may benefit from direct, targeted instruction. For example, a study conducted by Saddler & Graham (2005) indicated that when provided with direct instruction designed to foster sentence-combining skills, fourth-grade students who were considered less skilled in writing improved their story writing and revising skills. Graham & Perin's (2007) meta-analysis indicated that writing strategy instruction was found particularly effective for low-achieving students.

Research Recommendations for Writing

Range and scope of instruction

Grade Level. Young children are naturally inclined to express ideas in print, primarily through illustration. Writing instruction typically begins informally in preschool, as children begin to master basic concepts of print and letter formation, and becomes more sophisticated as children move into Kindergarten and beyond.

Pearson (1994) indicates that the "synergistic" relationship between reading and writing renders it critical to begin writing instruction in the early grades.

The *Standards* address writing for all grade levels, beginning in Kindergarten. Children in the lower elementary grades create opinion pieces, narratives, and informative/explanatory texts. They develop rudimentary skills in collaboration and publishing, and begin to utilize revising and editing processes to strengthen their writing. As children advance through the higher elementary grades, students are required to compose increasingly sophisticated texts that incorporate evidence and research to explain and support particular points. Students further refine and develop previously learned skills.

Instructional Methods and Features:

Graham & Harris (1994) advocate for an integrated approach by incorporating elements from direct skill instruction and the process-oriented methodology, including:

- Skill-oriented instruction designed to foster text production skills (e.g., spelling, phonemic awareness)
- Opportunities for children to engage in writing activities
- Frequent opportunities to apply specific skills in a variety of writing activities
- Peer review and collaboration

Graham & Perin (2007) in their meta-analysis of research on writing, identified 11 key elements for writing instruction:

1. Writing strategies, including planning revising, and editing;
2. Summarization, which includes explicit and systematic teaching
3. Collaborative writing, where students work together to plan, draft, revise, and edit
4. Specific product goals
5. Word processing, using computers and word processors as supports
6. Sentence combining, where students are taught to construct complex sentences
7. Prewriting, which assists students in generating and organizing ideas
8. Inquiry activities, where students analyze concrete data to help develop ideas and content
9. Process writing approach, which utilizes a workshop environment stressing extended writing opportunities, authentic writing, personalized instruction, and cycles
10. Study of models, which allows student to read, analyze, and emulate good writing
11. Writing for content learning, which uses writing as a tool for learning content material. (p. 4 – 5).

Writing practices demonstrated to increase students' reading comprehension skills, include the following:

- **Have students write about texts they read**. Write personal reactions, analyze and interpret text, write summaries keep notes, and answer and create questions about text;
- **Teach students the writing skills and processes that create text**. Teach the process of writing, text structures for writing, paragraph, sentence construction, and spelling;
- **Increase the frequency allocated for writing** (Graham & Herbert, 2010, p 11).

Writing Research Recommendations	Demonstration of Alignment in Reading Wonders
Students engage in writing activities to demonstrate understanding of text.	From Kindergarten through Grade 6, students engage in meaningful writing activities to demonstrate understanding of texts.

	In Kindergarten, weekly shared and interactive writing opportunities on Day 1 and Day 2 of the instructional plan allow teachers to model writing. Working together, the class writes about the weekly topic and essential question, using what they have learned from the texts read aloud. On Days 3-5, students are asked to write independently after discussing student models. In Grade 1, in addition to shared and interactive writing lessons each week, students write in response to the Interactive Read Aloud selection, using evidence from the text to demonstrate understanding. Through the comprehension minilesson on Day 2 of the instructional plan, teachers model how to reread the Shared Read in the Reading/Writing Workshop for a specific purpose, aligned with grade 1 CCSS reading standards. Students write to fill in a graphic organizer, using evidence from the text. As they read the weekly selection from the Literature anthology on Days 3 and 4, students are asked to take notes in a graphic organizer. This writing opportunity has students apply what was modeled in the minilesson from Day 2. The Respond to Reading at the end of each Literature Anthology selection provides text –dependent questions for students to answer. Students can respond in class or partner discussions or students can respond in writing to one or more of the questions. Instruction is provided to teach students how to go back into the text to find evidence to support their responses. On Day 5, the Research and Inquiry projects asks students to use information they have learned from the texts as sources for research writing. The Write About Reading activity begins to prepare students to write analytically about texts they have read. Students write to defend an opinion or statement about the texts, focused on specific grade 1 CCSS reading standards. Students are taught how to cite evidence from texts to support their responses. The Write About Reading Your Turn Practice Book pages offer additional scaffolded support for writing about texts. In grades 2 through 6, students are taught to take notes while the read, including using graphic organizers that demonstrate understanding of specific CCSS reading standard, as it applies to the Shared Read in the Reading/Writing Workshop, the selection from the Literature Anthology, and the leveled readers. Explicit instruction on writing

	about reading is provided each week in the comprehension minilessons. These lessons provide direct instruction, modeling, and guided practice for writing about reading. The writing activity is based on rereading the Shared Read in the Reading/Writing Workshop focused on a specific grade level CCSS reading standard. After modeling finding text evidence to support answers to questions or statements about a text, teachers model how to use the text evidence to write about the reading. The writing activities include writing a summary, paraphrase and character description. After the modeling, students then work through a guided practice activity, again, citing text evidence to support their writing. Each week, after reading the Literature Anthology, students apply what they have learned about Writing about Reading. Students are asked to cite evidence from the text. Write about Reading activities are also provided for all the Leveled Readers so students can apply what they have learned to the differentiated texts. At the end of each week, another Write About Reading activity asks students to write analytically about all the various texts that they have read throughout the week. Students write about opinions or informative/explanatory writing in response to the texts. Students learn to support their ideas and reasons by citing explicit evidence from the texts. The Write About Reading activity in the Your Turn Practice Book pages offers scaffold support and modeling. Additionally, throughout each week of instruction, students are asked to discuss and answer the essential questions with evidence from each text read. These activities can be completed as a class, small group, or partner discussion or they can be assigned as a partner or individual writing activity. Kindergarten Teacher's Edition, Unit 3 pages T18-T19, T32-T33, T40-T41, T50-T51 Grade 1 Teacher's Edition, Unit 2 pages T21, T27, T35B, T35E, T35K-T35L, T45, 44, T47, T62 Grade 4 Teacher's Edition, Unit 6, pages T148, T153T, T153V, T153W, T157, T158-T159, T160-T161 Grade 5 Teacher's Edition, Unit 2, pages T148-149, T153N, T156-T157, T158-161
Ample time is allocated for writing activities.	As noted in the explanation and examples cited above, each instructional week is filled with writing activities related to texts read at each grade.

	Additional writing activities are provided within the language arts block of instruction. Students are engaged in writing activities each day. Instruction, modeling, and guided practice provides the support students need to develop into proficient writers. At Grades 2-6, students analyze an expert model and student model of writing. They write and revise shorter pieces of writing throughout the week, reflecting on the how their revisions improved their writing. One to two longer pieces of writing is developed in each unit, allowing for 2-3 weeks for students to develop their writing through each stage of the writing process. Minilessons and writing models, as well as rubrics and anchor papers provide the support necessary to develop students writing proficiency. See citations above. In addition: For all Grades K-6, the Leveled Workstation Activity cards include writing activities that support the instruction of each week. Through these activities, students are spending small group independent time developing writing proficiency. Grade 2 Teacher's Edition, Unit 1, pages T22-T23, T36-T37, T48-T49, T62-T63, T480-T491 Grade 3, Teacher's Edition, Unit 2, pages T32-T33, T98-T99, T164-T165 Grades K-6: Workstation Leveled Activity Cards, Writing
Writing curricula includes skill-oriented instruction to enhance text production skills.	The Reading/Writing Workshop includes targeted writing skills –oriented instruction. Beginning at Kindergarten and Grade 1, student writing samples serve as models to teach specific writing traits and skills, including Organization: sequence, Word Choice: descriptive words, and Ideas: adding facts or details. Additional student models focus on the use of proper Standard English grammar usage. In Grades 2-6, more in depth instruction is provided in the Reading/Writing Workshop. Students analyze an expert model, focusing on a specific trait/skill. Students work with partners to discuss how the trait/skill is presented in the writing. Next students analyze a student model revision. Partners evaluate how the trait/skill was revised, how it improves the effectiveness of the writing model, and also propose additional revisions focused on the specific trait/ skill. Grammar and Usage revisions are also included in the model to emphasize for students how knowledge of the conventions of Standard English

	improves the effectiveness of writing. The Grammar Handbook at the back of the Reading/Writing Workshop is referenced through the writing instruction and is used by students during independent writing. Kindergarten Reading/Writing Workshop, Unit 7 pages 44, 45; Unit 10 pages 44, 45 Kindergarten Teacher Edition, Unit 4 pages T18, T58, T122 Grade 5 Reading/Writing Workshop pages 246-247, 318-319, 448-480
Students use specific criteria to evaluate the quality of writing.	At Kindergarten and Grade 1, Writing checklists are shared with students as they revise and evaluate their writing. At grades 2-6 writing rubrics are provided for Write about Reading activities. In addition, writing rubrics and anchor papers for narratives, informational, explanatory and opinion writing are used in the writing process lessons. Students review the rubrics and anchor papers as they revise their writing and to evaluate their writing. Generic rubrics are also provided. Teachers can work with students to create their own rubrics. Grade 2 Teacher's Edition, Unit 1, T480-T491 Grade 5 Teacher's Edition, Unit 5, T343-T361 Kindergarten-Grade 1 www.connected.mcgraw-hill.com; see Teacher Resources Grades 2-6 www.connected.mcgraw-hill.com; see Teacher Resources and Writer's Workspace
Students engage in collaborative learning experiences, such as peer review.	The power of collaborative learning is a cornerstone of the instructional plan of Reading Wonders in all grades throughout all parts of the instruction, including writing. The Collaborate logo throughout the student and teacher materials signals opportunities for collaborative discussions and learning. At Kindergarten and Grade 1 the shared and interactive writing lessons ask students to work together as a class to write, revise and evaluate their class writing. As they move to work on their independent writing, they work with peers to brainstorm ideas, give feedback on drafts and revisions and help evaluate writing after presentations. At Grades 2-6, opportunities for student collaboration in writing continues. Students begin analyzing expert and student writing models. Each week they write and revise shorter pieces of

	writing, meeting with peers to discuss revisions and how the revisions improved the writing. During the process lessons, students work in pairs after each step in the writing process. Peer conferencing checklists and speaking and listening checklists support the collaborative learning. Grade K Teacher's Edition, Unit 3, pages T18-T19, T32-T33, T40-T41, T50-T51 Grade 1 Teacher's Edition, Unit 4, pages T18-T19, T28-T29, T36-T37, T42-T43 Grade 2 Teacher's Edition, Unit 1, pages T22-T23, T36-T37, t48-T49, T54-T55 Grade 6 Teacher's Edition, Unit 2, pages T 30-T31, T32-T33, T34-T35, T344-T356
Lessons require students to compose a variety of text, including narratives, opinion pieces, and informative/exploratory texts, as indicated in the Standards	*Reading Wonders* provides in depth instruction, practice and application opportunities to compose a variety of text including narratives--real and imagined, opinion writing, and informative/explanatory writing. In Kindergarten and Grade 1, the shared, interactive and independent writing activities throughout the weeks focus on one of the required genres. At Grades 2-6, the various Write About Reading activities within each week ask students to write opinion, informative or explanatory writing. Each week, the writing trait and skill is taught and practiced in the context of one of these genres of writing, providing students the opportunity to write frequently within the week focused on a particular type of text. Additionally, the writing process genre lessons in each unit ask students to write longer pieces of writing in all the genres. Grade 1 Teacher's Edition Unit 1, pages T47, T125, T203, T281 Grade 2 Teacher's Edition Unit 6, pages T32, T34, T36, T452, T480-T491 Grade 4 Teacher's Edition Unit 1, pages T20, T25R, T30-T31, T344-T355
Students explore the variety of digital tools to produce and publish writing.	The Writer's Workspace in *Reading Wonders* Connect Ed provides a digital pathway for students to produce and publish their writing. Writer's Workspace takes students through each step of the writing process in a digital environment. Instruction, models, rubrics, checklists, grammar and usage references and other important writing support are included to assist students at each stage of the writing process.

	The writing process genre lessons and research activities encourage students to use various media to publish and present their work. Students learn how audio and visual displays enhance the publication and presentation of their writing. Digital assets accessible within the Student Center of *Reading Wonders* Connect Ed, including image and audio files can be used to publish and present various types of writing. Using the Reading/Writing Workshop, Literature Anthology, and Leveled Reader e Book writing tool, students can write their responses to text-dependent questions and other response to reading online and submit responses for teacher review. The My Binder tool in the student workspace allows students to create, revise, and submit their writing and research assignments as a digital submission to the teacher. Grades 1-6 www.connected.mcgraw-hill.com; Student Workspace-Read Grades K-6 www.connected.mcgraw-hill.com; Student Workspace-Write
Students participate in shared research and writing projects.	In Reading Wonders, students in Kindergarten through Grade 6 participate in shared research and writing projects throughout the year. Each week students work with partners or small groups to complete short research projects to explore and learn more about the topic or concept they are studying. Research Roadmaps provide guided support as they work their way through the steps of the research process. In Grades 1-6, students choose one of the short projects and conduct extended research on the topic. Working collaboratively, students learn how to assign roles, evaluate reliable print and media resources, cite evidence from sources, and organize and synthesize information in writing. Grade 1 Teacher's Edition Unit 2, pages T124-T125, T280-T281 Grade 4 Teacher's Edition Unit 1, pages T28-T29, T220-T221 Grades K-6: www.connected.mgraw-hill.com ,see the Collaborate section on the Teacher Workspace for research assignments online.

Speaking and Listening

"...children's understanding of the meaning of words and concepts and of other aspects of language such as sentence structure and listening comprehension, which they learn through their language interactions, are key foundational skills for later reading achievement"

(National Institute for Literacy, p. 1, para.1)

What are the processes involved in speaking and listening?

Oral language includes critical skills that allow children to:

- Communicate-listen and respond when people are talking
- Understand the meaning of a large number of words and concepts that they hear or read
- Obtain new information about things they want to learn about, and
- Express their own ideas and thoughts using specific language (National Institute for Literacy)

Oral language is divided into two subtypes: receptive language and expressive language. Receptive language is language that is heard and understood. Children exhibit receptive language skills when they listen and comprehend stories, understand vocabulary, engage in social exchanges with peers, and follow directions. Expressive language is the generation of thoughts, ideas, and needs through verbal and visual form. Children exhibit expressive language skills when they retell a story, incorporate vocabulary, and engage in discussion. Woven into these processes are other linguistic features and cognitive abilities, such as vocabulary, grammar, auditory memory, sequencing, and phonological processing, among others. Receptive language skills develop earlier than expressive language skills.

What is instruction in speaking and listening?

Instruction in speaking and listening focus on the following skills and processes:

- Understanding of information by answering questions about key details or facts
- Engaging in collaborative discussions
- Representing ideas and thoughts in oral and written form, as well as through media
- Reporting on topics and relating stories that contain key details and are presented in a logical fashion
- Speaking in complete sentences and utilizing developmentally appropriate vocabulary
- Differentiating contexts that require formal English from contexts where informal exchange is acceptable
- Interpreting and use images, graphics and symbols, as found in media
- Demonstrating understanding by rephrasing, summarizing

Why is instruction important?

There exists a complex interplay between speaking and listening skills and academic achievement. Speaking and listening are language-based processes that are prerequisites for reading and writing. Studies have shown that:

- Oral language skills, in conjunction with spelling and letter-writing fluency, are positively related to writing skills (Young-Suk, Otaiba, Puranik, & Folson, 2011) and reading skills (Cooper, Roth, Speece, & Schatschneider 2002).
- Expressive vocabulary knowledge and listening comprehension skills are related to word identification ability (Wise, Sevcik, Morris, Lovett, & Wolf, 2007, p. 1095).
- Receptive and expressive vocabulary knowledge are related to pre-reading skills (Wise, et.al, 2007)
- Expressive vocabulary and listening comprehension are related to word identification skills (Wise, et.al., 2007)

Common Core State Standards in English Language Arts Standard for Speaking and Listening: Students gain, evaluate, and present increasingly complex information, ideas, and evidence through listening and speaking as well as through media.

Examples by Grade

Kindergarten

- Participate in collaborative conversations with diverse partners about Kindergarten topics and texts with peers and adults in small and large groups
- Describe familiar people, places, things, and events, and with prompting and support, provide additional detail.
- Add drawings or other visual display to descriptions as desired to provide additional detail.

Grade 5

- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expression their own clearly.
- Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas of themes; speak clearly at an understandable pace.

Who benefits from instruction?

Kindergarten Students. Teachers are well aware that students embark upon their educational careers with varying degrees of development in their receptive and expressive language skills. Instruction at the Kindergarten and early elementary level includes engaging in shared discussions, learning to collaborate with peers, demonstrate understanding by answering and asking questions, turn-taking, and using rich, detailed description and new vocabulary.

Struggling Readers. A study of second- and third-grade students identified with a reading disability concluded that receptive and expressive vocabulary knowledge were related to pre-reading skills, and listening comprehension skills were found to facilitate word identification (Wise et.al., 2007). Engaging in activities designed to foster vocabulary and listening comprehension may benefit students who struggle in reading.

ELL Students. August and Shanahan (2006) state that "instruction in the key components of reading is necessary—but not sufficient—for teaching language-minority students to read and write proficiently in English" (p. 4) and that, "literacy programs that provide support in oral language development in English, aligned with high-quality literacy instruction are the most successful" (p. 4). Research conducted by Miller, Heilmann,, Nockerts, Iglesias, Fabiano, and Francis (2006) indicate that better oral language skills facilitate passage comprehension and word reading, in both Spanish and English. Further, higher English oral language skills are associated with higher Spanish reading scores, and higher Spanish oral language skills are associated with higher English reading scores, indicating a ‘cross-language’ effect. August and Shanahan (2006) note that:

> *…well-developed oral proficiency in English is associated with English reading comprehension and writing skills for these students. Specifically, English vocabulary knowledge, listening comprehension, syntactic skills, and the ability to handle metalinguistic aspects, such as providing definitions or words, are linked to English reading and writing proficiency (p 4).*

Research Recommendations for Speaking and Listening

Range and scope of instruction

Grade Level. The *Standards* address speaking and listening skills from Kindergarten and above. Two areas of focus, *Comprehension and Collaboration*, and *Presentation of Knowledge and Ideas* are listed. Students engage in grade-appropriate collaborative conversations with peers and follow rules of discussions. Students express their thoughts and ideas in verbal and visual form, and add rich detail and relevant facts.

Speaking and Listening Research Recommendations	Demonstration of Alignment in Reading Wonders
Students develop and refine speaking and listening skills by participating in collaborative learning activities.	*Reading Wonders* provides opportunities for students in all grades to engage in partner, small group, and whole class discussions. Each week of the program is organized around a weekly concept. In the Reading/Writing Workshop, students discuss the concept as a class, sharing information and answering an Essential Questio*n* related to the concept. In grade 2, unit 5, week 3, page 358, students discuss the concept of heroes and answer the Essential Question: What do heroes do? In grade 6 unit 1, week 3, page 46, students discuss the concept of environments and answer the Essential Question: How do life forms vary in different environments? The Talk About It feature supports the essential question and extends the discussion, providing students with an opportunity for collaborative conversations in pairs or groups. Instruction to help students successfully manage collaborative conversations, as both speakers and listeners, is provided in the Teacher’s Edition lessons Introduce the Concept and Start Smart. The Instructional Routines Handbook provides teaching strategies for conducting Collaborative Conversations in the classroom. The Professional Development Videos also model Collaborative Conversations taking place in the classroom.

	In grades 2-6, the Reading/Writing Workshop instructional lessons: Vocabulary, Comprehension Strategy, Comprehension Skill, Genre, Vocabulary Strategy and Readers to Writers each include a Your Turn activity in which students, working in pairs, engage in additional close reading and discussion of the text. In grade 1, the Words to Know, Phonics/Fluency, Comprehension Skill, and Writing and Grammar lessons also include a Your Turn partner activity. In the Literature Anthology, the Make Connections questions that appear at the end of each selection provide opportunities for students to discuss the text with partners, using text evidence to support their responses. Grade 2 Teacher's Edition, Unit 1, pages S5, S29 Grade 1 Teacher's Edition, Unit 5, page T191L Grade 6 Teacher's Edition: Unit 4, page T89N www.connected.mcgraw-hill.com; see the Teacher's Resources for Instructional Routines Handbook PDFs and Professional Development
Students demonstrate the ability to orally present ideas in a logical, thoughtful manner.	In the Teacher's Edition, the Research and Inquiry activities that wrap up each week provide students with opportunities to practice and demonstrate presentation skills. During Research and Inquiry, students work with a partner or in small groups to complete a project and orally present their findings to the class. In the Research and Inquiry project for grade 1, unit 3, week 5, pages T356-T357, students work with a partner to create a flowchart that shows where food comes from. Partners choose a food to research, find out how that food is produced, and create a flowchart—including illustrations and text— to explain the steps in the process. Students then share their flowcharts with the class. In grade 4, unit 2, week 5, students research an animal that can be found living in their state, gather visuals to support their research, and present the information to the class. As part of the presentation process, students use the online Presentation Checklist to evaluate their roles in the presentation. Oral presentation skills are also reinforced in the Unit Research project. For this activity, students

	are divided into five groups; each group selects a project relating to one of the Essential Questions from the unit. Groups complete their research, organize the information, and take turns presenting their projects to the class. Evaluation checklists are available both for students, to help them assess their research and presentation skills, and for teachers, providing guidelines and rubrics. In grades 1-6, writing instruction in the Teacher's Edition provides students with multiple opportunities to orally present their ideas. As part of the Weekly Writing lessons, students select a piece of their own writing to share with peers. In grades 2-6 Unit Writing, students present drafts of their writing pieces for peer review and response. In each unit of the Teacher's Edition, the CelebrateShare Your Writing lesson invites students to select, prepare, and orally present a piece of writing they have worked on throughout the unit. Grade 4 Teacher's Edition, Unit 2 page T334-335. Grade 5 Teacher's Edition, Unit 3 pages T31-T32. T346-T347, T352-T353, T334-T335.
Students contribute their own ideas and incorporate the ideas of others when engaging in collaborative discussions.	The Small Group Differentiated Instruction in the Teacher's Edition includes Literature Circles; activities for students at all reading levels—Approaching, On-level, Beyond, and English Language Learners—to engage in collaborative conversations, sharing and exchanging ideas. In grades 2-6, students have the opportunity to guide the discussions, using the Thinkmark questions in the Leveled Reader appropriate to their group. In grade 1, the discussions are teacher-led. The Workstation Activity Cards also provide opportunities for collaborative discussions. Each of the four types of cards: Reading, Writing, Phonics/Word Study, and Science/Social Studies, includes activities that students can complete by working with a partner. Additional collaborative opportunities in the Teacher's Edition include the Text Connections activities. Students work in groups to compare and analyze the Reading/Writing Workshop and Leveled Reader texts they read throughout the week and orally present their ideas and findings to

	the class, encouraging further discussion. Grade 6 Teacher's Edition, Unit 2 pages T29, T41, T49, T53,T59
Students acquire an understanding of diversity through interpersonal communications and interactions.	The Make Connections questions in the Reading/Writing Workshop and Literature Anthology provide students with opportunities to discuss how the weekly texts they have read relate to their own lives, as well as to the world around them. By sharing information and ideas, students gain a greater understanding and appreciation of diversity. Grade 3 Reading/Writing Workshop pages 48, 123. Grade 5 Literature Anthology page 315.
Students incorporate a variety of media elements when presenting information.	Across grades 1-6, the Research and Inquiry projects in the Teacher's Edition provide opportunities for students to incorporate a variety of media elements as part of their presentations. In grade 3, unit 4, week 5, page T284, pairs of students work together to create a poem and accompanying audio recording about people who have inspired them. In grade 5, unit 5, week 3, page T156, students have the option of creating a website entry or podcast that describes a nature reserve or a wildlife sanctuary they have researched. As part of the Unit Writing instruction in the Teacher's Edition, students select either a print or digital format to use when publishing their final writing products. For example, grade 3 students can choose to present their unit 5, week 6 opinion essay as an art mobile, on a debate wall, as a social networking page, or as a slide show.
Teachers use a variety of instruction methods, such as read-aloud, to assist students in acquiring a rich and varied vocabulary.	In grades K-2, the Interactive Read Aloud cards help students acquire a rich and varied vocabulary through oral exposure to a variety of literature and nonfiction selections. The five oral vocabulary words introduced each week are highlighted and used in the context of the selection. Instructional routines for oral vocabulary and retelling are included for support. In grades 2-6, the Vocabulary Strategy lessons in the Reading/Writing Workshop provide instruction to help students acquire a rich and varied vocabulary. Among the lessons featured are

	those that deal with synonyms, antonyms, homographs, homophones, figurative language, prefixes, suffixes, and morphology. In grades 3-6, the Build Vocabulary lessons in the Teacher's Edition include a variety of collaborative activities that extend the instruction. The activities in grade 6, unit 2, week 3, page T166-T167, for example, can be used to reinforce academic vocabulary, root words, connotation and denotation, shades of meaning, and morphology. Additional opportunities for vocabulary enrichment are provided in the Access Complex Text Vocabulary feature in the Teacher's Edition. This feature provides students with instruction on domain- specific vocabulary words from the week's readings that may be unfamiliar. Grade 1 Teacher's Edition, Unit 3 page T21 Grade 4 Reading/Writing Workshop page 201 Grade 3 Teacher's Edition, Unit pages T38-T39. Grade 5 Teacher's Edition, Unit 5 pages T217E, T217K.

Vocabulary Acquisition and Use

"Of the many compelling reasons for providing students with instruction to build vocabulary, none is more important than the contribution of vocabulary knowledge to reading comprehension"

– Baumann, Kame'enui, & Ash, 2003.

What is vocabulary?

Vocabulary is knowledge of the meaning, use, and pronunciation of individual words. It includes both oral vocabulary–words we use in speaking or recognize in listening–and reading vocabulary–words we use or recognize in print. Vocabulary is a key component of comprehension. Before readers can understand the meaning of spoken or written text, they must know what most of the words mean.

The *Standards* conceptualize vocabulary in two ways. First, the Standards emphasize the need for students to expand the breadth of their vocabulary knowledge; that is, to acquire a healthy stock of words. Second, the *Standards* indicate that students be able to not only interpret the meaning and tone of words in context, but also to use words appropriately. Vocabulary is an important component of many aspects of literacy, including listening comprehension, oral expression, reading comprehension, and written expression.

Why is vocabulary instruction important?

Much of our vocabulary knowledge comes from simple exposure to new words in context. However, research has verified that direct instruction in vocabulary–specifically teaching the meaning of new words, and teaching strategies for vocabulary building–has a positive impact on students' language development.

Two links (to comprehension and to specific skills) to vocabulary development are discussed below:

Link between vocabulary development and reading comprehension. According to the National Reading Panel (NRP), although a direct causal link between vocabulary development and reading comprehension has not been established by research, still a variety of studies "underscore the notion that comprehension gains and improvement on semantic tasks are results of vocabulary learning" (NICHHD, 2000, pp. 4-15, 4-20, citing 7 studies). Similarly, a longitudinal study on early reading development among British school children found evidence that vocabulary knowledge, as tested at the start of the students' first year of school, was one of three predictors of reading comprehension during the first year, as tested at the start of the students' third year of school–a span of two school years (Muter et al., 2004).

Effects on specific skill areas. According to a review of research on early childhood reading commissioned by the National Research Council (NRC), "Vocabulary instruction generally does result in measurable increase in students' specific word knowledge. Sometimes and to some degree it also results in better performance on global vocabulary measures, such as standardized tests, indicating that the instruction has evidently enhanced the learning of words beyond those directly taught. Second, pooling across studies, vocabulary instruction also appears to produce increases in children's reading comprehension" (Snow, Burns, & Griffin, 1998, p. 217). A review of research conducted by the National Early Literacy Panel indicated that "more complex aspects of oral language, such as grammar, definitional vocabulary, and listening comprehension, had more substantial predictive relations with later conventional literacy skills" (National Institute for Literacy, 2008, p. 78).

Who benefits from vocabulary instruction?

All Students. Research suggests that, when provided with direct instruction, children in Kindergarten and first-grade can acquire sophisticated vocabulary (Beck & McKeown, 1991; 2007). The NRP analysis underscored the fact that development of reading ability is dependent on oral vocabulary: in order for students to understand a word once it has been decoded, it must already be part of their vocabulary (NICHHD, 2000, p. 4-15). Similarly, the NRC report argues that "Learning new concepts and the words that encode them is essential for comprehension development" (Snow, Burns, & Griffin, 1998, p. 217). Based on these factors, it seems reasonable to conclude that even before students can read independently, direct methods for building oral vocabulary may help contribute to students' ultimate success in reading.

Common Core State Standards in English Language Arts:
Standard for Vocabulary Acquisition and Use

Vocabulary acquisition and use is incorporated throughout reading, writing, listening, and speaking instruction.

Examples

Kindergarten:

- Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on Kindergarten reading and content
- With guidance and support from adults, explore word relationships and nuances in word meanings
- Use words and phrases acquired through conversations, reading, and being read to, and responding to texts

Third-Grade:

- Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies
- Demonstrate understanding of figurative language, word relationships, and nuances in word meanings
- Acquire and use accurately grade-appropriate conversational, general academic, and domain specific words and phrases, including those that signal spatial and temporal relationships (www.corestandards.org)

Research Recommendations for Vocabulary

Range and Scope of Instruction

Grade Levels. The *Standards* incorporate vocabulary acquisition and use across all grade levels. Grade K-2 materials must provide ample instruction and exercise for those students possessing weak vocabulary knowledge, which may include non-native English speakers. The acquisition of academic vocabulary, or Tier 2 words, is of particular emphasis.

Instructional Methods and Features. Multiple strategies, incorporating direct and indirect vocabulary instruction. Based on research surveyed by the NRP, "It is clear that vocabulary should be taught both directly and indirectly"–that is, using both explicit instruction in vocabulary and methods of decoding word meanings, on the one hand, and more contextual approaches to exposing students to vocabulary on the other (NICHHD, 2000, p. 4-24). Based on both the research results it reviewed and theoretical considerations, the NRP further recommended that reading instruction include a combination of different strategies, both direct and indirect, for building vocabulary, rather than relying on only one method (NICHHD, 2000, p. 4-27).

The *Standards* emphasize that instruction should guide students to extract word meaning from the context in which it is used, and yet provide support for those students unlikely to determine word meaning from text alone. For example, English language learners may require support in mastering high-frequency words that are essential to reading grade-level text.

Instructional Methods and Features
Deriving meaning from context (NICHHD, 2000, 4-23, citing 2 studies) and a combination of context based and definitional approaches (NICHHD, 2000, p. 4-23, citing 2 studies)

"Restructuring the task" of learning new words in a variety of different ways, such as providing redundant information and providing sample sentences along with definitions (NICHHD, 2000, pp. 4-22–4-23, citing 7 studies)

Direct instruction in "vocabulary items that are required for a specific text to be read as part of the lesson" (NICHHD, 2000, pp. 4-24–4-25, citing 4 studies). This includes pre-instruction of vocabulary before the reading or lesson (p. 4-25, citing 3 studies).

Storybook reading. A body of research evidence shows that "reading storybooks aloud to young children . . . results in reliable gains in incidental word acquisition" (Ewers & Brownson, 1999, p. 12, citing 5 additional studies).

"Active student participation," including activities such as student-initiated talk in the context of listening to storybooks (NICHHD, 2000, pp. 4-21, 4-26, 4-27). This calls for active student participation, as in the findings of Ewers and Brownson (1999), who reported on a study in which a storybook with 10 targeted vocabulary words was read aloud individually to 66 kindergarteners. Pretest-posttest comparison found that students in both treatments learned a significant number of the targeted vocabulary words; however, students in the active (question-answering) treatment learned significantly more words than those in the passive treatment. This result was true both of students with a high phonological working memory and of those with a low phonological working memory.

"Richness of context in which words are to be learned," including "extended and rich instruction of vocabulary (applying words to multiple contexts, etc.)" (NICHHD, 2000, pp. 4-22, 4-27). Along similar lines, the NRC report cites a review of studies in which "methods in which children were given both information about the words' definitions and examples of the words' usages in a variety of contexts resulted in the largest gains in both vocabulary and reading comprehension," compared to drill and practice (Snow, Burns, & Griffin, 1998, pp. 217–218, citing Stahl & Fairbanks, 1986). The NRP further recommended that vocabulary items should be "derived from content learning materials" and likely to appear in a variety of other contexts as well (NICHHD, 2000, p. 4-25).

"High frequency and multiple, repeated exposures to vocabulary material" (NICHHD, 2000)

Vocabulary Acquisition Research Recommendations	Demonstration of Alignment in Reading Wonders
Vocabulary development begins in Kindergarten and increasingly focuses on the acquisition of Tier 2 (academic) vocabulary.	In kindergarten and first grade, exposure to new words begins with oral vocabulary development. The "Talk About It" weekly openers help develop oral vocabulary and build background knowledge about the weekly theme. New oral vocabulary words are introduced with the Visual Vocabulary Cards. The words are incorporated and repeated throughout the week to provide multiple exposure and understanding in context. New vocabulary is also introduced through the Literature Big Books and the Interactive Read-Aloud Cards.

	For example, in Grade 1, Unit 1, Week 1, on Day 1 students are introduced to new oral vocabulary with the Visual Vocabulary Words. The words are linked to the theme “At School” and students talk about what they do at school. On Day 2, students review and are introduced to new oral vocabulary words related to the theme using the Visual Vocabulary Cards. Students continue to build on this vocabulary throughout the week by reading and talking about school, using the Interactive Read-Aloud Cards “Schools Around the World” on Day 2, the Literature Big Book on Day 3, and the selections in the Literature Anthology on Day 4 and 5. Beginning in Grade 1, Unit 4, Tier 2 vocabulary words that have been selected from main selection in the Literature Anthology, are introduced each week. In addition, domain-specific words are introduced in context through selections in the Literature Anthology. The Access Complex Text feature provides scaffolding to help students with specific vocabulary in selections. For example, in the Grade 4, Unit 6, Week 4, students are introduced to Tier 2 (academic) vocabulary related to money and economics. Students begin the week by discussing the concept “Money Matters.” They use a Concept Web to generate words and phrases related to money. The vocabulary, selected from the Main Selection in the Literature Anthology, for the week includes *economics*, *entrepreneur*, and *currency*. The Shared Read in the Reading/Writing Workshop “The History of Money” and the selection in the Literature Anthology “The Big Picture of Economics” use these Tier 2 words. Students discuss and write with this academic vocabulary throughout the week. The Access Complex Text feature in the main selection provides additional scaffolding for the vocabulary words *scarcity* and *opportunity*. They have the chance to apply the words when they complete the Research and Inquiry project for the week, Researching World Currencies. In addition, the Readers to Writers feature focuses on how to use content words in writing. Kindergarten Teacher’s Edition, Unit 4 pages T11, T25, T41, T49, T87 Grade 1 Teacher’s Edition, Unit 1 pages T8-9, T20, T113B, T347B

	Grade 4 Teacher's Edition, Unit 6 pages T202-T203, T206-T207, T217E, T220, T222-223, T230-T231
Reading instruction includes a combination of strategies, both direct and indirect, for building vocabulary.	Reading Wonders includes both direct and indirect strategies to build vocabulary. Students build vocabulary indirectly by listening to, reading, and discussing fiction and nonfiction texts. In Kindergarten and Grade 1, each week of instruction includes reading selections in the Reading/Writing Workshop Big Book, a Literature Big Book, Interactive Read-Aloud Cards, and Leveled Readers. In grades 2 to 6, each week includes reading selections in the Reading/Writing Workshop, the Literature Anthology, an Interactive Read-Aloud, Leveled Readers, and the Classroom Library. Direct vocabulary instruction is also present throughout Reading Wonders. Key vocabulary words are taught to students before reading. Students also learn vocabulary strategies to help them decode word meanings, including identifying inflectional endings, root words, prefixes and suffixes, and Greek and Latin roots. They learn to recognize homophones, homographs, idioms, and figurative language. They learn to use print and online reference materials, including dictionaries and glossaries. For example, in Grade 2, Unit 3, Week 5, the Vocabulary Strategy lesson in the Reading/Writing Workshops teaches the prefixes *re,* and *ex-* and students learn how words parts can help them figure out the meaning of a word. Students practice the strategy in the Leveled Practice Book. Prefixes are also shown and taught in context in the main selection in the Literature Anthology. In Grade 4, Unit 6, Week 3, the Vocabulary Strategy lesson in the Reading/Writing Workshop teaches Latin and Greek Prefixes *non-*, *pre-*, *bio-*, and *hyper*. Students practice the strategy in the Leveled Practice book. The Latin and Greek Prefixes are also show and taught in context in the main selection in the Literature Anthology. Grade 2 Reading/Writing Workshop, Unit 3 page 253 Grade 4 Reading/Writing Workshop, Unit 6 page 417 Grade 4 Teacher's Edition, pp. T166-T167, T178

Vocabulary is taught using a variety of specific instructional methods, such as context-based approaches, restructuring, and pre-instruction in vocabulary before the reading lesson begins.	Pre-instruction, context-based instruction and restructuring are all used to teach vocabulary in Reading Wonders. New vocabulary words are introduced to student each week before they begin reading the selection. The Visual Vocabulary Cards and the Words to Know section in the Reading/Writing Workshop are used to introduce new vocabulary to students before reading. Beginning in Grade 1, students are also taught to use context clues to figure out the meaning of unknown words. Students are taught to use sentence and paragraph clues, definitions and restatements, synonyms, and antonyms throughout. Students are also given opportunities to learn new words in a variety of ways. Sample sentences and multiple definitions are given for the vocabulary words each week. Grade 5 Reading Writing Workshop, Unit 3 pages 164-165 Grade 5 Teacher's Edition, Unit 3 pages T24-25, T102
Storybooks are read aloud to children.	Students have many opportunities to hear storybooks read aloud. In Kindergarten and Grade 1, teachers read and discuss Literature Big Books and Interactive Read Alouds with the class. In addition, the Reading/Writing Workshop are used for Shared Reading. In grades 2-6, each week's lesson begins with an Interactive Read-Aloud. The Reading/Writing Workshop includes the "Shared Read" Main selections in the Literature Anthology can be read aloud. Interactive Read Alouds and Classroom Library Tradebooks are also read aloud to students. Grade 5 Teacher's Edition, Unit 4 page T77 Grade 5 Reading/Writing Workshop, Unit 4 pages 252-255 Grade 5 Literature Anthology, Unit 4 pages 282-291
Students are given both information about the words' definitions and examples of the words' usages in a variety of contexts.	In Reading Wonders, students encounter the vocabulary words in each week's lesson in a variety of contexts. Teachers use the Visual Vocabulary Cards and a Define/Example/Ask routine to introduce vocabulary words. The vocabulary words also appear in "Words to Know" in the Reading/ Writing Workshop. Each word is used in a sentence and is supported by a picture. The words are also used in the Shared

	Read in the Reading/Writing Workshop, in the main selection in the Literature Anthology, and in the Leveled Readers. Students also generate different forms of the word. For example, in Grade 3, Unit 2, Week 2, the word *immigration* is introduced with the Visual Vocabulary Card. The word is defined and used in a sentence. It appears again in "Words to Know" in the Reading/Writing Workshop. The word is used in a sentence and students are prompted to answer a question using the word. The word is encountered and discussed in "Sailing to America" in the Reading/Writing Workshop and "The Castle on Hester Street" in the Literature Anthology. The Approaching, On, and Beyond Leveled Readers for the week include the word *immigration* in the text. Students also generate different forms of the words by removing, changing of adding inflectional endings. Grade 3 Teacher's Edition, Unit 2 page T80 Grade 3 Reading Writing Workshop, Unit2 page 117 Grade 3 Literature Anthology, Unit 2 pages 130-132
Vocabulary items are derived from content learning materials.	In grades 1-6, vocabulary words are taken from the weekly main selection in the Literature Anthology. The words are introduced in the Shared Read and used again the Leveled Readers The students' leveled Practice Books provide further word exploration. Leveled readers and the Classroom Library also reinforce vocabulary development. In addition, domain-specific vocabulary words used in the Literature Anthology selections are identified and taught. Grade 5 Reading Writing Workshop, Unit 3 pages 166-169 Grade 5 Literature Anthology, Unit 3 pages 182-193 Grade 5 Leveled Reader Unit 3, Week 1
Vocabulary is taught through active (question-answering) student participation.	In Reading Wonders, the vocabulary lessons incorporate active student participation throughout. Each week, new vocabulary is introduced using the Visual Vocabulary Cards. The Vocabulary Routine on the cards ends by asking students a question related to the word. After the new vocabulary has been introduced, students discuss the new words with a partner and

	write questions using the words. This type of active student participation continues throughout the week. Students discuss the words with other students, practice using the words, and write with the words. For example, in Grade 5, Unit 1, Week 2, on Day 1 students practice using the new vocabulary by answering questions that use the new words. On Day 2, they are asked to generate new forms of the words by adding, changing, or removing inflectional endings. On Day 3, students complete sentence stems using the words. On Day 4, student write sentences in their word study notebooks using the words. On Day 5, they complete Word Squares for each vocabulary word. In the first square, they write the word. In the second square, they write a definition, in the third square, they draw an illustration that will help them remember the word. In the fourth square, students write antonyms for the word. Student share and discuss their word squares with a partner. Grade 2 Your Turn Practice Book, Unit 1 pages 1-2, 30 Teacher's Edition Grade 5, Unit 2 pages T78-T79 Grade 5 Your Turn Practice Book, Unit 2 pages 68
Word recognition is regularly assessed in multiple ways.	Assessment matches instructional context. In Leveled Practice Books, students choose vocabulary words from a list to complete each sentence. They write original sentences using the vocabulary words. Words are highlighted in the reading selections, and students stop at each word and identify clues to the meanings. They suggest or review the meanings as well. They complete graphic organizers such as semantic webs, and they add words to the Word Wall. Students also use a Practice Book page each week to demonstrate pronunciation and comprehension of vocabulary words. Weekly Assessments and Unit Test provide formal assessments of students' progress. Grade 3 Your Turn Practice Book, Unit 2 page 68 Grade 3 Teacher's Edition, Unit 2 page T143 Grade 5 Your Turn Practice Book, Unit 2 page 71
Additional instruction is provided for those students who need support mastering high-frequency words.	In K-1, the Visual Vocabulary Cards include high-frequency words. High-frequency words are also covered in the daily Word Work section. In grades 2-6, the small group lessons for

	Approaching level students include high-frequency word review each week. The high-frequency words cards can be used for repeated practice. Tier 2 Intervention Fluency Teacher’s Edition Guides also include additional instruction of high-frequency words. Kindergarten Teacher’s Edition, Unit 4 page T17 Grade 3 Teacher’s Edition, Unit 2 page T112 K- 2 Tier 2 Intervention Fluency Teacher’s Edition page 38

Conventions of Standard English and Knowledge of Language

Language choice is a matter of craft for both writers and speakers

*(*Common Core State Standards for English Language Arts, Appendix A*, p 28)*

What is meant by 'conventions of standard English' and 'knowledge of language'?

Conventions of standard English include grammatical structures, usage and mechanics, or the 'nuts and bolts' of writing and speaking. For example, students are expected to develop well-constructed sentences that contain correct spelling, punctuation, and grammar. Knowledge of language includes, for example, the ability to select words for effect, compare and contrast varieties of English (e.g., dialects and registers), and differentiate contexts that require formal English from those contexts where informal usage is acceptable and appropriate. In conjunction, students must develop knowledge regarding the 'digital mechanics' of audio-visual formats (Rice, 2008). These are elements that students must master as they increase the range and complexity of encountered text, engage in academic and social discourse, and as they prepare written communications.

Why is instruction important?

The conventions of Standard English and language use and structure extend into all literacy domains, including reading, writing, and speaking and listening. Students benefit from instruction for the following reasons:

- Students who gain control over Standard English grammar, usage, and mechanics are better able to effectively communicate their ideas, knowledge, and opinions through oral discussions and written work.
- Students who gain control over conventions of Standard English grammar, usage, and mechanics can more easily master the use of digital texts than students who lack this control.
- The ability to manipulate the language orally as well as the ability to decode words supports vocabulary development (www.readtennessee.org)

Who benefits from instruction?

All Students. It is recommended that, "an essential element in developing a comprehensive writing policy is the identification of effective instructional procedures, not just at the secondary level…but with younger students as well" (Saddler & Graham, 2005, p 43). The goal of explicit, strategic writing instruction is two-fold: first, to enhance the writing skills all children, from early elementary school on; and second, to minimize the number of children who experience difficulties learning to write (Graham & Harris, 2002). Writing instruction benefits all students, as"the teaching of writing skills such as grammar and spelling reinforces reading skills" (Graham & Herbert, 2010, p. 7).

Common Core State Standards in English Language Arts: Standard for Conventions of Standard English and Knowledge of Language:

Demonstrate command of the conventions of Standard English grammar and usage when writing and speaking. Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Conventions of Standard English are addressed for grades Kindergarten and above. Knowledge of Language begins in grade 2.

Examples

Kindergarten

- Print upper- and lowercase letters
- Use frequently occurring nouns and verbs
- Produce and expand complete sentences in shared language activities
- Understand and use question words (e.g., who, what, where, when, why, how)

Third-Grade

- Form and use regular and irregular verbs
- Produce simple, compound, and complex sentences
- Use spelling patterns and generalizations in writing words
- Ensure subject-verb and pronoun-antecedent agreement

Research Recommendations Conventions of Standard English and Knowledge of Language

Range and Scope of Instruction

Grade Level. Explicit instruction on conventions of Standard English begin in Kindergarten and extend throughout the later grades. Knowledge of language begins in grade 2. Graham and Harris (1994) recommend direct, skill-oriented instruction designed to foster text-production skills (e.g., spelling, grammar). For example, fourth-grade students identified as either more or less skilled in their writing benefitted from strategic instruction designed to improve their ability to construct sentences (Saddler & Graham, 2005). Teaching basic skills, such as grammar within the context of writing— instead of teaching them in isolation—has been shown to enhance writing performance (Fearn & Farnan, 2007).

Conventions of Language Research Recommendations	Demonstration of Alignment in Reading Wonders
Students participate in shared-language activities to refine and develop their language skills.	Shared-language activities are integrated into daily instruction throughout the grades. Teachers encourage students to express their ideas in a thoughtful and organized manner, while incorporating the specific lessons being taught hat week. **All Grades:** Students regularly participate in Collaborative Conversations as they discuss the weekly topics and concepts, talk about selections read, and practice skills in partner activities. Students share ideas speaking in complete sentences, using conventions of Standard English and incorporating the academic vocabulary they have been learning. Teachers model how to speak clearly using more formal standard English in discussions and responses to questions. Students are guided to speak clearly and coherently, using the more formal Standard English conventions while

	speaking and listening carefully and respectfully to others. At Kindergarten and Grade 1, students engage in shared and interactive writing activities. During these activities, specific grammar and usage skills are introduced, practiced and applied. In Grades 1-6, as students revise and edit their own writing each week, students discuss revisions and edits in peer conferences. In Grades K-6, the daily grammar lessons ask students to work together to practice and apply conventions of grammar and usage in writing and speaking and listening activities. These oral activities are identified by the “Talk about It” label in the lessons. Grade 1 Teacher’s Edition: T9, T18, T19, T114–T115 Grade 2 Teacher’s Edition, Unit 1: T8, T36, T54–T55 Grade 3 Teacher’s Edition, Unit 1 pages T10, T34–T35, T36–T37 Grade 4 Teacher’s Edition, Unit 1 pages T10, T32–T33, T34–T35
Students receive strategic, direct instruction regarding the “rules” of formal written and spoken English.	Explicit instruction on conventions of Standard English is provided throughout all grade levels. Through daily lessons and activities, students develop understanding of the conventions of Standard English grammar, usage, and mechanics. This knowledge of language allows students to effectively communicate their ideas, knowledge, and opinions in writing and in speaking **All Grades:** Daily direct and explicit instruction in standard English grammar, mechanics and usages is provided throughout grades K-6. Grammar is taught in the context of writing. After instruction and guided practice in a particular skill, students apply that skill in speaking activities as well as in their writing At Grades K-6, the Readers to Writers pages in the Reading/Writing Workshop teach grammar rules as it applies to student writing. At Grades 2-6, the Grammar Handbook provides specific rules and instruction, as well as activities for practice. Students use the Grammar Handbook as a resource to develop their own writing.

	Grammar Practice pages provided for grades 1-6 are also another opportunity for students to review and practice the rules of formal English. A variety of interactive grammar games and activities that offer practice in grammar, mechanics and usage can be found on the Student Workspace at www.connected.mcgraw-hill.com. Kindergarten Teacher's Edition, Unit 1 page T19 Kindergarten Reading/Writing Workshop page 56 Grade 1 Teacher's Edition, Unit 1 page T115 Grade 1 Reading/Writing Workshop pages 46–47; Grade 1 Grammar Practice Book pages 1–5 Grade 5 Teacher's Edition, Unit 1 pages T34–T35 Grade 5 Reading/Writing Workshop pages 30–31; Grade 5 Grammar Practice Book pages 1–5
Students approach language as a matter of craft, and make informed choices among alternatives.	Students are taught to analyze expert models, student models, and their own writing in regards to the use of language. The instruction in *Reading Wonders* emphasizes the power of revision, focusing on the use of language as a craft to improve the effectiveness of writing and speaking. **All Grades:** Across all grades, the Readers to Writers weekly lessons in the Reading/Writing Workshop teaches students how to revise for grammar and usage, such as sentence fluency, or use of punctuation to make their writing more effective. To help develop their proficiency in revising their writing, students are taught to look at how the conventions of language affect their writing. In teacher conferences and peer conferences each week. Choices on how to revise the use of language are discussed. Speaking Checklists and Presentation Rubrics also emphasize the effectiveness of the proper use of language in speaking to an audience. The Workstation Writing Activity Cards provide additional practice in revising writing. Grade 1 Teacher's Edition, Unit 1 pages T50, T114–T115, T402 Grade 1 Reading/Writing Workshop pages 46–47 Grade 3 Teacher's Edition, unit 1 pages T34–T35 T342 Grade 3 Reading/Writing Workshop pages 32–33

	Grade 4 Teacher's Edition, Unit 1 pages T32–T33, T334 Grade 4 Reading/Writing Workshop pages 30–31

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Reading Wonders Comprehensive Reading Curriculum
Synopsis of Findings and Technical Appendix

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Technical Appendix (IESD)

IESD Research:
McGraw-Hill Education

- Recent research related to reading instruction was identified through a combination of referral by reading experts and review of important research journals.

McGraw-Hill Education has a longstanding tradition and commitment to helping every child learn to read–a tradition that continues today with McGraw-Hill Education's *Reading Wonders*. Our commitment to helping all American children master the skills and strategies they need to become successful readers and lifelong learners is as strong as ever.

Increasingly, federal, state, and local requirements in every area focus on the need for research-verified instructional strategies, methods, and approaches. McGraw-Hill Education *Reading Wonders* has stepped up to this challenge by identifying reputable research related to effective reading instruction, summarizing relevant instructional recommendations based on that research, and then showing how those recommendations are incorporated into McGraw-Hill Education *Reading Wonders*. This paper presents the results of that research-based process.

Development of this research-based white paper included the following steps.

- Recent research related to reading instruction was identified through a combination of referral by reading experts and review of important research journals.
- Research sources were reviewed and summarized, with special reference to
  - Details of the supporting research evidence
  - Strength of the link between the research and specific instructional recommendations.

Sources and findings were excluded which failed in one of these respects, or in overall quality of the research as reported.

- Cross-comparison of the research-based recommendations and McGraw-Hill Education Reading verified that each research-based recommendation listed in this white paper is supported by McGraw-Hill Education Reading Research Sources.

This paper summarizes key research findings and research-based recommendations related to effective reading instruction from several key sources:

- Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (National Institute of Child Health and Human Development [NICHHD], 2000). This source presents an extensive, detailed research review related to five broad categories (see above under Reading First Content Focus). In cases where the data were of sufficient quality and uniformity, research results were summarized in a meta-analysis, a method for statistically combining research results across an entire body of research studies.
- Preventing reading difficulties in young children, a review of research on early childhood reading commissioned by the National Research Council (Snow, Burns, & Griffin, 1998). This source represents a broad-ranging research summary and review, but without inclusion of specific details of the research.
- Writing to Read: Evidence for How Writing Can Improve Reading. A Report from the Carnegie Corporation of New York (Graham & Herbert, 2010). This document provides a meta-analysis of research on the effects of specific types of writing interventions found to enhance students' reading skills.

- Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools. A Report from the Carnegie Corporation of New York (Graham & Perin, 2007). This report provides a review of research-based techniques designed to enhance the writing skills of 4th to 12th grade students.
- Improving Reading Comprehension in Kindergarten Through 3rd Grade: A Practice Guide. (Shanahan, Callison, Carriere, Duke, Pearson, Schatschneider, & Torgesen, 2010). This article contains recommended research-based practices in reading, according to level of evidence assigned by a panel of experts.

Additionally, specific findings have been incorporated from other recent, reputable research related to reading development, instruction, and assessment:

Correlation

Barger, J. (2003). Comparing the DIBELS oral reading fluency indicator and the North Carolina end of grade reading assessment. (Technical Report). Asheville: North Carolina Teacher Academy.

Quasi-experimental

Beck, I.L., & McKeown, G. (2007). Increasing young children's oral vocabulary repertoires through rich and focused instruction. The Elementary School Journal, 107(3), 251-271.

Correlation

Buck, J., & Torgesen, J. (2003). The relationship between performance on a measure of oral reading fluency and performance on the Florida Comprehensive Assessment Test. (FCRR Technical Report No. 1). Tallahassee: Florida Center for Reading Research. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index.php

Cooper, D.H., Roth, F.P., Speece, D. L. & Schatschneider, C. (2002). The contribution of oral language skills to the development of phonological awareness. Applied Psycholinguistics, 23, 399 – 416

Correlation

Elbro, C., & Petersen, D. K. (2004). Long-term effects of phoneme awareness and letter sound training: An intervention study with children at risk for dyslexia. Journal of Educational Psychology, 96(4), 660-670.

Experimental/ Quasi-experimental

Ewers, C. A., & Brownson, S. M. (1999). Kindergartners' vocabulary acquisition as a function of active vs. passive storybook reading, prior vocabulary, and working memory. Journal of Reading Psychology, 20, 11-20.

Experimental

Fearn, L., & Farnan, N. (2007). When is a verb? Using functional grammar to teach writing. Journal of Basic Writing, 26(1), 63 – 87.

Fuchs, L. S., Fuchs, D., Hosp, M.D., & Jenkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. Scientific Studies of Reading, 5(3), 239-256.

Research review/ research-based theoretical analysis

Good, III, R.H., Simmons, D.C., & Kame'enui, E.J. (2001). The importance and decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes outcomes. Scientific Studies of Reading, 5(3), 257-288.

Meta-Analysis

Graham, S. & Herbert, M.A. (2010). Writing to read: Evidence for how writing can improve reading. A Carnegie Corporation Time to Act Report. Washington, DC: Alliance for Excellent Education

Correlation

Hasbrouck, J., & Tindal, G. A. (2006). Oral reading fluency norms: A valuable tool for reading teachers. The Reading Teacher, 59(7), 636-644.

Norming research

Jenkins, J.R., Fuchs, L.S., van den Broek, P., Espin, C., & Deno, S.L. (2003). Sources of individual differences in reading comprehension and reading fluency. Journal of Educational Psychology, 95(4), 719-729.

Experimental

Lever, R., & Senechal, M. (2011). Discussing stories: On how a dialogic reading intervention improves Kindergarteners' oral narrative construction. Journal of Experimental Child Psychology, 108(1), 1-24.

Miller, J.F., Heilmann, J., & Nockerts, A. (2006). Oral language and reading in bilingual children. Learning Disabilities Research & Practice, 21(1), 30-43.

Correlation and statistical modeling

Morris, D., Bloodgood, J. W., Lomax, R. G., & Perney, J. (2003). Developmental steps in learning to read: A longitudinal study in kindergarten and first grade. Reading Research Quarterly, 38(3), 302-328.

Statistical modeling

Muter, V., Hulme, C., Snowling, M. J., & Stevenson, J. (2004). Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: Evidence from a longitudinal study. Developmental Psychology, 40(5), 665-681.

Olinghouse, N.G., & Graham, S. (2009). The relationship between the discourse knowledge and the writing performance of elementary-grade students. Journal of Educational Psychology, 101(1), 37-50

Saddler, B., & Graham, S. (2005). The effects of peer-assisted sentence-combining instruction on the writing performance of more and less skilled young writers. Journal of Educational Psychology, 97(1), 43-54

Statistical modeling

Shaw, R., & Shaw, D. (2002). DIBELS oral reading fluency-based indicators of third grade reading skills for Colorado State Assessment Program (CSAP). (Technical Report). Eugene: University of Oregon. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index. php

Slavin, R.E., Lake, C., Davis, S., & Madden, N.A. (2011). Effective programs for struggling readers: A best-evidence synthesis. Educational Research Review, 6, 1-26.

Stuart, M. (2004). Getting ready for reading: A follow-up study of inner-city second language learners at the end of key state 1. British Journal of Educational Psychology, 74, 15 – 36.

Correlation

van Bon, W. H. J., & van Leeuwe, J. F .J. (2003). Assessing phonemic awareness inkindergarten: The case for the phoneme recognition task. Applied Psycholinguistics, 24, 195-219.

Statistical modeling

Wilson, J. (2005). The relationship of Dynamic Indicators of Basic Early Literacy Skills (DIBELS) oral reading fluency to performance on Arizona Instrument to Measure Standards (AIMS). (Research Brief). Assessment and Evaluation Department, Tempe School District No. 3. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index.php

Statistical Modeling

Wise, J.C., Sevcik, R.A., Morris, R.D., Lovett, M.W., & Wolf, M. (2007). The relationship among receptive and expressive vocabulary, listening comprehension, pre-reading skills, word identification skills, and reading comprehension by children with reading disabilities. Journal of Speech, Language, and Hearing Research, 50, 1093-1109

Statistical Modeling

Young-Suk, K., Otaiba, S. A., Puranik, C., & Folson, J. S. (2011). Componential skills of beginning writing: An exploratory study. Learning and Individual Differences, 21, 517-525.

Key Research in topics aligned with the *Common Core State Standards*:

- Reading Comprehension and Text
- Reading Foundations, which include:
  - Phonological Awareness
  - Phonics and Word Recognition
  - Fluency
- Writing
- Speaking and Listening
- Language, which includes:
  - Vocabulary Acquisition and Use
  - Conventions of Standard English and Knowledge of Language

Reading Instruction

Each section presents a summary of relevant research findings and recommendations. Top-level descriptions of each research finding and research-based recommendation are presented in the main text, with details of the supporting research provided in footnotes.

Reading: Comprehension and Text

Comprehension is often identified as the primary goal of reading: children and adults read in order to understand. If children can “read” words but cannot understand them, they are merely decoding. Real reading requires understanding. Over the past 30 years, reading researchers have come to understand that such comprehension is not merely passive, but is the result of active involvement on the part of the reader.

Researchers have identified a variety of strategies effective readers use in order to actively comprehend texts. Additional research has verified the positive impact of teaching such strategies to students as a means of improving comprehension.

- Effectiveness of comprehension instruction. In examining research on reading comprehension instruction, the National Reading Panel (NRP) identified 16 broad categories, or methods, of comprehension instruction. Of these, seven methods were identified as having “a firm scientific basis for concluding that they improve comprehension in normal readers” (NICHHD, 2000, p. 4-42)–demonstrating that comprehension can be improved through explicit, formal instruction. Five of these methods were in use by the third- grade level, and are thus research-verified as appropriate and effective for instruction in the early elementary grades. Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) concluded that “Explicit instruction in comprehension strategies has been shown to lead to improvement” (Snow, Burns, & Griffin, 1998, p. 322).
- Effects on specific skill areas. According to the NRP, research “favors the conclusion that teaching of a variety of reading comprehension strategies leads to increased learning of the strategies, to specific transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension” (NICHHD, 2000, p. 4-52).
- Grade levels. The NRP’s review of research verified the effectiveness of some methods of text comprehension instruction as early as grades 2-3, ranging up to grade 9. The NRC, based on its interpretation of the research evidence, recommended such instruction as early as the kindergarten and first- grade levels, advocating explicit instruction on text comprehension “throughout the early grades” (Snow, Burns, & Griffin, 1998, p. 323). A study conducted by Lever and Senechal (2011)[1] found that dialogic reading, or a discussion of text through elaborative questioning, was found to have positive impacts on the structure and content of children’s narratives.

Range and Scope of Instruction

- Early grades. According to the NRC report recommendations for reading instruction in grades K-3, “Throughout the early grades, reading curricula should include explicit instruction on strategies such as summarizing the main idea, predicting events and outcomes of upcoming text, drawing inferences, and monitoring for coherence and misunderstandings. This instruction can take place while adults read to students or when students read [to] themselves” (Snow, Burns, & Griffin, 1998, p. 323). More recently, What Works Clearinghouse released a review (Shanahan et.al, 2010)[2] citing “strong research evidence” demonstrating that reading comprehension is improved through explicit teaching in grades K-3.
- Grade levels for comprehension strategies. Of the seven instructional methods verified by the NRP as having a research base, one (comprehension monitoring) was in use by grade 2 in the studies examined, and an additional four were in use by grade 3. The NRP concluded that “the instruction of comprehension appears to be effective on grades 3 through 6” (NICHHD, 2000, p. 4-51). This suggests a solid research base for including comprehension instruction as part of the reading curriculum by the third- grade level.

In addition to this NRP-verified research base in the upper elementary grades, many research-based instructional recommendations, such as those from the NRC, and many state standards call for explicit comprehension instruction at earlier grades as well. Such instruction may help to build a foundation for development of such skills in later grades. It is worth noting that the lack of NRP verification for comprehension instruction at the K–2 levels appears to reflect a scarcity of reputable research on comprehension instruction at these grade levels–a lack of evidence, as opposed to negative or ambivalent evidence.

Instructional Methods and Features

- Specific effective methods. Methods that were identified by the NRP as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42) and that were used by grade 3 in the research studies included the following:

Question answering (17 studies, mostly grades 3–5), in which teachers ask questions about the Text[3]

Question generation (27 studies, grades 3–9), in which students "generate questions during reading" (NICHHD, 2000, p. 4-45)[4]

Story structure (17 studies, grades 3–6), in which students are instructed in the "content and organization of stories," including use of graphic organizers in conjunction with story content and structure (NICHHD, 2000, p. 4-45)[5]

Comprehension monitoring (22 studies, grades 2–6), in which students learn how to monitor their own understanding of texts using procedures such as think-aloud[6]

Cooperative learning (10 studies, grades 3–6), in which "peers instruct or interact over the use of reading strategies" (NICHHD, 2000, p. 4-45)[7]

Methods identified by Shanahan, et.al, (2010) as having 'strong evidence' include:
Teaching students to use comprehension strategies, such as:

- Activating prior knowledge, or predicting (5 studies)[8]
- Questioning (4 studies)[9] when taught in conjunction with other strategies
- Visualization (2 studies)[10]
- Monitoring and clarifying (3 studies)[11]
- Inference training (1 study)[12]
- Retelling (4 studies)[13]

Methods identified by Shanahan, et.al, (2010) as having 'moderate evidence' include:

- Identifying text structure (5 studies, 3 using narrative text, 2 using informational text)[14], in which students were taught to understand text structure through story-mapping, paying attention to story structure during retelling, using cause-effect statements and related clue words, for example.
- Cooperative learning (10 studies)[15]
- Multiple strategies. In looking at 36 studies featuring instruction that combined a variety of different comprehension methods, the NRP concluded that "considerable success has been found in improving comprehension by instructing students on the use of more than one strategy during the course of reading" (NICHHD, 2000, p. 4-47).[16] One particular advantage of this approach is its ability to guide students through the kind of "coordinated and flexible use of several different kinds of strategies" that is required for skilled reading (NICHHD, 2000, p. 4-47).
- Instructional model. In its discussion of the research, the NRP identified a four-part model for building student comprehension strategies in which "teachers demonstrate, explain, model, and implement interaction with students in teaching them how to comprehend a text" (NICHHD, 2000, p. 4-47, citing 6 studies).[17]

- Regular assessment. According to the NRC report, "Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom, permitting timely and effective instructional response where difficulty or delay is apparent" (Snow, Burns, & Griffin, 1998, p. 323).

[1] Participants included 40 Kindergarten students randomly assigned to either the diaglogic reading group (n=21) or the alternative group (n=19). Those in the diaglogic reading group evidenced higher story grammar scores on the production task ($p = .001$, $d = .38$) and the retelling task ($p = .032$, $d=.28$).

[2] Shanahan, et.al, (2010) reviewed 812 studies, 27 of which met What Works Clearinghouse standards with or without reservations. These studies represent the strongest evidence of the effectiveness of various practices on reading comprehension for students in grades K – 3.

[3] Anderson & Biddle, 1975; Ezell et al., 1992; Fischer, 1973; Garner, Hare, Alexander, Haynes, & Winograd, 1984; Garner, Macready, & Wagoner, 1984; Griffey et al., 1988; Levin & Pressley, 1981; Pressley & Forrest-Pressley, 1985; Raphael & McKinney, 1983; Raphael & Pearson, 1985; Raphael & Wonnacott, 1985; Richmond, 1976; Rowls, 1976; Serenty & Dean, 1986; Sheldon, 1984; Watts, 1973; Wixson, 1983.

[4] Blaha, 1979; Brady, 1990; Cohen, 1983; Davey & McBride, 1986; Dermody, 1988; Dreher & Gambrell, 1985; Hansen & Pearson, 1983; Helfeldt & Lalik, 1976; King, 1989; King, 1990; King, 1992; Labercane & Battle, 1987; Lonberger, 1988; Lysynchuk, Pressley, & Vye, 1990; MacGregor, 1988; Manzo, 1969; Nolte & Singer, 1985; Palinscar, 1987; Palinscar & Brown, 1984; Ritchie, 1985; Short & Ryan, 1984; Simpson, 1989; Singer & Donlan, 1982; Smith, 1977; Taylor & Frye, 1992; Williamson, 1989; Wong & Jones, 1982.

[5] Baumann & Bergeron, 1993; Buss, Ratliff, & Irion, 1985; Fitzgerald & Spiegel, 1983; Gordon & Rennie, 1987; Greenewald & Rossing, 1986; Griffey et al., 1988; Idol, 1987; Idol & Croll, 1987; Nolte & Singer, 1985; Omanson, Beck, Voss, McKeown, et al., 1984; Reutzel, 1984; Reutzel, 1985; Reutzel, 1986; Short & Ryan, 1984; Singer & Donlan, 1982; Spiegel & Fitzgerald, 1986; Varnhagen & Goldman, 1986.

[6] Babbs, 1984; Baker & Zimlin, 1989; Baumann, Seifert-Kessell, & Jones, 1992; Block, 1993; Carr, Dewitz, & Patberg, 1983; Cross & Paris, 1988; Elliot-Faust & Pressley, 1986; Hasselhorn & Koerkel, 1986; Markman, 1977; Miller, 1985; Miller, 1987; Miller, Giovenco, & Rentiers, 1987; Nelson et al., 1996; Paris, Cross, & Lipson, 1984; Paris & Jacobs, 1984; Paris, Saarnio, & Cross, 1986; Payne & Manning, 1992; Schmitt, 1988; Schunk & Rice, 1984; Schunk & Rice, 1985; Silven, 1992; Tregaskes & Daines, 1989.

[7] Bramlett, 1994; Guthrie et al., 1996; Judy, Alexander, Kulikowich, & Wilson, 1988; Klingner, Vaughn, & Schumm, 1998; Mathes et al., 1994; Pickens & McNaughton, 1988; Soriano, Vidal-Abarca, & Miranda, 1996; Stevens, Madden, Slavin, & Farnish, 1987; Stevens, Slavin, & Farnish, 1991; Uttero, 1988.

[8] Brown et.al, 1995; Hansen, 1981; Paris, Cross, & Lipson 1984; Williamson, 1989; Morrow, 1984.

[9] Brown et.al, 1995; Williamson 1989; McGee & Johnson, 2003; Morrow 1984.

[10] Center, et.al, 1999; Brown et.al., 1995

[11] Brown et.al, 1995; Paris, Cross, and Lipson, 1984; Williamson, 1989.

[12] Hansen, 1981.

[13] Brown et.al., 1995; Morrow, 1985; Morrow, Pressley, & Smith, 1995; Williamson, 1989.

[14] Baumann & Bergeron, 1993; Morrow, 1996; Reutzel, Smith, & Fawson, 2005; Williams et.al., 2007; Morrow, 1984.

[15] Gutherie et.al. 2004; Morrow, 1996; Morrow, Pressley, & Smith, 1995; Morrow, Rand, & Young, 1997; Stevens & Slavin, 1995a, 1995b; Fizzano, 2000; Gutherie et.al, 2006; Baumann 1986; Baumann & Gergeron, 1993.

[16] Adams, Carnine, & Gersten, 1982; Anderson & Roit, 1993; Blanchard, 1980; Brady, 1990; Brown, Pressley, Van Meter, & Schuder, 1996; Carnine & Kinder, 1985; Carr, Bigler, & Morningstar, 1991; Chan & Cole, 1986; Dermody, 1988; Fischer Galbert, 1989; Gilroy & Moore, 1988; Grant, Elias, & Broerse, 1989; Jacobs & Paris, 1987; Jones, 1987; Kelly, Moore, & Tuck, 1994; Klingner, Vaughn, & Schumm, 1998; Labercane & Battle, 1987; Loranger, 1997; Lysynchuk, Pressley, & Vye, 1990; Padron, 1985; Palinscar, 1987; Palinscar & Brown, 1984; Palinscar, David, Winn, & Stevens, 1991; Pelow & Colvin, 1983; Reutzel & Hollingsworth, 1991a; Reutzel & Hollingsworth, 1991b; Rich, 1989; Ritchie, 1985; Rush & Milburn, 1988; Shortland-Jones, 1986; Sindelar, 1982; Smith, Johnson, & Johnson, 1981; Soriano, Vidal-Abarca, & Miranda, 1996; Stevens, 1988; Taylor & Frye, 1992; Williamson, 1989.

[17] Palinscar & Brown, 1984; Rosenshine, Meister, & Chapman, 1996; Rosenshine & Meister, 1994; Bereiter & Bird, 1985; Block, 1993; Brown, Pressley, Van Meter, & Schuder, 1996.

Phonological Awareness

Phonological awareness includes the ability to work with larger units in spoken language such as syllables and rhymes, which often include more than one phoneme. Children typically find it easier to work with these larger units (e.g., rhyming words) before proceeding on to develop skills with individual phonemes (NICHHD, 2000, p. 2-10).

Strong phonemic awareness is considered an early indicator of eventual success in beginning reading. Phonemic awareness instruction helps children learn to read words, spell words, and comprehend text.

- Phonemic awareness instruction has a positive overall effect on reading and spelling. A meta-analysis by the National Reading Panel (NRP) found that instruction in phonemic awareness (PA) had a "moderate" effect on both reading skills (based on 90 comparisons)[18] and spelling (39 comparisons) (NICHHD, 2000, pp. 2-3, 2-63, 2-69).[19] Results across several categories of assessments "show that teaching children to manipulate phonemes in words was highly effective across all the literacy domains and outcomes" (p. 2-3).
- Phonemic awareness instruction leads to lasting reading improvement. The NRP meta-analysis found that the effect of PA instruction on reading outcomes was moderate on both immediate and first follow-up post-tests, and small on second follow-up posttests (NICHHD, 2000, p. 2-63).[20] Based on these results, the NRP concluded that "effects of PA training on reading lasted well beyond the end of training" (NICHHD, 2000, p. 2-5).
- Phonemic awareness instruction can be effectively carried out by teachers. PA instruction had a positive impact on students' reading and spelling, whether the instruction was carried out by classroom teachers or by individuals with specialized training, such as researchers (NICHHD, 2000, pp. 2-65, 2-74).[21]

Additionally, the National Early Literacy Panel (2008) reports that phonological awareness was one of six precursor literacy skills (e.g., alphabet knowledge, rapid automatic naming, phonological memory, writing name, rapid automatic naming of objects or colors) that had medium to large predictive relationships with later measures of literacy development (National Institute for Literacy, 2008, p vii.).[22]

Reading

PA instruction has been shown to have a positive impact on reading skills across many student categories and grade levels (NICHHD, 2000, pp. 2-5, 2-66–2-67):

- Normally developing readers[23]
- Children at risk for future reading problems.[24]

Later research suggests the benefits of PA instruction specifically for kindergartners at risk for developing dyslexia (Elbro & Petersen, 2004).[25]

- Disabled readers[26]
- Preschoolers[27]
- Kindergartners[28]
- First-graders[29]
- Second- through 6th-graders (most of whom were disabled readers)[30]
- Children across various SES (socioeconomic status) levels[31]
- Children learning to read in English as well as in other languages[32]

In a review of 97 studies on the achievement outcomes of various approaches for teaching struggling readers, "almost all successful programs have a strong emphasis on phonics" (Slavin, Lake, Davis, & Madden, 2011, p 19).[33]

Spelling

PA instruction has been shown to have a positive impact on spelling skills across many student categories and grade levels (NICHHD, 2000, pp. 2-6, 2-70–2-74):

- Kindergartners[34]
- First-graders[35]
- Children at risk for future reading problems[36]
- Normally developing readers[37]
- Children across various SES levels[38]
- Children learning to spell in English as well as children learning in other languages[39]

The following tasks are commonly used to assess PA skills and/or teach them to students (NICHHD, 2000, p. 2-2):

- Phoneme isolation–Recognizing individual sounds in words. For example: What sound do you hear at the beginning of pin? (/p/)
- Phoneme identification–Recognizing the common sound in different words. For example: What sound do you hear that is the same in sat, sun, and soup? (/s/)
- Phoneme categorization–Recognizing the odd sound in a set of words. For example: Listen to these words–hand, heart, sun. Which word begins with a different sound? (sun)
- Phoneme blending–Listening to a sequence of separately spoken sounds and then blending them naturally into a recognizable word. For example: What word is /b/ - /a/ - /t/? (bat)
- Phoneme segmentation–Breaking a word into its sounds by tapping out or counting the sounds. For example: How many sounds do you hear in cat? (three)
- Phoneme deletion–Recognizing the word that remains when a specific phoneme is removed. For example: What word do we have when we say smile without the /s/? (mile)

Range and scope of instruction

- Grade level. Research summarized by the NRP suggests that PA instruction should be provided
  - At the kindergarten level
  - At the first-grade level
  - At elementary levels above first grade as supplemental instruction for students with special needs.

Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) concluded that "kindergarten instruction should be designed to provide practice with the sound structure of words [and] the recognition and production of letters," and "first-grade instruction should be designed to provide explicit instruction and practice with sound structures that lead to phonemic awareness" (Snow, Burns, & Griffin, 1998, p. 322).

Instructional methods and features

- Spoken and written versus spoken only. Instruction that used letters to teach phoneme manipulation had a considerably greater impact on both reading and spelling than instruction that did not use letters but was limited to spoken sounds only (NICHHD, 2000, pp. 2-64, 2-73).[40]
- Assessment for kindergarteners based on phoneme recognition. A study of Dutch children analyzing the relationship among several different assessments of PA found that a group-administered phoneme

recognition assessment was the “best paper and pencil representative” of PA skill in kindergarten,[41] and that it “equals phoneme segmentation” (an individually administered assessment) in “sensitivity and specificity when predicting later literacy failure” (van Bon & van Leeuwe, 2003, p. 195).[42] These findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students’ PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.

- Guidance by initial and ongoing assessment at first and second grades. Based on the research findings, the NRP recommended a design in which assessment results drive PA instruction at the first- and second-grade levels, both initially and through ongoing formative assessments.

Assessments conducted before PA instruction begins should “indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters” (NICHHD, 2000, p. 2-6).

In order to determine the length of PA instruction, “What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds” (NICHHD, 2000, p. 2-42). Similarly, the NRC research review argued that “intensity of nstruction should be matched to children’s needs” in acquiring phonological skills (Snow, Burns, & Griffin, 1998, p. 321).

[18] Each comparison is a single instance of one treatment group being compared to one control group. Some studies included multiple comparisons (e.g., a single treatment group being compared to multiple comparison groups, or a single comparison group being compared to multiple treatment groups).

[19] Effect size (ES) = 0.53 for reading, 0.59 for spelling. Both results were statistically significant at $p < 0.05$. According to the NRP, an effect size of 0.20 is considered “small,” 0.50 is considered “moderate,” and 0.80 is considered “large” (2000, p. 2-Characterizations of meta-analysis results as small, moderate, or large in this paper are based on rounding to the nearest of these values.

[20] ES = 0.53 on immediate posttests (90 comparisons), 0.45 on first follow-up posttests (35 comparisons), and 0.23 on second follow-up posttests (8 comparisons). All of these results were statistically significant at $p < 0.05$.

[21] On immediate-reading posttests, ES = 0.41 for classroom teachers (22 comparisons) and 0.64 for researchers and others (68 comparisons). On follow-up reading posttests, ES = 0.32 for classroom teachers (12 comparisons) and 0.63 for researchers and others (23 comparisons). On immediate-spelling posttests when reading-disabled comparisons were removed from the analysis, ES = 0.74 for classroom teachers (8 comparisons) and 0.96 for researchers and others (20 comparisons). All of these results were statistically significant at $p < 0.05$. (The NRP found that of the groups they analyzed, PA instruction did not have a statistically significant impact on spelling outcomes for reading-disabled students. Results were therefore reported separately by the NRP after excluding reading disabled comparisons. Unless otherwise stated, PA research results in this paper related to spelling do not include reading-disabled comparisons. Additionally, results in some categories for both reading and spelling were reported by the NRP separately for immediate posttests and follow-up posttests, while other results were reported for immediate posttests only. In cases where both immediate posttests and follow-up posttests were reported, both sets of results are included in this paper.)

[22] Average correlations for predicting decoding by precursor literacy skill: Alphabet knowledge, 0.50 (52 studies); phonological awareness, 0.40 (69 studies); phonological short-term memory, 0.26 (33 studies); rapid automatic naming letters and digits, 0.40 (12 studies); rapid automatic naming objects and colors, 0.32 (16 studies); writing or writing name, 0.49 (10 studies). Average correlations for predicting reading

comprehension by precursor literacy skill: Alphabet knowledge, 0.48 (17 studies); phonological awareness, 0.44 (20 studies); phonological short-term memory, 0.39 (13 studies); rapid automatic naming letters and digits, 0.43 (3 studies); rapid automatic naming objects and colors, 0.42 (6 studies); writing or writing name, 0.33 (4 studies).

[23] ES = 0.47 on immediate posttests (46 comparisons), 0.30 on follow-up posttests (12 comparisons). Both results were statistically significant at $p < 0.05$.

[24] ES = 0.86 on immediate posttests (27 comparisons), 1.33 on follow-up posttests (15 comparisons). Both results were statistically significant at $p < 0.05$.

[25] At-risk students who received 17 weeks of PA and letter knowledge instruction during their kindergarten year significantly outperformed untrained at-risk students in letter knowledge ($d = .67$, $F(1, 78) = 15.4$, $p < .01$), phoneme deletion ($d = .47$, $F(1, 78) = 4.7$, $p < .05$), and phoneme identification ($d = .54$, $F(1, 78) = 6.6$, $p < .05$) at the beginning of grade 1 (p. 664), and "significantly outperformed the at-risk controls on all measures of reading, with effect sizes in the range from .40 to .69" in tests at the beginning of grades 2 and 3 (p. 665; all effects were significant at $p < .01$ or $p < .05$). Even at the beginning of grade 7, "there were still significant effects" for oral-word reading efficiency ($d = .48$), oral-nonword-reading efficiency ($d = .53$) and phonological coding ($d = .49$) (p. 665; all effects were significant at $p < .05$). There was also a nonsignificant but positive trend at grade 7 in reading comprehension ($d = .49$), a trend that "was present in both accuracy and efficiency of reading comprehension" (p. 665). At-risk status was determined by having at least one parent with dyslexia.

[26] ES = 0.45 on immediate posttests (17 comparisons), 0.28 on follow-up posttests (8 comparisons). Both results were statistically significant at $p < 0.05$.

[27] ES = 1.25 on immediate posttests (7 comparisons), $p < 0.05$.

[28] ES = 0.48 on immediate posttests (40 comparisons), $p < 0.05$.

[29] ES = 0.49 on immediate posttests (25 comparisons), $p < 0.05$.

[30] ES = 0.49 on immediate posttests (18 comparisons), $p < 0.05$.

[31] ES = 0.45 on immediate posttests for low SES (11 comparisons), 0.84 for mid & high SES (29 comparisons). Both results were statistically significant at $p < 0.05$.

[32] For children learning to read in English, ES = 0.63 on immediate posttests (72 comparisons), 0.42 on follow-up posttests (17 comparisons). For children learning to read in a language other than English, ES = 0.36 on immediate posttests (18 comparisons), 0.47 on follow-up posttests (18 comparisons). All of these results were statistically significant at $p < 0.05$.

[33] Mean ES = .62 across studies for students participating in one-to-one tutoring programs with a heavy emphasis on phonics. This compares to a mean ES = .23 for students participating in program.ms with less emphasis on phonics.

[34] ES = 0.97 on immediate posttests (15 comparisons), $p < 0.05$.

[35] ES = 0.66 on immediate posttests (13 comparisons), $p < 0.05$.

[36] ES = 0.76 on immediate posttests (13 comparisons), $p < 0.05$.

[37] ES = 0.88 on immediate posttests (15 comparisons), $p < 0.05$.

[38] ES = 0.76 on immediate posttests for low SES (6 comparisons), 1.17 for mid and high SES (9 comparisons). Both results were statistically significant at $p < 0.05$. (These statistics include reading disabled comparisons. SES results were not reported separately with reading disabled comparisons removed.)

[39] For children learning to spell in English, ES = 0.95 on immediate posttests (22 comparisons). For children learning to spell in a language other than English, ES = 0.51 on immediate posttests (6 comparisons). Both results were statistically significant at $p < 0.05$.

[40] For reading on immediate posttests, ES = 0.67 for programs that used letters (48comparisons), v. 0.38 for programs that did not use letters (42 comparisons). On follow-up posttests, ES = 0.59 for programs that used letters (16 comparisons), v. 0.36 for programs that did not use letters (19 comparisons). For spelling on immediate posttests, ES = 1.00 for programs that used letters (17 comparisons), v. 0.57 for programs that did not use letters (11 comparisons). All of these ES comparisons were significantly different in favor of programs that use letters at $p < 0.05$.

[41] A confirmatory structural analysis using linear structured relations (LISREL) was conducted on assessments administered in May/June of kindergarten (Time 1) and March of grade 1 (Time 2), producing a factor loading score for each of eight PA assessments carried out during the Time 1 administration (four of which were also repeated at Time 2). The analysis also included an Early Reading Test at Time 1 and a spelling test and two portions of the Three-Minute Test (a standardized word reading test) at Time 2. The highest loading factor among Time 1 PA tests was for phoneme segmentation (.91), followed by phoneme recognition (.78), one of two phoneme counting measures (.72), phoneme blending (.70), the second of two phoneme counting measures (.57), phoneme deletion (.50), rhyme judgment (.49), and pseudoword repetition (.40) (p. 206). Analysis also showed a single common factor underlying PA scores, which "is closely related to literacy performance" (p. 209).

[42] "Averaged over reading and spelling, maximum specificity of maximum sensitivity was 46% for Phoneme Segmentation and 47% for Phoneme Recognition. Conversely, choosing 80% as the desired level of specificity, the average sensitivity was found to be 45% for Phoneme Recognition whereas Phoneme Segmentation did not even attain an 80% level of specificity. Maximum Phoneme Segmentation specificity averaged over the three literacy measures was 65%, associated with 77% sensitivity (cf. 75% sensitivity at the same specificity level for Phoneme Recognition). This shows that both the Phoneme Segmentation and Phoneme Recognition Tests tend to identify too many children at kindergarten as running the risk of meeting with literacy problems in Grade 1 and that Phoneme Recognition is not inferior to Phoneme Segmentation in that respect" (p. 213).

Phonics and Word Recognition

Phonics instruction teaches children the relationship between letters (graphemes) and the sounds in spoken language (phonemes), and how to apply that knowledge in reading and spelling words.

Phonics instruction builds on phonemic awareness. Although it includes some types of phonemic awareness activities, in which students "use grapheme-phoneme correspondences to decode or spell words," it extends beyond such tasks to "include other activities such as reading decodable text or writing stories" (NICHHD, 2000, p. 2-11).

Research recommendations favor phonics instruction that is "systematic and explicit." An explicit approach includes specific directions to teachers for teaching letter-sound correspondences. A systematic approach is one that incorporates a planned, sequential set of phonetic elements to master. These elements are explicitly and systematically introduced in meaningful reading and writing tasks.

Systematic and explicit phonics instruction includes teaching a full spectrum of key letter-sound correspondences: not just major correspondences between consonant letters and sounds, but also short and long vowel letters and sounds, and vowel and consonant digraphs such as oi, ea, ou, sh, and th.

Several different methods have been developed to teach phonics systematically and explicitly, including synthetic phonics, analytic phonics, embedded phonics, analogy phonics, onset-rime phonics, and phonics through spelling. Broadly speaking, these approaches are all effective (NICHHD, 2000, p. 2-89).

Phonics instruction leads to an understanding of the alphabetic principle–the set of systematic and predictable relationships between written letters and spoken sounds. For children to learn how to sound out word segments and blend these parts to form recognizable words, they must know how letters correspond to sounds.

- Phonics instruction has a positive overall effect on reading. A meta-analysis by the National Reading Panel (NRP) found that systematic and explicit phonics instruction had a significantly stronger effect on children's reading than every category of nonsystematic or non-phonics instruction that was studied. This was true whether nonsystematic or non-phonics instruction occurred in the context of "basal programs, regular curriculum, whole language approaches, whole word programs, [or] miscellaneous programs" (NICHHD, 2000, pp. 2-95, 2-160).[43] Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) cited a research finding that "children taught via the direct code approach" (i.e., systematic and explicit phonics instruction) showed better reading gains than students receiving whole-language or embedded phonics instruction (Snow, Burns, & Griffin, 1998, p. 205, citing Foorman et al., 1998).
- Phonics instruction has positive overall effects on specific skill areas. The NRP metaanalysis found that across grades K-6, phonics instruction was "most effective in improving children's ability to decode regularly spelled words . . . and pseudowords," but also helped students to read miscellaneous words (some of which were irregularly spelled) and read text orally (NICHHD, 2000, pp. 2-94, 2-159). Phonics instruction positively impacted spelling and text comprehension for kindergarten and first-grade students, but not for those in grades 2-6 (NICHHD, 2000, p. 2-159).[44]
- Phonics instruction has a lasting impact on reading. Follow-up tests in the NRP meta-analysis found that the effects of phonics instruction were reduced, but still significant, several months after the instruction ended, "indicating that the impact of phonics instruction lasted well beyond the end of training" (NICHHD, 2000, pp. 2-113, 2-159, 2-161).[45]

Grade levels

The NRP meta-analysis found that:

- Kindergarten and first-grade students experienced significantly better improvement from phonics instruction than from other types of instruction in all six areas measured (decoding regular words, decoding pseudowords, reading miscellaneous words, spelling, reading text orally, and comprehending text), with a moderate to large effect size for all areas except reading text orally (NICHHD, 2000, p. 2-159). Overall levels of achievement were very similar for kindergartners and first-graders.[46]
- Grades 2–6 students (the majority of which were disabled readers) also experienced significantly better improvement from phonics instruction in four out of six areas (decoding regular words, decoding pseudowords, reading miscellaneous words, and reading text orally), with effect sizes for the various areas ranging from small to moderate (NICHHD, 2000, p. 2-159).[47]

A meta-analysis of 97 studies investigating the effects of reading interventions for struggling readers revealed that "almost all successful programs have a strong emphasis on phonics" (Slavin, Lake, Davis, and Madden, 2011, p 19). For example, one-to-one tutoring models that focus on phonics obtain much better outcomes than programs that do not emphasize phonics (Slavin et.al., 2011).[48]

One of the major findings of the National Literacy Panel's report, Developing Literacy in Second Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth, indicates, "Instruction that provides substantial coverage in the key components of reading—identified by the National Reading Panel (NICHD, 2000) as phonemic awareness, phonics, fluency, vocabulary, and text comprehension—has clear benefits for language-minority students (National Literacy Panel, 2006, p 3). For instance, research has demonstrated that phonics instruction enhances the reading and writing skills of children for whom English is a second language, and the positive effects remain a year later (Stuart, 1999; Stuart, 2004).[49]

Student categories

Phonics instruction has been shown to have a statistically significant positive impact across many student categories (NICHHD, 2000, p. 2-160):

- Kindergartners at risk of developing future reading problems[50]
- First-graders at risk[51]
- First-grade normally achieving readers[52]
- Second through sixth grade normally achieving readers[53]
- Second through sixth graders identified as disabled readers[54]
- Children across various SES (socioeconomic status) levels[55]

Range and scope of instruction

- Grade level. The NRP finding that phonics instruction benefited students in kindergarten, grade 1, and grades 2–6 (the majority of which were disabled readers) suggests a value to including phonics instruction at the kindergarten and first-grade levels and beyond, particularly for disabled readers.
- Level at which phonics instruction begins. The NRP meta-analysis found that phonics instruction in kindergarten and first grade was "much more effective" than phonics instruction that began in second grade or later, after students have learned to read independently (NICHHD, 2000, p. 2-93, emphasis added).
- Letter knowledge as precursor. Two developmental studies, drawing on and extending a body of existing research, suggest that knowledge of letter names and/or letter sounds is an important precursor to the earliest stages of reading knowledge. Muter et al. (2004) found that students' ability to identify letter sounds and/or names on entering schooling (average age 4 years, 9 months) was one of two

significant predictors, together with phoneme sensitivity, of word recognition ability a year later (pp. 671–672).[56] Similarly, word recognition ability the following year (two years after the first set of tests) was significantly predicted by the three factors of earlier word recognition, letter knowledge, and phoneme sensitivity.[57]

- In another study involving five assessment rounds spread across kindergarten and first grade, Morris et al. (2003) determined that alphabet knowledge, defined as the ability to name 15 uppercase and lowercase letters, was the first of seven sets of tested reading-related skills to develop chronologically58.
- These findings suggest a possible value for the common practice of explicitly teaching letter names and sounds to students early in kindergarten. One note of caution: these findings are not based on research comparisons of a group of students exposed to such instruction and a similar group of students not so exposed. Thus, a causal link between teaching letter names and sounds to students early in kindergarten and later development of reading skills has not been firmly established from this research.
- Instruction over multiple years. Results of a few multi-year studies examined by the NRP "suggest that when phonics instruction is taught to children at the outset of learning to read and continued for 2 to 3 years, the children experience significantly greater growth in reading at the end of training than children who receive phonics instruction for only 1 year after 1st grade" (NICHHD, 2000, p. 2-118).[59]

Instructional methods and features

- Varieties of effective programs. The NRP meta-analysis found small to moderate statistically significant effects that "did not differ statistically from each other" (NICHHD, 2000, p. 2-93) for several types of systematic and explicit phonics instructional programs. Included among these were "Synthetic phonics programs which emphasized teaching students to convert letters into sounds and then to blend the sounds to form recognizable words" (NICHHD 2000, pp. 2-93, 2-160).[60]
- Spelling instruction. An analysis of research commissioned by the NRC claimed that spelling instruction, in particular at the 2nd grade level, is important in building "phonemic awareness and knowledge of basic letter-sound correspondences" (Snow, Burns, & Griffin, 1998, p. 212).
- Phonics instruction as means to an end. Based on their interpretation of the research results, the NRP argued that phonics instruction (i.e., "the teaching of letter-sound relations") should not be pursued as an end in itself, but should be directed toward the goal of helping students in their "daily reading and writing activities" (NICHHD, 2000, p. 2-96). Students should understand that this is the goal of learning letter-sounds, and should have practice in putting their skills to use.
- Part of an integrated reading program. Based on their interpretation of the research results, the NRP argued that phonics instruction "should be integrated with other reading instruction to create a balanced reading program" including vocabulary and literature (NICHHD, 2000, p. 2-97). Phonics "should not become the dominant component in a reading program, neither in the amount of time devoted to it nor in the significance attached" (NICHHD, 2000, p. 2-97).
- Variable, guided by assessment. Based on their interpretation of the research results, the NRP argued that, ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC research review argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

[43] ES = 0.46 v. basal programs (10 comparisons), 0.41 v. regular curriculum (16 comparisons), 0.31 v. whole language (12 comparisons), 0.51 v. whole word programs (10 comparisons), and 0.46 v. miscellaneous programs (14 comparisons); all differences were significant at $p < 0.05$. Note that these categories included only instructional programs that did not feature explicit, systematic phonics instruction. For example, a basal

program that included systematic and explicit phonics instruction would not be included in the category of "basal programs" as defined here.

[44] Across grades K–6, ES = 0.67 for decoding regular words (30 comparisons), 0.60 for decoding pseudowords (40 comparisons), 0.40 for reading miscellaneous words (59 comparisons), 0.25 for reading text orally (16 comparisons), 0.35 for spelling words (37 comparisons), and 0.27 for comprehending text (35 comparisons). All of these results were statistically significant at $p < 0.05$. However, in separate analyses for grades K–1 and 2–6, results for spelling and comprehending text were found to be statistically significant at $p < 0.05$ for grades K–1 but not for grades 2–6. (For ES data from these separate grade range analyses, see footnote 24 for grades K–1 and footnote 25 for grades 2–6.)

[45] In six studies, the experimental and control groups were tested at the end of training and again "after a delay following training to assess long-term effects" (2000, p. 2-110). ES = 0.51 for testing at the end of training and ES = 0.27 for follow-up testing. In both cases, the results were statistically significant at $p < 0.05$. However, the two effect sizes did not significantly differ from one another at $p < 0.05$.

[46] For K–1 combined, ES = 0.98 for decoding regular words (8 comparisons), 0.67 for decoding pseudowords (14 comparisons), 0.45 for reading miscellaneous words (23 comparisons), 0.23 for reading text orally (6 comparisons), 0.67 for spelling words (13 comparisons), and 0.51 for comprehending text (11 comparisons). ES for all measures together = 0.56 for kindergartners (7 comparisons), 0.54 for first graders (23 comparisons). All of these results were statistically significant at $p < 0.05$. Results were not reported separately for kindergartners and first graders for the six areas measured. The relatively small number of studies at the kindergarten level is partly the result of studies that were incorporated by the NRP into the meta-analysis on phonemic awareness (PA), which were therefore excluded from the phonics meta-analysis. The NRP notes that taking the PA studies measuring reading outcomes into account, "Combined, these findings clearly support the importance of teaching phonemic awareness and grade-appropriate phonics in kindergarten" (NICHHD, 2000, p. 2-115)

[47] ES = 0.49 for decoding regular words (17 comparisons), 0.52 for decoding pseudowords (13comparisons), 0.33 for reading miscellaneous words (23 comparisons), and 0.24 for reading text orally (6 comparisons). All of these results were statistically significant at $p < 0.05$.

[48] Mean ES = .62 across studies for students participating in one-to-one tutoring programs with a heavy emphasis on phonics. This compares to a mean ES = .23 for students participating in programs with less emphasis on phonics.

[49] This study represents a follow-up from the previous study (1999) investigating the effectiveness of phoneme awareness and phonics teaching as an introduction to reading for ESL students. When compared to students utilizing a more holistic approach, students receiving 12 weeks of phoneme awareness and phonics teaching exhibited significantly higher scores on tests of initial phoneme identification, phoneme segmentation, letter-sound recognition, and recall, word and non-word reading, and dictation. Post-tests were administered 18 months after the end of intervention. The 2004 study sought to determine whether these gains had been retained in the long term, 30 months post intervention. Findings were significant for phoneme segmentation, $F(2, 98) = 27.48$, $p < .0001$; letter-sound recall, $F(2, 98) = 30.9$, $p < .0001$, non-word reading, $F(2, 98) = 8.66$, $p < .0001$, and in spelling $F(2. 98) = 6.65$, $P < .002$.

[50] ES = 0.58 (6 comparisons), $p < 0.05$. Results were not reported separately for kindergarten students not at risk.

[51] ES = 0.74 (9 comparisons), $p < 0.05$.

[52] ES = 0.48 (14 comparisons), $p < 0.05$.

[53] ES = 0.27 (7 comparisons), $p < 0.05$.

[54] ES = 0.32 (17 comparisons), $p < 0.05$.

[55] ES = 0.66 for low SES (6 comparisons), 0.44 for middle SES (10 comparisons), 0.37 where the SES was varied (14 comparisons), and 0.43 where the SES was not given (32 comparisons); $p < 0.05$ for all results.

[56] Standardized path coefficient for the effect of letter knowledge on word recognition = .63, based on a path analysis of factors from all three sets of tests. Chi square (24, N=90) = 28.80, not significant, comparative fit index = 0.988, goodness of fit index = 0.941, root mean square error of approximation = 0.049 (90% confidence interval = 0.000 to 0.102) (p. 674).

[57] Standardized path coefficient for the effect of letter knowledge on word recognition = .22, based on a path analysis of factors predicting word recognition in the third set of assessments from factors in the second set of assessments. Chi square (2, N=90) = 0.64, not significant, comparative fit index = 1.00, goodness of fit index = 0.998, root mean square error of approximation = 0.000 (90% confidence interval = 0.000 to 0.149) (p. 674).

[58] Structural equation modeling found that alphabet knowledge preceded beginning consonant awareness (standardized path coefficient of .42, $p < .05$), which in turn preceded concept of word in text and spelling with beginning and ending consonants. These two factors in turn preceded phoneme segmentation, which preceded word recognition, which preceded contextual reading. Chi square (12df) = 44.23, goodness of fit index = .90, normed chi square = 3.69, comparative fit index = .90 (pp. 315316). All of the standardized path coefficients were significant at $p < .05$.

[59] ES = 0.43 at the end of second grade for students who had received 2–3 years of phonics instruction (4 comparisons), v. 0.27 for “older children receiving only 1 year of phonics instruction in grades beyond 1st” (p. 2-118; number of comparisons not given). Because of the small number of comparisons, the results are described as “mainly suggestive” (p. 2-118).

[60] ES = 0.45 overall for synthetic programs (39 comparisons). Among specific groups taught using synthetic programs, ES = 0.64 for kindergartners and first-graders at risk of developing future reading problems (9 comparisons), 0.54 for first-grade normally achieving readers (8 comparisons), 0.27 for second through sixth grade normally achieving readers (6 comparisons), and 0.36 for disabled readers (9 comparisons). All of these results are significant at $p < 0.05$.

Fluency

Fluency is the ability to read text quickly, accurately, and with expression. It provides a bridge between word recognition and comprehension. Fluency includes word recognition, but extends beyond knowledge of individual words to reflect the meaningful connections among words in a phrase or sentence. Fluent readers are able to recognize words and comprehend them simultaneously.

Fluency is widely acknowledged to be a critical component of skilled reading. A study conducted by the National Assessment of Educational Progress (NAEP) found a "close relationship between fluency and reading comprehension" (NICHHD, 2000, p. 3-1, citing Pinnell et al., 1995). More generally, a National Research Council report stated that "adequate progress in learning to read English beyond the initial level depends on . . . sufficient practice in reading to achieve fluency with different kinds of texts written for different purposes" (Snow, Burns, & Griffin, 1998, p. 223). Additional evidence of this link between fluency and the development of general reading ability, particularly reading comprehension, is provided by several studies that found student performance on fluency assessments was an effective predictor of their performance on other types of reading measures.[61]

It is generally agreed that fluency results from reading practice. However, approaches to developing fluency have ranged from simply encouraging independent reading to more structured approaches to oral reading practice, designed to guide students toward developing specific fluency skills (e.g., reading with expression). In reviewing the research on fluency instruction, the National Reading Panel (NRP) found value in approaches that incorporated repeated oral reading, guided or unguided, as opposed to less focused attempts to encourage reading in general.

- Repeated oral reading instruction has a positive overall effect on reading. A meta-analysis by the NRP found that fluency instruction in the form of repeated oral reading (guided or unguided) "had a consistent, and positive impact on word recognition, fluency, and comprehension as measured by a variety of test instruments and at a range of grade levels" (NICHHD, 2000, p. 3-3). The weighted average of these effect sizes resulted in a moderate effect on student reading (NICHHD, 2000, p. 3-16).[62]
- Repeated oral reading instruction has a positive impact on specific skill areas. The NRP meta-analysis found that repeated oral reading had a moderate effect on reading accuracy, a somewhat less strong effect on reading fluency, and a smaller effect on reading comprehension (NICHHD, 2000, pp. 3-3, 3-18).[63]
- In contrast, encouraging children to read on their own has no research-verified impact on reading achievement. The NRP reviewed research studies on attempts to build fluency through encouraging independent student reading; most of these were studies of sustained silent reading. It found that the body of research failed to confirm any positive effects (NICHHD, 2000, pp. 3-3, 3-24–3-26, citing 14 studies).[64]

Analysis of grade levels covered by the studies in the NRP meta-analysis led to the conclusion that "repeated reading procedures have a clear impact" on reading ability among

- "Nonimpaired readers at least through grade 4"
- "Students with various kinds of reading problems throughout high school" (NICHHD, 2000, p. 3-17)

Range and scope of instruction

- Grade level. The NRP research findings suggest a value to including fluency instruction in the form of repeated oral reading procedures at least through the fourth grade level, and possibly beyond in a supporting capacity for students with reading problems. A review of research on early childhood reading commissioned by the National Research Council (NRC) identified fluency instruction as a key component of first-1st grade instruction and argued that "throughout the early grades, time, materials, and resources should be provided" for both daily independent reading and daily supported reading and rereading (Snow, Burns, & Griffin, 1998, p. 195). However, the NRC did not cite specific studies as the basis for recommending that such activities occur daily.

Instructional methods and features

- Effective methods. Small sample sizes in studies reviewed by the NRP made it impossible to compare the effectiveness of different methods that fell within the category of repeated (guided or unguided) oral reading. However, some of the methods that produced "clear improvement" (NICHHD, 2000, p. 3-15) included the following:

Repeated readings (set number of repetitions, set amount of time, or until fluency criteria were reached) (NICHHD, 2000, p. 3-15, citing 9 studies)[65] Repeated readings "combined with other [guiding] procedures such as a particular type of oral reading feedback . . . or phrasing support for the reader" (NICHHD, 2000, p. 3-15, citing 2 studies)[66]

Practice of oral reading "while listening to the text being read simultaneously" (NICHHD, 2000, p. 3-15, citing 3 studies)[67]

- Oral reading practice. In the NRP's description of effective repeated oral reading programs, the NRP stated that many of these programs provided increased oral reading practice "through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means," compared to earlier approaches (NICHHD, 2000, p. 3-11).
- Incorporation of independent reading. The report commissioned by the NRC identified independent reading, whether silent or spoken, as a key strategy for helping students develop fluency. Such reading requires that students read texts at the appropriate instructional level, neither too easy nor too difficult (i.e. at the instructional level) (Snow, Burns, & Griffin, 1998, p. 213). In light of the NRP research results, this recommendation should be considered not as an alternative to repeated oral reading, but as a supplement to it.
- Part of a larger reading program context. According to the NRP, in all of the programs reviewed, "the fluency work was only part of the instruction that students received" (NICHHD, 2000, p. 3-20). They cited a study cautioning against too much focus on fluency issues as a potential distraction from reading comprehension, then concluded that repeated oral reading should occur "in the context of an overall reading program, not as stand-alone interventions" (NICHHD, 2000, p. 320, citing Anderson, Wilkinson, & Mason, 1991).
- Regular assessment. Based on the research, the NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies).[68] Similarly, the NRC report recommended that "because the ability to obtain meaning from print depends so strongly on the development of . . . reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).
- Validity of oral reading fluency measures. According to Hasbrouck and Tindal (2006), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, Fuchs et al. (2001) summarized research showing that measures of oral reading fluency involving text passages that were several paragraphs in length corresponded well with "traditional, commercial, widely used tests of reading comprehension" (p. 243), and were superior in this regard to reading words from a list,[69] measures of silent fluency,[70] and more direct measures of reading comprehension.[71]
  More specifically, several studies have shown that third-grade tests of oral reading fluency from

the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) correlated well to high-stakes reading assessments from Arizona,[72] Colorado,[73] Florida,[74] North Carolina,[75] and Oregon.[76]

- Oral reading fluency norms. Based on analysis of assessment data from a pool ranging from approximately 3,500 to over 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (2006) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . and those developed by Edformation with their AIMSweb system . . . with few exceptions." These new norms cover grades 1–8 and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings. The researchers also provided specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress:
- Screening. According to the authors, "fluency-based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001).

For screening in grades 2–8, the authors recommended that "a score falling within 10 words above or below the 50th percentile should be interpreted as within the normal, expected, and appropriate range for a student at that grade level at that time of year."

For screening in grade 1, the authors recommended following guidelines established by Good et al. (2002) that identified students reading at or above 40 words correct per minute (wcpm) by the end of the school year as being "at low risk of reading difficulty," students reading at 20–40 wcpm as being "at some risk," and students reading below 20 wcpm as being "at high risk of failure."

[61] Barger, 2003; Buck & Torgesen, 2003; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Fuchs, Fuchs, & Maxwell, 1988; Good, Simmons, & Kame'enui, 2001; Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; Shaw & Shaw, 2002; Wilson, 2005. For additional information on results of these studies, see below under Validity of oral reading fluency measures.

[62] Weighted ES = 0.41, based on 14 studies incorporating 99 comparisons. Weighting reflected the number of subjects per study (i.e., studies with larger numbers of subjects weighted more than studies with smaller numbers of subjects). The NRP meta-analysis for fluency did not report statistical significance or p-values.

[63] Weighted ES = 0.55 for word recognition (11 comparisons from 8 studies), 0.44 for fluency (35 comparisons from 10 studies), and 0.35 for comprehension (49 comparisons from 12 studies).

[64] Evans & Towner, 1975; Reutzel & Hollingsworth, 1991a; Collins, 1980; Langford & Allen, 1983; Cline & Kretke, 1980; Davis, 1988; Holt & O'Tuel, 1989; Burley, 1980; Summers & McClelland, 1982; Manning & Manning, 1984; Morrow & Weinstein, 1986; Peak & Dewalt, 1994; Vollands, Topping, & Evans, 1999; Carver & Leibert, 1995. These studies were not considered to be of sufficiently high quality and quantity to conduct a meta-analysis.

[65] Faulkner & Levy, 1999; Levy, Nicholls, & Kohen, 1993; Neill, 1979; O'Shea, Sindelar, & O'Shea, 1985; Rasinski, 1990; Sindelar, Monda, & O'Shea, 1990; Stoddard, Valcante, Sindelar, O'Shea, & Algozzine, 1993; Turpie & Paratore, 1995; VanWagenen, Williams, & McLaughlin, 1994..

[66] Reitsma, 1998; Taylor, Wade, & Yekovich, 1985.

[67] van Bon, Boksebeld, Font Freide, & van den Hurk, 1991; Rasinski, 1990; Smith, 1979.

[68] Johnson, Kress, & Pikulski, 1987; Goodman & Burke, 1972; Pinnell et al., 1995; Clay, 1972; Hasbrouck & Tindal, 1992.

[69] Jenkins, Fuchs, van den Broek, Espin, & Deno (2003) compared measures of oral reading fluency of (a) connected text (a folktale) and (b) a context-free word list (list of words from the folktale) to performance on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension for 113 fourth- graders. They found that speed of oral reading from the folktale correlated more strongly to the ITBS score than did speed of oral reading from the word list (criterion validity coefficients of .83 and .54, respectively; the difference was statistically significant, $t(110) = 7.86$, $p < .001$) (p. 723).

[70] Fuchs, Fuchs, Eaton, & Hamlett (2000) compared measures of oral and silent reading speed with “the number of questions answered correctly on the passages that had been read” and with the raw score on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension (Fuchs et al., 2001, p. 247, summarizing Fuchs et al., 2000). They found that “for For silent reading, the correlation with the questions answered on the passage was .38, and with the Iowa test, it was .47. For oral reading, the correlation with the passage questions was .84, and with the Iowa test, it was .80. So, correlations for the oral reading fluency score were substantially and statistically significantly higher than for the silent reading fluency scores” (Fuchs et al., 2001, p. 247; p- values not reported).

[71] Fuchs, Fuchs, & Maxwell (1988) compared measures of oral reading fluency, short-answer question answering, passage recall, and cloze (all based on the same 400-word passages) with the Reading Comprehension subtest of the Stanford Achievement Test for 70 middle school and junior high school students with reading disabilities. They found that criterion validity coefficients (average correlations across the different scoring methods) for the question answering, the recall, and the cloze measures were .82, .70, and .72, respectively. The coefficient for oral reading fluency was .91. Tests for differences between these correlations demonstrated that the correlation for oral reading fluency was significantly higher than the correlation for each of the three direct measures of reading comprehension” (Fuchs et al., 2001, p. 244, summarizing Fuchs et al., 1988; p-values not reported). Additionally, according to Fuchs et al. (2001), “high correlations have also been documented for nondisabled elementary school age children within a variety of studies that (a) incorporated different criterion measures of reading accomplishment, (b) examined within-grade as well as across-grade coefficients, and (c) used instructional level as well as a fixed level of text across students” (p. 245, citing as research reviews Hosp & Fuchs, 2000; Marston, 1989).

[72] “The correlation between [Arizona Instrument to Measure Standards] and [DIBELS oral reading fluency assessment] for the overall group was . . . $r = .741$,” based on scores of 241 third- graders (Wilson, 2005; p-value not reported).

[73] The DIBELS oral reading fluency assessment was administered three times: in fall, winter, and spring. The fall and winter administrations each had a correlation coefficient of .73 with the spring assessment of the Colorado State Assessment Program (CSAP). The spring administration of DIBELS oral reading fluency assessment had a correlation of .80 with CSAP (Shaw & Shaw, 2002; p-values not reported). Each correlation was based on the scores of more than 50 third-graders.

[74] “There was a significant correlation between [DIBELS oral reading fluency] scores and reading [Florida Comprehensive Assessment Test–Sunshine State Standards] scores ($r = .70$, $p < .001$) . . . and reading scores on the [Florida Comprehensive Assessment Tests norm-referenced test] ($r = .74$, $p < .001$),” based on scores of 1,102 third- grade students (Buck & Torgesen, 2003).

[75] “The correlation between [DIBELS oral reading fluency] Spring scores and [North Carolina] End of Grade reading scores was . . . $r = .73$,” based on scores of 38 third-grade students (Barger, 2003; no p-value reported).

[76] The correlation coefficient between DIBELS oral reading fluency assessment and the Oregon Statewide Assessment was .67 (45% of variance explained, $p < .001$), based on the scores of 364 third- graders (Good, Simmons, & Kame’enui, 2001, p. 275.

Standard: Writing

What are the processes involved in writing?

At the most basic level, writing by definition is the translation of thought into visual form; however, the process of writing is remarkably complex. The act of writing is rarely linear and requires the iteration of planning, drafting, and revising while simultaneously employing critical thinking skills to analyze, summarize, and evaluate. Writing is a language-based activity that naturally overlaps with other processes included elsewhere in the *Standards*, such as reading, expressive language, receptive language, vocabulary use, and writing mechanics.

Graham & Perin (2007) in their meta-analysis of research on writing instruction, identified 11 key elements for writing instruction:

1. Writing strategies, including planning revising, and editing;[77]
2. Summarization, which includes explicit and systematic teaching[78]
3. Collaborative writing, where students work together to plan, draft, revise, and edit[79]
4. Specific product goals[80]
5. Word processing, using computers and word processors as supports[81]
6. Sentence combining, where students are taught to construct complex sentences[82]
7. Prewriting, which assists students in generating and organizing ideas[83]
8. Inquiry activities, where students analyze concrete data to help develop ideas and content[84]
9. Process writing approach, which utilizes a workshop environment stressing extended writing opportunities, authentic writing, personalized instruction, and cycles[85]
10. Study of models, which allows student to read, analyze, and emulate good writing[86]
11. Writing for content learning, which uses writing as a tool for learning content mateiral. (p. 4 – 5).[87]

Writing is a central form of communication. It requires a deep knowledge of subject matter and employs critical thinking skills. As students transition to high school and college, writing becomes one of the primary methods by which their work is judged.

When students increase their knowledge about writing processes, they become better writers. It has been demonstrated that students' knowledge of discourse writing—that is, knowledge about various genres of and schemas for writing, coupled with linguistic knowledge (e.g., grammar, procedures for constructing sentences, spelling)—are factors that uniquely contribute to student variation in writing performance. Olinghouse and Graham (2009) found the following five types of discourse knowledge significantly contribute to story writing quality, length, and vocabulary diversity:

- Substantive processes (role of process in good writing and carrying out the writing process;
- Production procedures (role of linguistic and mechanical factors in good writing, story writing, and carrying out the writing process);
- Motivation (role of effort in good writing and carrying out the writing process);
- Story elements (basic structural elements in a story);
- Irrelevant information (p 47). [88]

In their meta-analysis examining the effects of various writing practices on reading performance, Graham and Herbert (2010) found that when students write about text, are explicitly taught writing skills and processes, and increase the amount of time spent writing, students demonstrate greater text comprehension.

In Writing Next, the majority of research articles reviewed in Graham & Perin's (2007) meta-analysis included students across the full range of normal classroom variation. The 11 key elements of writing instruction were found to benefit a wide variety of learners. Students who struggle with foundational writing skills, for example, ESL students or students with a disability, may benefit from direct, targeted instruction.

For example, a study conducted by Saddler & Graham (2005) indicated that when provided with direct instruction designed to foster sentence-combining skills, fourth-grade students who were considered less skilled in writing improved their story writing and revising skills.[89] Graham & Perin's (2007) meta-analysis indicated that writing strategy instruction was found particularly effective for low-achieving students[90] (11 studies).

Range and scope of Instruction:

Young children are naturally inclined to express ideas in print, primarily through illustration. Writing instruction typically begins informally in preschool, as children begin to master basic concepts of print and letter formation, and becomes more sophisticated as children move into Kindergarten and beyond. Pearson (1994) indicates that the "synergistic" relationship between reading and writing renders it critical to begin writing instruction in the early grades.

Instructional Methods and Features:

Graham & Harris (1994) advocate for an integrated approach by incorporating elements from direct skill instruction and the process-oriented methodology, including:

- Skill-oriented instruction designed to foster text production skills (e.g., spelling, phonemic awareness)
- Opportunities for children to engage in writing activities
- Frequent opportunities to apply specific skills in a variety of writing activities
- Peer review and collaboration

Writing practices demonstrated to increase students' reading comprehension skills, include the following:

- **Have students write about texts they read**. Write personal reactions, analyze and interpret text (9 studies)[91], write summaries (19 studies)[92], keep notes (23 studies)[93], and answer and create questions about text (8 studies[94]);
- **Teach students the writing skills and processes that create text**. Teach the process of writing, text structures for writing, paragraph (12 studies)[95] and sentence construction and spelling (4 studies)[96]; spelling (5 studies)[97]
- **Increase the frequency allocated for writing** (6 studies)98 (Graham & Herbert, 2010, p 11).

[77] ES = .82 (20 studies; 11 with low-achieving students, 9 with normal variation)

[78] ES = .82 (4 studies)

[79] ES = .75 (7 studies)

[80] ES = .70 (5 studies)

[81] ES = .55 (18 studies)

[82] ES = .50 (5 studies)

[83] ES = .32 (5 studies)

[84] ES = .32 (5 studies)

[85] ES = .32 (21 studies

[86] ES = .25 (6 studies)

[87] ES = .23 (26 studies)

[88] These five factors accounted for 14% ($p < .001$) of the variability in quality of writing, when selected variables (gender, grade, basic reading skills, handwriting fluency, spelling, written story plan, and attitude toward writing) were controlled.

[89] Students receiving instruction in sentence-combining were twice as likely as comparison students to product a correctly written sentence ($F(1, 39) = 31.3$, MSE = 37.7, $p = .00$. Findings were similar when sentence combining was assessed via researcher-designed progress monitoring assessments and using a norm-referenced measure of sentence combining.

[90] ES = 1.02 (11 studies).

[91] Peronal reactions. ES = .77 (9 studies)

[92] ES = .52 (19 studies)

[93] ES = .47 (23 studies)

[94] ES = .27 (8 studies

[95] ES = .18 (12 studies, published tests); ES = .27 (5 studies, researcher-created tests)

[96] ES = .79 (4 studies)

[97] ES = .68 (5 studies)

[98] ES = .30 (11 studies)

Standard: Speaking and Listening

Oral language includes critical skills that allow children to:

- Communicate-listen and respond when people are talking
- Understand the meaning of a large number of words and concepts that they hear or read
- Obtain new information about things they want to learn about, and
- Express their own ideas and thoughts using specific language (National Institute for Literacy)

Oral language is divided into two subtypes: receptive language and expressive language. Receptive language is language that is heard and understood. Children exhibit receptive language skills when they listen and comprehend stories, understand vocabulary, engage in social exchanges with peers, and follow directions. Expressive language is the generation of thoughts, ideas, and needs through verbal and visual form. Children exhibit expressive language skills when they retell a story, incorporate vocabulary, and engage in discussion. Woven into these processes are other linguistic features and cognitive abilities, such as vocabulary, grammar, auditory memory, sequencing, and phonological processing, among others. Receptive language skills develop earlier than expressive language skills.

Instruction in speaking and listening focus on the following skills and processes:

- Understanding of information by answering questions about key details or facts
- Engaging in collaborative discussions
- Representing ideas and thoughts in oral and written form, as well as through media
- Reporting on topics and relating stories that contain key details and are presented in a logical fashion
- Speaking in complete sentences and utilizing developmentally appropriate vocabulary
- Differentiating contexts that require formal English from contexts where informal exchange is acceptable
- Interpreting and use images, graphics and symbols, as found in media
- Demonstrating understanding by rephrasing, summarizing

There exists a complex interplay between speaking and listening skills and academic achievement. Speaking and listening are language-based processes that are prerequisites for reading and writing. Studies have shown that:

- Oral language skills, in conjunction with spelling and letter-writing fluency, are positively related to writing skills (Young-Suk, Otaiba, Puranik, & Folson, 2011)[99] and reading skills (Cooper, Roth, Speece, & Schatschneider 2002).[100]
- Expressive vocabulary knowledge and listening comprehension skills are related to word identification ability (Wise, Sevcik, Morris, Lovett, & Wolf, 2007, p. 1095).
- Receptive and expressive vocabulary knowledge are related to pre-reading skills (Wise, et.al, 2007)
- Expressive vocabulary and listening comprehension are related to word identification skills (Wise, et.al., 2007)[101]

Teachers are well aware that students embark upon their educational careers with varying degrees of development in their receptive and expressive language skills. Instruction at the Kindergarten and early elementary level includes engaging in shared discussions, learning to collaborate with peers, demonstrate understanding by answering and asking questions, turn-taking, and using rich, detailed description and new vocabulary.

A study of second- and third-grade students identified with a reading disability concluded that receptive and expressive vocabulary knowledge were related to pre-reading skills, and listening comprehension skills were found to facilitate word identification (Wise et.al., 2007). Engaging in activities designed to foster vocabulary and listening comprehension may benefit students who struggle in reading.

Research conducted by Miller, Heilmann,, Nockerts, Iglesias, Fabiano, & Francis (2006) indicate that better oral language skills facilitate passage comprehension and word reading, in both Spanish and English. Further, higher English oral language skills are associated with higher Spanish reading scores, and higher Spanish oral language skills are associated with higher English reading scores, indicating a ‘cross-language’ effect. [102]

[99] Young-Suk, et.al., employed structural equation modeling to investigate the relationships between oral language skills, spelling, letter-writing fluency and writing skills. Oral language (γ=.16, p = .03), spelling, γ=.30, p = < .001), and letter writing fluency (γ=.26, p = < .001) were positively and uniquely related to writing (γ=.26, p = .003). The predictors explained 33% of total variance. The hypothesized model demonstrates a good fit for the data, X^2 (76) = 190.67, p < .001, CFI = .98, TLI = .98 RMSEA = .079, CI= .06 to .09.

[100] General oral language was found to be the sole predictor of 28% of the variance in phonological awareness for nonreaders in Kindergarten; in first grade 42% of the variance in phonological awareness; and in second grade, 41% of the variance in phonological awareness.

[101] Wise, et.al. employed structural equation modeling to investigate the relationship among receptive and expressive vocabulary, listening comprehension, pre-reading skills, word identification skills, and reading comprehension by children identified as disabled in reading. 279 students in 2nd to 3rd grade were administered selected subtests from standardized, norm-referenced assessments (e.g., PPVT, WISC, WIAT) to assess receptive vocabulary, expressive vocabulary, and listening comprehension skills. Pre-reading skills and word identification skills were assessed via selected subtests from standardized, norm-referenced assessments (CTRRPP; SSI; WRMT, WRAT). Findings indicate that receptive vocabulary and expressive vocabulary knowledge evidenced independent and significant paths to pre-reading skills (.29 and .12, respectively). Expressive vocabulary knowledge and listening comprehension skills evidenced independent and significant paths to word identification skills (.19 and .23, respectively). The path from word identification skills to pre-reading skills was significant (.72). The model selected fit the data well, X^2 (21, n = 279) = 56.84, p < .05, X^2 / df = 2.71, NFI = .96, NNFI = .95 CFI = .97, SRMR = .046.

[102] Measures of oral Spanish were found to predict Spanish passage comprehension, accounting for 10% of the variance after accounting for grade. Measures of oral English were found to predict English passage comprehension for Spanish speaking students, accounting for 22% of the variance in reading scores after accounting for grade. Measures of oral English were found to predict Spanish passage comprehension, accounting for 6% of the variance in Spanish reading outcomes. Measures of oral Spanish were found to predict English passage comprehension, accounting for 2% of the variation in English reading comprehension.

Vocabulary Acquisition and Use

Vocabulary is knowledge of the meaning, use, and pronunciation of individual words. It includes both oral vocabulary–words we use in speaking or recognize in listening–and reading vocabulary– words we use or recognize in print. Vocabulary is a key component of comprehension. Before readers can understand the meaning of spoken or written text, they must know what most of the words mean.

Much of our vocabulary knowledge comes from simple exposure to new words in context. However, research has verified that direct instruction in vocabulary–specifically teaching the meaning of new words, and teaching strategies for vocabulary building–has a positive impact on students' language development.

- Link between vocabulary development and reading comprehension. According to the National Reading Panel (NRP), although a direct causal link between vocabulary development and reading comprehension has not been established by research, still a variety of studies "underscore the notion that comprehension gains and improvement on semantic tasks are results of vocabulary learning" (NICHHD, 2000, pp. 4-15, 4-20, citing 7 studies).[103] Similarly, a longitudinal study on early reading development among British schoolchildren found evidence that vocabulary knowledge, as tested at the start of the students' first year of school, was one of three predictors of reading comprehension during the first year, as tested at the start of the students' third year of school–a span of two school years (Muter et al., 2004).[104]
- Effects on specific skill areas. According to a review of research on early childhood reading commissioned by the National Research Council (NRC), "Vocabulary instruction generally does result in measurable increase in students' specific word knowledge. Sometimes and to some degree it also results in better performance on global vocabulary measures, such as standardized tests, indicating that the instruction has evidently enhanced the learning of words beyond those directly taught. Second, pooling across studies, vocabulary instruction also appears to produce increases in children's reading comprehension" (Snow, Burns, & Griffin, 1998, p. 217). Most of the studies reviewed by the NRP occurred within the grades 3–8 range, with only a few studies addressing vocabulary instruction before grade 3. At least five studies reviewed by the NRP supported vocabulary instruction by the third- grade level.[105] The NRC report expanded the grade range of students who can benefit from vocabulary instruction, advocating direct instruction in vocabulary development for "children who have started to read independently, typically second graders and above" so that they will "sound out and confirm the identities of visually unfamiliar words" (Snow, Burns, & Griffin, 1998, p. 322). A review of research conducted by the National Early Literacy Panel indicated that "more complex oral language skills are dependent on vocabulary", and "vocabulary provides the foundation for grammatical knowledge, definitional vocabulary, and listening comprehension (National Institute for Literacy, 2008, p. 75). [106]

It is worth noting that these research findings and recommendations relate specifically to reading vocabulary, and are thus dependent on the development of independent reading skills. In contrast, development of children's oral vocabulary starts much earlier–as soon as children can begin to understand spoken language. Research suggests that, when provided with direct instruction, children in Kindergarten and first-grade can acquire sophisticated vocabulary (Beck & McKeown, 2007).

Although the NRP research did not cover development of oral vocabulary per se, the NRP analysis underscored the fact that development of reading ability is dependent on oral vocabulary: in order for students to understand a word once it has been decoded, it must already be part of their vocabulary (NICHHD, 2000, p. 4-15). Similarly, the NRC report argues that "Learning new concepts and the words that encode them is essential for comprehension development" (Snow, Burns, & Griffin, 1998, p. 217). Based on these factors, it seems reasonable to conclude that even before students can read independently, direct methods for building oral vocabulary may help contribute to students' ultimate success in reading.

Range and Scope of Instruction

- Grade levels. Grade K-2 materials must provide ample instruction and exercise for those students possessing weak vocabulary knowledge, which may include non-native English speakers. The acquisition of academic vocabulary, or Tier 2 words, is of particular emphasis.

Instructional Methods and Features

- Multiple strategies, incorporating direct and indirect vocabulary instruction. Based on research surveyed by the NRP, "It is clear that vocabulary should be taught both directly and indirectly"–that is, using both explicit instruction in vocabulary and methods of decoding word meanings, on the one hand, and more contextual approaches to exposing students to vocabulary on the other (NICHHD, 2000, p. 4-24). Based on both the research results it reviewed and theoretical considerations, the NRP further recommended that reading instruction include a combination of different strategies, both direct and indirect, for building vocabulary, rather than relying on only one method (NICHHD, 2000, p. 4-27).
- Specific instructional methods. The NRP found that a variety of instructional methods led to improvements in student vocabulary, including deriving meaning from context (NICHHD, 2000, p. 4-23, citing 2 studies)[108] and a combination of context-based and definitional approaches (NICHHD, 2000, p. 4-23, citing 2 studies)[109]

"Restructuring the task" of learning new words in a variety of different ways, such as providing redundant information and providing sample sentences along with definitions (NICHHD, 2000, pp. 4-22–4-23, citing 7 studies)[110]

Direct instruction in "vocabulary items that are required for a specific text to be read as part of the lesson" (NICHHD, 2000, pp. 4-24–4-25, citing 4 studies).[111] This includes pre-instruction of vocabulary before the reading or lesson (p. 4-25, citing 3 studies).[112]

- Storybook reading. A body of research evidence shows that "reading storybooks aloud to young children . . . results in reliable gains in incidental word acquisition" (Ewers & Brown-son, 1999, p. 12, citing 5 additional studies).[113]
- Characteristics of effective instructional methods. Summarizing the characteristics of instructional methods that were found to be effective according to the research surveyed, the NRP identified several factors, including the following:

"Richness of context in which words are to be learned," including "extended and rich instruction of vocabulary (applying words to multiple contexts, etc.)" (NICHHD, 2000, pp. 4-22, 4-27). Along similar lines, the NRC report cites a review of studies in which "methods in which children were given both information about the words' definitions and examples of the words' usages in a variety of contexts resulted in the largest gains in both vocabulary and reading comprehension," compared to drill and practice (Snow, Burns, & Griffin, 1998, pp. 217–218, citing Stahl & Fairbanks, 1986). The NRP further recommended that vocabulary items should be "derived from content learning materials" and likely to appear in a variety of other contexts as well (NICHHD, 2000, p. 4-25).

"Active student participation," including activities such as student-initiated talk in the context of listening to storybooks (NICHHD, 2000, pp. 4-21, 426, 4-27). This calls for active student participation supported by the findings of Ewers and Brownson (1999), who reported on a study in which a storybook with 10 targeted vocabulary words was read aloud individually to 66 kindergarteners. After each sentence that included a targeted vocabulary word, readers either would "recast" the target word using a familiar synonym (e.g., after reading "He is wearing his favorite fedora," the reader would say, "He is wearing his favorite hat"), or would ask a what or where question (e.g., "What was he wearing?" with a follow-up question asking "What was the word I used?" if the student answered with a synonym). Pretest-posttest comparison found that students in both treatments learned a significant number of the targeted vocabulary words; however, students in the active (question-answering) treatment learned significantly more words than those in the passive treatment.[114] This result was true both of students with a high phonological working memory and of those with a low phonological working memory.[115]

"High frequency and multiple, repeated exposures to vocabulary material" (NICHHD, 2000, p. 4-22)

- Assessment. Both the NRP and the NRC report included specific research-based recommendations related to assessment. The NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of word recognition accuracy," this skill "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

Based on the variety of measures used to assess student vocabulary and the different results those measures can achieve, the NRP recommended that vocabulary be assessed in multiple ways in the classroom. In particular, they argued that "the more closely the assessment matches the instructional context, the more appropriate the conclusions about the instruction will be" (NICHHD, 2000, p. 4-26).

[103] Beck, Perfetti, & McKeown, 1982; McKeown, Beck, Omanson, & Perfetti, 1983; Wixson, 1986; Carney, Anderson, Blackburn, & Blessing, 1984; Kameenui, Carnine, & Freschi, 1982; Stahl & Fairbanks, 1986; Medo & Ryder, 1993.

[104] Standardized path coefficient for the effect of vocabulary knowledge on reading comprehension = .16, based on a path analysis of factors from all three sets of tests. Chi square (2, N=90) = 3.92, not significant, comparative fit index = 0.992, goodness of fit index = 0.986, root mean square error of approximation = 0.104 (90% confidence interval = 0.000 to 0.257) (p. 675). Vocabulary knowledge was measured by the British Picture Vocabulary Scale II (Dunn, Dunn, Whetton, & Burley, 1997); reading comprehension was measured by the Neale Analysis of Reading Ability II (Neale, 1997). Note that vocabulary knowledge was measured in the first of three annual sets of assessments when students first entered school (average age four years nine months), but was not measured during the second set of assessments. Reading comprehension was measured during the third set of assessments. Thus, vocabulary knowledge from when students first entered school was still a significant predictor of reading comprehension two years later. This held true "even when the effects of early word recognition, phoneme sensitivity, and letter knowledge were controlled" (p. 678). Other significant predictors of reading comprehension were word recognition and grammatical awareness, from the second set of assessments.

[105] Heise, Papalewis, & Tanner, 1991; Levin, Levin, Glasman, & Nordwall, 1992; Eldredge, 1990; Gipe & Arnold, 1979; Rinaldi, Sells, & McLaughlin, 1997.

[106] Results of the meta-analysis discriminate between expressive vocabulary and definitional vocabulary. Analysis indicates relatively weaker correlations for expressive vocabulary and decoding ($r = 0.24$) and expressive vocabulary and reading comprehension ($r = 0.34$) pooled across studies. While the authors suggest that "building vocabulary alone is unlikely to be sufficient for improving outcomes not only in literacy but also in oral language itself" they also state that "these results should not be taken to imply that well-developed vocabularies are unimportant for literacy. The results suggest that well-developed vocabularies are insufficient for literacy. More complex oral language skills are dependent upon vocabulary" (p 75). However, stronger correlations are noted for *definitional* vocabulary and decoding ($r = 0.38$) and *definitional* vocabulary and reading comprehension ($r = 0.45$).

[107] The article reports on 2 studies with Kindergarten and first-grade children. Study 1 compared the number of sophisticated words learned for children who were directly taught words and children who received no such instruction. The instructed Kindergarten group demonstrated significant gains in vocabulary, $F(1,45) = 15.93$, $p = .000$ as did the first-grade group, $F(1, 51) = 7.25$, $p = .010$. The effect size (d) for the Kindergarten and first-grade group equaled 1.17 and .744, respectively. Study 2 assessed whether increasing the length of

instructional time had an effect on the number of sophisticated words learned by Kindergarten and first-grade children. Findings revealed that the number of words increased with length of additional instructional time. For Kindergarten students, $F(1, 35) = 69.47$, $p < .001$. For first-grade students, $F(1, 39) = 64.10$, $p < .001$. The effect size (*d*) for the Kindergarten and first-grade group equaled 2.09 and 2.09, respectively.

[108] Gipe & Arnold, 1979; Tomesen & Aarnoutse, 1998.

[109] Kolich, 1991; Stahl, 1983.

[110] Kameenui, Carnine, & Freschi, 1982; Gordon, Schumm, Coffland, & Doucette, 1992; Schwartz & Raphael, 1985; Scott & Nagy, 1997; Wu & Solman, 1993; Eldredge, 1990; Malone & McLaughlin, 1997.

[111] Tomesen & Aarnoutse, 1998; White, Graves, & Slater, 1990; Dole, Sloan, & Trathen, 1995; Rinaldi, Sells, & McLaughlin, 1997.

[112] Brett, Rothlein, & Hurley, 1996; Wixson, 1986; Carney, Anderson, Blackburn, & Blessing, 1984.

[113] Eller, Pappas, & Brown, 1988; Elley, 1989; Leung & Pikulski, 1990; Senechal, 1997; Senechal & Cornell, 1993.

[114] $F(1, 62) = 19.59$, $p < .01$ (p. 15).

[115] $F(1, 62) = 18.60$, $p < .001$ (p. 16). Level of phonological working memory was determined by administration of the Children's Test of Nonword Repetition (CNRep) (p. 14, citing Gathercole, Willis, Baddeley, & Emslie, 1994).

Conventions of Standard English and Knowledge of Language

Conventions of Standard English include grammatical structures, usage and mechanics, or the 'nuts and bolts' of writing and speaking. For example, students are expected to develop well-constructed sentences that contain correct spelling, punctuation, and grammar. Knowledge of language includes, for example, the ability to select words for effect, compare and contrast varieties of English (e.g., dialects and registers), and differentiate contexts that require formal English from those contexts where informal usage is acceptable and appropriate. In conjunction, students must develop knowledge regarding the 'digital mechanics' of audio-visual formats (Rice, 2008). These are elements that students must master as they increase the range and complexity of encountered text, engage in academic and social discourse, and as they prepare written communications.

The conventions of Standard English and language use and structure extend into all literacy domains, including reading, writing, and speaking and listening. Students benefit from instruction for the following reasons:

- Students who gain control over Standard English grammar, usage, and mechanics are better able to effectively communicate their ideas, knowledge, and opinions through oral discussions and written work.
- Students who gain control over conventions of Standard English grammar, usage, and mechanics can more easily master the use of digital texts than students who lack this control.
- The ability to manipulate the language orally as well as the ability to decode words supports vocabulary development (www.readtennessee.org)

It is recommended that, "an essential element in developing a comprehensive writing policy is the identification of effective instructional procedures, not just at the secondary level…but with younger students as well" (Saddler & Graham, 2005, p 43). The goal of explicit, strategic writing instruction is two-fold: first, to enhance the writing skills all children, from early elementary school on; and second, to minimize the number of children who experience difficulties learning to write (Graham & Harris, 2002).

Range and Scope of Instruction

Graham and Harris (1994) recommend direct, skill-oriented instruction designed to foster text-production skills (e.g., spelling, grammar). For example, fourth-grade students identified as either more or less skilled in their writing benefitted from strategic instruction designed to improve their ability to construct sentences (Saddler & Graham, 2005).[116] Teaching basic skills, such as grammar within the context of writing— instead of teaching them in isolation—has been shown to enhance writing performance (Fearn & Farnan, 2007).[117]

[116] Students receiving instruction in sentence-combining were twice as likely as comparison students to product a correctly written sentence ($F(1, 39) = 31.3$, $MSE = 37.7$, $p = .00$. Findings were similar when sentence combining was assessed via researcher-designed progress monitoring assessments and using a norm-referenced measure of sentence combining.

[117] Four classes were randomly assigned to either the treatment or the control condition. Treatment students participated in a classroom where attention was focused on grammar as an aid in thinking about writing. The authors consider this "directed writing" (p 73). Results were significant for both treatment classrooms, $p < .002$ and $p < .003$.

General Conclusions

General conclusions that can be reached about assessment based on the recommendations of the National Reading Panel (NRP)and the National Research Council (NRC) reports include the following:

- Assessment should guide instruction.
- Assessment should be frequent and/or regular. This was explicitly mentioned for most of the areas.
- Assessment should use appropriate measures.
- This was particularly a concern with fluency and vocabulary.

Area-Specific Conclusions

- Phonemic awareness (PA)–kindergarten assessment based on phoneme recognition; guidance by initial and ongoing assessment at 1st and 2nd grades. A study of kindergartners suggested that PA assessment at this level should focus on phoneme recognition. Additionally, the NRP recommended, based on its research findings, an instructional design in which assessment results drive PA instruction at the 1st and 2nd grade levels, both initially and through ongoing formative assessments. All these research-based recommendations are described in more detail below.

Assessment for kindergarteners based on phoneme recognition. A study of Dutch children analyzing the relationship among several different assessments of PA found that a group-administered phoneme recognition assessment was the "best paper and pencil representative" of PA skill in kindergarten,[118] and that it "equals phoneme segmentation" (an individually administered assessment) in "sensitivity and specificity when predicting later literacy failure" (van Bon & van Leeuwe, 2003, p. 195).[119] These findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students' PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.

Pre-assessment.
Assessments conducted before PA instruction begins should "indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters" (NICHHD, 2000, p. 2-6).

Ongoing assessments and instructional time.
In order to determine the length of PA instruction, "What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds" (NICHHD, 2000, p. 2-42). Similarly, a report commissioned by the NRC argued that "intensity of instruction should be matched to children's needs" in acquiring phonological skills (Snow, Burns, & Griffin, 1998, p. 321).

- Phonics–variable, guided by assessment.

Based on their interpretation of the research results, the NRP argued that ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC report argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

- Fluency–regular assessment, using research-validated methods. A broad range of research, including both research reviewed by the NRP and research from other sources, describes research-validated measures and provides research-based recommendations for how to use those measures.

Regular assessment.

Based on the research, the NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies).[120] Similarly, the NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of . . . reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

Validity of oral reading fluency measures. According to Hasbrouck and Tindal (2006), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, Fuchs et al. (2001) summarized research showing that measures of oral reading fluency involving text passages that were several paragraphs in length corresponded well with "traditional, commercial, widely used tests of reading comprehension" (p. 243), and were superior in this regard to reading words from a list,[121] measures of silent fluency,[122] and more direct measures of reading comprehension.[123] More specifically, several studies have shown that third-grade tests of oral reading fluency from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) correlated well to high-stakes reading assessments from Arizona,[124] Colorado,[125] Florida,126 North Carolina,127 and Oregon.

Oral reading fluency norms. Based on analysis of assessment data from a pool ranging from approximately 3,500 to more than 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (2006) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . and those developed by Edformation with their AIMSweb system . . . with few exceptions." These new norms cover grades 1-8, and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings. The researchers also provided specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress:

– Screening. According to the authors, "fluency based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001).

For screening in grades 2-8, the authors recommended that "a score falling within 10 words above or below the 50th percentile should be interpreted as within the normal, expected, and appropriate range for a student at that grade level at that time of year."

For screening in grade 1, the authors recommended following guidelines established by Good et al. (2002) that identified students reading at or above 40 words correct per minute (wcpm) by the end of the school year as being "at low risk of reading difficulty," students reading at 20–40 wcpm as being "at some risk," and students reading below 20 wcpm as being "at high risk of failure."

– Diagnosis According to the authors, oral reading fluency norms "can play a useful role in diagnosing possible problems that are primarily fluency based."

– Monitoring progress. According to the authors, oral reading fluency measures "have been found by many educators to be better tools for making decisions about students' progress than traditional standardized measures which can be time-consuming, expensive, are only administered infrequently, and have limited instructional utility" (citing Good et al., 2001; Tindal & Marston, 1990). Fuchs et al. (2001) provided a similar, research-based description of how oral reading fluency can be used to monitor student progress, both across and within individual student performance.

For monitoring student progress, Hasbrouck and Tindal (2006) recommended that students scoring within 10 wcpm of the 50th percentile at or above grade level should be “considered as making adequate progress in reading, unless there are other indicators that would raise concern.” Such students “may only need to have their reading progress monitored a few times per year to determine if they are meeting the benchmark standards that serve as predictors of reading success.”

For students reading below grade level, the authors suggested more frequent oral reading fluency assessments: once or twice monthly to once a week, depending on the severity of the problem, with scores graphed against goals and with adjustments to the instructional program if a student falls short of needed progress for three or more consecutive assessments (citing Hasbrouck et al., 1999).

- Vocabulary–regular assessment in multiple ways. Both the NRP and the NRC report included specific research-based recommendations related to assessment.

The NRC report identified word recognition accuracy as a skill that “should be regularly assessed in the classroom,” with assessment results used to guide instruction (Snow, Burns, & Griffin, 1998, p. 323).

Based on the variety of measures used to assess student vocabulary and the different results those measures can achieve, the NRP recommended that vocabulary be assessed in multiple ways in the classroom. In particular, they argued that “the more closely the assessment matches the instructional context, the more appropriate the conclusions about the instruction will be” (NICHHD, 2000, p. 4-26).

- Text comprehension–regular assessment. According to the NRC report, “Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom,” with teachers tailoring instruction accordingly “where difficulty or delay is apparent” (Snow, Burns, & Griffin, 1998, p. 323). The NRP did not directly address assessment of text comprehension.

[118] A confirmatory structural analysis using linear structured relations (LISREL) was conducted on assessments administered in May/June of kindergarten (Time 1) and March of grade 1 (Time 2), producing a factor loading score for each of eight PA assessments carried out during the Time 1 administration (four of which were also repeated at Time 2). The analysis also included an Early Reading Test at Time 1 and a spelling test and two portions of the Three-Minute Test (a standardized word reading test) at Time 2. The highest loading factor among Time 1 PA tests was for phoneme segmentation (.91), followed by phoneme recognition (.78), one of two phoneme counting measures (.72), phoneme blending (.70), the second of two phoneme counting measures (.57), phoneme deletion (.50), rhyme judgment (.49), and pseudoword repetition (.40) (p. 206). Analysis also showed a single common factor underlying PA scores, which “is closely related to literacy performance” (p. 209).

[119] “Averaged over reading and spelling, maximum specificity of maximum sensitivity was 46% for Phoneme Segmentation and 47% for Phoneme Recognition. Conversely, choosing 80% as the desired level of specificity, the average sensitivity was found to be 45% for Phoneme Recognition whereas Phoneme Segmentation did not even attain an 80% level of specificity. Maximum Phoneme Segmentation specificity averaged over the three literacy measures was 65%, associated with 77% sensitivity (cf. 75% sensitivity at the same specificity level for Phoneme Recognition). This shows that both the Phoneme Segmentation and Phoneme Recognition Tests tend to identify too many children at kindergarten as running the risk of meeting with literacy problems in Grade 1 and that Phoneme Recognition is not inferior to Phoneme Segmentation in that respect” (p. 213).

[120] Johnson, Kress, & Pikulski, 1987; Goodman & Burke, 1972; Pinnell et al., 1995; Clay, 1972; Hasbrouck & Tindal, 1992.

[121] Jenkins, Fuchs, van den Broek, Espin, & Deno (2003) compared measures of oral reading fluency of (a) connected text (a folktale), and (b) a context-free word list (list of words from the folktale) to performance on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension for 113 fourth graders. Fuchs et al. found that speed of oral reading from the folktale correlated more strongly to the ITBS score than did speed of oral reading from the word list (criterion validity coefficients of .83 and .54, respectively; the difference was statistically significant, $t(110) = 7.86$, $p < .001$) (p. 723).

[122] Fuchs, Fuchs, Eaton, & Hamlett (2000) compared measures of oral and silent reading speed with "the number of questions answered correctly on the passages that had been read" and with the raw score on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension (Fuchs et al., 2001, p. 247, summarizing Fuchs et al., 2000). They found that "For silent reading, the correlation with the questions answered on the passage was .38, and with the Iowa test, it was .47. For oral reading, the correlation with the passage questions was .84, and with the Iowa test, it was .80. So, correlations for the oral reading fluency score were substantially and statistically significantly higher than for the silent reading fluency scores" (Fuchs et al., 2001, p. 247; p values not reported).

[123] Fuchs, Fuchs, & Maxwell (1988) compared measures of oral reading fluency, short-answer question answering, passage recall, and cloze (all based on the same 400-word passages) with the Reading Comprehension subtest of the Stanford Achievement Test for 70 middle school and junior high school students with reading disabilities. They found that "Criterion validity coefficients (average correlations across the different scoring methods) for the question answering, the recall, and the cloze measures were .82, .70, and .72, respectively. The coefficient for oral reading fluency was .91. Tests for differences between these correlations demonstrated that the correlation for oral reading fluency was significantly higher than the correlation for each of the three direct measures of reading comprehension" (Fuchs et al., 2001, p. 244, summarizing Fuchs et al., 1988; p-values not reported). Additionally, according to Fuchs et al. (2001), "high correlations have also been documented for nondisabled elementary school age children within a variety of studies that (a) incorporated different criterion measures of reading accomplishment, (b) examined within-grade as well as across-grade coefficients, and (c) used instructional level as well as a fixed level of text across students" (p. 245, citing as research reviews Hosp & Fuchs, 2000; Marston, 1989).

[124] "The correlation between [Arizona Instrument to Measure Standards] and [DIBELS oral reading fluency assessment] for the overall group was . . . $r = .741$," based on scores of 241 third graders (Wilson, 2005; p-value not reported).

[125] The DIBELS oral reading fluency assessment was administered three times: in fall, winter, and spring. The fall and winter administrations each had a correlation coefficient of .73 with the spring assessment of the Colorado State Assessment Program (CSAP). The spring administration of DIBELS oral reading fluency assessment had a correlation of .80 with CSAP (Shaw & Shaw, 2002; p-values not reported). Each correlation was based on the scores of more than 50 third graders.

[126] "There was a significant correlation between [DIBELS oral reading fluency] scores and reading [Florida Comprehensive Assessment Test–Sunshine State Standards] scores ($r = .70$, $p < .001$) . . . and reading scores on the [Florida Comprehensive Assessment Tests norm-referenced test] ($r = .74$, $p < .001$)," based on scores of 1,102 third grade students (Buck & Torgesen, 2003).

[127] "The correlation between [DIBELS oral reading fluency] Spring scores and [North Carolina] End of Grade reading scores was . . . $r = .73$," based on scores of 38 third-grade students (Barger, 2003; no p-value reported)

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APPENDIX E – LEAP VALIDITY STUDY

Formative Assessment Analysis

Prepared for Connections Education, LLC

July 2017

Table of Contents

HANOVER RESEARCH

Introduction

- In this presentation, Hanover Research analyzes the relationship between student achievement on a formative assessment created by Connections Education (LEAP assessment) and their proficiency on a State assessment.
  - The analysis is done by grade (3-8), subject (reading and math), and test type (pre, mid, and post).
- The aim of this analysis is to validate whether LEAP scores are predictive of the result a student ultimately achieves on the State test.
- Accompanying this presentation is an interactive Excel dashboard that allows the user to view accuracy rates and model details by selecting the grade, subject, and test of interest.

Introduction (continued)

- This presentation is structured as follows:
  - First, we discuss the key findings and implications from this research.
  - Second, we describe the data and methodology used to conduct this analysis, along with general information on model creation.
  - Finally we provide a detailed outline of the results.

Executive Summary

This analysis validates that there is a positive, statistically significant relationship between students' results of the LEAP assessment and the proficiency level they achieve on the State assessment.

In general, negative accuracy rates (the proportion of those who were "Unlikely to Succeed" in the LEAP assessment and ultimately "Below Proficient" in the state assessment) are higher than positive accuracy rates (the proportion of those who were "Likely to Succeed" in the LEAP assessment and ultimately "Proficient" in the state assessment), indicating that the LEAP assessment is more effective at predicting those who will not be proficient than those who will be proficient.

Overall (for students in all grades), negative accuracy rates range from 72 percent to 82 percent, while positive accuracy rates range from 55 percent to 76 percent for specific subjects and tests.

Executive Summary

Overall accuracy rates (i.e. a combination of positive and negative accuracy rates) are typically lower due to the existence of the “May be Successful” category, which does not clearly predict the outcome of the state proficiency test and as such was not considered accurate for either proficient or not proficient. Overall accuracy rates range from 55 percent to 64 percent.

Additionally, this analysis found that accuracy rates differ across grade levels. When comparing tests across different grades, positive accuracy rates range from 44 percent to 87 percent and are typically higher for grades 6,7, and 8 while negative accuracy rates range from 64 percent to 91 percent and are typically higher for grades 3,4, and 5.

Key Findings

Please note: Negative accuracy rate = Proportion of "Unlikely to be Successful" who are ultimately "Below Proficient"
Positive accuracy rate = Proportion of "Likely to be Successful" who are ultimately "Proficient"

- **Overall, negative accuracy rates are higher than positive accuracy rates, indicating that the LEAP assessments are better at predicting who will not be proficient than predicting who will be proficient.**
  – Positive accuracy rates of the LEAP assessments range from 55 percent (Mid Math Assessment) to 76 percent (Post Read Assessment) while the negative accuracy rates of the LEAP assessments range from 72 percent (Pre Math Assessment) to 82 percent (Post Math Assessment).
- **Both positive and negative accuracy rates vary across grades.**
  – By grade, negative accuracy rates range from 64 percent (Pre Math Grade 6) to 91 percent (Mid Math Grade 5). In general, negative accuracy rates are higher for grades 3,4, and 5 and lower for grades 6,7,and 8).

Key Findings

Please note: Negative accuracy rate = Proportion of "Unlikely to be Successful" who are ultimately "Below Proficient"
Positive accuracy rate = Proportion of "Likely to be Successful" who are ultimately "Proficient"

- **Both positive and negative accuracy rates vary across grades.**
  - By grade, positive accuracy rates range from 44 percent (Mid Math Grade 3) to 87 percent (Post Read Grade 8). In general, positive accuracy rates are higher for grades 6,7, and 8 and lower for grades 3,4, and 5.
  - In general, positive accuracy rates are higher for Read assessments than Math assessments.
- **Overall accuracy rates are lower than positive and negative accuracy rates due to the existence of the "May be successful category", which was not considered to accurately predict either "Proficient" or "Below Proficient" on the State assessment.** These range from 55 percent (Post Math) to 64 percent (Pre Read).

Key Findings

- There is a significant, positive relationship between the results of the LEAP assessment and the results of the State assessments proficiency level, across all grades, tests and subjects.
- **When considering the LEAP assessment score as a predictor of State proficiency, a 10 point increase in the LEAP score corresponds to an increase in the likelihood that a student will be proficient of between 7.0 to 10.7 percentage points, when controlling for demographic variables.**
  - In general, the effects are slightly higher for Read assessments than Math assessments.

Key Findings

- **When considering the LEAP assessment band results, students who score in the "Likely to be Successful" or "May be Successful" range are significantly more likely to be "Proficient" than those who score in the "Unlikely to be Successful" range.**
  - This is true across all grades, tests, and subjects. In general, the effect sizes are larger for those who are "Likely to be Successful" than those who "May be Successful", but there are exceptions (such as in the Grade 5 Math Pre Assessment).
  - When controlling for demographic variables, students who score in the "Likely to be Successful" range are between 13 and 52 percent more likely to be "Proficient" than those who are "Unlikely to be Successful".
  - When controlling for demographic variables, students who score in the "May be Successful" range are between 11 and 32 percent more likely to be "Proficient" than those who are "Unlikely to be Successful".

Data and Methodology

Data

Initial data cleanup → Data Transformations → Model Types → Creating the final models

- For this analysis, Connections Education provided data on 2014-15 and 2015-16, including students scaled score and proficiency level for the state assessment, as well as the LEAP score for the Pre, Mid, and Post tests. Additionally some demographic variables were available for controlling purposes.
- The original datasets contained 86,294 rows for 2014-15 and 93,302 rows for 2015-16, however, a large portion of these observations were missing either State scores or LEAP scores.
- This analysis concentrates only on those from Grade 3- 8 and as such all other grades were removed, resulting in a dataset of 72,935 at the student – year level.

Step 1: Initial Data Cleanup

Initial data cleanup → Data Transformations → Model Types → Creating the final models

Dependent Variable Transformation:

- Since the scale of the raw State scores are not consistent, this analysis focuses on a student's proficiency result from the State. Student proficiency has been defined as follows:

Advanced	Proficient
Proficient	Proficient
Proficient – Borderline	Proficient
Basic Proficiency	Below Proficiency
Below Basic Proficiency	Below Proficiency

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Step 2: Data Transformations

Initial data cleanup → **Data Transformations** → Model Types → Creating the final models

Control Variable Transformations:

- Locations for which at least one grade level had fewer than 50 responses were grouped together into an “Other” category. These schools are: CalCAN, CalCAR, CCA, CenCA, FLVSFT-H, IACA, INSPIRE, KCA, MCA, TECCA, WCA, and WYCA.
- Respondents for whom the IEP value was missing were assumed to be non-IEP.
- Respondents who were coded as either “Eligible” or “FARMS” were considered to have FARMS status.
- Due to their small sample size, students who were “Previously Enrolled” were combined with “New” students, since they had not been attending in the prior year.
- For LEAP performance categories, respondents were assigned to groups based on their LEAP score and the bands provided by Connections Academy.

Step 3: Model Types

Initial data cleanup → Data Transformations → **Model Types** → Creating the final models

- In order to obtain a complete picture of the relationship between LEAP assessment score and State proficiency, the following models have been created. In each case, State proficiency is the dependent variable.

1. LEAP Scores (for each grade, subject, and test combination)
2. LEAP Scores with controls (for each grade, subject, and test combination)
3. LEAP Band Categories (for each grade, subject, and test combination)
4. LEAP Band Categories with controls (for each grade, subject, and test combination)

The controls included in the models are: *Location, Enrollment, SPED, IEP, Gender, Ethnicity, FARM ,ELL, and year**

*Please note: Consecutive years was considered as a control variable, but was ultimately removed as it was not statistically significant.

Step 4: Creating the Final Models

Initial data cleanup → Data Transformations → Model Types → **Creating the final models**

- Since the dependent variable State Proficiency is a binary variable, logistic regression models were used.
- These models produce predicted probabilities that are bounded between 0 percent and 100 percent, which makes them appropriate for estimating dichotomous dependent variables.
  - Logistic regression coefficients have the interpretation of being the change in log of the odds ratio, which is not very straightforward. However, we can estimate the change in probability of a student being proficient given a change in the independent variable.

Step 4: Creating the Final Models

Initial data cleanup → Data Transformations → Model Types → **Creating the final models**

- In addition to the logistic regression models, Hanover has also provided tabulations comparing LEAP success likelihood results to State proficiency results.

Results: Descriptive Analysis

Overall Positive and Negative Accuracy

Please note: Negative accuracy rate = Proportion of "Unlikely to be Successful" who are ultimately "Below Proficient"
Positive accuracy rate = Proportion of "Likely to be Successful" who are ultimately "Proficient"

- Overall, the positive accuracy rates of the LEAP assessments range from 55 percent (Mid Math Assessment) to 76 percent (Post Read Assessment) while the negative accuracy rates of the LEAP assessments range from 72 percent (Pre Math Assessment) to 82 percent (Post Math Assessment)
- The overall positive and negative accuracy rates are shown in the table below. Interpretation of the table is as follows: Overall, 82% of students who were "Unlikely to be Successful" in the Math Post LEAP assessment were ultimately "Below Proficient" in the state assessment.

Type of Accuracy	Grade	Test	Subject	Accuracy
Negative Accuracy Rate	Overall	Post	Math	82%
Negative Accuracy Rate	Overall	Pre	Read	78%
Negative Accuracy Rate	Overall	Mid	Math	78%
Negative Accuracy Rate	Overall	Mid	Read	76%
Negative Accuracy Rate	Overall	Post	Read	75%
Negative Accuracy Rate	Overall	Pre	Math	72%
Positive Accuracy Rate	Overall	Post	Read	76%
Positive Accuracy Rate	Overall	Pre	Read	74%
Positive Accuracy Rate	Overall	Mid	Read	71%
Positive Accuracy Rate	Overall	Post	Math	61%
Positive Accuracy Rate	Overall	Pre	Math	60%
Positive Accuracy Rate	Overall	Mid	Math	55%

Overall Accuracy

- The table below shows the overall accuracy, calculated using the following formula

$$\frac{\text{Number of Students "Likely to be Successful" and "Proficient"} + \text{Number of Students "Unlikely to be Successful" and "Below Proficient"}}{\text{Number of Students "Likely to be Successful"} + \text{Number of Students "May be Successful"} + \text{Number of Students "Unlikely to be Successful"}}$$

- Please note, these accuracy rates are lower since the number of students classified as “May be Successful” are included in the denominator, but are not considered to be correctly predicted as either “Proficient” or “Not Proficient”. Interpretation of the table is as follows: Overall, 64% of students who took the Pre Read LEAP assessment were either “Unlikely to be Successful” and ultimately “Below Proficient” in the state assessment or “Likely to be Successful” and ultimately “Proficient” in the state assessment.

Type of Accuracy	Grade	Test	Subject	Accuracy
Overall Accuracy	Overall	Pre	Read	64%
Overall Accuracy	Overall	Mid	Read	63%
Overall Accuracy	Overall	Post	Read	61%
Overall Accuracy	Overall	Mid	Math	57%
Overall Accuracy	Overall	Pre	Math	55%
Overall Accuracy	Overall	Post	Math	55%

By Grade (Positive Accuracy)

Please note: Negative accuracy rate = Proportion of "Unlikely to be Successful" who are ultimately "Below Proficient"

Positive accuracy rate = Proportion of "Likely to be Successful" who are ultimately "Proficient"

- By grade, positive accuracy rates range from 45 percent (Mid Math Grade 3) to 87 percent (Post Read Grade 8). In general, positive accuracy rates are higher for grades 6,7, and 8 and lower for grades 3,4, and 5.
- In general, positive accuracy rates are higher for Read assessments than Math assessments.

- The top and bottom three positive accuracies are shown in the table below. Interpretation of the table is as follows: Overall, 87% of students in Grade 8 who were "Likely to be Successful" in the Read Post LEAP assessment were ultimately "Proficient" in the state assessment.

Type of Accuracy	Grade	Test	Subject	Accuracy
Positive Accuracy Rate	8	Post	Read	87%
Positive Accuracy Rate	8	Mid	Read	84%
Positive Accuracy Rate	7	Post	Read	83%
Positive Accuracy Rate	5	Mid	Math	49%
Positive Accuracy Rate	3	Pre	Math	46%
Positive Accuracy Rate	3	Mid	Math	45%

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By Grade (Negative Accuracy)

Please note: Negative accuracy rate = Proportion of "Unlikely to be Successful" who are ultimately "Below Proficient"
Positive accuracy rate = Proportion of "Likely to be Successful" who are ultimately "Proficient"

- By grade, negative accuracy rates range from 64 percent (Pre Math Grade 6) to 91 percent (Mid Math Grade 5). In general, negative accuracy rates are higher for grades 3,4, and 5 and lower for grades 6,7, and 8).

- The top and bottom three negative accuracies are shown in the table below. Interpretation of the table is as follows: Overall, 91% of students in Grade 5 who were "Unlikely to be Successful" in the Math Mid LEAP assessment were ultimately " Below Proficient" in the state assessment.

Type of Accuracy	Grade	Test	Subject	Accuracy
Negative Accuracy Rate	5	Mid	Math	91%
Negative Accuracy Rate	3	Post	Math	90%
Negative Accuracy Rate	5	Post	Math	89%
Negative Accuracy Rate	3	Pre	Math	68%
Negative Accuracy Rate	8	Post	Read	67%
Negative Accuracy Rate	6	Pre	Math	64%

Results: LEAP Score Models

Overall

- Overall, when controlling for demographic variables, there is a significant positive relationship between the score that a student receives on the LEAP assessment and the likelihood that the student achieves "Proficient" status on the State test.
  - This is true across all grade levels (grade 3-grade 8), for both Math and Reading assessments, and for Pre, Mid, and Post tests.
- The size of this effect is relatively consistent. When controlling for demographic variables, the increase in the likelihood that a student is classified as proficient ranges from approximately 7.0 percentage points to 10.7 percentage points given a 10 point increase in LEAP score.
- In general, the effect is slightly higher for Read assessments than Math assessments

Grade Results

- The top and bottom effect sizes are shown in the table below. Interpretation is as follows: an increase for a Grade 4 student of 10 points on the Read Mid LEAP assessment corresponds to a 10.7 percentage point increase in the likelihood that a student is proficient on the state exam, when all other variables are held constant.

Subject	Grade	Test	Percentage Point Increase in Likelihood of State Proficiency for 10 point increase in LEAP (with controls)	Percentage Point Increase in Likelihood of State Proficiency for 10 point increase in LEAP (without controls)
Read	4	Mid	10.7	10.6
Read	3	Pre	10.1	8.2
Read	7	Mid	10.1	12.6

Subject	Grade	Test	Percentage Point Increase in Likelihood of State Proficiency for 10 point increase in LEAP (with controls)	Percentage Point Increase in Likelihood of State Proficiency for 10 point increase in LEAP (without controls)
Math	8	Post	7.3	9.5
Math	4	Mid	7.0	8.6
Math	8	Pre	7.0	8.5

Effect of Control Variables

- Overall, there is also a significant positive relationship between the score that a student receives on the LEAP assessment and the likelihood that the student achieve “Proficient” status on the State test without controlling for demographic variables.
  - This is true across all grade levels (grade 3-grade 8), for both Math and Reading assessments, and for Pre, Mid, and Post tests.
- Controlling for demographic variables changes these effect sizes slightly, but the change is typically not drastic. However, the models that do not control for demographic variables are biased models.

Results: LEAP Band Models

Overall

- Overall, students who score "Likely to be Successful" or "May be Successful" on the LEAP assessment are significantly more likely to be proficient in the State assessment than those who score "Unlikely to be Successful" on the LEAP assessment, when controlling for demographic variables.
  - The effects are positive and statistically significant for all grades, tests, and subjects.
  - Understandably, students who are categorized as "Likely to be Successful" are generally more likely to be proficient on the state exam than those who are categorized as "May be Successful", however there are some exceptions.
    - The size of the effects for those who are likely to be successful range from approximately 13 percent to 52 percent (i.e. they are 52 percent more likely to be proficient than those who are unlikely to succeed, when all other variables are held constant).
    - The size of the effects for those who may succeed range from approximately 11 percent to 32 percent (i.e. they are 32 percent more likely to be proficient than those who are unlikely to succeed, when all other variables are held constant).

Grade Results

- By grade, the top and bottom effect sizes are shown in the table below. Interpretation is as follows: A Grade 6 student who scores "Likely to be Successful" in the Pre Read LEAP assessment is 52.2 percent more likely to be Proficient than a Grade 6 student that scores "Unlikely to be Successful" in the Pre Read Assessment, holding all other variables constant.

Subject	Grade	Test	Likely to be successful (Controls)	May be Successful (Controls)	Likely to be successful (No controls)	May be Successful (No controls)
Read	6	Pre	52.2%	17.6%	57.0%	18.5%
Read	5	Post	51.7%	18.3%	55.4%	19.9%
Read	6	Post	51.5%	19.0%	56.4%	21.0%

Subject	Grade	Test	Likely to be successful (Controls)	May be Successful (Controls)	Likely to be successful (No controls)	May be Successful (No controls
Math	Grade 4	Pre	22.3%	17.8%	24.8%	20.7%
Math	Grade 5	Pre	19.4%	22.6%	21.5%	25.5%
Math	Grade 3	Pre	13.3%	11.0%	14.3%	14.9%

Effect of Control Variables

- Overall, students who achieve “Likely to be Successful” or “May be Successful” on the LEAP assessment were also significantly more likely to be proficient in the State exam without controlling for demographic variables.
  - This is true across all grade levels (grade 3-grade 8), for both Math and Reading assessments, and for Pre, Mid, and Post tests.
- Controlling for demographic variables changes the size of the effect slightly, but the changes are not drastic. However, the models that do not control for demographic variables are considered biased models.

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HANOVER RESEARCH

Clarifying Questions to NCAs Response to the Notice of Breach June 4, 2018

Authority staff is requesting that NCA clarify the following per the Notice of Breach letter dated March 12, 2018:

1) Nevada Connections (NCA) was asked to articulate the most essential features of the proposed academic change(s) to the education program to be implemented to correct the level of underperformance. NCA was asked to include information on how these approaches are different from those previously implemented.

   Authority staff would like more information on how the following proposed changes are different from those previously implemented:

   a) MATH, We Got This! (pgs. 9 – 11);
   b) Math Time to Talk (pgs. 11 – 12), including the frequency of these sessions; and
   c) Response to Intervention Model Training (pgs. 17 – 19).

2) NCA was asked to articulate how the organization will measure and evaluate academic progress throughout the school year, at the end of the academic year, and the entire school year. This includes the performance of individual students, student cohorts, subgroups and the entire school.

   Authority staff is requesting the following information:

   a) The MAP formative assessment section (pg. 22) describes the mean normative RIT scores as a critical element in determining satisfactory progress for students. A cut-score chart by grade level is referenced, but was not included in the submission.
   b) The LEAP formative assessment section (pgs. 22 – 23) seems to indicate that NCA currently utilizes this assessment. If this assessment has already been implemented by NCA, Authority staff would like to review a copy of an anonymized student report, as described on page 22, that provides academic information to teachers and parents so as to identify skills, strengths and weaknesses of a student.
   c) On page 23, NVA references that Connections Education has specific definitions for each assessment that NCA uses in the formative assessment cycle. It appears that the submission only provides a definition for Satisfactory progress for the LEAP assessment. If there are, in fact, other definitions of satisfactory progress as implied, Authority would like for these to be provided.

3) NCA was asked how teachers and school leadership will be supported in developing capacity around the academic benchmarks and interim and annual assessments. Additionally, NCA was asked what

steps the school will take should the school fall short of benchmarks at a school-wide and/or classroom level.

Authority staff is requesting the following information:

a) More details about how teachers will be supported in the implementation of the Math, We Got This! initiative as described on page 10, Math Time to Talk as described on page 11, and the Response to Intervention model training as described on page 18. Specifically, Authority staff requests to know the scope of the professional learning opportunities, the frequency of each, and how participation is to be monitored.
b) More details about how learning coaches will be supported in the implementation of the Math, We Got This! initiative as described on page 10, and on the learning coach training as described on page 17. Specifically, Authority staff requests to know the scope of the professional learning opportunities, the frequency of each, and how participation is to be monitored so as to increase the participation rate from 34% during the 2017-2018 school year.
c) More details about how frequently Professional Learning Communities (PLCs) will be implemented in the 2018-19 school year, and what student test data will be utilized during these meetings as described on page 19.

<u>Additionally, Authority staff has a few follow-up requests that are specific to the response received on May 4, 2018:</u>

1) On page 1, the submission notes that the school is working in consultation with a turnaround specialist on targeted interventions, and expects to receive the preliminary findings at the end of May, 2018. Authority staff is requesting a copy of these findings.
2) In the rationale for the Math Time to Talk initiative described on page 12, the submission states that two Connections Academy schools participated in a pilot of the Math Time to Talk program. The rationale goes on to state that the outcomes of this pilot were closely studied and verified in order to decide whether the program was successful and should be used in other schools. Because the program was deemed successful, Authority staff is requesting a copy of these results for review.
3) In the description of the Lexia Reading Core5, the submission states on page 16 that NCA data shows a need to increase student proficiency in the six areas (phonological awareness, phonics/phonemic awareness, structural analysis, fluency, vocabulary, and comprehension) of reading instruction, including activities focused on academic vocabulary through structural analysis. Authority staff is requesting a copy of this data for review.
4) In the description of the Response to Intervention Model Training, the submission explains how the School Support Team (SST) and performance data will be used to support struggling students on page 19. Authority staff would like more information on the RtI tiering process, as well as how frequently students will be re-evaluated for movement within the RtI tiers.

5) Authority staff agrees with NCAs assessment that the student mobility rate at the school has been a problem the last few years. Page 21 of the submission notes that the school had the highest mobility rate in Nevada in 2015-16 at 73%. Authority staff requests that the school provide the mobility numbers for the 2016-17 and 2017-18 school years.

NCA Elementary School Improvement Plan Clarifying Questions

Submitted to:

State Public Charter School Authority

By:

Nevada Connections Academy
Board of Directors

June 14, 2018

Table of Contents

CLARIFYING QUESTIONS

The clarifying questions are a supplement to and should be considered in context with the NCA Elementary Improvement Plan that was submitted to the Authority on May 4, 2018.

Authority staff is requesting that NCA clarify the following per the Notice of Breach letter dated March 12, 2018:

Question 1

1) Nevada Connections (NCA) was asked to articulate the most essential features of the proposed academic change(s) to the education program to be implemented to correct the level of underperformance. NCA was asked to include information on how these approaches are different from those previously implemented.
Authority staff would like more information on how the following proposed changes are different from those previously implemented:

a) MATH, We Got This! (pgs. 9 – 11);

For the 2018-19 school year, NCA will be participating in the "Math, We've Got This!" initiative, a schoolwide focus on improving math achievement in students. Math We've Got This! (MWGT!) is a research-based professional learning series that has received positive feedback from teachers and delivery specialists at other Connections Academy schools. MWGT! is designed to improve understanding of math content among elementary school teachers, while focusing on pedagogical skills for teachers who are already content experts in math. As part of the initiative, each grade level and school curricular department is asked to own a piece of math and to propose and assess ways that their group could contribute to improving student outcomes. Aside from participating in the initiative, teachers receive specific MWGT! professional development. Learning Coaches (LC) also receive support on instructional practices to assist students achieve a growth mindset. This is a new professional learning initiative and it was not previously implemented at NCA. Previously offered professional learning opportunities are still available to NCA teachers. The professional development previously offered did not include a dedicated focus on math. MWGT! professional learning is now required for all elementary school teachers, as well.

b) Math Time to Talk (pgs. 11 – 12), including the frequency of these sessions; and

Math Time to Talk (Math TtT) is a synchronous math session that encourages students to engage in math discourse, discussion, and problem solving. Participation in math discourse has been shown to be associated with higher performance in final course score and math state assessment at Connections Academy schools (Choi & Walters, 2018).[1]

[1] Choi, J., & Walters, A. (2018, April). *Exploring the impact of small-group synchronous discourse sessions in online math learning*. Paper presented at the meeting of the American Educational Research Association, New York, NY.

Math TtT consists of small group LiveLesson® sessions that appear in student courses approximately every seven lessons. NCA data demonstrates a need to focus on increasing students' ability to engage in math discourse in such a way that promotes an increase in conceptual understanding. Math TtT is available every week (about every seven lessons) to all students in grades 3-5. This program was not previously implemented at NCA. It differs from previous approaches by adding increased emphasis on math discourse to the curriculum. Previous mathematics coursework in grades 3-5 at NCA did not offer a dedicated, synchronous session each week for students to practice math discourse with a certified professional that wasn't directly attached to specific coursework.

c) Response to Intervention Model Training (pgs. 17 – 19).

While NCA is already using multiple strategies to provide struggling students with effective and timely interventions, NCA is retraining all teachers on the multi-tiered instructional approach for the 2018-19 school year. This is to ensure all teachers are up-to-date on our strategies and how to utilize the available resources for students. NCA is retraining all teachers in the Response to Intervention (RtI) program/protocols and on the teachers' role in helping students. NCA is also retraining teachers to interpret data to make instructional decisions, to document their work with students as part of the Personal Learning Plan (PLP), to implement strategies for differentiating instruction, to identify the most appropriate SISPs for students, and to support students who are not progressing or are not engaged in the instructional program. While this Rtl program was in place previously, it was not being utilized effectively by all teachers due to annual turnover and changes to the program. The goal for the 2018-19 school year is to train and "retrain" all teachers to effectively use this resource.

Question 2

2) NCA was asked to articulate how the organization will measure and evaluate academic progress throughout the school year, at the end of the academic year, and the entire school year. This includes the performance of individual students, student cohorts, subgroups and the entire school. Authority staff is requesting the following information:

a) MAP Formative Assessment Section

a) The MAP formative assessment section (pg. 22) describes the mean normative RIT scores as a critical element in determining satisfactory progress for students. A cut-score chart by grade level is referenced, but was not included in the submission.

The cut-score chart for 2016-17 by grade level is provided in Figure 1.

Grade	Read Mean + 1 SD	Read Expected Growth	Math Mean + 1 SD	Math Expected Growth
2	205	13.7	204	13.2
3	214	9.3	216	11
4	221	6.8	227	8.7
5	227	5.2	236	8.1
6	231	4.1	242	6.0
7	234	3.4	248	4.9
8	237	3.2	252	4.3
9	239	2.0	255	2.2
10	241	2.0	256	2.4
11	241	2.0	258	2.0
12	241	2.0	258	2.0

Figure 1. 2016-17 Cut-Score Chart.

b) LEAP Formative Assessment

b) The LEAP formative assessment section (pgs. 22 – 23) seems to indicate that NCA currently utilizes this assessment. If this assessment has already been implemented by NCA, Authority staff would like to review a copy of an anonymized student report, as described on page 22, that provides academic information to teachers and parents so as to identify skills, strengths and weaknesses of a student.

Please see the "Sample LEAP Data View Report" attached as Appendix A.

c) Assessment Definitions

c) On page 23, N[C]A references that Connections Education has specific definitions for each assessment that NCA uses in the formative assessment cycle. It appears that the submission only provides a definition for Satisfactory progress for the LEAP assessment. If there are, in fact, other definitions of satisfactory progress as implied, Authority would like for these to be provided.

In order to gauge student growth on the Formative Assessments, Connections has defined a measure of Satisfactory Progress for Math and English Language Arts Reading. The calculation of this measure varies based on the test that the student is assigned, which can differ by school and by grade.

On each of these assessments, Connections defines three types of success (predictor bands): Likely to be Successful, May be Successful, and Unlikely to be Successful. Please see Appendix B for the breakdown per assessment.

Additionally, we have included the following definitions that Connections uses in the Formative Assessment Cycle.

Longitudinal Evaluation of Academic Progress® (LEAP)

Students receive a score of percent correct on the pretest and posttest LEAP assessments. Students have made satisfactory gains if they score a minimum of 75% on the posttest assessment and/or if they increase their score from the pretest to the posttest by 10 percentage points.

DIBELS® Next

Students who score "At or Above Benchmark" on the Spring Composite Benchmark score are considered to be making Satisfactory Progress.

MAP®

To measure Satisfactory Progress on this assessment we use the mean normative RIT scores and the expected growth measures provided by the testing company, NWEA. This is defined as students who make the expected RIT gain score from pretest to posttest or who score one standard deviation above the mean RIT score on the posttest.

Question 3

3) NCA was asked how teachers and school leadership will be supported in developing capacity around the academic benchmarks and interim and annual assessments. Additionally, NCA was asked what steps the school will take should the school fall short of benchmarks at a school-wide and/or classroom level.
Authority staff is requesting the following information:

a) Teacher Support

a) More details about how teachers will be supported in the implementation of the Math, We Got This! initiative as described on page 10, Math Time to Talk as described on page 11, and the Response to Intervention model training as described on page 18. Specifically, Authority staff requests to know the scope of the professional learning opportunities, the frequency of each, and how participation is to be monitored.

i) Math, We've Got This! initiative as described on page 10

Aside from participating in the MWGT! initiative, teachers will receive specific MWGT! professional development. Returning K-5 teachers who participated in the MWGT! Series during the 2017-2018 school year will take part in a specially-tailored professional learning series directed to the MWGT! campaign, titled *Building Conceptual Understanding in Math*. During this seven-session series, participants will dive deeply into topics such as teaching place value, decimals, fractions, and geometry.

The *Building Conceptual Understanding in Math* Professional Learning Series is:

- Intensive – Participants will identify the purpose of educational practices, examine how they can be implemented in the virtual or blended environment, and collaboratively discuss strategies that can be implemented with students.
- Ongoing – New instructional strategies and the latest learning research will be connected to topics presented and discussed in prior sessions to demonstrate how specific educational practices form the "big picture" of effective instruction. Further discussion and exploration at the school level strengthens these connections.
- Connected to practice – Following each session, participants will apply what they've learned to their professional practice. They will integrate precise, targeted strategies into their planning and instruction, and reflect on the outcomes through the MWGT! ePortfolio Data View.

Participants in the *Building Conceptual Understanding in Math* are content-area teachers, instructional support staff, advisory teachers, and substitute teachers that directly support student learning through courses at select Connections Academy schools. All have completed the MWGT! professional learning previously.

PL Series during the 2018–2019 school year:

September: MWGT! Building Conceptual Understanding in Math Series Overview (recorded session)

How can teachers move beyond an instructional practice focused on computation and a focus on the “right” answer? Through deep content exploration, teachers can build mathematical conceptual understanding in their students. In this recording, teachers will preview the MWGT! Series which focuses on developing strategies for teaching foundational skills including place value, decimals, fractions, geometry, and algebra readiness.

October: Know They Place (Value)

What is the role of place value in connecting foundational concepts? As students build from counting to two-digit whole numbers, comparing and ordering numbers to addition and subtraction, place value is the central component that links these skills. In this session participants will investigate strategies for engaging students in activities that develop understanding of place value and serve as a bridge into activities and problem-based tasks that extend their learning.

November: Get to the Point

Why is the concept of the decimal so challenging for elementary math learners?

Transitioning students from whole-number ideas to the role of the decimal as an indication of the parts of the whole is critical for deepening understanding of the complexity of numbers. In this session, participants will discuss strategies for addressing decimal misconceptions and for laying a solid foundation for future problem-solving applications.

January: “How Many Slices of Pizza Do I Get?”

Why do students typically enjoy the exploratory and discovery phase of learning fractions, but exhibit confusion or frustration when completing fraction computations? Shifting students from that exploratory phase to computation phase a critical point for ensuring that students have the ability to reason and make sense of math. In this session, participants will explore a variety of instructional strategies and tools that can be used to support an immersive and diverse experience with fractions.

February: “Why Can’t I Add Apples and Oranges?”

Why are diverse exposures to fractions a critical component for preventing the development of mathematical misconceptions? Oftentimes, fractions are deeply connected to a set of computation rules rather than a conceptual understanding of the meaning of a fraction. In this session, participants will delve deeper into common misunderstandings many students have about fractions and will explore instructional strategies for ensuring a thorough understanding of what a fraction represents.

March: “My Dad is Eight Feet Tall.”

How does early skill development of measurement lay the foundation for later success in geometry? Students who develop a sense of relative measurements and feel comfortable using units to describe measurements have a solid conceptual understanding of geometry. In this session, we will explore this relationship and strategies to grow student understanding of these critical foundational skills.

April: X Marks the Spot

Does algebra readiness start as early as first grade? Elementary students are successfully using big algebraic ideas including working with patterns, using symbols, and representing numbers in a variety of ways. In this session, participants will examine instructional strategies for building upon early elementary math skills with an algebraic mindset.

Participation is monitored by the K-8 administrators, the managing teachers and the school leader. All staff members are required to participate, per their evaluation competencies.

ii) Math Time to Talk as described on page 11

Math TtT sessions are moderated by Pearson Online and Blended Learning (Pearson OBL) math subject experts who have a degree in mathematics and have received formal training on:

- presenting the problem,
- guiding the students in the discussion to focus on the process and different ways of approaching the particular problem rather than arriving at the solution,
- Encouraging students to talk to one another about their thought processes, and
- Giving feedback that promotes growth mindset.

iii) Response to Intervention model training as described on page 18.

All NCA teachers are enrolled in a Professional Development series that corresponds to their years of expertise in various areas of instruction, including Response to Intervention (RtI). Teachers new to NCA are enrolled in the 100 series (introduction and instructional-based), second year teachers in the 200 series (expanding beyond first-year resources), and veteran teachers in the 300 series (refreshed information and retraining). For each series, there are seven sessions, usually starting in September and ending in April. Attendance in these professional development sessions is monitored by the K-8 administrators, the managing teachers and the school leader and is connected to EOY evaluations and expected teacher competencies. Sessions are held at various times each week to accommodate teacher schedules.

b) Learning Coach Support

b) More details about how learning coaches will be supported in the implementation of the Math, We Got This! initiative as described on page 10, and on the learning coach training as described on page 17. Specifically, Authority staff requests to know the scope of the professional learning opportunities, the frequency of each, and how participation is to be monitored so as to increase the participation rate from 34% during the 2017-2018 school year.

i) Math, We Got This! initiative as described on page 10

In 2018, NCA launched “Learning Coach Central” to provide parents and LCs with various resources from one central location. Included in these resources are various recordings and documents to assist LCs succeed in assisting students. As part of these resources, LCs have access to multiple articles and recordings to develop positive student mindsets and provide academic support, specifically in math.

Below is a sampling of those math resources/activities for LCs:

- Math Mind Reader - Amaze family and friends by being able to reveal numbers they have in mind.
- Fun With Infinity - Explore shapes through topology. One little twist in a piece of paper leads to some surprising discoveries.
- Let the Math Games Begin! - November 1 marked the start of the 100-day countdown to the 2018 Winter Olympics. There's no need to wait! There are plenty of math games to play now!
- Adventures with Numbers and Words - This month's Family Math Activity explores the linguistics of math and the English words behind the numbers. You will discover some puzzling facts and some surprising patterns!
- It's Just a Matter of Time - This month's Family Math Activity explores the math behind the way time is divided into years, months, and days.
- The Domino Effect - This month's Family Math Activity explores one of the greatest strategy games of all time-dominoes!
- Math Unplugged - This month's Family Math Activity explores various methods for computation without using a digital device.
- Famous Number Phrases - In this month's Family Math Activity challenge yourself to identify famous number phrases.
- Find the Math Superhero In You! - Rate your accomplishments and share strategies for continuing to exercise your mathematical muscles.

In addition to these resources, live sessions are held throughout the year (quarterly) to provide LCs and/or parents support in helping their students remain positive about math. Participation is voluntary in these sessions, but LCs of "at-risk" students will be recommended to attend appropriate sessions by grade appropriate teachers.

ii) Learning Coach Training as described on page 17.

Learning Coach Orientation is available to all Learning Coaches (LC) of students who attend NCA. For the 2018-19 school year, this orientation session is mandatory for all LCs. The Learning Coach Orientation provides LCs with information about their roles and responsibilities, a snapshot of what they and the students they support will encounter during a regular school day, as well as an opportunity for hands-on practice with common student processes and routine tasks. LCs will be given the first two weeks of the school year (or two weeks from their student's enrollment date) to complete the orientation and completion of this orientation session will be monitored by homeroom teachers at all grade levels. Please see Figure 2.

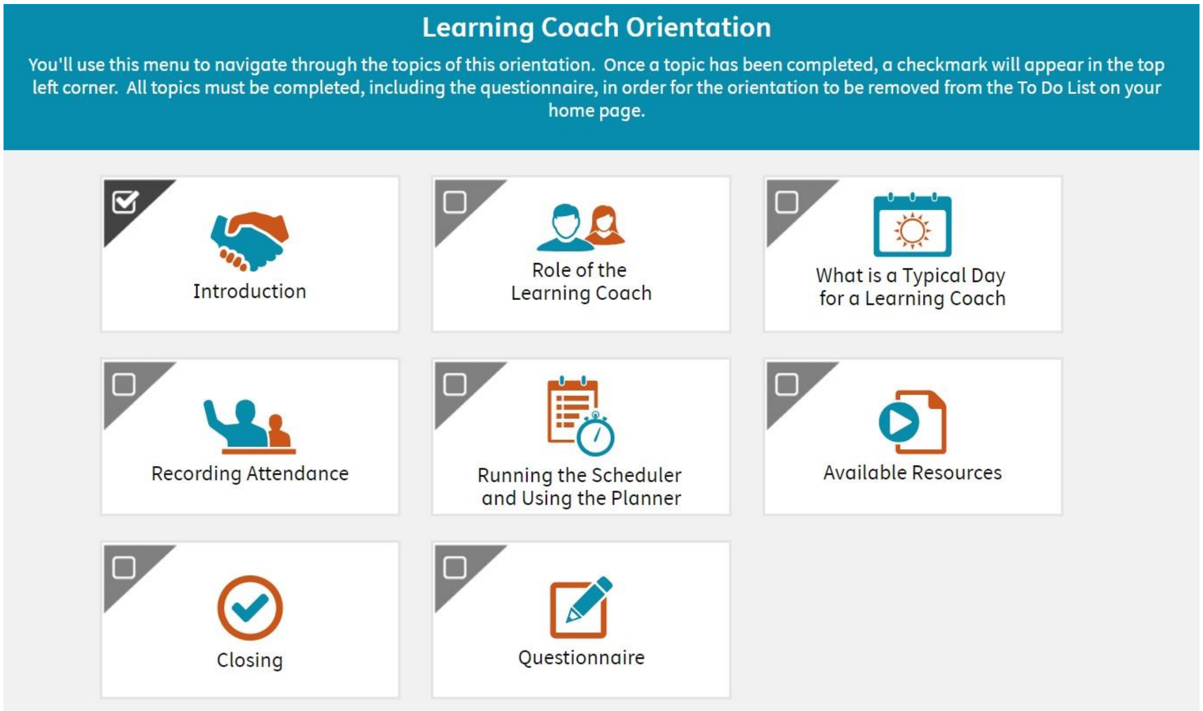


Figure 2. Learning Coach Orientation

c) Professional Learning Communities

c) More details about how frequently Professional Learning Communities (PLCs) will be implemented in the 2018-19 school year, and what student test data will be utilized during these meetings as described on page 19.

i) Professional Learning Communities

At NCA, the entire staff meets in their Professional Learning Community (PLC) teams on a bi-weekly basis. PLC participation and progress is monitored by K-8 administrators, the managing teachers and the school leader managers and the school leadership team. Successful participation and use of SMART (Specific, Measurable, Attainable, Results-Oriented, Time-Bound) goals is part of the EOY evaluation process for all NCA employees.

ii) Student Test Data as described on page 19.

Formative and Summative test data is utilized in academic-based PLC meetings, including (but not limited to) MAP, LEAP, course-based assessments, portfolios and student work samples. Nevada Department of Education School Performance Framework (NSPF) data is also utilized in PLC meetings, when available and appropriate.

FOLLOW-UP REQUESTS

Additionally, Authority staff has a few follow-up requests that are specific to the response received on May 4, 2018:
1) On page 1, the submission notes that the school is working in consultation with a turnaround specialist on targeted interventions, and expects to receive the preliminary findings at the end of May 2018. Authority staff is requesting a copy of these findings.

Perceptual Data Set for NCA is provided as Appendix C. Additionally, NCA is expecting to receive an evaluation report from the Community Training and Assistance Center by the end of July that combines the perceptual data with student achievement data.

NCA will update its Plan based on this report to achieve optimum results.

2) In the rationale for the Math Time to Talk initiative described on page 12, the submission states that two Connections Academy schools participated in a pilot of the Math Time to Talk program. The rationale goes on to state that the outcomes of this pilot were closely studied and verified in order to decide whether the program was successful and should be used in other schools. Because the program was deemed successful, Authority staff is requesting a copy of these results for review.

Please see Appendix D for the Math Time to Talk Pilot Results.

3) In the description of the Lexia Reading Core5, the submission states on page 16 that NCA data shows a need to increase student proficiency in the six areas (phonological awareness, phonics/phonemic awareness, structural analysis, fluency, vocabulary, and comprehension) of reading instruction, including activities focused on academic vocabulary through structural analysis. Authority staff is requesting a copy of this data for review.

The most recent NSPF data (2016-2017) for the elementary school at NCA indicates that on the ELA CRT, 46.3% of students achieved above the cut score. Additionally ELA CRT MGP was 38.5 and AGP was 40.7. This data suggests that NCA needs to continue to work on improving student literacy at the elementary school. To best support student literacy growth and achievement, NCA believes it is important to focus on phonological awareness, phonics/phonemic awareness, structural analysis, fluency, vocabulary, and comprehension. We do not currently have data on each of those areas of literacy instruction, but for students who use Lexia Reading Core5 in the 2018-2019 school year, this data will be generated for those students moving forward.

4) In the description of the Response to Intervention Model Training, the submission explains how the School Support Team (SST) and performance data will be used to support struggling students on page 19. Authority staff would like more information on the RtI tiering process, as well as how frequently students will be re-evaluated for movement within the RtI tiers.

The RtI “At-A-Glance Flowchart” (Appendix E) demonstrates the difference between the Rtl tiers and provides an overview of how students are identified for each tier. Students are re-evaluated for Rtl tiers quarterly, based on performance and/or teacher recommendation.

5) Authority staff agrees with NCAs assessment that the student mobility rate at the school has been a problem the last few years. Page 21 of the submission notes that the school had the highest mobility rate in Nevada in 2015-16 at 73%. Authority staff requests that the school provide the mobility numbers for the 2016-17 and 2017-18 school years.

The data presented on page 21 is the data provided by the Nevada Department of Education on the transiency rate. NDE published this data for the 2016-17 school year and the rate for NCA is 62.5% for 2016-17 (compared to 73.6% for 2015-16). As NDE has not yet published the data for the 2017-18 school year, student mobility data for 2017-18 is not yet available.

As a public school, NCA is open-enrollment and cannot turn away students; thus, we gladly serve each and every student enrolled despite where they are at academically when they come to us. The impact of this mobility on academic performance can be unpredictable from year to year. Similar to students who arrive behind in coursework, studies also indicate that changing schools can have an adverse impact on test scores (Rumberger, 2015).[2]

As stated in our Elementary Improvement Plan, NCA is going to track students as "New to the School" to understand this subgroup better going forward. It is NCA's desire to work collaboratively with the Authority to identify meaningful ways to measure student growth and school performance, particularly with highly mobile students, since NCA and the Authority both recognize understanding mobility rate's impact is a piece of the puzzle for school improvement.

[2] Rumberger, Russell W. (2015). Student Mobility: Causes, Consequences, and Solutions. Boulder, CO: National Education Policy Center. Retrieved 4/27/2018 from http://nepc.colorado.edu/publication/student-mobility.

APPENDIX A – SAMPLE LEAP DATA VIEW REPORT

LEAP provides a periodic checkpoint during the school year to measure progress and support teacher decision making in conjunction with the prior year's state test results and the student's current grade book and associated objective performance report.

LEAP Math Midtest Results

The list of the LEAP Math Subtest Categories is here.

LEAP Math Midtest Taken 2017-18: LEAP MATH 2.5.4

LEAP Math Midtest Score: 82%

LEAP Math Midtest Final Score 2017-18: 82

Results: **Math Midtest Result:** 82%View Math Test

LEAP Math Midtest Subtest 1 2017-18: 100

LEAP Math Midtest Subtest 2 2017-18: 100

LEAP Math Midtest Subtest 3 2017-18: 67

LEAP Math Midtest Subtest 4 2017-18: 83

LEAP Math Midtest Subtest 5 2017-18: 67

NV State Testing Scores (Grades 3-8) -

State Test Scores From Student Records:

State Test Scores for 2016-17

Final Grade 2016-2017: 4

Enrollment Date 1 2016-2017: 8/29/2016

Final Withdrawal Date 1617:

Smarter Balanced 2016-17

Date score reports mailed: 8/18/2017

Tested Grade: 4

Math

Achievement Level: Not Met

Scale Score: 2387

Concepts and Procedures: Below Standard

Problem Solving, Modeling, and Data Analysis: Below Standard

Communicating Reasoning: At/Near Standard

ELA

Achievement Level: Nearly Met

Section Details - Math 5 B: 83% B

Assessment Summary:

Type	Weight	Score
Test	55%	75%
Quiz	20%	86%
Portfolio Item	15%	100%
Discussion	5%	60%
Participation	5%	133%

Assessment Details:

Show me all assessments, excluding dropped items, in all units of the following types: Discussion Participation Portfolio Item Practice Quick Check Quiz Refl

Drop	Unit	Lesson	Name	Type	Requires	Earned	Possible	Score	Value	Weight
			Participation	Participation		20	20	100%	20	67%
			State Test Participation	Participation		20	10	200%	10	33%
	1	✓1	Quick Check	Quick Check		6	8	75%	8	
	2	✓1	Classify Triangles	Quick Check		2	5	40%	5	
	2	✓2	Classify Quadrilaterals	Quick Check		3	5	60%	5	
	2	✓3	Continue to Classify Quadrilaterals Quiz	Quiz		7	10	70%	10	13%
	2	✓4	Reflection	Reflection		6	6	100%	6	
	2	✓4	Unit Practice	Practice		1	8	13%	8	

calculations with numbers, and interpret numerical expressions without	100%	2
g two given rules. Identify apparent relationships between corresponding terms. g terms from the two patterns, and graph the ordered pairs on a coordinate plane.	100%	2
	100%	2
lings of multiplication and division to multiply and divide fractions	64%	11
ategories based on their properties	67%	3
a given measurement system	0%	2
concepts of volume and relate volume to multiplication and to addition	80%	5
to solve real-world and mathematical problems	100%	3
hole numbers and with decimals to hundredths	100%	7
	100%	2
	100%	7
Cluster: Use equivalent fractions as a strategy to add and subtract fractions	75%	4
Cluster: Write and interpret numerical expressions	100%	4
Domain: Geometry	83%	6
Domain: Measurement and Data	67%	9
Domain: Number and Operations in Base Ten	100%	14
Domain: Numbers and Operations - Fractions	67%	15
Domain: Operations and Algebraic Thinking	100%	6

M:😐↑1/R:☹1

Each student has a teacher-facing alert for both math (M) and reading (R), indicating the predicted likelihood of achieving proficiency on the state test. Green is likely proficient, yellow is may be proficient, which red in unlikely. The up arrow in this example indicates that this student's math proficiency has improved but still is low in reading. The 1's indicates that the student is in intervention Tier I.

- **LEAP 2012-13** - LEAP Pretest, Midtest, and Posttest scores for the 2012-2013 School Year- Math and Reading
- **LEAP 2013-14** - LEAP Pretest, Midtest, and Posttest scores for the 2013-2014 School Year- Math and Reading
- **LEAP 2014-15** - LEAP Pretest, Midtest, and Posttest scores for the 2014-2015 School Year- Math an
- **LEAP 2015-16** - LEAP Pretest, Midtest, and Posttest scores for the 2015-2016 School Year- Math an
- **LEAP 2016-17** - LEAP Pretest, Midtest, and Posttest scores for the 2016-2017 School Year- Math an
- **LEAP 2017-18** - LEAP Pretest, Midtest, and Posttest scores for the 2017-2018 School Year- Math an
- **LEAP Midtest (Grades K-8)** - This is the data view to access the LEAP midtest information every w
- **LEAP Midtest Results** - This is the data view to access the LEAP midtest results for families every
- **LEAP Midtest Results-Teacher** - This is the data view to access the LEAP midtest results for schoo
- **LEAP Posttest (Grades K-8)**
- **LEAP Posttest Results**
- **LEAP Posttest Results-Teacher**
- **LEAP Pretest (Grades K-8)** - This is the data view to access the LEAP pretest information every fall
- **LEAP Pretest Results-Teacher** - This is the data view to access the LEAP pretest results for school

LEAP Midtest Results - Data for Current School Year

This data view has all of the important information from the LEAP Midtests for the current school year.

Current Homeroom Teacher:	Ann McDonald
Start Year (calculated):	2015-2016
The student's current stage:	Enrolled
Current Grade Level:	5
Students with disabilities with IEPs:	
Enrollment Date:	8/14/2017
Withdrawal Date:	
Date DIBELS Next Kindergarten was Taken (Winter):	
Proficiency on math section of state test 2016-2017:	Below Proficiency
Proficiency on reading section of state test for 2016-2017:	Below Proficiency
Student's Predicted Pretest Math Performance:	May be Proficient on Math State Test
Student's Predicted Pretest ELAR Performance:	Unlikely to be Proficient on Reading State Test
Student's Predicted Midtest Math Performance:	Likely to be Proficient on Math State Test
Student's Predicted Midtest ELAR Performance:	Unlikely to be Proficient on Reading State Test

LEAP Math Midtest Results

The list of the LEAP Math Subtest Categories is here.

LEAP Math Midtest Taken 2017-18:	LEAP MATH 2.5.4
LEAP Math Midtest Score:	82%
LEAP Math Midtest Final Score 2017-18:	82
Results:	**Math Midtest Result:** 82%View Math Test
LEAP Math Midtest Subtest 1 2017-18:	100
LEAP Math Midtest Subtest 2 2017-18:	100
LEAP Math Midtest Subtest 3 2017-18:	67
LEAP Math Midtest Subtest 4 2017-18:	83
LEAP Math Midtest Subtest 5 2017-18:	67

From a lost of available data "views", teachers can access a variety individual reports for each student, including current and past years' LEAP results.

When viewing the most current LEAP test results, teachers will also see state test results as well as the LEAP tests results already completed this year.

LEAP Math Midtest Results

The list of the LEAP Math Subtest Categories is here.

LEAP Math Midtest Taken 2017-18: LEAP MATH 2.5.4

LEAP Math Midtest Score: 82%

LEAP Math Midtest Final Score 2017-18: 82

Results: **Math Midtest Result:** 82% View Math Test

LEAP Math Midtest Subtest 1 2017-18: 100

LEAP Math Midtest Subtest 2 2017-18: 100

LEAP Math Midtest Subtest 3 2017-18: 67

LEAP Math Midtest Subtest 4 2017-18: 83

LEAP Math Midtest Subtest 5 2017-18: 67

The LEAP results include links to the category descriptions and question alignment.

CONNECTIONS EDUCATION®

LEAP Subtest Categories - Math

	LEAP Math Subtest 1	LEAP Math Subtest 2	LEAP Math Subtest 3	LEAP Math Subtest 4	LEAP Math Subtest 5	LEAP Math Subtest 6
0	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)		Counting and Cardinality (CC)
1	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)		
2	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)		
3	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)	Numbers and Operations – Fractions (NF)	
4.3	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)	Numbers and Operations – Fractions (NF)	
5.4	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)	Numbers and Operations –	

Teachers can also directly view the student's completed LEAP test.

CONNECTIONS EDUCATION®

LEAP Question Alignment - Math

	Operations & Algebraic Thinking (OA)	Number & Operations in Base Ten (NBT)	Measurement & Data (MD)	Geometry (G)	Numbers and Operations – Fractions (NF)	Counting and Cardinality (CC)
0	Questions 9 – 17	Questions 18 – 22	Questions 23 – 28	Questions 29 – 30		Questions 1 – 8
1	Questions 1 – 10	Questions 11 – 20	Questions 21 – 30	Questions 31 – 35		
2	Questions 1 – 10	Questions 11 – 20	Questions 21 – 32	Questions 33 – 40		
3	Questions 1 – 18	Questions 19 – 24	Questions 33 – 45	Questions 46 – 50	Questions 29 – 32	
4.3	Questions 1 – 9	Questions 10 – 21	Questions 36 – 45	Questions 46 – 50	Questions 22 – 35	
5.4	Questions 1 – 6	Questions 7 – 20	Questions 36 – 44	Questions 45 – 50	Questions 21 – 35	

LEAP Math Midtest - 5 (4 GT)

Completed By:

Submitted: Thursday, January 11, 2018 at 7:37 PM

Elapsed Time: 41 minutes

Maximum Time: n/a

Points scored may differ from the grading guidelines because c

Correct Partial Credit Incorrect

1. Margo read for 20 minutes each day for 5 days, and she re
expression represents the number of minutes Margo read

- *(0 pts)* $(20 + 60) \times 7$
- *(0 pts)* $(5 \times 2) + 80$
- *(1 pt)* $(20 \times 5) + (60 \times 2)$
- *(0 pts)* $(60 + 2) + (20 + 5)$

1/1 point

LEAP Math Midtest - 5 (4 GT)

View Objective Performance Report

Completed By:

Submitted: Thursday, January 11, 2018 at 7:37 PM

Elapsed Time: 41 minutes

Maximum Time: n/a

Points scored may differ from the grading guidelines because of teacher review. Contact your program teacher if y

✔ Correct ✔ Partial Credit ✘ Incorrect

1. Margo read for 20 minutes each day for 5 days, and she read for 60 minutes each day for 2 days. Which expression represents the number of minutes Margo read on all 7 days? *(1 point)*

   - ○ *(0 pts)* (20 + 60) × 7
   - ○ *(0 pts)* (5 × 2) +80
   - ✔ *(1 pt)* (20 × 5) + (60 × 2)
   - ○ *(0 pts)* (60 + 2) + (20 + 5)

   1 /1 point

2. What is the value of the expression shown? *(1 poi*

   8 + 12 ÷ 2 × (6 + 3)

   - ○ *(0 pts)* 90
   - ○ *(0 pts)* 78
   - ○ *(0 pts)* 63
   - ✔ *(1 pt)* 62

   1 /1 point

Besides viewing the original questions and the student responses, teachers can also link to view the Objective Performance Report, which summarizes the domain, cluster, and objective results for the student from the student's current course data.

5.OA.A.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	100%	2
5.OA.B3: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.	100%	2
Cluster: Analyze patterns and relationships	100%	2
Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions	64%	11
Cluster: Classify two-dimensional figures into categories based on their properties	67%	3
Cluster: Convert like measurement units within a given measurement system	0%	2
Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition	80%	5
Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems	100%	3
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths	100%	7
Cluster: Represent and interpret data	100%	2
Cluster: Understand the place value system	100%	7
Cluster: Use equivalent fractions as a strategy to add and subtract fractions	75%	4
Cluster: Write and interpret numerical expressions	100%	4
Domain: Geometry	83%	6
Domain: Measurement and Data	67%	9
Domain: Number and Operations in Base Ten	100%	14
Domain: Numbers and Operations - Fractions	67%	15
Domain: Operations and Algebraic Thinking	100%	6

APPENDIX B – FORMATIVE ASSESSMENT PREDICTOR BANDS

Formative Assessment Pretest Proficiency Bands for English Language Arts: 2016 – 17

Grades K – 1

	Proficiency Predictor Category	DIBELS Next	PALS	Iowa FAST
	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	Composite >= 46
K	May be Successful	Below Benchmark	---	Composite 30 – 45
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	Composite <= 29
	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	Composite >= 46
1	May be Successful	Below Benchmark	---	Composite 30 – 45
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	Composite <= 29

Grades 2 – 12

	Proficiency Predictor Category	LEAP	Scantron	MAP	Iowa FAST
	Likely to be Successful	>= 70%	Above or High Average	>= 191	>= 55
2	May be Successful	51% – 69%	Low Average	159 – 190	40 – 54
	Unlikely to be Successful	<= 50%	Below Average	<= 158	<= 39
	Likely to be Proficient	>= 67%	Above or High Average	>= 205	>= 87
3	May be Proficient	52% – 66%	Low Average	172 – 204	65 – 86
	Unlikely to be Proficient	<= 51%	Below Average	<= 171	<= 64
	Likely to be Proficient	>= 62%	Above or High Average	>= 215	>= 127
4	May be Proficient	56% – 61%	Low Average	183 – 214	100 – 126
	Unlikely to be Proficient	<= 55%	Below Average	<= 182	<= 99
	Likely to be Proficient	>= 73%	Above or High Average	>= 222	>= 127
5	May be Proficient	60% – 72%	Low Average	191 – 221	100 – 126
	Unlikely to be Proficient	<= 59%	Below Average	<= 190	<= 99
	Likely to be Proficient	>= 64%	Above or High Average	>= 227	
6	May be Proficient	58% – 63%	Low Average	196 – 226	
	Unlikely to be Proficient	<= 57%	Below Average	<= 195	
	Likely to be Proficient	>= 62%	Above or High Average	>= 231	
7	May be Proficient	44% – 61%	Low Average	199 – 230	
	Unlikely to be Proficient	<= 43%	Below Average	<= 198	
	Likely to be Proficient	>= 62%	Above or High Average	>= 234	
8	May be Proficient	49% – 61%	Low Average	201 – 233	
	Unlikely to be Proficient	<= 48%	Below Average	<= 200	
	Likely to be Proficient		Above or High Average	>= 237	
9	May be Proficient		Low Average	205 – 236	
	Unlikely to be Proficient		Below Average	<= 204	
	Likely to be Proficient		Above or High Average	>= 238	
10	May be Proficient		Low Average	204 – 237	
	Unlikely to be Proficient		Below Average	<= 203	
	Likely to be Proficient		Above or High Average	>= 240	
11	May be Proficient		Low Average	206 – 239	
	Unlikely to be Proficient		Below Average	<= 205	
	Likely to be Proficient		Above or High Average	>= 240	
12	May be Proficient		Low Average	206 – 239	
	Unlikely to be Proficient		Below Average	<= 205	

Formative Assessment Pretest Proficiency Bands for Math: 2016 – 17

Grades K – 12

	Proficiency Predictor Category	LEAP	Scantron	MAP
K	Likely to be Successful	>= 70%		
	May be Successful	51% – 69%		
	Unlikely to be Successful	<= 50%		
1	Likely to be Successful	>= 70%		
	May be Successful	51% – 69%		
	Unlikely to be Successful	<= 50%		
2	Likely to be Successful	>= 70%	Above or High Average	>= 191
	May be Successful	51% – 69%	Low Average	164 – 190
	Unlikely to be Successful	<= 50%	Below Average	<= 163
3	Likely to be Proficient	>= 84%	Above or High Average	>= 205
	May be Proficient	46% – 83%	Low Average	177 – 204
	Unlikely to be Proficient	<= 45%	Below Average	<= 176
4	Likely to be Proficient	>= 81%	Above or High Average	>= 217
	May be Proficient	44% –80%	Low Average	188 – 216
	Unlikely to be Proficient	<= 43%	Below Average	<= 187
5	Likely to be Proficient	>= 72%	Above or High Average	>= 227
	May be Proficient	50% – 71%	Low Average	197 – 226
	Unlikely to be Proficient	<= 49%	Below Average	<= 196
6	Likely to be Proficient	>= 66%	Above or High Average	>= 234
	May be Proficient	45% – 65%	Low Average	202 – 233
	Unlikely to be Proficient	<= 44%	Below Average	<= 201
7	Likely to be Proficient	>= 66%	Above or High Average	>= 240
	May be Proficient	45% – 65%	Low Average	206 – 239
	Unlikely to be Proficient	<= 44%	Below Average	<= 205
8	Likely to be Proficient	>= 65%	Above or High Average	>= 245
	May be Proficient	46% – 64%	Low Average	208 – 244
	Unlikely to be Proficient	<= 45%	Below Average	<= 207
9	Likely to be Proficient		Above or High Average	>= 249
	May be Proficient		Low Average	212 – 248
	Unlikely to be Proficient		Below Average	<= 211
10	Likely to be Proficient		Above or High Average	>= 251
	May be Proficient		Low Average	211 – 250
	Unlikely to be Proficient		Below Average	<= 210
11	Likely to be Proficient		Above or High Average	>= 254
	May be Proficient		Low Average	213 – 253
	Unlikely to be Proficient		Below Average	<= 212
12	Likely to be Proficient		Above or High Average	>= 254
	May be Proficient		Low Average	213 – 253
	Unlikely to be Proficient		Below Average	<= 212

Formative Assessment Midtest Proficiency Bands for English Language Arts: 2016 – 17

Grades K – 1

	Proficiency Predictor Category	DIBELS Next	PALS	Iowa FAST
K	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	
	May be Successful	Below Benchmark	---	
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	Coming Soon
1	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	
	May be Successful	Below Benchmark	---	
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	

Grades 2 – 12

	Proficiency Predictor Category	LEAP	Scantron	MAP	Iowa FAST
2	Likely to be Successful	>= 76%	Above or High Average	>= 199	
	May be Successful	60% – 75%	Low Average	170 – 198	
	Unlikely to be Successful	<= 59%	Below Average	<= 169	
3	Likely to be Proficient	>= 85%	Above or High Average	>= 211	
	May be Proficient	70% – 84%	Low Average	181 – 210	
	Unlikely to be Proficient	<= 69%	Below Average	<= 180	Coming Soon
4	Likely to be Proficient	>= 80%	Above or High Average	>= 219	
	May be Proficient	---	Low Average	190 – 218	
	Unlikely to be Proficient	<= 79%	Below Average	<= 189	
5	Likely to be Proficient	>= 80%	Above or High Average	>= 224	
	May be Proficient	75% – 79%	Low Average	196 – 223	
	Unlikely to be Proficient	<= 74%	Below Average	<= 195	
6	Likely to be Proficient	>= 75%	Above or High Average	>= 229	
	May be Proficient	65% – 74%	Low Average	201 – 228	
	Unlikely to be Proficient	<= 64%	Below Average	<= 200	
7	Likely to be Proficient	>= 65%	Above or High Average	>= 232	
	May be Proficient	55% – 64%	Low Average	203 – 231	
	Unlikely to be Proficient	<= 54%	Below Average	<= 202	
8	Likely to be Proficient	>= 65%	Above or High Average	>= 234	
	May be Proficient	60% – 64%	Low Average	203 – 233	
	Unlikely to be Proficient	<= 59%	Below Average	<= 204	
9	Likely to be Proficient		Above or High Average	>= 237	
	May be Proficient		Low Average	207 – 236	
	Unlikely to be Proficient		Below Average	<= 206	
10	Likely to be Proficient		Above or High Average	>= 238	
	May be Proficient		Low Average	205 – 237	
	Unlikely to be Proficient		Below Average	<= 204	
11	Likely to be Proficient		Above or High Average	>= 240	
	May be Proficient		Low Average	207 – 239	
	Unlikely to be Proficient		Below Average	<= 206	
12	Likely to be Proficient		Above or High Average	>= 240	
	May be Proficient		Low Average	207 – 239	
	Unlikely to be Proficient		Below Average	<= 206	

Formative Assessment Midtest Proficiency Bands for Math: 2016 – 17

Grades K – 12

	Proficiency Predictor Category	LEAP	Scantron	MAP
K	Likely to be Successful	>= 93%		
	May be Successful	60% – 92%		
	Unlikely to be Successful	<= 59%		
1	Likely to be Successful	>= 88%		
	May be Successful	60% – 87%		
	Unlikely to be Successful	<= 59%		
2	Likely to be Successful	>= 80%	Above or High Average	>= 200
	May be Successful	60% – 79%	Low Average	174 – 199
	Unlikely to be Successful	<= 59%	Below Average	<= 173
3	Likely to be Proficient	>= 95%	Above or High Average	>= 211
	May be Proficient	60% – 94%	Low Average	186 – 210
	Unlikely to be Proficient	<= 59%	Below Average	<= 185
4	Likely to be Proficient	>= 85%	Above or High Average	>= 223
	May be Proficient	65% – 84%	Low Average	195 – 222
	Unlikely to be Proficient	<= 64%	Below Average	<= 194
5	Likely to be Proficient	>= 95%	Above or High Average	>= 233
	May be Proficient	70% – 74%	Low Average	203 – 232
	Unlikely to be Proficient	<= 69%	Below Average	<= 202
6	Likely to be Proficient	>= 60%	Above or High Average	>= 238
	May be Proficient	55% – 59%	Low Average	207 – 237
	Unlikely to be Proficient	<= 54%	Below Average	<= 206
7	Likely to be Proficient	>= 60%	Above or High Average	>= 243
	May be Proficient	55% – 59%	Low Average	210 – 242
	Unlikely to be Proficient	<= 54%	Below Average	<= 209
8	Likely to be Proficient	>= 55%	Above or High Average	>= 247
	May be Proficient	---	Low Average	212 – 246
	Unlikely to be Proficient	<= 54%	Below Average	<= 211
9	Likely to be Proficient		Above or High Average	>= 251
	May be Proficient		Low Average	215 – 250
	Unlikely to be Proficient		Below Average	<= 214
10	Likely to be Proficient		Above or High Average	>= 252
	May be Proficient		Low Average	212 – 251
	Unlikely to be Proficient		Below Average	<= 211
11	Likely to be Proficient		Above or High Average	>= 255
	May be Proficient		Low Average	215 – 254
	Unlikely to be Proficient		Below Average	<= 214
12	Likely to be Proficient		Above or High Average	>= 255
	May be Proficient		Low Average	215 – 254
	Unlikely to be Proficient		Below Average	<= 214

Formative Assessment Posttest Proficiency Bands for English Language Arts: 2016 – 17

Grades K – 1

	Proficiency Predictor Category	DIBELS Next	PALS	Iowa FAST
K	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	Composite >= 46
	May be Successful	Below Benchmark	---	Composite 30 – 45
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	Composite <= 29
1	Likely to be Successful	At or Above Benchmark	Benchmark = Yes	Composite >= 46
	May be Successful	Below Benchmark	---	Composite 30 – 45
	Unlikely to be Successful	Well Below Benchmark	Benchmark = No	Composite <= 29

Grades 2 – 12

	Proficiency Predictor Category	LEAP	Scantron	MAP	Iowa FAST
2	Likely to be Successful	>= 70%	Above or High Average	>= 205	>= 96
	May be Successful	55% – 69%	Low Average	173 – 204	81 – 95
	Unlikely to be Successful	<= 54%	Below Average	<= 172	<= 80
3	Likely to be Proficient	>= 70%	Above or High Average	>= 215	>= 129
	May be Proficient	55% – 69%	Low Average	184 – 214	114 – 128
	Unlikely to be Proficient	<= 54%	Below Average	<= 183	<= 113
4	Likely to be Proficient	>= 70%	Above or High Average	>= 222	>= 157
	May be Proficient	55% – 69%	Low Average	191 – 221	142 – 156
	Unlikely to be Proficient	<= 54%	Below Average	<= 190	<= 123
5	Likely to be Proficient	>= 70%	Above or High Average	>= 228	>= 154
	May be Proficient	55% – 69%	Low Average	197 – 227	139 – 153
	Unlikely to be Proficient	<= 54%	Below Average	<= 196	<= 138
6	Likely to be Proficient	>= 70%	Above or High Average	>= 231	
	May be Proficient	55% – 69%	Low Average	201 – 230	
	Unlikely to be Proficient	<= 54%	Below Average	<= 200	
7	Likely to be Proficient	>= 70%	Above or High Average	>= 234	
	May be Proficient	55% – 69%	Low Average	203 – 233	
	Unlikely to be Proficient	<= 54%	Below Average	<= 202	
8	Likely to be Proficient	>= 70%	Above or High Average	>= 237	
	May be Proficient	55% – 69%	Low Average	204 – 236	
	Unlikely to be Proficient	<= 54%	Below Average	<= 203	
9	Likely to be Proficient		Above or High Average	>= 239	
	May be Proficient		Low Average	206 – 238	
	Unlikely to be Proficient		Below Average	<= 205	
10	Likely to be Proficient		Above or High Average	>= 240	
	May be Proficient		Low Average	204 – 239	
	Unlikely to be Proficient		Below Average	<= 203	
11	Likely to be Proficient		Above or High Average	>= 241	
	May be Proficient		Low Average	205 – 240	
	Unlikely to be Proficient		Below Average	<= 204	
12	Likely to be Proficient		Above or High Average	>= 241	
	May be Proficient		Low Average	205 – 240	
	Unlikely to be Proficient		Below Average	<= 204	

Formative Assessment Posttest Proficiency Bands for Math: 2016 – 17

Grades K – 12

Grade	Proficiency Predictor Category	LEAP	Scantron	MAP
	Likely to be Successful	>= 70%		
K	May be Successful	61% – 70%		
	Unlikely to be Successful	<= 60%		
	Likely to be Successful	>= 70%		
1	May be Successful	61% – 70%		
	Unlikely to be Successful	<= 60%		
	Likely to be Successful	>= 70%	Above or High Average	>= 207
2	May be Successful	61% – 70%	Low Average	179 – 206
	Unlikely to be Successful	<= 60%	Below Average	<= 178
	Likely to be Proficient	>= 65%	Above or High Average	>= 218
3	May be Proficient	51% – 65%	Low Average	190 – 217
	Unlikely to be Proficient	<= 50%	Below Average	<= 189
	Likely to be Proficient	>= 65%	Above or High Average	>= 229
4	May be Proficient	51% – 65%	Low Average	199 – 228
	Unlikely to be Proficient	<= 50%	Below Average	<= 198
	Likely to be Proficient	>= 65%	Above or High Average	>= 239
5	May be Proficient	51% – 65%	Low Average	205 – 238
	Unlikely to be Proficient	<= 50%	Below Average	<= 204
	Likely to be Proficient	>= 65%	Above or High Average	>= 243
6	May be Proficient	51% – 65%	Low Average	209 – 242
	Unlikely to be Proficient	<= 50%	Below Average	<= 208
	Likely to be Proficient	>= 65%	Above or High Average	>= 247
7	May be Proficient	51% – 65%	Low Average	211 – 246
	Unlikely to be Proficient	<= 50%	Below Average	<= 210
	Likely to be Proficient	>= 65%	Above or High Average	>= 251
8	May be Proficient	51% – 65%	Low Average	212 – 250
	Unlikely to be Proficient	<= 50%	Below Average	<= 211
	Likely to be Proficient		Above or High Average	>= 254
9	May be Proficient		Low Average	214 – 253
	Unlikely to be Proficient		Below Average	<= 213
	Likely to be Proficient		Above or High Average	>= 254
10	May be Proficient		Low Average	211 – 254
	Unlikely to be Proficient		Below Average	<= 210
	Likely to be Proficient		Above or High Average	>= 257
11	May be Proficient		Low Average	214 – 256
	Unlikely to be Proficient		Below Average	<= 213
	Likely to be Proficient		Above or High Average	>= 257
12	May be Proficient		Low Average	214 – 256
	Unlikely to be Proficient		Below Average	<= 213

APPENDIX C – PERCEPTUAL DATA SET

Perceptual Data Set for

NEVADA
CONNECTIONS
ACADEMY

Spring 2018

Prepared by:

ctac | COMMUNITY TRAINING AND ASSISTANCE CENTER

30 Winter Street, 7th Floor • Boston, MA 02108
617.423.1444 • www.ctacusa.com

The following data come from these sources:

- School Engagement Survey (2017-2018)
- Student Satisfaction Survey (2017-2018)
- Parent Satisfaction Survey (2017-2018)
- Focus Groups with Educators, Students, and Parents (Spring 2018)

The data displays are organized by seven dimensions of effective schools:

A. School Context and Culture
B. Leadership and School Improvement
C. Curriculum and Instruction
D. Teacher Effectiveness and Support
E. Student Responsibility and Support
F. Family and School Relationships
G. Network Systems of Support

Dimension A. School Context and Culture

Aligned School Engagement Survey Items for Educators	Percent of Favorable Responses
1. My school is moving in the right direction	77
2. I feel connected to my colleagues	74
3. My manager keeps me informed about updates that impact my job	94
4. I see myself still working at my school next school year	91
5. My school motivates me to go beyond what I would in a similar role elsewhere	77

Aligned Student Satisfaction Survey Items

1. How much do you like Connections Academy?	**K-2 Response**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	39	99	---	---
I like Connections Academy a lot.	**90%**	**69%**	---	---
I like Connections Academy a little.	5%	19%	---	---
I dislike Connections Academy a little.	3%	5%	---	---
I dislike Connections Academy a lot.	3%	7%	---	---

2. What letter grade would you give to your Connections Academy school for the 2017-2018 school year?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	99	174	139
A	---	**52%**	**49%**	**53%**
B	---	32%	30%	27%
C	---	8%	17%	14%
D	---	6%	3%	5%
F	---	2%	1%	0%

3. Overall, how satisfied are you with the Connections Academy program?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	174	139
Very Satisfied	---	---	**61%**	**70%**
Somewhat Satisfied	---	---	29%	23%
Somewhat Dissatisfied	---	---	8%	6%
Very Dissatisfied	---	---	2%	1%

Dimension A: School Context and Culture

Aligned Student Satisfaction Survey Items

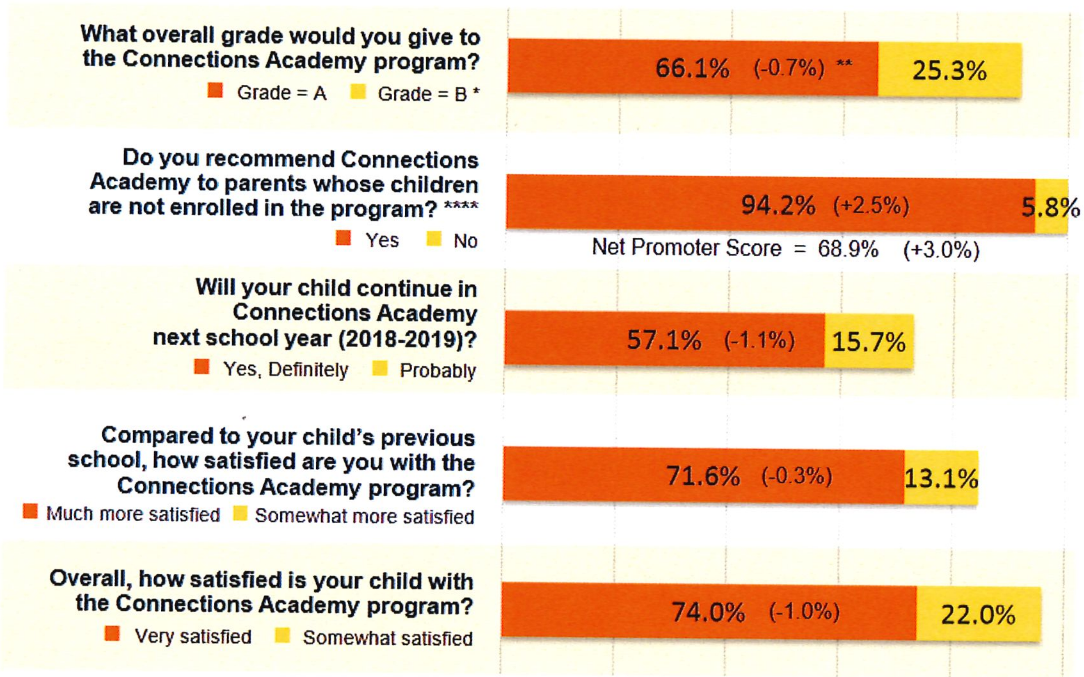
4. *Compared to your previous school, how satisfied are you with Connections Academy?*	K-2 Responses	3-5 Responses	6-8 Responses	9-12 Responses
Sample Size	---	---	*171*	*139*
Much more satisfied	---	---	**51%**	**60%**
Somewhat more satisfied	---	---	29%	24%
Somewhat less satisfied	---	---	15%	12%
Much less satisfied	---	---	5%	4%

5. *Please tell us how much you agree or disagree with the following statement…*	K-2 Responses	3-5 Responses	6-8 Responses	9-12 Responses
I am enjoying the program				
Sample Size	---	---	*174*	*139*
Strongly Agree	---	---	**49%**	**53%**
Agree	---	---	37%	36%
Disagree	---	---	10%	9%
Strongly Disagree	---	---	5%	1%

6. *Will you continue all the way through 12th grade with Connections Academy?*	K-2 Responses	3-5 Responses	6-8 Responses	9-12 Responses
Sample Size	---	---	*174*	*113*
Yes, Definitely	---	---	14%	**43%**
Probably	---	---	19%	23%
Maybe	---	---	13%	15%
Probably Not	---	---	**21%**	8%
Definitely Not	---	---	16%	7%
I don't know			17%	4%

Dimension A: School Context and Culture

Aligned Parent Satisfaction Survey Items



Focus Group Themes

Most teachers feel they are well supported and that there is good collaboration among the teachers. Some teachers feel overly directed and would like to have more trust and support from the leadership. Teachers, parents, and students all report there is a good relationship between teachers and students. It can sometimes be challenging, however, to get some students involved. Parents like Nevada Connections Academy (NCA) for such reasons as the freedom to manage one's own time, the flexibility afforded, personalized instruction, and higher levels of parental engagement. Parents also appreciate the school's support of their students.

> *All teachers I've met are nice and I learn a lot. Back at my old school, they didn't care about me. They just wanted me out of class. These teachers saw it and included me.*
>
> -Student

> *[Students are] succeeding with NCA where they would be failing at the district schools. I like the more direct involvement and knowing what's going on day-to-day. You get more of the one-on-one help if you need it…It's not a guessing game.*
>
> -Parent

> *NCA is a big family and we all benefit from the collaborative nature of this school. Teachers work together to collaborate on curriculum, planning, and to discuss students when necessary. I also feel that there is no hesitation to ask questions and everyone is very open to help out.*
>
> -Teacher

Dimension B. Leadership and School Improvement

Aligned School Engagement Survey Items for Educators	Percent of Favorable Responses
1. The leadership team at my school has communicated a vision that motivates me	85
2. I have confidence in the leadership team at my school	84
3. My school's leadership team uses data to make informed decisions	88
4. My School Leader sets a clear direction for my school	55
5. The leadership team at my school demonstrates that people are important to the school's success	93
6. My School Leader is accessible to and known by our employees	65
7. My school's leadership team clearly communicates information that affects our school	86
8. I have the ability to impact change at my school	78
9. Our school's leadership team is transparent about school changes	82
10. My manager, or someone else, has communicated some clear actions based on recent survey results	41
11. My manager does a good job involving staff in decisions that affect them	88
12. I feel comfortable speaking with my manager about my needs	91
13. My manager does a good job explaining the rationale for decisions	89
14. My manager provides regular performance feedback	91
15. My manager is a great role model for my school	90
16. My manager is invested in my development and continued growth	86

Aligned Student Satisfaction Survey Items
No aligned Student Satisfaction Survey items found at this time

Aligned Parent Satisfaction Survey Items
No aligned Parent Satisfaction Survey items found at this time

Dimension B. Leadership and School Improvement

Focus Group Themes

Teachers and parents feel the leadership team is approachable and supportive. Parents and teachers also note the rapid response time and availability of school leaders. Teacher leadership is very evident at NCA. Teachers serve a variety of roles (e.g., manager, team lead, coach) to support their colleagues. The overall communication is good, with some teachers hoping to get more consistent messaging from school leaders. Teachers tend to report instructional leadership as coming from the broader Connections Academy network or a colleague.

> *This year has been challenging…we have leadership from corporate, then leadership from the state, and leadership here. Those visions don't always line up…[School leaders] have done a good job of maintaining the course.*
>
> -Teacher

> *We have the problem of getting conflicting messages from different leaders, particularly miscommunications related to deadlines and what is required to do.*
>
> -Teacher

> *We've never had a problem getting a hold of the administrators. They are responsive and provide timely responses. They send emails and check in on a regular basis.*
>
> -Parent

Dimension C. Curriculum and Instruction

Aligned School Engagement Survey Items for Educators
No aligned School Engagement Survey items found at this time

Aligned Student Satisfaction Survey Items

1. Did you enroll in a Connections Academy national club or attend any national special events (such as the Music Contest) this year?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	39	99	174	139
Yes	**51%**	20%	9%	6%
No	49%	**80%**	**91%**	**94%**

2. Have you gone on a field trip or been to another school-sponsored event this school year?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	39	99	174	139
Yes	**51%**	**54%**	34%	23%
No	49%	46%	**66%**	**77%**

3. Overall, how satisfied are you with the course options available to you?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	---	139
Very Satisfied	---	---	---	**58%**
Somewhat Satisfied	---	---	---	32%
Somewhat Dissatisfied	---	---	---	9%
Very Dissatisfied	---	---	---	1%

Dimension C. Curriculum and Instruction

Aligned Student Satisfaction Survey Items

4. K-5 Prompt: Please let us know how much you like your Connections Academy courses.			4. 6-12 Prompt: Please let us know how satisfied you are with your Connections Academy courses.		
	K-2 Responses	**3-5 Responses**		**6-8 Responses**	**9-12 Responses**
a. Health and Physical Education					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**77%**	**52%**	**Very Satisfied**	**63%**	**63%**
It is OK	21%	44%	**Somewhat Satisfied**	29%	32%
I don't like it	3%	4%	**Not Very Satisfied**	5%	4%
			Not at all Satisfied	3%	1%
b. Art/Humanities					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**82%**	**62%**	**Very Satisfied**	**56%**	**58%**
It is OK	15%	32%	**Somewhat Satisfied**	30%	34%
I don't like it	3%	6%	**Not Very Satisfied**	9%	4%
			Not at all Satisfied	5%	4%
c. Language Arts					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**59%**	**47%**	**Very Satisfied**	**49%**	**64%**
It is OK	38%	43%	**Somewhat Satisfied**	44%	29%
I don't like it	3%	9%	**Not Very Satisfied**	3%	6%
			Not at all Satisfied	4%	1%
d. Math					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**59%**	35%	**Very Satisfied**	**49%**	**58%**
It is OK	36%	**42%**	**Somewhat Satisfied**	39%	33%
I don't like it	5%	22%	**Not Very Satisfied**	10%	6%
			Not at all Satisfied	2%	3%
e. Science					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**85%**	**70%**	**Very Satisfied**	**62%**	**64%**
It is OK	15%	28%	**Somewhat Satisfied**	30%	28%
I don't like it	0%	2%	**Not Very Satisfied**	4%	6%
			Not at all Satisfied	3%	2%
f. Social Studies					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**77%**	**46%**	**Very Satisfied**	**59%**	**68%**
It is OK	21%	44%	**Somewhat Satisfied**	30%	27%
I don't like it	3%	9%	**Not Very Satisfied**	6%	3%
			Not at all Satisfied	4%	2%
g. Technology					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**64%**	**58%**	**Very Satisfied**	**49%**	**54%**
It is OK	31%	32%	**Somewhat Satisfied**	37%	34%
I don't like it	5%	10%	**Not Very Satisfied**	6%	7%
			Not at all Satisfied	7%	5%
h. Electives (K-5)/Career Tech (6-12)					
Sample Size	39	99	*Sample Size*	174	139
I really like it	**54%**	45%	**Very Satisfied**	**43%**	**55%**
It is OK	41%	**49%**	**Somewhat Satisfied**	42%	35%
I don't like it	5%	5%	**Not Very Satisfied**	9%	6%
			Not at all Satisfied	6%	4%

Dimension C. Curriculum and Instruction

Aligned Student Satisfaction Survey Items

5. Have you participated in a real-time discussion or instruction through Connections Academy's LiveLesson®?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Yes	---	---	**82%**	**87%**
No	---	---	18%	13%

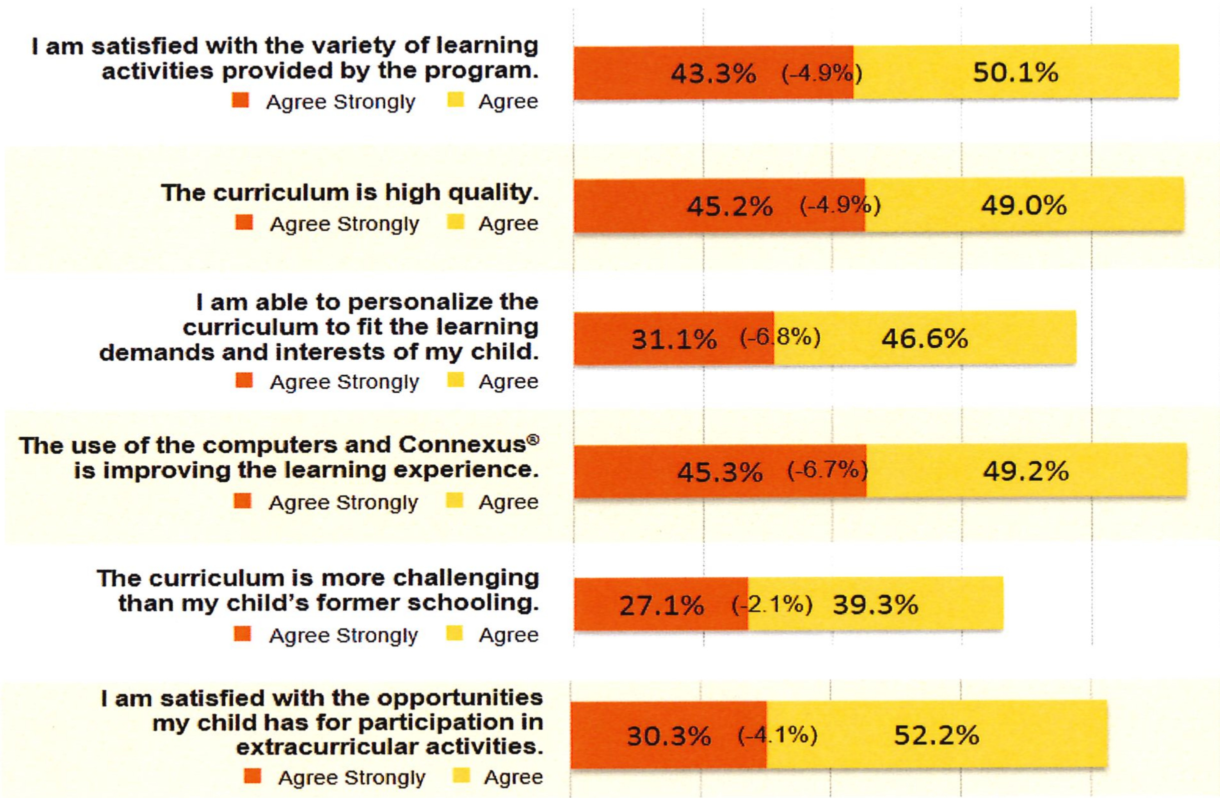
6. Why do you attend LiveLession® sessions?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*143*	*121*
To engage with my teacher	---	---	66%	60%
To engage with other students	---	---	36%	30%
To receive instructional help	---	---	**80%**	**84%**

7. Have you ever had a hard time learning something in school (or struggled in class)?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	*39*	*99*	*174*	*139*
Yes	**56%**	**90%**	**90%**	**84%**
No	44%	10%	10%	16%

8. Please tell us how much you agree or disagree with the following statement…	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
My courses/subjects are more challenging than my former schooling (public, home, or other)				
Sample Size	---	---	*171*	*139*
Strongly Agree	---	---	38%	**33%**
Agree	---	---	**45%**	32%
Disagree	---	---	12%	29%
Strongly Disagree	---	---	5%	6%

Dimension C. Curriculum and Instruction

Aligned Parent Satisfaction Survey Items



Dimension C. Curriculum and Instruction

Focus Group Themes

Teachers think the curriculum is very rigorous, and it can be challenging for some students to keep up. However, teachers report that when students do take ownership of their learning, they have higher achievements. Teachers use data to identify students' learning needs and progress in their Teacher Learning Communities (TLCs). However, finding time and getting motivated to dig deep into the data can be a challenge. Teachers appreciate the freedom to modify the curriculum to better meet students' individual needs. Parents tend to like the curriculum, and comment on its rigor, sometimes stating it is beyond their expectations. Students agree that the curriculum at the NCA is more conducive to learning, and report getting more content than at other schools. Some feel it is the way that lessons and tests are presented that makes it difficult. Students and parents report that portfolios are worthwhile though complex, and can be a challenge when multiple portfolios are due at the same time. Portfolio directions are sometimes not explicit enough for students and families. Students and families feel there is room for more innovation in the lessons. They cite an example instructional practice of reading a long text and answering questions, which they feel happens too frequently. Students hope to have more face-to-face collaborations with their peers.

> *The curriculum is incredibly challenging. I would put our curriculum against any college prep school in the nation....I am glad we have the latitude to modify the curriculum.*
>
> -Teacher

> *If they have more pop-ups within the lessons within the subject, it might make it more meaningful for them. That could help keep the spark for the kids. I was very excited about the video chatting...The attention span is longer when there's interaction.*
>
> -Parent

> *You're teaching yourself as you read through a lesson. In my old school...no big projects. At this school, there are a lot of science experiments—awesome!*
>
> -Student

Dimension D. Teacher Effectiveness and Support

Aligned School Engagement Survey Items for Educators	Percent of Favorable Responses
1. I can see the opportunities for continued growth and development	77
2. I am happy with my current role related to what was described to me	83
3. I have enough autonomy to perform my job effectively	95
4. I receive appropriate recognition for good school work at my school	85
5. My team inspires me to do my best work	81
6. My work gives me a feeling of personal accomplishment	89
7. Staff at my school are held mutually accountable for student achievement	74
8. Feedback is openly shared at my school	79
9. Generally, I believe my workload is reasonable for my role	66
10. I know what I need to do to be successful in my role	95
11. Our school's leadership team is transparent about school changes	82
12. I am satisfied working with my immediate manager	90

Aligned Student Satisfaction Survey Items

1. How many stars, out of five, would you give your teacher?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	*39*	*99*	*174*	*139*
5 Stars	87%	74%	56%	60%
4 Stars	5%	16%	28%	28%
3 Stars	3%	6%	12%	11%
2 Stars	3%	3%	2%	1%
1 Star	3%	1%	2%	1%
0 Stars	0%	0%	1%	0%

2. How satisfied are you with the amount of contact you have with your teachers?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Very Satisfied	---	---	**55%**	**71%**
Somewhat Satisfied	---	---	39%	24%
Somewhat Dissatisfied	---	---	4%	4%
Very Dissatisfied	---	---	2%	1%

Dimension D. Teacher Effectiveness and Support

Aligned Student Satisfaction Survey Items

3. How frequently are you in touch with your Connections Academy teachers?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Daily	---	---	14%	9%
Once a week or more frequently	---	---	**39%**	**42%**
Three times a month	---	---	16%	19%
Twice a month	---	---	9%	17%
Once a month	---	---	14%	6%
Less than once a month	---	---	9%	7%

4. What is the most common method of communication between you and your Connections Academy teachers?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
WebMail	---	---	**57%**	**53%**
Telephone	---	---	18%	31%
Mail	---	---	1%	0%
LiveLesson® session	---	---	23%	17%

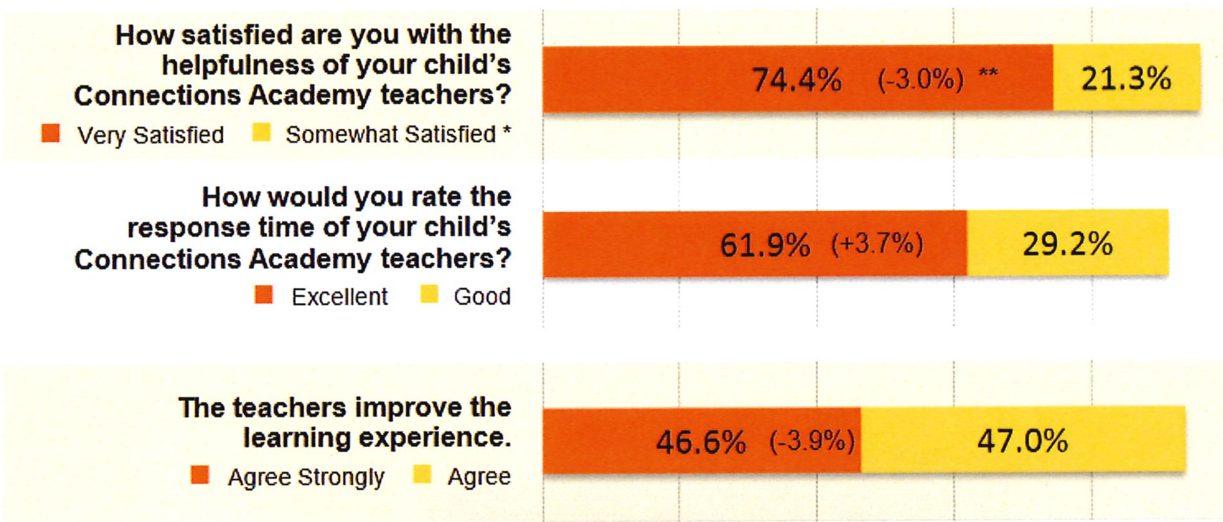
5. Please rate the response time of your teachers	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Excellent	---	---	40%	**53%**
Good	---	---	**41%**	37%
Fair	---	---	17%	9%
Poor	---	---	2%	1%

6. We would like to know whether the teachers' responses to your questions are informative and helpful. In general, how satisfied are you with the helpfulness of your Connections Academy teachers?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Very Satisfied	---	---	**56%**	**67%**
Somewhat Satisfied	---	---	38%	29%
Somewhat Dissatisfied	---	---	5%	3%
Very Dissatisfied	---	---	1%	1%

7. Do you read the Student Experience E-News that is sent to your WebMail box every other week?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Yes	---	---	21%	19%
No	---	---	13%	22%
Sometimes	---	---	**53%**	**50%**
Not sure what the Student Experience E-News is	---	---	13%	9%

Dimension D. Teacher Effectiveness and Support

Aligned Parent Satisfaction Survey Items



Focus Group Themes

Teachers feel supported overall and acknowledge there is a learning curve for educators who transfer from other school settings. Teachers collaborate and review data together to discuss students' progress. Teachers report class sizes are large, which brings challenges such as meeting students' individual needs. Parents and students are pleased on the whole with their teachers and state that interactive times during lessons are among the most effective. Teachers appreciate the professional development on strategies for delivering LiveLessons® and having nationwide collaboration. Teachers feel some of the professional development offerings are less relevant that others. Some teachers would like to have more professional development that is subject specific and other training opportunities outside the network.

> *We do the portfolios, and teachers give us feedback. That is positive. If they do bad, the teacher is calling us, right away. [The teacher] will pinpoint it and call us, versus the district schools where teachers don't care.*
>
> -Parent

> *The only thing I'd like to see is that because we have so many teachers that come from the brick and mortar setting, just like a fireman going to be a policeman, a special training for them would be helpful.*
>
> -Teacher

> *The sheer amount of data we have on student performance is just mind-boggling. However, the time to drill down to that data is not always available. The one negative...is the number of students [teachers] have.*
>
> -Teacher

Dimension E. Student Responsibility and Support

Aligned School Engagement Survey Item for Educators	Percent of Favorable Responses
1. My school provides a safe environment for students to learn	99

Aligned Student Satisfaction Survey Items

1. Please rate how your teacher(s) helped when you were having a hard time learning...	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
a. My teacher(s) was easy to get in touch with when I needed help				
Sample Size	22	89	*157*	*117*
Strongly Agree	**68%**	**60%**	**46%**	**57%**
Agree	27%	30%	45%	38%
Disagree	0%	8%	6%	3%
Strongly Disagree	5%	2%	2%	1%
b. My teacher(s) responded quickly				
Sample Size	22	89	*157*	*117*
Strongly Agree	**68%**	42%	33%	**50%**
Agree	27%	**43%**	**45%**	36%
Disagree	0%	12%	19%	12%
Strongly Disagree	5%	3%	3%	2%
c. My teacher(s) provided the help that I needed				
Sample Size	22	89	*157*	*117*
Strongly Agree	**77%**	**70%**	**51%**	**54%**
Agree	18%	24%	37%	40%
Disagree	0%	6%	9%	5%
Strongly Disagree	5%	1%	3%	1%
d. My teacher(s) made me feel more confident				
Sample Size	22	89	*157*	*117*
Strongly Agree	**73%**	**72%**	**45%**	**44%**
Agree	23%	18%	34%	43%
Disagree	0%	6%	13%	11%
Strongly Disagree	5%	4%	8%	2%

2. When you started with Connections Academy, did you feel you had all of the resources and support that you needed to be successful?	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*108*	63
Definitely	---	---	**61%**	**63%**
For the most part	---	---	27%	29%
Not really	---	---	8%	5%
Not at all	---	---	4%	3%

Dimension E. Student Responsibility and Support

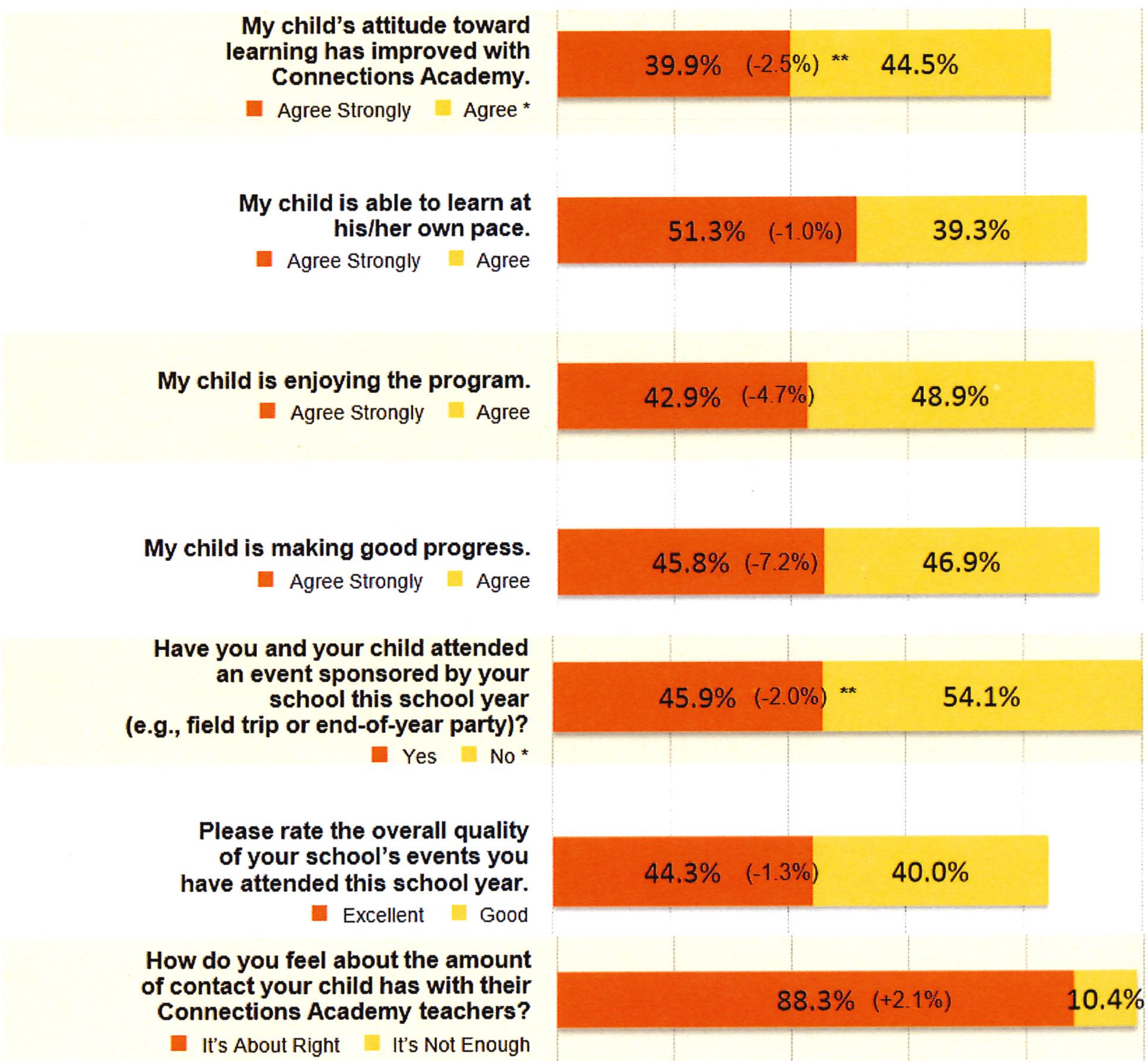
Aligned Student Satisfaction Survey Items

3. *Have you made friends through Connections Academy?*	K-2 Responses	3-5 Responses	6-8 Responses	9-12 Responses
Sample Size	39	99	---	---
I have made many good friends through Connections Academy	21%	17%	---	---
I have made at least one good friend through Connections Academy	15%	34%	---	---
I have not made any friends through Connections Academy	**64%**	**48%**	---	---

4. *Please tell us how much you agree or disagree with the following statements…*	K-2 Responses	3-5 Responses	6-8 Responses	9-12 Responses
a. I am able to interact with other students				
Sample Size	---	---	*174*	*139*
Strongly Agree	---	---	18%	**29%**
Agree	---	---	**37%**	**29%**
Disagree	---	---	28%	28%
Strongly Disagree	---	---	17%	13%
b. The use of computer and Connexus® is improving my learning experience				
Sample Size	---	---	*174*	*139*
Strongly Agree	---	---	39%	**48%**
Agree	---	---	**41%**	38%
Disagree	---	---	14%	11%
Strongly Disagree	---	---	6%	3%
c. I am able to learn at my own pace				
Sample Size	---	---	*174*	*139*
Strongly Agree	---	---	**57%**	**66%**
Agree	---	---	30%	26%
Disagree	---	---	8%	6%
Strongly Disagree	---	---	5%	2%
d. My attitude towards learning has improved since starting with Connections Academy				
Sample Size	---	---	*174*	*139*
Strongly Agree	---	---	**37%**	**45%**
Agree	---	---	33%	28%
Disagree	---	---	21%	22%
Strongly Disagree	---	---	9%	5%

Dimension E. Student Responsibility and Support

Aligned Parent Satisfaction Survey Items



Dimension E. Student Responsibility and Support

Focus Group Themes

Teachers report that while some of the more self-disciplined students own their learning and are committed to school obligations, some others need help and parental involvement is the key. Teachers appreciate the significance of the partnership among teachers, parents, and students, though they note it is not happening across all NCA families, and state those students with parental involvement are on much more solid footing for success. Teachers find NCA a school where they get to know their students very well—more so than any other school they have worked at. Parents agree that it is a joint endeavor between parents and teachers to motivate students, and some parents tend to find teachers supportive and responsive. Students express a desire to spend more time with their peers and several report having limited audio participation with their teachers during lessons. Meanwhile, students feel very well supported at NCA and there are many resources available when they need them. Students hope NCA can provide more LiveLessons®, better explanations of the lessons, and more help in understanding concepts and skills when they get stuck.

> *For me the hardest part is working up the courage to actually socialize, like the webcam, mic, etc.*
>
> -Student

> *Teachers are very supportive. One activity was very confusing. I sent a webmail...they decided to do away with that activity. In the beginning, we didn't give [my student] that responsibility. Now that's changed. [My student is] now much more on task. They have to be intrinsically motivated. I can click through the grade book and see...it's a huge investment of their responsibility. If they're not actually trying, they're not going to get anything out of it. The student has to be invested.*
>
> -Parent

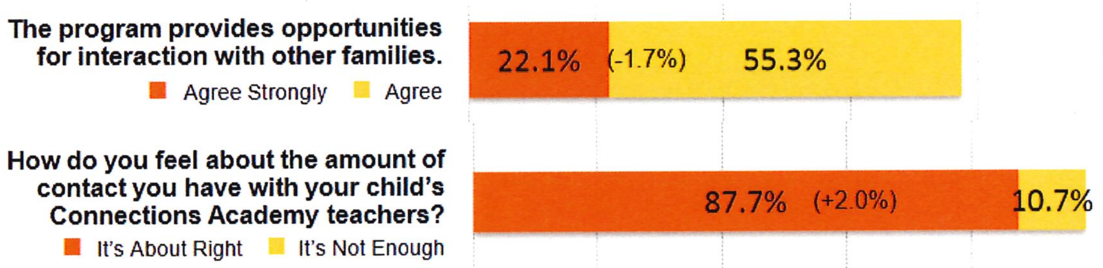
> *Kids hiding out is another issue that we face. I think it's important the triangle approach of teacher, parent, and student—that's when it's really working. When they're all invested, the student will show up, and as a result their grades go up.*
>
> -Teacher

Dimension F. Family and School Relationships

Aligned School Engagement Survey Item for Educators	Percent of Favorable Responses
1. My school provides high quality services to students and families	87

Aligned Student Satisfaction Survey Items
No aligned Student Satisfaction Survey items found at this time

Aligned Parent Satisfaction Survey Items



Focus Group Themes

Teachers report strong connections—often in the superlative—with parents and homeroom classes. Teachers and parents note the "You Can Book Me" function as helpful. Teachers have concerns on accepting students late in the semester and the large enrollment of students. Teachers emphasize the importance of engaging families using multiple approaches (e.g., video, newsletters, meetings, WebMails). They call students in rotation and parents can also request a call from teachers. Some teachers think that parents may receive too many school communications. Parents and students share favorable perceptions that communication efforts are strong at NCA.

> *I am amazed at how smart my kids are. They have learned so much. I think the curriculum is great and they have everything on there. They have support and it's not making it easy for them. I'm learning too all the time.*
>
> -Parent

> *It's not home school, but school at home—that's a huge mind shift. Persistence and talking one-on-one with the kids, we just want to let them know they can reach the goal, instead of feeling overwhelmed. We can do this.*
>
> -Teacher

> *Teachers are communicating well with the families. My teacher is really supportive. She contacts about every other week…really nice.*
>
> -Student

Dimension G. Network Systems of Support

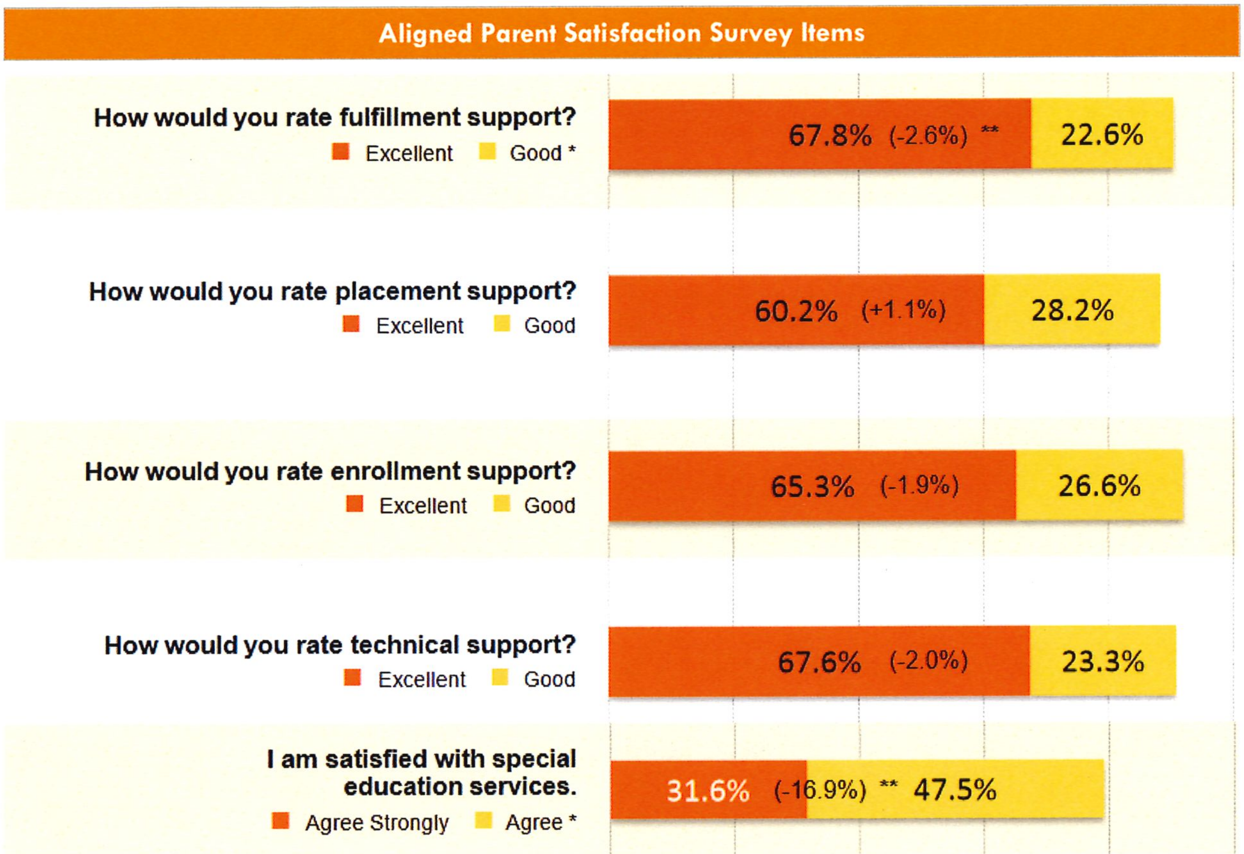
Aligned School Engagement Survey Item for Educators	Percent of Favorable Responses
1. I believe action will take place as a result of this survey	56
2. I have the tools and resources to do my job well	89
3. Most of the systems and processes here support me getting my work done effectively	86
4. Workloads are divided fairly among the staff at my school	60
5. I am proud to work at my school	88
6. I rarely think about looking for a job at another school	75

Aligned Student Satisfaction Survey Items

1. How satisfied are you with the functionality of Connexus® (e.g., navigating...)	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Very Satisfied	---	---	**58%**	**68%**
Somewhat Satisfied	---	---	36%	28%
Somewhat Dissatisfied	---	---	3%	1%
Very Dissatisfied	---	---	3%	2%

2. How satisfied are you with the functionality of Connexus® (e.g., look and feel...)	**K-2 Responses**	**3-5 Responses**	**6-8 Responses**	**9-12 Responses**
Sample Size	---	---	*174*	*139*
Very Satisfied	---	---	**56%**	**64%**
Somewhat Satisfied	---	---	37%	31%
Somewhat Dissatisfied	---	---	3%	3%
Very Dissatisfied	---	---	3%	2%

Dimension G. Network Systems of Support



Dimension G. Network Systems of Support

Focus Group Themes

Teachers appreciate the autonomy and work environment that the Connections Academy approach provides. Teachers cite strong reasons for staying with the school, such as support, knowing students and families better, and having the freedom to teach. Teachers and parents tend to speak highly of the Connections Academy network, citing they are supplying resources and assistance in a timely manner. A few ongoing technology challenges are noted as not yet being fully resolved. Teachers and parents alike point to the recent advocacy and support the network is providing during increased state scrutiny. Teachers hope to be able to collaborate with other Connection Academies, and noted compensation may not always match the workload. Parents state NCA better meets their students' needs. Students report they like the opportunities at NCA, such as meeting with Aces players, the Beehives, the Renaissance Fair, and the Magical Forest. Students and parents alike comment they enjoy the safety of going to school at home, the flexibility of scheduling, and the ability to learn at an individual pace.

> *I appreciate that they give us a lot of autonomy to make change--Not a lot of bureaucracy and red tape...It would be great if we could have more collaborations with other state connections academy to have more of a regional network in place between schools. We could share ideas.*
>
> -Teacher

> *I don't feel like there's any staff member that feels left alone. The tech system and support network is helpful. There are many resources within Connexus®. Thank God for the search in the virtual library [on Connexus®]. I find the trainings are pretty efficient actually. They are considerate of your time and get to the specifics of what you need to know.*
>
> -Teacher

> *Maybe the whole network doesn't understand they have students enrolling with large credit deficiencies. I don't want a lot of other kids to miss out on this opportunity. The state wants to close NCA down and the state ignores students that won't graduate.*
>
> -Parent

APPENDIX D – MATH TIME TO TALK PILOT RESULTS

Pearson

Exploring the Impact of Small-group Synchronous Discourse Sessions in Online Math Learning

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Problem: K-12 virtual school students have shown lower math performance

- Virtual schools serve a **highly mobile** student population (Gatti, 2018), and mobility has a **consistent and severe negative impact** on math performance (Rumberger, 2015). Indeed, studies have shown **low average state assessment scores in math** (Woodworth et al., 2015; Ahn, 2016)

However, research on how to support learning is lacking

- How can we **remediate the negative effect of high mobility** by having special interventions to help support math learning?
- Research shows **a lack of rigorous studies on the practices of successful school-level strategies** to improve learning outcomes of virtual school students (Choi et al., 2016).

Does math discourse matter for online math learning?

In our intervention, we increased opportunities to talk about math in online learning

- Fully-online learning environments provide **different experiences** of learning math than in traditional classrooms: **decrease in opportunities to talk about math**
- While research shows that **discourse promotes robust reasoning and deep understanding of complex concepts, studies have not used virtual school data** to examine how discourse works for improving math performance
- We analyzed empirical data to examine **if participation in synchronous discourse sessions matters for math performance** in an online learning environment

Research Questions

RQ1	Is there a relationship between **participation in math discourse** and **students' confidence, self-efficacy toward math and math mindset**?
RQ2	Is there a relationship between **participation in math discourse** and math **performance** in the course and on the state assessments?

Study Design and Participants

Participants

- 898 students in grades 3, 4 and 5
- 5 fully-online virtual elementary schools
- 2016-2017 school year (two semesters: A and B)

Study Design

- A retrospective study using online platform data
- Participation in the discourse sessions was **voluntary but strongly recommended** at the classroom and school levels
- Participation was tracked in terms of three variables
    - **Number of participated sessions** per each semester
    - **High vs. low participation**: yes if attended 6 or more sessions
    - **Semester participation pattern**: A only, B only, or A and B

Implementation of Discourse Sessions

Session Format and Implementation

- Synchronous, small-group, verbal and visual communication environment with 1:1 to 10:1 student-facilitator ratio
- Embedded in the math courses that are normally asynchronous with flexible schedules
- Sessions occurred once about every 7 lessons
  - The queue was open during the normal school hours in the weekdays: students accessed the sessions through a link to the queue in their course for each designated lessons
  - New math problems each week (easy to moderate difficulty)
- Students were given opportunities to participate from 9 to 11 discourse sessions per semester (depending on grade level and courses)

Implementation of Discourse Sessions

Session Facilitator Roles

- Each session was facilitated by one of eight math subject experts who received a degree in mathematics
- They received formal training on
    - presenting the problem,
    - guiding the students in the discussion to focus on the process and different ways of approaching the particular problem rather than arriving at the solution,
    - encouraging students to talk to one another about their thought processes, and
    - giving feedback that promotes growth mindset.

Implementation of Discourse Sessions

Desired Participant Actions

- The facilitators encouraged participants’ actions such as
  - interactively communicating with each other about mathematical reasoning and problem-solving using screen sharing,
  - explaining and justifying,
  - listening carefully,
  - seeking understanding,
  - asking questions that clarify, and
  - comparing different approaches to the same problem

Methods

Dependent Variables

- Mindset (alpha=.40), confidence, and self-efficacy towards math (alpha=.45)
    - Interchangeably collected after every 2-3 sessions to see trends
- Math performance measures
    - Final course scores: scale of 0 to 100. Collected at the end of each semester for the current and previous school years.
    - State assessment results: 1 if advanced or proficient. 0 if basic proficiency or below basic proficiency. Collected at the end of the current school year.

Methods

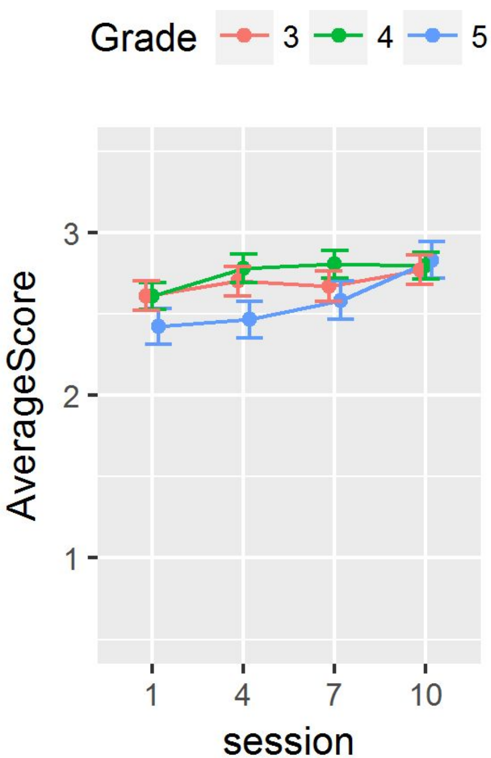
Independent Variables

- High vs. low participation: yes if at least 6 sessions in a semester
- Number of participated sessions in a semester
- Semester participation pattern: A only, B only, or A and B both
- Prior year final math course score: 0 to 100

Statistical Methods

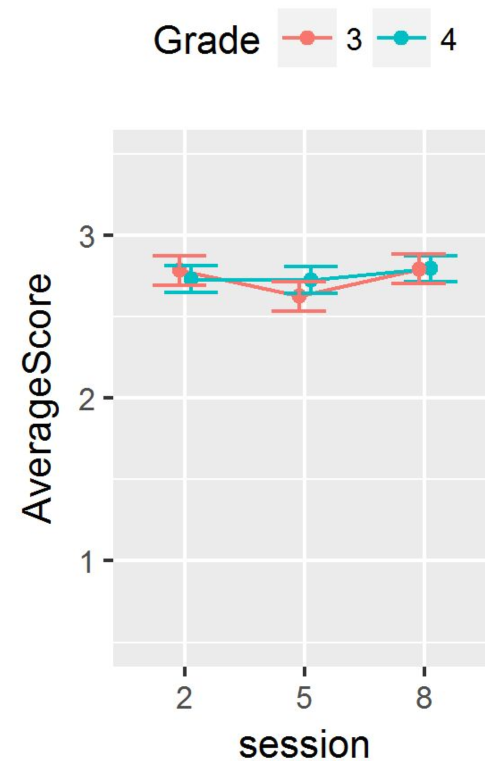
- RQ1. Confidence, Self-esteem, and Mindset: Changes Over Time
  - Paired t-tests between the session means
  - Only with the sample who answered every time the measures were administered
- RQ2. Effects on Math Performance
  - Generalized linear models
  - Unit of analysis: a student's record for a semester

Finding 1. Confidence, Self-esteem, and Mindset Did Not Change Significantly



<- Semester A (N=561)
confidence and self-esteem showed a slightly increasing trend

Semester B (N=476)->
confidence and self-esteem slightly decreased then increased



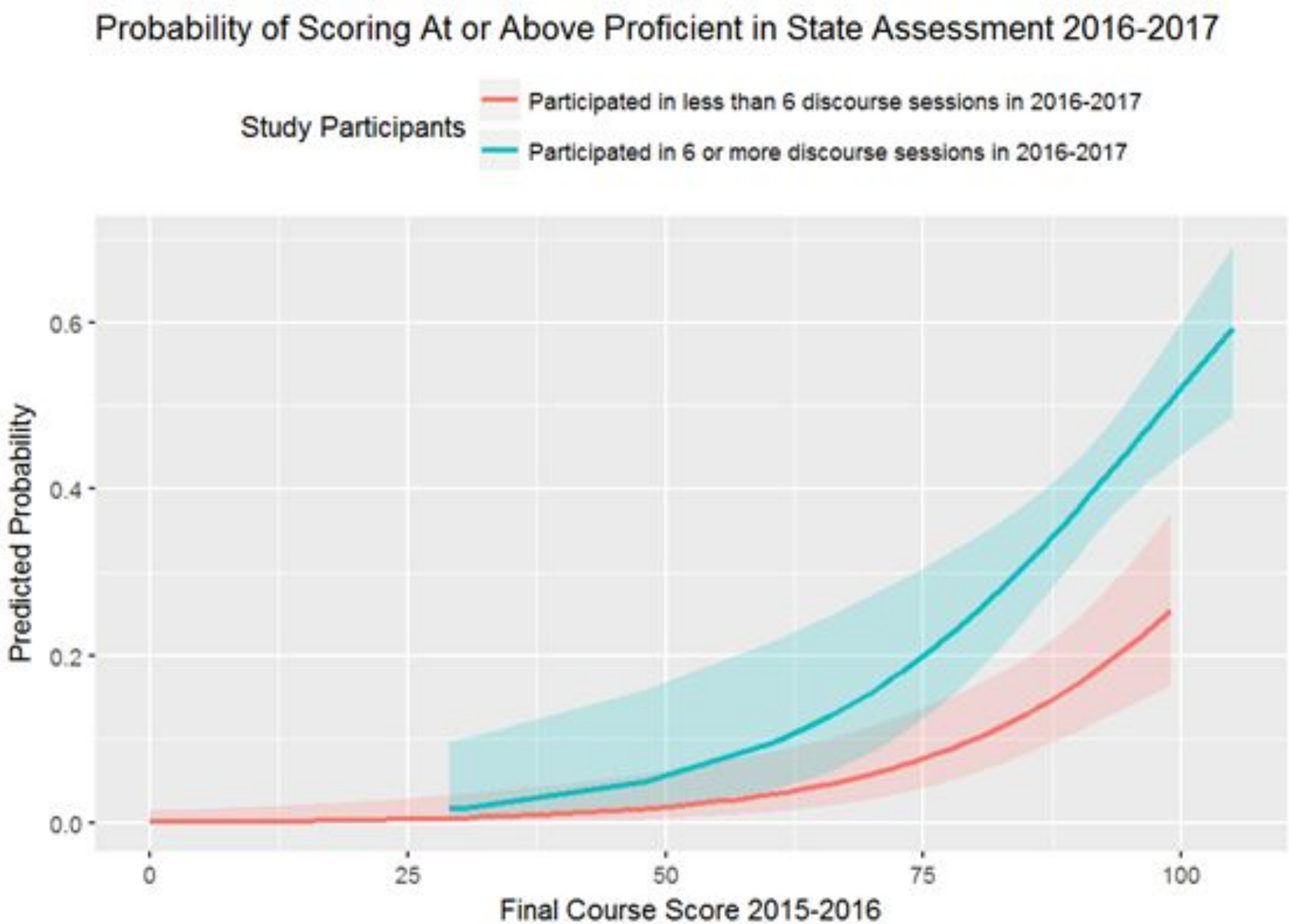
However,
differences were either **not significant or practically very small**. **Mindset results showed similar** pattern, while at all sessions the average score showed **'growth' mindset** rather than 'fixed' mindset.

Finding 2. Participation in Discourse Showed Positive Effect on Math Performance

Model 1 (N=868) Y: Final Course Score	Model 2 (N=562) Y: State Assessment Result
High vs. low participation	High vs. low participation
Number of participated sessions (1.423 increase in score for an added session)	**Number of participated sessions** (19% increase in the odds of Proficient and above)
Semester participation pattern	Semester participation pattern
Prior year final course score	**Prior year final course score**
Semester B course (vs. A)	**Semester B course (vs. A)**
Locations	**Locations**
Grade	Grade

Bolded: the estimates were statistically significant at alpha = .05 level

In a Simpler Model, High Participants Had Twice the Odds of Scoring At or Above Proficient



Summary: Math Performance is Higher for Students who Participate in More Synchronous Discourse Sessions

- Fully-online K-12 virtual school students have shown **lower performance in math** possibly due to high mobility
- We analyzed empirical data to examine if participation in **synchronous discourse sessions** matters for online math learning.
- In 2016-2017 school year, we embedded synchronous discourse sessions in math courses at **5 fully-online virtual elementary schools**..
- Students who **participated in more discourse sessions had higher odds of scoring at or above Proficient level** in the state assessments.

Next Steps: What actually happened in the sessions?

- How was the implementation fidelity?
- The main finding was highly consistent with previous literature on math discourse, but our analysis did not tell us why students had higher outcomes. What elements of the activities within the sessions were really related to the outcomes?

Thank you!

Any questions or suggestions?

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APPENDIX E – RTI AT-A-GLANCE FLOWCHART

RTI AT-A-GLANCE FLOWCHART

Tier I

Academic or behavioral concerns noted by Homeroom, Content, Advisory Teacher, and/or or Learning Coach

Teacher and Caretaker discuss concerns

Tier I core curriculum with differentiated activities attempted and documented in student's Log using differentiation log tag. Teacher identifies and documents multiple data sets in the student's <u>Greatest Area of Need (GAN)</u> over a four-week time frame

<u>Successful</u> Document baseline data in the student's Log and continue as needed

<u>Unsuccessful</u> Refer to SST for potential Tier II intervention

Tier II is concurrent with parental request for special education evaluation.

Tier II

SST meets to assess problem and initiate first Tier II intervention

Data collected every 2 weeks and documented in Log using Intervention Tier II/III tag

At 6–8 weeks: SST meets to review performance

<u>Successful</u> Document in Log and continue as needed <u>or</u> move back to Tier I

<u>Unsuccessful</u> Document in Log and continue in Tier II
<u>Ask</u>: Should intervention be changed? If yes, change intervention.

Data collected every 2 weeks and documented in Log using Intervention Tier II/III tag

6–8 weeks later: SST meets to review performance

<u>Successful</u> Document in Log and continue as needed or **move back to Tier I**

<u>Unsuccessful</u> Document in Log and go to Tier III (non-special education)

If intervention is part of a special education evaluation, follow state timeline and determine intensity in an SST meeting.

Tier III

Student receiving Tier III interventions

Data collected weekly and documented in Log using Intervention Tier II/III tag

At 6–8 weeks: SST meets to review performance

<u>Successful</u> Document in Log and continue as needed <u>or</u> move back to Tier II

<u>Unsuccessful</u> Document in Log and continue in Tier III

6–8 weeks later: SST meets to review performance

<u>Unsuccessful</u> Student is not making progress even with Tier III interventions document in Log.

Referral to special education

Special Education (3*)

Special education team meets to review RTI data and recommend evaluation

Evaluation completed in state-required time frame

Multidisciplinary Evaluation Team meets to review results and determine eligibility for special education

Student **is eligible** for special education

Special Education programming

Student **is not eligible** for special

Tier III programming: consider dropping electives

Recommended Student Support Team (SST) Members

- Parent/Caretaker
- Student
- HR/Advisory Teacher
- Classroom/Content Area Teacher
- Administrator
- SST/RTI Lead
- School Counselor
- Intervention Specialists
- Special Educator
- Success Coaches, if applicable