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A Study of Early Literacy Interventions on the College and Career Readiness of High School Students Identified as Struggling Readers in First Grade

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A Study of Early Literacy Interventions on the College and Career Readiness of High School Students Identified as Struggling Readers in First Grade

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Abstract

This study examined the college and career readiness of high school graduates who, as struggling first-grade readers, successfully completed a specific, research-based literacy intervention. By examining students' Gates-MacGinitie Reading Test (GMRT) scores (2002–2009), ACT PLAN test results from 10th grade, ACT test scores from 11th or 12th grade, and course enrollment throughout their high school careers, the degree to which the students were prepared to enter college or the work force was examined. College and career readiness was defined using guidelines and benchmarks outlined in the Common Core State Standards (National Governors Association Center for Best Practice, 2010) and those determined by the ACT corporation (ACT, 2013).

This study sought to link literacy intervention efforts in grades K–1 to the college and career readiness of students as they graduate high school. It also sought to add to the body of knowledge regarding literacy instruction and intervention and the nationwide focus to ensure that all students are college and career ready as they graduate high school.

The study found that the majority of the students who received early literacy intervention were reading at grade level by the end of eighth grade. However, few of the students studied met college and career readiness benchmarks by the time they graduated high school.

Acknowledgment

I dedicate this work to my husband, Steve, and my daughter, Zoe. Without their support and gentle nudges, I would have never accomplished this task. A special thank you to my parents for instilling the importance of hard work and education in my sisters and me. They are responsible for raising three first-generation college students who each attained master's degrees. That is no small task.

Finally, I would like to thank the circle of women who served on my committee: Dr. Carole Murphy, Dr. Helene Sherman, Dr. Kathleen Brown, and Dr. Gwendolyn Turner. Not only did you guide me through this process, but years ago you paved the way for women to achieve academically while also working full-time and raising a family. If you had not dared to challenge societal expectations, women like me would never have been able to pursue this work.

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Chapter 1: Introduction to the Study

The move to adopt the Common Core State Standards (CCSS) across the United States to increase academic rigor places a new emphasis on the concept of college and career readiness for all students (NGACBP, 2010). Previous to the adoption of the CCSS, college readiness was a focus for some students, not all students. However, a majority of careers in the United States are calling for increased literacy skills, resulting in a need to increase all students' skills (Carnevale, Smith, & Strohl, 2010). One key aspect of college and career readiness are literacy skills (Carnegie Corporation of New York's Council on Advancing Adolescent Literacy [Carnegie], 2010). Literacy includes a wide body of skills that students use to communicate both orally and in the written word: reading, writing, speaking, and communicating. Without the ability to read, write, speak, and communicate, college-level text when they leave high school, students are at a disadvantage (Carnevale et al., 2010).

Compounding the challenge of ensuring all students are college and career ready is the fact that literacy demands are increasing (MetaMetrics, 2015, "Lexile"). Reading level demands are increasing in technical fields and often exceed the reading demands of college texts (Carnevale et al., 2010). For example, the manuals for many technical fields, such as crane operators and heating, ventilation, and air conditioning are more complex text than most college textbooks (Carnevale, 2010). Schools will need to address literacy at all levels for all students as a core component of college and career readiness (Carnevale, 2010).

Building the reading skills necessary to enter college or a career with success begins in elementary school. When students lack sound foundational reading skills, it is

difficult for them to gain those skills as they make the transition from learning to read in Grades K–2 to reading to learn in Grades 3–12 (NELP, 2008). Several key research studies point to the importance of early reading intervention in Grades K–2 (Pinnell, 1989; Torgesen, 2002; Solis, Vaughn & Fletcher, 2014). The research overwhelmingly supports early identification of reading issues and subsequent intervention at an early age, typically Kindergarten through second grade, in order to keep students on reading pace with their peers. Early intervention allows students to build foundational reading skills, so that, as text complexity increases, students are able to meet the reading demands these texts pose.

For most students, the increase in literacy demands simply means more work and practice, but for students who struggle with reading, these increased demands present additional challenges for schools (Torgesen, 2002). Students who struggle in reading have difficulty accessing content in other curricular areas, often struggle to communicate through writing, and can disengage in the learning process due to frustration. There is great debate among educators as to how schools should initiate literacy intervention efforts for the general population (National Institute of Child Health and Human Development [NICHD], 2000). While there is a wide body of research with a variety of approaches supported, many studies point to the importance of early literacy intervention in order to correct reading issues in a timely manner (National Early Literacy Panel [NELP], 2008). Despite the body of research supporting the benefits of early reading interventions, there are many questions regarding whether those who receive early reading interventions are able to maintain the gains they make throughout their educational careers (Fuchs, D., Fuchs, L., & Vaughn, 2008). At what reading level do

those students end their K–12 school careers? Are they able to attain college and career readiness at a similar rate to their peers who were not at risk for reading failure?

Statement of the Problem

After examining a variety of research studies on three main topics—U.S. student academic performance in a global context (National Center on Educational Statistics, 2013), the movement to increase academic rigor in U.S. schools (National Governor’s Association 2010) , and strategies and support for preparing all students to become college and career ready (ACT, 2006; ACT, 2011), one population of students was not specifically addressed: struggling readers. Struggling readers are those students who are reading below grade-level expectations. They often lack fundamental reading skills such as basic comprehension, decoding, and fluency.

The research suggesting what skills students need in order to be considered college and career ready does not indicate specific instructional strategies or practices schools should use for those students who are reading at grade level versus students who are reading below grade level such as a Response to Intervention structure. Furthermore, the literature does not make recommendations regarding extra systemic approaches schools could take in order to prepare struggling readers for college and career readiness.

Poor reading skills present a variety of problems for students throughout their academic careers. Students who struggle in reading tend to achieve less academically than their peers who are proficient readers (NICHD, 2000). The CCSS call for all students to be college and career ready upon completion of high school. The English Language Arts (ELA) portion of the standards calls for all students to be proficient in four key areas of reading: finding key ideas and details in text, understanding author’s

craft and text structure, being able to integrate knowledge and ideas, and having the ability to read a wide range of texts with increasing level of text complexity and challenge (National Governors Association Center for Best Practice, 2010 [NGACBP]). In addition, all students need to meet writing standards, listening and speaking standards, and language usage standards. Reading is a key focus in the college and career readiness standards; therefore, providing specific, systematic reading interventions for this group of students would be instrumental in preparing them for college or career post-high school.

According to the *Projection of Jobs and Educational Requirements Through 2018* Report, most jobs that either already exist or will be created in the next few years will require high reading skills (Carnevale et al., 2010). Fifty-nine percent of jobs in the state of Missouri will require some type of postsecondary education (Carnevale, 2010). Currently, Missouri ranks 34th in the nation in terms of jobs that require postsecondary education (Carnevale, 2010). If Missouri students are going to compete on a more global level, they will mostly likely need to continue after high school in some type of postsecondary education (Carnevale, 2010).

This study attempts to fill the gap between the current body of research regarding increased academic rigor, including increased literacy demands, and college and career readiness and early intervention for struggling readers. Specifically, it will examine whether students who are provided a systematic, research-based reading intervention in first grade reach the definition of college and career readiness by the time they graduate high school. Do these students take rigorous coursework? Do they have adequate reading skills at the time they enter high school? Have they reached college readiness benchmarks?

Purpose of the Study

Currently, school districts across the country must confront standards that are increasingly more rigorous (National Governors Association Center for Best Practice, 2010 [NGACBP]). These standards are a direct result of increased academic demands in the work force (Carnevale, 2010). As rigor increases, most students are able to make adjustments and increase their achievement at a steady rate, but struggling readers bring with them additional challenges (Juel, 1988; Pinnell, 1989, Snow C, Burns, M, & Griffin, P., 1998). When students are still struggling readers as they enter college, they are often forced to take remedial courses for no credit and struggle with coursework and the college workload (Perin, 2013).

In the past, schools provided numerous accommodations and modifications for struggling readers. Students who were still struggling readers after elementary school were not challenged to take rigorous course work (ACT, 2008). However, this is no longer an option because of the increased literacy demands of many career fields, especially technical fields (Carnevale, 2010). All students must leave high school with the ability to read and interpret complex texts (National Governors Association Center for Best Practice, 2010 [NGACBP]).

The purpose of this study is to examine whether first-grade students who received a formal, systematic, research-based intervention, in this case, Reading Recovery, early in their educational experiences, graduate from high school college and career ready. College and career readiness includes taking rigorous coursework measured by those who achieved the Missouri College Preparatory Certificate , those who enrolled in Advanced

Placement courses in high school, and those who reached college readiness benchmarks on the ACT in the areas of Reading, English, Science and Mathematics.

Research Questions and Hypotheses

RQ₁: Do students who receive a systematic, research-based first-grade intervention meet the definition of college and career readiness by the time they graduate from high school as twelfth graders?

H₀: There is no difference between students who successfully completed the Reading Recovery program and their peers when examined for college and career readiness based on three separate measures: ACT criteria for college and career readiness, the state of Missouri's College Preparatory Certificate, and enrollment in at least one high school (AP) course.

RQ₂: Are students who successfully complete the Reading Recovery program in first grade able to maintain a reading level similar to the average level of their peers until they enter high school as ninth graders?

H₀: There is no difference between the Reading Recovery cohort and their peers on Gates MacGinitie Reading Test scores in Grades 3–8.

Operational Definitions

Several operational definitions will be used in this study.

ACT (not an acronym, but the formal assessment name) is the national organization that not only provides the bulk of college testing in the United States, but it also has conducted a wealth of research on what it means to be college and career ready as well as a series of tests that students take throughout their school careers that serve as an indicator of college and career readiness (ACT, 2008, "College Readiness System").

College and Career Readiness is “the acquisition of knowledge and skills needed to enroll in credit-bearing courses in a 2- or 4-year institution without the need to enroll in remedial courses (ACT, 2013).”

Students who achieve ACT college and career readiness benchmarks and enroll in the recommended coursework have a 75% chance or greater of receiving a C in freshman-level college courses and a 50% chance or greater of receiving a B in freshman-level college courses (ACT, 2013).

Common Core State Standards (CCSS) is a set of standards developed after the National Governors’ Association determined that states needed more uniform learning standards and assessments (NGACBP, 2010). The standards address literacy in the English Language Arts (ELA), social studies, science, and technical classrooms (NGACBP, 2010).

Gates-MacGinitie Reading Test (GMRT) is a nationally-normed reading assessment that includes two sessions: vocabulary and comprehension (MacGinitie, 2000).

PLAN (not an acronym, but the formal assessment name) is the practice ACT exam given to students during their sophomore year of high school in order to predict future ACT benchmark scores (ACT, 2009). It includes the same subtests as the ACT test: Reading, English, Math, Science, and Social Studies.

Reading Recovery is a reading intervention for grades K–2 based on the work of Dr. Marie Clay and her associates. The program has been in use in U.S. schools since the late 1980s (The Reading Recovery Council of North America [RRCNA], 2009). Teachers provide this intervention in a one-on-one setting for 12 to 20 weeks, for 30

minutes each day. The lessons are in addition to the classroom instruction that students receive daily. Teachers follow a systematic lesson protocol where the student practices fluency, comprehension, and word attack skills in each lesson. Metacognitive strategies such as questioning, drawing conclusions, inferring, and making connections are taught explicitly so that students learn to use these strategies with automaticity. Reading Recovery teachers undergo intensive monthly professional development to ensure they are administering the intervention in a manner that is true to the model. Teacher leaders observe Reading Recovery teachers frequently to provide regular feedback regarding their instructional practices.

Response to Intervention (RTI) is the theoretical framework that many schools use to ensure students are receiving the assistance they need to achieve at grade level (Fuchs, D. & Fuchs L., 2006). Schools that adhere to the RTI framework provide systematic, research-based interventions to students who struggle in reading and math. All students are screened for academic deficits two to three times a year. Teachers analyze that data and individual intervention plans are put into place to address deficits. Throughout the intervention process, students are progress-monitored regularly. If progress is not being made, the interventions increase in frequency and intensity.

Assumptions

1. Reading Recovery guidelines were utilized when determining when it was time for students to complete the program.
2. Teachers implemented the Reading Recovery program according to program guidelines.

3. Student assessments are indicative of the acceptable student effort and ability.
4. All students were offered the opportunity to take the ACT and PLAN tests.
5. All students had the opportunity to enroll in challenging coursework such as honors and Advanced Placement courses.

Limitations

1. The study is limited to students in one suburban school district who graduated high school in 2011, 2012, and 2013 and successfully completed the Reading Recovery program within 12–20 weeks.
2. The study is limited to a homogeneous demographic group in which approximately 95% of the students are Caucasian and of predominately middle socioeconomic status.
3. This study may be generalized to other large suburban school districts because the students share demographics and similar socioeconomic factors.
4. The study is limited to four specific factors related to college and career readiness, not additional academic factors.

Organization of the Study

This study will be organized into five chapters, reference citations, and appendices. Chapter 2 will present the theoretical framework along with a review of the literature on academic standards, college and career readiness, literacy skills and their connection to college and career readiness, early intervention for struggling readers,

Reading Recovery, Response to Intervention (RTI), and the academic success of adults who received early intervention in reading instruction. Chapter 3 presents the methodology, research design, research procedures, population sample, data collection, data analyses, and timeline for the study. Chapter 4 will discuss statistical procedures and data analyses. Chapter 5 will present the study's summary, conclusions, and recommendations.

Summary

This study proposes to explore the college and career readiness of students who received early intervention in reading during first grade. The research questions, hypotheses, background and scope of the study have been presented in this first chapter. The theoretical framework and review of the pertinent research are presented in chapter 2.

Chapter 2: The Literature Review

Background Information

The literature in this study was chosen based on several topics and questions that arose after the adoption of the rigorous CCSS (NGACBP, 2010). First, a number of studies were examined to learn more about the new, more rigorous standards and determine current student achievement levels in the United States in relation to these standards (ACT, 2013a; National Center for Education Statistics, 2013; NGACBP, 2010). During this phase of the research, several key ACT documents were analyzed, as they were used as foundational research in defining college and career readiness for the CCSS (ACT, 2004; ACT, 2006; ACT, 2008a). Each of these studies successively builds the case that schools must put plans in place to achieve the goal of college and career readiness for all students.

After reading the ACT reports, this researcher was left asking: Which skills were essential to college and career readiness? Throughout the literature review, literacy skills continued to surface as foundational college and career readiness skills. Not only was this supported in a variety of academic studies, but also in future job projection reports, research conducted during the development of the CCSS, and from research conducted by the Missouri Department of Elementary and Secondary Education, as well as national and international achievement tests (ACT, 2006; Carnegie, 2010; Carnevale et al., 2010). The research in this area, which typically spoke to the average U.S. student, generated additional questions for the researcher. What additional steps have to be taken to ensure that struggling readers have equal opportunity to achieve these college and career

readiness standards? Are schools systematically addressing this particular population of students with the long-term goal of achieving college and career readiness?

These questions led the researcher to seek studies examining intervention options for struggling readers. A close review of these studies yielded several commonalities. Each consisted of systematic, research-based strategies, including a progress-monitoring component, and was time intensive. This made the studies similar in framework to the body of research outlining an RTI (Fuchs, D. & Fuchs, L., 2006; Fuchs et al., 2008). After this review of the related literature, the researcher was left asking whether students were able to sustain the impacts of such interventions long term.

Many longitudinal studies tracked student reading progress throughout elementary school; few tracked students through middle school, and only one could be found that tracked students through high school. However, the high school study was limited as it only tracked students from 3rd grade through 10th grade. This prompted additional questions: Do students who receive early literacy interventions maintain the growth they make throughout their school careers? Ultimately, are they able to begin college or careers with the literacy skills required to be successful?

U.S. Student Achievement Lags on an International Level

One reason for the current move to more rigorous academic standards in the United States began with an examination of international test scores (Kelly et al., 2013). The Program for International Student Assessment (PISA) consists of a series of assessments that tracks international student achievement (Kelly et al., 2013). The first of these assessments was given in 2000, and the tests are administered every three years. Students are tested in the areas of mathematics, science, and reading. Each year one of

those areas is considered the “focus” and is measured “in depth.” This in-depth analysis focuses on how students demonstrate problem solving, application of knowledge, and higher-order thinking skills. These areas are assessed using a computer-based assessment that emphasizes performance events. The other two areas are considered “minor,” which means they are assessed through paper and pencil assessments in a multiple choice format.

PISA assessment results are used to compare the performance of U.S. students to those of students in 65 educational systems around the world. The results of the 2012 PISA assessments showed that U.S. students are not keeping academic pace with their international peers in the areas of reading and math (Kelly et al., 2013). In 2012, 18 educational systems outperformed the United States in both areas. The 2012 PISA assessment measured math in depth, but reading was also assessed (Kelly et al., 2013). U.S. students performed below 33 educational systems in foreign countries, above 14 systems, and the same as 12 systems (Kelly et al., 2013). These scores were essentially unchanged from the 2009 PISA assessment. Students in 10 educational systems scored higher than the U.S.; students in 22 systems performed lower than U.S. students; and students in 11 systems were not measurably different from the United States (Kelly et al., 2013).

Changing Job Market

Not only are students behind academically on an international level, but the skill demands of the domestic job market are rapidly changing (Kena et al., 2014). Research discussing U.S. students’ ability to compete globally is outlined in *The Condition of Education*, published by the U.S. Department of Education (Kena et al., 2014). This

report includes data on educational attainment, demographics, preprimary education, elementary and secondary enrollment, postsecondary enrollment, school characteristics and climate, assessments, student effort, persistence, and progress—with transition to college, and characteristics of postsecondary students among its many topics. Data for this report was gathered from a variety of sources including students and teachers, state educational organizations, local schools, and postsecondary institutions. Most of the data was gathered from surveys conducted by the National Center for Education Statistics (Kena et al., 2014).

Lexiles

Employers are increasingly reporting that U.S. graduates are not prepared for the literacy demands of the current job market (ACT, 2006). Eighty percent of businesses reported it is a challenge to find qualified candidates for jobs due to their poor literacy skills (ACT, 2006). Low literacy cost U.S. companies in terms of productivity and, eventually, earnings (ACT, 2006). Nearly \$16 billion is lost each year due to a lack of literacy skills in the U.S. work force. As the ACT (2006) report states, “Unless school systems adopt higher standards, rigorously assess programs, and hold schools accountable for results, too many students will be unable to get and keep the kinds of jobs they want. And too few companies will be able to sustain the growth they need to compete” (ACT, 2006).

One common unit of measure that allows teachers to gauge the level or difficulty of text is the Lexile measure. Lexile measures take into account the semantic and syntactic elements of a text and are one consideration to be made when determining overall text complexity (MetaMetrics, 2015, “Lexile”). Lexile measures range from 0–

1500 (MetaMetrics, 2015, “Grade Equivalent Chart”). Lexile is one of three aspects to consider when determining overall text complexity. The qualitative dimensions of a text including meaning, structure, language conventionality, content, and knowledge demands and the reader and task demands such as student interest in the text and motivation must be equally considered (NGACBP, 2010). The CCSS called for an increase in Lexile levels at most grade levels (NGACBP, 2010).

Table 1

Lexile Demand Shifts from 2009–2012

Grade	Text Demand Study from 2009*	2012 CCSS Text Measures*
1	230L–420L	190L–530L
2	450L–570L	420L–650L
3	600L–730L	520L–820L
4	640L–780L	740L–940L
5	730L–850L	830L–1010L
6	860L–920L	925L–1070L
7	880L–960L	970L–1120L
8	900L–1010L	1010L–1185L
9	960L–1110L	1050L–1260L
10	920L–1120L	1080L–1335L
11&12	1070L–1220L	1185L–1385L

* Lexile expectations are indicated for the 25th–75th percentile of students

Note: Adapted from MetaMetrics (2015, “Lexile”).

Movement toward More Rigorous Standards

In response to the data and the increasing workforce demands, the National Governors Associations set forth to create a set of common standards that would provide a sense of uniformity in terms of rigor. The CCSS were developed following several specific guidelines (CCSS Initiative Standards-Setting Criteria Section, preamble, p. 3):

- fewer, clearer, and higher, to best drive effective policy and practice,
- aligned with college and work expectations so that all students are prepared for success upon graduating from high school,
- inclusive of rigorous content and applications of knowledge through higher-order thinking skills so that all students are prepared for the 21st century,
- internationally benchmarked so that all students are prepared for succeeding in our global economy and society, and
- research and evidence based.

The CCSS focus on both skill and content. Literacy skills are addressed not only in the English Language Arts (ELA) standards, but separately in content area standards for social studies, science, and the technical areas (NGACBP, 2010). In addition, the standards provide exemplar texts and writing samples to help teachers gauge the degree of rigor that the standards require and maintain consistency for what could be fairly subjective. These samples provide clear focus and allow teachers to conduct better writing and goal setting with students.

The ELA standards address both reading and writing. Specifically, there are three key instructional shifts that the standards are asking teachers to make as they implement the standards (NGACBP, 2010).

Shift #1: Students need to interact with complex texts on a regular basis. The standards define complex text as increasing incrementally throughout their school career so students are able to meet the demands of college and career texts by the time they graduate from high school. Comprehension demands increase as students progress

through the grade levels requiring that students are explicitly taught reading strategies. In addition, there is an increased focus on academic vocabulary as well as a variety of classic and contemporary literature (NGACBP, 2010).

Shift #2: Students must provide evidence from texts in reading, writing, and speaking. As students analyze texts, make claims, and search for information, the CCSS focus on students using examples from the text to support their claims. The standards emphasize teachers asking text-dependent questions, so students gain multiple experiences involving textual evidence. The writing standards emphasize presenting textual evidence.

Shift #3: Students must be exposed to content-rich nonfiction. The standards emphasize an importance on making sure that students have multiple experiences with diverse informational text to build content knowledge. Exposure to nonfiction text should increase as students progress through school (NGACBP, 2010). When students are in elementary school, their time should be split equally reading fiction and nonfiction text. However, the demand for reading nonfiction increases as students progress to middle school and high school. Eventually, the high school students should be reading nonfiction approximately 70% of their day (NGACBP, 2010).

College and Career Readiness is “the acquisition of knowledge and skills needed to enroll in credit-bearing courses in a 2- or 4-year institution without the need to enroll in remedial courses (ACT, 2013).”

Students who achieve ACT college and career readiness benchmarks and enroll in the recommended coursework have a 75% chance or greater of receiving a C in

freshman-level college courses and a 50% chance or greater of receiving a B in freshman-level college courses (ACT, 2013).

For the purposes of this study, four criterion will be used to measure college and career readiness (ACT, 2013):

1. Number of ACT college readiness benchmarks met (ACT, 2008, "Forgotten Middle"), and

Table 2

ACT College Readiness Benchmarks for the PLAN and ACT Assessments

ACT Subject Test Area	ACT PLAN Benchmark	ACT Benchmark
English	15	18
Mathematics	19	22
Reading	18	22
Science	20	23

Note: Adapted from “ACT’s College Readiness Benchmark Scores” (ACT, 2008, "Forgotten Middle").

2. ACT rigorous core curriculum (ACT, 2008, "Forgotten Middle").

Table 3

ACT Recommendations for Students Wishing to Enroll in Rigorous Coursework

Subject Area	No. of Years	Additional Requirements
English	4	
Mathematics	3	Must be Algebra I and higher
Science	3	Must be lab-based courses
Social Studies	3	

Note: Adapted from "ACT's Critical Core Curriculum" (ACT (2008, "Forgotten Middle").

Additional factors that will be considered when determining college and career readiness based on Missouri Department of Elementary and Secondary Education recommendations:

3. Enrollment in at least one AP course, and
4. Qualification for the Missouri College Preparatory Certificate.

College and Career Readiness Indicators

Throughout the review of the literature on U.S. student performance, future job demands, and increased standards, a common theme emerged, preparing all students for college and career readiness. However, the literature revealed a variety of ideas regarding how college and career readiness should be defined and what should be done to attain it for all students (ACT, 2008b; Camara, 2013; Conley D., 2007).

ACT published a wide body of research outlining the skills students need to be considered college and career ready as well as determining benchmarks to measure each of those skills that inform schools and families about the degree to which their student may or may not be prepared for postsecondary studies (ACT, 2011; ACT, 2013; ACT, 2013). In addition, ACT has also conducted research to identify the degree to which students are prepared to enroll in challenging coursework in high school (ACT, 2008; ACT, 2009).

ACT defines college and career readiness as having the knowledge and skills a student needs to be successful in credit-bearing courses during the first year of enrollment in a postsecondary institution (ACT, 2013a). That institution could be a 2-year college, a 4-year college, or a technical or trade school. ACT has created benchmark scores for each of its subtests (English, reading, math, and science) that indicate college and career

readiness. Students who meet the benchmark are 75% or more likely to receive a C or better in the course and 50% or more likely to receive a B or better in the course (ACT, 2013a). In 2013 26% of college-bound students met the readiness benchmarks in all four subject areas, 69% met one of the four benchmarks, 44% met the reading benchmark, 44% met the mathematics benchmark, and 36% met the science benchmark (ACT, 2013a). This is only a slight increase since 2009, when the benchmark was 23%. However, there were a significant number of students who were close to meeting the college and career readiness benchmark (ACT, 2013a). In this group of students, 8–6% of all graduates were within 2 points of meeting the benchmark (ACT, 2013a).

Student coursework taken during high school is also an indicator of college and career readiness (ACT, 2009). While the research generally indicates that simply enrolling in a rigorous course (e.g., advanced placement, international baccalaureate, or dual credit/enrollment courses) and attending regularly does impact college readiness (College Board, 2013), there is additional research that indicates that merely taking the minimum high school core coursework, as indicated in state graduation requirements and course enrollment guides, is not enough to prepare students for the coursework they would experience in college (ACT, 2004). Of key importance to students' preparation for college and career was the quality of the courses students took (ACT, 2004).

A transcript study conducted by the U.S. Department of Education further emphasizes the ACT research regarding the importance of course enrollment in high school and its connection to college and career readiness (Nord et al., 2011). The purpose of the study was to review the rigor of the course work U.S. students were choosing, examine the credits U.S. students were earning, and analyze U.S. students'

grade point averages (GPA) (Nord et al., 2011). More than 600 public schools and 130 private schools were examined for the study which included a sample of nearly 37,700 students in a year when there were approximately three million graduates nationwide (Nord et al., 2011).

Overall, the researchers found that students were making progress in terms of time spent in an educational setting. Students in 2009, on average, earned three more high school credits than their peers in 1990, which amounted to more than 400 additional hours in the classroom. The authors point out that the length of the school day and the number of school days in the school year were consistent throughout the study, so students could have earned more credits by taking summer course for acceleration, taking middle school courses of high school credit, or taking courses in an online or electronic setting outside the school day (Nord et al., 2011).

An increased number of students in the Class of 2009 engaged in more rigorous coursework as well. The researchers categorized each student’s high school transcript as standard, midlevel, or rigorous based on the criterion below (Nord et al., 2011).

Table 4

Number of High School Credits Deemed to Consider Enrollment in Rigorous High School Coursework

Subject Area	Standard	Midlevel	Rigorous
English	4	4	4
Social Studies	3	3	3
Mathematics	3	3 (including geometry and Algebra I or II)	4 (including precalculus or higher)
Science	3	3 (including at least two of biology, chemistry, and physics)	3 (including biology, chemistry, and physics)
Foreign Language	0	1	3

Note: From the U.S. Department of Education (USDE) , 2005 High School Transcript Study, as cited Nord (2011).

In 2009 13% of students completed what was considered to be rigorous coursework, an increase of nearly 10% over two decades (Nord et al., 2011).

Science courses appeared to be those that most frequently kept students from completing a level of curriculum that resulted in college and career readiness (Nord et al., 2011). Thirty-nine percent of students who did not take high school courses that would have placed them in the “rigorous” category lacked only the required science courses (Nord et al., 2011). Of those who achieved the standard level of curriculum, 35% did not reach the midlevel category due solely to the science course (Nord et al.).

Despite the subjectivity of grades in the U.S. school system, the literature does point to a correlation between grades and college readiness (Nord et al.). In fact, some studies indicate that strong grades and low ACT scores may be a better indicator of college success than average grades and high ACT scores (Camara, 2013).

Graduates who completed a rigorous curriculum tended to also have higher achievement on National Assessment of Educational Progress (NAEP) assessments (Nord et al., 2011). The NAEP results support similar findings that students who completed a rigorous curriculum also achieved higher scores on the ACT assessments (ACT, 2013a). The researchers cautioned that the higher achievement could be due to the fact that these students were exposed to more material that appeared on these assessments in their rigorous coursework, or the most-motivated and best-prepared students tend to enroll in more rigorous coursework (Nord et al., 2011). Students who completed the courses necessary to be considered rigorous coursework also tended to have higher math and science NAEP scores. This same trend was also the case for students who took a rigorous ninth-grade course sequence (Nord et al., 2011).

The literature review resulted in several suggestions for educational institutions to consider, including

- opening lines of communication between K–12 and higher education officials;
- training teachers to promote higher education from a young age;
- raising expectations for all students;
- focusing on college and career readiness from a young age;
- revising K–8 curriculum to ensure that foundational skills are the focus;
- offering all students opportunities to become college ready through dual enrollment, bridge programs, and other enrichment opportunities; and
- providing teachers with model lessons and student work samples to enable them to teach with rigor (ACT, 2004).

Suggestions were also made to start guiding students toward college and career readiness by expanding career and educational planning services for all students, counsel students to take rigorous high school courses, and build academic confidence in students so they being to aspire to a college education (ACT, 2004).

An additional study published in *Educational Measurement: Issues and Practice*, suggests determining college and career readiness by first defining postsecondary success (Camara, 2013). The author points to seven specific criteria:

- persistence in completing coursework that results in a degree or certificate;
- completion of a degree or certificate,
- time taken to complete the degree or certificate,
- placement into credit-bearing courses upon college entrance,

- no placement in remedial coursework,
- grades in specific core college courses (i.e., math and English) or grades during freshman year, and
- grade point average (Camara, 2013).

Camara (2013) believes that cut scores for college and career readiness must be determined using data that speaks to the desired outcomes for college freshmen. He argues that it will be difficult to arrive at one definition of college and career readiness, as they each have different requirements (Camara, 2013).

While several studies point to specific tangible criteria to predict college readiness, a study from Southern Illinois University-Carbondale discusses the role of noncognitive factors play in predicting college success (Komarraju, Ramsey, & Rinella, 2012). The authors suggest that it is necessary to look beyond admission criteria (high school achievements and test scores) and consider other factors, such as nonacademic indicators, that lead to college freshman success. ACT created a Student Readiness Inventory that asks students 108 questions related to noncognitive academic behaviors. Komarraju et al. (2012) suggest using this inventory in addition to the academic data ACT and GPA's provide in order to get a more well-rounded idea of a student's college and career readiness. They point to a body of research that suggests that test scores and grades provide information about what a student is capable of academically, but noncognitive motivational factors inform more about what a student might actually achieve (Komarraju et al., 2012). Overall, Komarraju et al. found that student high school GPA was more predictive of student college success than standardized test scores.

One way to begin the discussion about college and career readiness early is to increase exposure to the concept beginning in middle school (ACT, 2008b). This enables families to be better informed about course choices prior to high school enrollment. Early measurement of college and career readiness standards also allows educational institutions to begin addressing each student's college and career readiness (ACT, 2008b).

While the majority of the studies in the body of literature regarding college and career readiness focus on standardized tests and rigorous coursework, there were several studies that discussed student behaviors and other nonacademic indicators as indicators of college and career readiness (Conley, 2014).

Several studies point to the need to teach students to be lifelong learners (Camara, 2013; Conley, 2014; Ivey, 2011). These studies look at the need to teach students the tools they will need to be lifelong learners including inquiry skills, collaboration skills, technical skills, critical thinking skills, and problem-solving skills.

Camara points out that the state tests given to students for state accountability do not align with assessments that provide information regarding a student's college and career readiness (2013). As a result, there are few measures which clearly define or determine the college and career readiness of today's students.

Conley's work focuses on the non-academic indicators that students need to exhibit in order to be college and career ready. First, and foremost, Conley believes that students need to be lifelong learners (2014). Without a love for learning and a desire to do better, students cannot keep up with college and career demands. Conley asserts that

the current economy places demands on the entire workforce to be able to learn new skills and change jobs or even careers (2014).

Ivey states that critical thinking, literacy skills, communication skills, and problem-solving skills are key to college and career success. She believes it is difficult to make a definitive definition of college and career readiness because there are so many options for students and a variety of new literacies that are expected of students (2014).

Despite the wide variety of definitions and expectations for college and career readiness, there is some consistency within the literature to support a particular set of measures to determine college and career readiness. The most consistent measures were ACT benchmarks and high school coursework. Other, more difficult to measure indicators such as motivation and academic skills including inquiry skills, critical thinking and collaboration were considered indicators, but were not used in most studies simply because they are difficult to define and measure. One particular set of skills was a common thread throughout the literature, but researchers failed to address it with any level of clarity—literacy skills. The possible connection between literacy skills and college and career readiness warranted further research.

Literacy Skills and College and Career Readiness

A review of the literature resulted in few studies overtly connecting literacy skills to college and career readiness. While literacy is included in the previously mentioned studies on college and career readiness, it is only embedded in the broader set of college and career readiness skills, not examined in its own right. Therefore, a further review of the literature specifically addressing literacy skills and college and career readiness was

warranted. The literature review netted three research studies and a commentary on the literacy skills of adolescents and its connection to college and career readiness.

Despite the personal nature of Ivey's (2011) commentary on adolescent literacy skill in the *Journal of Adolescent and Adult Literacy*, she makes some valid points. Ivey recalls her enjoyment in conducting research as a graduate student and how different that was from her experience as a freshman undergraduate when she knew nothing about inquiry and how to conduct research. She maintains that she simply did not have the literacy skills she needed to be a successful researcher.

Ivey (2011) connects the literacy standards set forth by the CCSS and the need for increased literacy skills in order to prepare students to meet the demands of college and career readiness. She discusses various pieces of research that advocate the literacy demands of college students are many and, thus, critical to achieving postsecondary success. Literacy skills, Ivey claims, are not to be taught merely to improve skills, but should be presented to students as a tool they will use throughout their lives. Therefore, she suggests that students need practice in pursuing personal interests through literacy when they are still in high school in order to understand how literacy skills can be used.

When determining the literacy skills students need to have for college and career readiness, a glimpse at the literacy skills needed to be a successful college student is helpful. The literature review yielded a study on the literacy demands of students entering college or other postsecondary institutions (Yancey, 2009). Yancey (2009) identified five key skills students need in order to be successful at the postsecondary level: (a) a variety of processes to approach writing and reading tasks; (b) ability to determine valid, reliable sources and evaluate information yielded in the research; (c)

critical thinking skills; (d) ability to reflect on practices and revise accordingly; and (e) ability to transfer literacy skills in order to apply them in new situations with new texts and new discourses (Yancey, 2009).

A further review of the research included a meta-analysis of 13 studies which examined the reading and writing skills of students who enter postsecondary institutions unprepared (Perin, 2013). Perin (2013) contends that nearly half of all students who enter community college are forced to enroll in a noncredit-bearing remedial course because of a lack of skill. The studies point, overwhelmingly, to overall lack of reading and writing skill in these students. Because of the reciprocity of these skills in postsecondary education, a lack of these skills presents an even larger gap. Specifically, writing and decoding of text are two key skills that are often missing (Perin, 2013). Studies also showed that students frequently struggled with locating main ideas, drawing conclusions, making inferences, and writing an effective summary of a reading (Perin, 2013).

Several articles suggested ways that schools or districts could intervene to ensure that all students are college and career ready. Because of the literacy demands that college and career readiness standards require, many institutions are looking at early literacy efforts to ensure that all students have access and exposure to college and career readiness skills (Turner & Dandridge, 2014). Four guiding principles were suggested for ensuring all students are academically prepared for postsecondary endeavors:

1. Build classrooms that encourage community and collaboration ;
2. Teach and support students in reading complex texts closely ;
3. Teach and support students' inquiry skills; and

4. Teach students to find connections within and among the texts they read (Turner & Dandridge, 2014, p. 215).

When these skills are taught in K–12, students will have the academic preparedness they need to succeed in college and careers.

Given that literacy is the foundation of college and career readiness, there are several shifts that must be made in the culture and climate of U.S. high schools (Carnegie, 2010). Schools must place a renewed emphasis on college and career readiness for all students, not just those who are college bound. All students must be able to meet the demands that postsecondary jobs or education require(Carnegie, 2010).

The literacy skills students learn and practice in Grades 4–12 have a direct correlation to their college and career readiness (Carnegie, 2010). It is during this time that students are transitioning from learning to read to reading to learn. All too often it is assumed that adolescents in this grade range no longer need literacy instruction. However, it is during this time that students need a wide variety of literacy supports including direct instruction, guided practice, and continued assessment and intervention (Carnegie, 2010).

The postsecondary demands that students face include increasingly complex text. Such text often includes increasingly difficult structures, vocabulary, and sentence formation (Carnegie, 2010). Students are also faced with more graphic representations that need to interpret and draw conclusions.

It is recommended that schools take specific steps to focus on literacy at all levels which, in turn, prepares all students for college and career readiness (Carnegie, 2010). First, teachers need training in teaching the literacy required of the content they teach at

each grade level. Second, students need to be assessed both formatively and diagnostically through high school. As a result of the analysis of those assessments, interventions need to be planned and adjusted (Carnegie, 2010).

Schools that administered all the assessments in ACT testing process, including the ACT EXPLORE and PLAN tests in 8th and 10th grade, had better college and career readiness skills than they did upon graduation when they took the ACT (ACT, 2006). ACT claims the increase in college and career readiness stemmed from a systematic approach to monitoring college and career readiness benchmarks throughout a student's school career and providing interventions to increase college and career readiness (ACT, 2006). The report points out the information the EXPLORE and PLAN tests can provide in helping students obtain critical college and career readiness skills such as reading comprehension, vocabulary, and writing (ACT, 2006).

Schools must focus on college and career readiness for all and that literacy is a skill that is essential to college and career readiness. However, there are questions that remain unanswered about students who are at risk for reading failure or are considered struggling readers. As those questions arose, the researcher began to investigate what steps could be taken to increase the literacy skills of struggling readers in order to increase their likelihood of meeting the conditions of college and career readiness as they progress through the school system toward graduation.

Efficacy of Early Literacy Intervention

While there were few research studies that addressed literacy intervention and college and career readiness directly, several studies analyzed the impact of early intervention as a means of monitoring students regarding their progress toward college

and career readiness (ACT, 2009). A significant body of research exists that supports the impact of early literacy intervention on later reading success (Juel, 1988; Partanen & Siegel, 2013; Simmons et al., 2008). This examiner found literature dating from the 1980s to the present which supports early literacy intervention for students at risk of reading struggles.

Research supporting early literacy intervention dates back to the early 1980s. Many of the basic tenets of early literacy intervention that Pinnell discussed in her 1989 research article entitled “Reading Recovery: Helping At-Risk Children Learn to Read” still hold true in the current body of research. Pinnell asserted that many schools used intervention programs that removed students from general classroom instruction and placed them in remedial instruction instead. Thus, children were not in the room when the teacher delivered reading instruction to the whole class. To further compound their reading challenges, this group of students rarely had regular reading practice, because their instructional time was spent on isolated reading skills (Pinnell, 1989). Pinnell also pointed out the incongruity of slowing down instruction for struggling students with no goal of reaching grade-level reading standards.

Additionally, Pinnell (1989) was instrumental in pointing out the disadvantage that many poor readers have compared to their peers who are average or below average readers. First, many poor readers are from low socioeconomic backgrounds. This may make it more difficult for them to show their language competence in a large-group setting. Their background also makes them more likely to receive different treatment from teachers, fewer opportunities to read text, and more likely to be corrected in a public setting on a regular basis (Pinnell, 1989). Their instruction tends to focus on putting

together sounds and letters, not on making meaning from what they read (Pinnell, 1989). Unfortunately, students are often very perceptive to the fact that they are being treated and taught differently, which, in turn, makes them more reluctant to read and brings negative connotations to the act of reading. These students often lack academic confidence, which can result in negative relationships with peers (Pinnell, 1989).

Pinnell (1989) contends that many struggling readers have not had enough experiences to form a framework for the reading instruction they experience in school. For example, if they have not been read to at home, they may have difficulty connecting oral reading of a story to the printed word. In order to allow them to better understand the literacy that is occurring around them at school, this group of students needs practice experiencing text outside their regular classroom reading instruction. Pinnell notes that the Reading Recovery program is a viable solution to meeting struggling students' needs.

Pinnell (1989) pointed out one key difference between the Reading Recovery program and other reading interventions for young students. The premise of Reading Recovery is that it was born in a school system that immersed children in text through authentic reading and writing experiences. The Reading Recovery program focuses on the teacher working individually with the child to model and help the child learn the strategies that good readers use on a regular basis (Pinnell, 1989). The goal of the program is to practice those skills with great intensity and frequency so students build some automaticity in using them as they encounter new text. Among the skills of focus are self-monitoring, cross-checking, searching for cues and self-correction. Each lesson is tailored to meet individual student needs (RRCNA, 2009).

The program results that Pinnell (1989) notes in her research were promising, and her key ideas about early intervention can be found throughout the literature review on this topic. She noted that children who were initially targeted as being at risk for failure made accelerated progress in the Reading Recovery program, and after 12–14 weeks nearly all had caught up to the average reading level of their peers. After three years, the children were still reading at that average level of their peers and were making progress at a rate acceptable to maintain pace with their peers (Pinnell, 1989).

A review of recent studies regarding early literacy intervention resulted in several key studies that point to many of the same advantages that Pinnell (1989) pointed out in her work that took place more than 30 years ago (Gilbert et al., 2013; Hilbert & Eis, 2013; Kamps et al., 2008). However, the value of early literacy intervention has been explained through the literature since Pinnell's initial study in 1989.

The literature review netted a key study by Juel (1988) that preceded the idea that early reading issues that are not remediated early tend to persist. This study followed the reading development of 54 students as they progressed from first through fourth grade. The purpose of the study was to determine whether students who begin their school careers as poor readers remain poor readers over time (Juel, 1988). The 54 students included in the study were tested over time using a number of different assessments. A phonemic awareness test was given in the fall and spring of each school year, in addition to the Bryant Test of Basic Decoding Skill and a word recognition test. At the end of the year, students took the Iowa Test of Basic Skills and the Wide Range Achievement Test. Home reading was a key part of the study. Students were interviewed about their reading habits outside of school, and their writing and spelling was assessed (Juel, 1988).

Juel (1988) found that of the 29 students who scored in the bottom quartile of the reading assessments in first grade, 24 were still enrolled in the district at the end of fourth grade. Of those students, 21 students remained struggling readers. The “struggling reader” designation meant that the students were at least six months below the expected reading level at the end of fourth grade. The majority of these children demonstrated low levels of phonemic awareness as first-grade students and generally had poor decoding skills. By the end of first grade, the poor readers had read half as many words overall in comparison to students who read at grade level thus emphasizing the need for early intervention before their literacy issues begin to compound (Juel, 1988). Overall, the most significant finding of this study was that first-grade readers generally remained poor readers by fourth grade, previously noted in research by Dr. Marie Clay. As a result, Juel explained that systematic, research-based early intervention with poor readers is a must for their future success. In order to students to “catch up” to their peers, she maintained that intervention lessons had to increase in intensity and frequency.

A 1996 study by Velluntino further supports Juel’s (1988) findings (Velluntino et al., 1996). However, this study went further to point out remediation difference between students who had experiential deficits compared to those students who had cognitive deficits. This study followed a group of kindergarten students from 17 different schools, located within six middle-to upper-middle-class areas. Of the 183 students who were part of the study’s sample, 118 were poor readers, and 65 were normal readers whose progress was analyzed as a comparison group (Velluntino et al., 1996). The study asserts that there are two distinct groups of students who have reading difficulties and each has different needs. One group of students is considered readily

remediated meaning they had no additional factors that may have contributed to a reading disability. This group of students had at least average intelligence, but lacks quality schooling or exposure to reading readiness activities. The other group had additional factors that may have contributed to reading or other learning disabilities and tended to score lower on initial measures of literacy than the first group of struggling readers (Velluntino et al., 1996).

The authors point out that the work of Dr. Marie Clay, supports their theory. Clay maintained that “the failure to control for the child’s educational history is the major impediment to differential diagnosis of reading disability (Velluntino et al., 1996, p. 601).” Clay developed the Reading Recovery program which supports the idea that students with a lack of educational history benefit from intensive literacy intervention early in their schooling careers and such interventions allow them to “catch up” and maintain pace with their peers over time (Velluntino et al., 1996).

Specifically, in this study, the researchers sought to examine what methods of early remediation were best for students in the two comparison groups—those who were readily remediated versus those who were difficult to remediate (Velluntino et al., 1996). When students received intervention appropriate to their needs, they would be equipped to maintain appropriate reading levels later in their educational careers (Velluntino et al., 1996).

The results of this study showed that the students who had the most limited growth in reading had the lowest scores when the study began (Velluntino et al., 1996). Those who had the highest scores had the highest scores when the study began (Velluntino et al., 1996). Overall, students who received remediation for one semester

scored above the 30th percentile on reading measures after the intervention was administered. More important, the researchers found that students who entered the study with lower scores and additional interventions that may have contributed to reading or learning disabilities tended to make larger gains when they participated in one-on-one tutoring compared to small-group remediation (Velluntino et al., 1996). Students who scored higher on the initial assessments made just as many gains with small-group tutoring as they did with individual remediation. The researchers concluded that after providing all students with one-on-one tutoring, they found that this type of intervention was extremely effective in determining students who were disabled and nondisabled learners. They also found that for many students, early intervention, even in small groups, can result in a majority of struggling readers testing with reading skills within the average range of their peers. The authors note

We can, therefore, have some faith in the possibility that early and labor-intensive intervention can be reasonably effective in distinguishing between children who are difficult to remediate and those who are readily remediated and, thus, between children who might be classified as disabled learners, despite even optimal intervention, and those who need not be so classified given adequate intervention.

(Velluntino et al., 1996, p. 628)

In 2000 the National Institute of Child Health and Human Development's National Reading Panel (NRP) completed its report and issued its recommendations for literacy intervention. Once again early intervention was a key component of this study. The study was conducted after Congress asked the director of the NICHD to organize a national panel to examine the research-based knowledge used to determine the best

methods to teach children to read. As a result the NRP—a group of 14 teachers, administrators, parents, researchers, and representatives of high education— whittled down an initial body of 100,000 pieces of reading research in order to make recommendations in five key areas: phonemic awareness, phonics, fluency, comprehension, and vocabulary (NICHD, 2000). Of these five areas, the NRP found two to be particularly important in early literacy instruction and intervention: phonemic awareness and phonics (NICHD, 2000).

The NRP made several recommendations for phonemic awareness instruction and intervention (NICHD, 2000). The research overwhelmingly supported the idea that focused attention on phonemic awareness skills early in a child's literacy experience gave them a solid foundation which, in turn, may avoid later reading issues (NICHD, 2000). Conversely, when students struggle in this area, early intervention is key. The report specifically identified phonemic awareness and letter knowledge as the two best indicators of early literacy success in the first two years in school (NICHD, 2000). Phonics was an additional area that the NRP cited as key to early literacy learning (NICHD, 2000). Much research had been conducted on this topic, so the NRP decided to conduct a meta-analysis of this research.

The research unveiled that explicit phonics instruction had an overall effect size of 0.44, a moderate effect (NICHD, 2000). The idea that systematic phonics instruction had a larger impact on a student's growth in reading than other reading programs was a key finding. Synthetic phonics programs in which emphasis was placed on converting letters into sounds and then blending them into words was one type of program

examined. This type of program was found to have an effect size of 0.45 (NICHD). Early intervention in this area could have a major impact on later literacy skills.

The age at which phonics instruction was introduced also had an overall effect on students' ability to learn to read. The NRP findings suggest that early phonics instruction has greater impact than phonics taught after first grade (NICHD, 2000). The effect size of phonics instruction on kindergarten students is 0.56. For first-grade students, the effect size drops slightly to 0.54. However, if students do not receive phonics instruction until they reach second grade until or any subsequent year until they reach sixth grade, the effect size drops to 0.27 (NICHD, 2000).

In its report on the effect of phonics instruction on struggling readers, the NRP states, "Phonics instruction produced substantial reading growth among younger children at risk of developing future reading problems (NICHD, 2000, pp. 2-94)." Focusing on phonics instruction with struggling kindergarten students yielded a 0.58 effect size, while having the same focus with first-grade students yields 0.74 for at-risk readers (NICHD, 2000).

While phonics instruction often appears to be an isolated reading skill, the focus on this area of reading instruction also yields results in students' overall reading growth. Systematic phonics instruction had a strong impact on students' ability to decode words with an effect size of 0.67 (NICHD, 2000). It also showed a moderate impact on young students' ability to comprehend text with an effect size of 0.51 (NICHD, 2000).

The findings of the NRP supported the idea that early literacy intervention with struggling or at-risk students at a young age provides many students with the foundational skills they need to improve their overall reading ability (NICHD, 2000).

Such intervention can have significant impact on students' later literacy learning (Torgesen, 2002). After the 2000 NRP report, additional research supporting the idea of early literacy intervention began to emerge, all of which echoed the sentiments of Pinnell (1989).

An additional piece of research by Torgesen (2002) also addressed the prevention of reading difficulties in working with struggling readers. Torgesen researched teachers' approaches toward at-risk children. He warned that schools must provide resources in the early grades in order to provide intervention and preventative instruction. Like several of the previous studies, he asserts that compounding the lack of growth is the realization that many students who struggle with reading continue to fall further and further behind because they lack the opportunities for additional practice in reading. Much of their reading instruction focuses on acquisition of foundational skills rather than reading practice (Torgesen, 2002).

Again, Torgesen's (2002) research repeats what many of the previous studies on early literacy found. Many students who experience early reading struggles have difficulty decoding, so they tend to attempt to guess words rather than trying to decode them (Torgesen, 2002). Not only do many lack decoding skills, but oftentimes they lack sufficient background knowledge to be able to use context to determine the meaning of unknown words. Additionally, many struggling readers have difficulty learning to read, because they possess a more limited vocabulary than average readers. Students who exhibit either of these issues early in their schooling should be closely monitored, as children with these issues have often been labeled as poor readers by the time they reach fourth grade (Snow et al., 1998).

One of the most widely referenced portions of Torgesen's (2002) work regarded his conclusion on the causes that lead to students' reading difficulties early on their path to becoming readers. Just as the results of the NRP report (NICHD, 2000) indicated, Torgesen found that students who enter kindergarten with low phonemic awareness are at much greater risk for struggling with phonological skills. Additionally, Torgesen noted that these same students tend to struggle with noticing phonemic patterns within written words or the words they use regularly to communicate.

Finally, Torgesen (2002) made instructional recommendations for struggling young readers. First, he pointed to the need for balanced literacy instruction for young struggling readers. Emphasis should be placed on word-level skills and comprehension skills. Secondly, schools must have procedures in place to identify students in a timely manner, accurately identify areas of deficit, and begin appropriate interventions (Torgesen, 2002). Torgesen noted that

- It is important that interventions need to be taking place in addition to good first, best instruction, not in place of classroom instruction.
- Interventions must be intensive in time, frequency, and, if necessary, duration.
- Skillful instruction can dramatically reduce reading failure in first and second grade and eliminate the need for any additional interventions.

(pp. 15–18)

Both the NRP and the Torgesen's work supported providing struggling readers with explicit phonemic awareness instruction, phonemic decoding skills, fluent word

recognition, reading comprehension strategies, oral language vocabulary, spelling, and writing skills (NICHD, 2000; Torgesen, 2002).

Torgesen (2002) also pointed out that traditional approaches to reading instruction lack a focus on individual student needs and student variability in reading backgrounds. He supported additional repetition for students who struggle and who may have lacked previous literacy exposure, keeping them from establishing strong reading foundations. In addition, at-risk readers need two types of scaffolding in the classroom. The first focuses on carefully planned sequencing in order to build skills gradually, allowing students' confidence to grow as their skills strengthen. The second involves direct student-teacher dialog that shows the student what type of processing needs to be done and reinforces good reading behaviors (Torgesen, 2002).

Like the key studies pointed out before his, Torgesen's (2002) meta-analysis drew from many widely referenced pieces of reading research, and the conclusions he drew were consistent with them. Early intervention with kindergarten and first-grade struggling readers makes all the difference to their future reading success. That intervention needs to be systematic, scaffolded, intensive, and supported with teaching modeling and dialog (Torgesen, 2002).

By 2003 the body of reading research was growing to reflect the emphasis being placed on research-based instructional practices (Denton, Vaughn, & Fletcher, 2003). For the first time, researchers in brain research, cognitive development, and instruction were working together to add more depth to research regarding how students learn to read. This body of research was on the rise because of discussions regarding RTI. It was believed that in order to determine how and when to intervene with struggling learners,

teachers needed to have a research-based foundation for making decisions that, in many cases, were critical to a child's success in school. What began this discussion on research-based instruction was the growing body of research on what made up effective early literacy instruction. Areas found to be most important to improve the reading development of all students include (a) a knowledgeable teacher who effectively connects with students, (b) lessons that regularly include proven instructional strategies, (c) a differentiated approach to teaching reading for all students, (d) explicit instruction, and (e) connecting research with practice (Denton et al., 2003).

Denton et al. (2003) also point to the importance of delivering reading programs in a consistent manner. Reading Recovery is just one example of a program in which districts have to make a large-scale effort to implement with fidelity in order to offer the intervention to its students. There are specific policies and procedures that Reading Recovery sites must follow (RRCNA, 2009). Of note, the teacher professional development component is consistent, ongoing, and high quality. Teachers learn from each other and regularly have a peer or supervisor analyze their practice in coaching situations. All new teachers go through an extensive training and mentoring process, and teachers must collect and share a variety of data on their students (Denton et al., 2003).

Denton et al. (2003) point to older federal initiatives as driving the new educational focus on research-based instructional practices. Until 2000 special education and Title I programs had little accountability for showing that they were using funding to ultimately improve and enhance student achievement. They add that reading initiatives such as Reading First further reinforced the need to create systematic, research-based reading programs. More and more schools began seeking out reading programs that were

based on scientific programs, addressed all areas of reading with balance, and provided a wealth of training and support for their teachers (Denton et al., 2003).

Research indicated that struggling readers who participated in such programs had much greater odds of maintaining the reading growth these programs brought (Denton et al., 2003). Many saw this new approach to reading intervention as promising, because research showed the programs yielded fairly good results for a year or two after the intensive intervention. Others simply wondered how long such interventions last. It was believed that this type of research would have to be conducted in the next decade. However, there was an existing reading program that already fit the criteria for a sound RTI program (Denton et al., 2003).

Further supporting the impact early intervention can have on student achievement was a 2007 meta-analysis of 18 literacy interventions which found that interventions conducted in kindergarten and first grade yielded better results than those implemented in later grades (Wanzek & Vaughn, 2007). Results were also better for students who were placed in smaller intervention groups. The study also found that interventions implemented over an entire school year had the same results as studies implemented over shorter periods of time (Wanzek & Vaughn, 2007).

In 2008 the NELP released a comprehensive report that supported early literacy intervention in response to the work completed by the NRP in 2000. The NELP report came about after many schools found that the NRP did not address instruction for younger children. The NELP synthesized numerous studies regarding how children ages birth to five develop literacy skills. Several organizations combined their efforts to complete this study: The National Institute for Literacy, Partnership for Reading, and

National Center for Family Literacy. When the group convened, they determined that four key questions would drive their research:

1. What are the skills and abilities of young children (age birth to five years or kindergarten) that predict later reading, writing, or spelling outcomes?
2. Which programs, interventions, and other instructional approaches or procedures have contributed to or inhibited gains in children's skills and abilities that are linked to later outcomes in reading, writing, or spelling?
3. What environments and settings have contributed to or inhibited gains in children's skills and abilities that are linked to later outcomes in reading, writing, or spelling?
4. What child characteristics have contributed to or inhibited gains in children's skills and abilities that are linked to later outcomes in reading, writing, or spelling (NELP, 2008)?

The NELP (2008) noted several key findings from their meta-analysis. First, there are many things that educators and parents can do to strengthen children's literacy skills when they are young. Intervention studies focusing on teaching children the connection between letters and sounds had positive effects on children's conventional literacy skills. Studies on shared reading experiences showed moderate effects on children's oral language skills and print knowledge. Studies that focused on literacy interventions in the home and programs that parents could initiate showed significant to moderate effects on oral language skills and general cognitive abilities (NELP, 2008).

It should be noted that the NELP (2008) found that there were few consistent or well-constructed research studies on age-appropriate interventions for students below the

age of five. As a result the panel recommended that additional research needs to be conducted in this area. However, it did find that when age-level comparisons were popular, the results typically showed that the type of instruction that was effective with kindergarten students was generally effective with preschools students (NELP, 2008).

More recent studies on early intervention point to the value of intervention in preschool (Hilbert & Eis, 2013). Hilbert and Eis (2013) asked two key questions in their study of preschool students:

1. Does the early literacy intervention they examined lead to gains in early literacy that are similar to those in the regular preschool curriculum?
2. Is an early literacy intervention program that targets early literacy skill development effective?

Hilbert and Eis conducted a quasi-experimental study of preschool children who were enrolled in a full-day Head Start program in a Midwestern public school that uses the HighScope program for its curriculum. This experimental group consisted of 23 preschool students from a low socioeconomic background. This experimental group took part in an intervention that focused on knowledge-of print-skills, phonemic awareness, vocabulary, and elements of narrative text (Hilbert & Eis). This intervention was in addition to the standard classroom instruction these students were receiving. The control group of 131 students had no specific intervention and only received classroom instruction. Children were identified for the intervention group based on their pre-assessment scores on the Individual Growth and Development Indicators from the University of Minnesota. In this particular study, the alliteration, rhyming, and

picture-naming probes were used. Teacher observations were also used in order to determine which students would receive the intervention (Hilbert & Eis, 2013).

Students chosen for the intervention participated in 60 lesson plans. Students completed two to three lessons a week for 23 weeks (Hilbert & Eis, 2013). During each lesson students read a book while the teacher lead pre-, during, and postreading lessons based on knowledge-of-print skills, phonemic awareness, vocabulary, and narrative skills (Hilbert & Eis, 2013). Teachers were trained to deliver lessons in a consistent manner and met with researchers on a regular basis in order to further ensure consistency (Hilbert & Eis, 2013).

The results of the study showed that teachers can close gaps in preliteracy skills by implementing structured interventions. This paves the way for students to keep up with their peers once formal reading instruction begins (Hilbert & Eis, 2013). Students in the intervention group showed a statistically significant increase in the picture-naming probe, knowledge-of-print probe, and vocabulary probe in comparison to the control group (Hilbert & Eis, 2013).

Overall, this portion of the literature review resulted in consistent studies that supported the concept of early identification of literacy difficulties and early intervention. The research, spanning three decades, is fairly clear. Students are more likely to overcome reading issues when research-based, systematic, early interventions are put into place.

Reading Recovery Program Background

The Reading Recovery program is an intensive reading intervention for first-grade students developed by Dr. Marie Clay, a reading specialist in New Zealand (RRCNA,

2009). Reading Recovery students spend 30 minutes a day with a trained Reading Recovery teacher for 12–20 weeks in one-on-one reading lessons. Each Reading Recovery teacher has four Reading Recovery students in his or her caseload at any given time (RRCNA, 2009). They spend one half of their day teaching Reading Recovery and the other half of their day instructing small groups of students, typically three to five students, in Grades K–2 in what the program calls early literacy groups. These groups are designed to meet daily, and they follow a specific lesson protocol that is intended to encourage students to communicate with each other while learning reading strategies. The program tends to focus on comprehension skills, although phonics, phonemic awareness and writing are also addressed (RRCNA, 2009).

Students are selected for the Reading Recovery program and early literacy groups based on the results of the Observation Survey (OS) assessment also created by Dr. Marie Clay in 1976 (RRCNA, 2009). Reading Recovery began in the United States when Ohio State University brought the program from New Zealand in the early 1980s (Pinnell, 1989). The premise of the program is to intervene early in order to avoid later literacy issues. Specifically, the Reading Recovery program goals are to “provide early intervention to help the lowest-achieving first-grade students to develop effective strategies for reading and writing and reach average levels of classroom performance” (RRCNA, 2009, p. 5). Clay believed that children who were failing with literacy were doing so because they were not learning to read and write, not because of something wrong with the child (RRCNA, 2009). Those selected for the program rank in the lowest 20% of those taking this assessment. The first group of Reading Recovery students in the school district featured in this study have now graduated from high school. To this

researcher's knowledge, there has been no systematic examination of the learning achievement of these students since they successfully completed the program. This study examined the degree to which this particular group of students met the college and career readiness standards set forth by ACT (ACT, 2013a).

The theoretical framework used in this study begins with the early literacy theory first constructed by Dr. Marie Clay (Pinnell, 1989). Clay believed that students' early literacy experiences shaped who they were as readers later in life. She believed that early intervention would solve most literacy issues; thus, she developed the Reading Recovery program aimed at struggling first-grade students. In addition to Clay's conceptual theory of early literacy, the Response to Intervention conceptual framework will also be addressed (Fuchs, D. & Fuchs, L., 2006). Response to Intervention is a systematic approach that school systems put in place to address struggling learners. As students are assessed regularly in the classroom, individual needs are determined, and interventions are put into place to address those needs. According to this theory, 80% of students should achieve grade-level standards with effective classroom instruction. An additional 15% will need additional instructional intervention beyond previously offered lessons. Finally, 5% of the students in the classroom will require more intensive intervention. Such a model focuses on special education referral as a last resort, a sentiment that Clay's Reading Recovery program shares.

Long-Term Effects of Early Literacy Intervention

The literature review resulted in a number of studies supporting early literacy intervention. Many of these studies found that the effects of early literacy intervention were lasting. However, few of the studies were longitudinal in nature. Therefore, further

research on longitudinal studies spanning from the early grades was initiated. The result was a series of research articles that examined students for at least a 3-year and as much as an 8-year span.

An early longitudinal study published in the *Journal of Literacy Research* followed kindergarten students who participated in a literacy intervention for five years (Phillips, Norris, & Mason, 1996). All students in this study received the same classroom instruction for reading. This study consisted of three sample treatment groups: Treatment 1 received no intervention materials; Treatment 2 received intervention materials for use at home—no instruction at school using the materials was provided; Treatment 3 received intervention materials for home, but students also received additional instruction using the materials at school. The students' reading progress was followed from kindergarten through fourth grade. At the end of fourth grade, Treatment 3 was found to be the only group that still showed significant positive effects from the intervention (Phillips et al., 1996).

In 2008 a study noted in the *Journal of Learning Disabilities* highlighted the progress of a group of 41 kindergarten at-risk readers through third grade (Simmons et al., 2008). This study was conducted before the term *Response to Intervention* was used, but, like Juel's 1988 study, it points to the need for consistent, systematic, research-based instruction for at-risk readers (Simmons et al., 2008). Such lessons are conducted in addition to standard classroom instruction. The researchers found that intervention prior to first grade yielded positive benefits later in school. Such intervention is critical in kindergarten as foundational skills are being learned (Simmons et al., 2008). This study supports the research by Torgesen (2002) and Juel

(1988) that showed the impact of early phonemic awareness and phonics intervention on later reading achievement (Simmons et al., 2008).

The researchers in this study set out to determine whether reading intervention at the kindergarten level helps students who are at risk of reading difficulty achieve adequate levels of reading skill over time (Simmons et al., 2008). They examined a group of 41 kindergarten students throughout a 4-year period until they reached third grade. Their work centered around the question, "What is the probability that children identified as at-risk in kindergarten who receive small-group supplemental intervention will move out of risk at intervals from kindergarten through third grade?" (Simmons et al., 2008, p. 162).

Student reading achievement was measured using subtests from the Woodcock Reading Mastery Tests-Revised (WRMT-R) and the Dynamic Indicators of Basic Literacy Skills (DIBELS). The determination of those students falling below the 30th percentile was made based on the Letter Naming Fluency and Initial Sound Fluency portions of the DIBELS measures (Simmons et al., 2008).

The interventions students received over the course of four years included beginning reading skills and strategies including phonemic awareness, phonics, and word reading. As students progressed in their reading skill, interventions changed to fluency and comprehension interventions (Simmons et al., 2008). Students received approximately 30–45 minutes of intervention every day of the week from November through May in addition to their core reading instruction in the general education classroom.

In general, students who received interventions in kindergarten and the beginning of first grade in phonemic awareness and phonics were moved out of interventions by the end of third grade in all areas except oral reading fluency. Students still made gains in that particular area, but the gains were not as significant as those made in phonemic awareness, phonics, and word reading (Simmons et al., 2008). Specifically, the researchers found great benefit in explicit decoding-based instruction starting in kindergarten for at-risk readers. By third grade, students who were performing below the 30th percentile in kindergarten on several reading measures were performing in the 50th percentile or better by the end of third grade after receiving systematic intervention (Simmons et al., 2008).

The literature also included a similar study that examined the impact of small -group intervention instruction for at-risk kindergarten readers (Kamps et al., 2008). This study follows previous studies' findings that students benefit from early, systematic intervention (Kamps et al., 2008; Hilbert & Eis, 2013; Juel, 1988).

Students in this study were chosen based on the results of a DIBELS screening conducted at the middle of the kindergarten school year (Kamps et al., 2008). Students were determined to be at-risk for reading failure based on DIBELS benchmark criteria in the Nonsense Word Fluency subtest and the Oral Reading Fluency subtest. A recent study also points to the long-term impact of early intervention (Partanen & Siegel, 2013). The study followed kindergarten students through seventh grade in order to examine several questions:

1. How many of the at-risk children in kindergarten have reading difficulties in Grade 7?

2. Are there any early literacy measures that discriminate between those who performed within the average or below average range in Grade 7?
3. What is the trajectory of children's reading skills over time (Partanen & Siegel, 2013)? (p. 670)

Thirty Canadian schools took part in this longitudinal study that began with 650 students. The students were assessed in kindergarten using the Wide Range Achievement Test-3 (WRAT-3), which measures word reading, comprehension, spelling, and math skills. After test administration, students were grouped into at-risk of reading difficulty—140 students, and not at-risk for reading difficulty—487 students (Partanen & Siegel, 2013).

Kindergarten students participated in reading intervention lessons three to four days per week for 20 minutes per session (Partanen & Siegel, 2013). The lessons focused on phonemic awareness and phonics skills, or foundational reading skills. Once students moved on to Grades 1–7 and were still found to be at risk of reading failure based on the WRAT-3, they were placed in the *Reading 44* program, which focused more on reading comprehension skills and strategies and less on phonemic awareness and phonics (Partanen & Siegel, 2013). Students received small-group instruction, but the frequency and duration of the interventions were not monitored as closely as they had been in kindergarten.

An analysis of the WRAT-3 scores from kindergarten through Grade 7 indicated that only 6.2% of students were identified as reading in the below-average range by the time they reached Grade 7 (Partanen & Siegel, 2013). This was down from kindergarten, when 21.5% of students scored in the below-average range. These results suggest that

early intervention makes a difference in the long-term effects of reading skills, even as students transition from learning to read to reading to learn. While this study is significant, it does not answer the question of what happens to students once they reach high school, and how those literacy skills or lack thereof impact their college and career readiness.

A longitudinal study of first-grade students revealed that early intervention efforts yielded stronger outcomes in third grade (Connor et al., 2013). This study found that when students received intervention in first grade, they were more likely to have maintained the literacy gains made if they had one-on-one intervention versus small-group intervention. The researchers also found that a one-time approach to intervention was not enough. Struggling readers typically benefit from consistent interventions over time (Connor et al., 2013). The students who received systematic, intensive interventions in first, second, and third grade had stronger reading skills at the end of third grade than students who did not receive systematic interventions along the way (Connor et al., 2013).

Few studies in this stage of the research spanned from elementary through high school. One longitudinal study, published in 2014, traced student reading, spelling, vocabulary, IQ, and listening comprehension from first through third grade (Sparks, Patton, & Murdoch, 2013). The Sparks et al. (2013) study showed that early exposure to text and early intervention paid off later in terms of student achievement ; the more students read, and the more they were exposed to literacy early in their school careers, the greater their skills were by 10th grade. This replica of a past study by Cunningham and Stanovich included a larger sample and more frequent testing. While this study showed a

connection between early literacy exposure and high school success, it did not answer whether students would have actually met college and career readiness standards. The mere correlation of exposure to future academic success does not address the degree to which students are meeting the standards (Sparks et al., 2013).

While the intervention in this study began and ended in first grade, there is research to support extending literacy interventions into middle school for students who struggle with reading skills (Solis, Miciak, Vaughn, & Fletcher, 2014). This study found that students who were deemed struggling readers in third grade benefitted from extended intervention efforts as they progressed through middle school (Solis et al., 2014).

Another study supported early intervention but cautioned that it may be best to extend those interventions throughout elementary school (Gilbert et al., 2013). This group also found that increasing the intensity and frequency of students in Tier 2 interventions did not improve the reading skills of those students who were unresponsive prior to the change in intervention time and intensity (Gilbert et al., 2013). Students in the study responded better overall to individualized approaches to intervention, but the researchers acknowledged the institutional benefits of more structured, small-group interventions, while also pointing out that teacher training did have a direct impact on the degree to which students responded to intervention efforts (Gilbert et al., 2013).

Systematic Approaches to Intervention to Ensure College and Career Readiness

The path to college and career readiness is not always a clear, straight path. Many students need some type of additional academic support along the way. As standards have increased in rigor, many schools have seen the necessity to address student supports in a systematic way. For years, the only option for schools was to refer students to

special education as a last-ditch effort to help those who were so far behind it felt as though they could never catch up to their peers. As a result many students never received assistance or were mislabeled with a learning disability when, in reality, their learning gaps just compounded over time because no attempt was made to close them. It became clear that intervention needed to occur early, when students first began to struggle, and it needed to be systematic. Schools began to look at ways to develop systematic intervention programs to better prepare all students.

In 2004 President George W. Bush signed a revised Individuals with Disabilities Education Act (Fuchs, D. & Fuchs, L., 2006). While many aspects of the law were similar to the original act of 1975, there was one major difference in the revised act. Previously, schools operated on a discrepancy model for special education placement. Students who were struggling were given a battery of assessments. If the students' achievement level was sufficiently lower than his or her IQ would suggest, the student was referred for special education services. If the difference was not large enough, the student simply did not receive services. There was no other systematic option for this group of students. This system created significant frustration for educators when they knew a student needed additional interventions, but the system would not support it. The revised act supported an RTI approach, which supports early intervention for all students at risk for academic failure (Fuchs, D. & Fuchs, L., 2006).

RTI is key to ensuring students get the literacy interventions they need, as approximately 80% of students who have been labeled as learning disabled have a reading disability (Fuchs, D. & Fuchs, L., 2006). When an RTI program is developed, there are two key areas that educators must consider. First, they need to determine how

they will choose students to intervene. Second, they need to consider what types of interventions they will offer and what the process will be to monitor those interventions (Fuchs, D. & Fuchs, L., 2006).

In order to choose students who need intervention, it is suggested that schools have a tool or a performance benchmark that is given to all students at the beginning of the school year. Once students are tested, teachers examine the data to determine which students are at risk for academic struggles. Before they examine the data, teachers discuss the criterion that determines when a student needs intervention. For instance, students who perform below the 25th percentile will receive intervention (Fuchs, D. & Fuchs, L., 2006).

The next step in the RTI process is to determine what type of intervention students need. If students are given a universal screening tool, additional diagnostic testing may be needed to further pinpoint specific skill deficits. Schools often develop a menu of intervention options based on common learning struggles. Once the student's individual deficits have been uncovered, he or she is then placed in a particular intervention. The intervention team determines the type of intervention, how frequently students will receive the intervention, and how long each intervention session will last. In addition, plans must be made to monitor the student's progress along the way. As progress is monitored, student interventions may need to be completed, adjusted, or extended (Fuchs, D. & Fuchs, L., 2006).

D. Fuchs and L. Fuchs (2006) define interventions as being mostly academic, although many school systems include behavior interventions as part of their RTI process. The schools assert that many intervention practices revolve around reading

problems, and they may focus on intervention for early reading problems. Reading is a primary focus because the policymakers behind the RTI movement were also involved in the Reading First movement, a major component of the No Child Left Behind Act ([NCLB], 2003) which was signed into law in 2002. NCLB emphasized the use of scientifically researched best practices to guide curriculum development and choose appropriate screening assessments and progress monitoring tools (Fuchs, D. & Fuchs, L., 2006).

One key aspect of the RTI process is that it is a multi-tiered approach. Each academic intervention changes at each tier. As students progress up the RTI pyramid, interventions increase in intensity. Increasing intensity is defined as using more teacher-focused, systematic instruction, increasing the duration of an intervention, increasing frequency of the intervention, creating smaller groups or more homogenous groups as student needs increase, or using intervention specialists—those instructors who have specialized training in a particular academic area such as reading specialists (Fuchs, D. & Fuchs, L., 2006).

The RTI approach is a problem-solving approach to serving student needs. Teachers use a systematic intervention protocol and monitor data as they analyze student progress toward reaching the standards or benchmarks. One example of a problem-solving approach can be found in the Heartland Educational Agency in Iowa. The Heartland staff created a four-tiered approach in order to respond to students' educational needs in a timelier manner. The first level of their intervention system includes contacting parents in an attempt to resolve educational or behavioral struggles. When a student's academics begin to fail, a building intervention team meets to examine

learning issues and assist the classroom teacher in designing an intervention protocol for the student that meets his or her needs. Once that intervention is in place, the student's progress is monitored to determine whether the intervention needs to be adjusted. When progress does not occur at step two, the intervention team meets again to make necessary adjustments. If the student does not respond to the intervention after continued adjustments, special education assistance is considered (Fuchs, D. & Fuchs, L., 2006).

Because previous systems to help struggling students were often narrow in focus—many only focused on special education diagnosis when students fell significantly behind their peers—schools are turning more to the RTI process. However, early attempts at an RTI process can be found in the work of literacy researchers as recently as the late 1980s. At that time, research began to emerge that pointed to the potential impact of early literacy intervention on student success later in their elementary school careers. Such findings were backed by the 2000 NRP report (NICHD, 2000) and the NELP in 2008.

Summary

A review of the research resulted in identifying a number of studies that examined the college and career readiness of high school students in general and made general recommendations that schools or districts could take in order to increase college and career readiness levels of students (ACT, 2006; ACT, 2008b; ACT, 2013a). In addition, a number of studies were found that discussed the value of using systematic, research-based interventions to increase the literacy skills of students at risk of reading failure (Denton et al., 2003; Fuchs, D. & Fuchs, L., 2006; Hilbert & Eis, 2013; Torgesen, 2002; Snow et al., 1998). A number of studies also examined the longitudinal reading

success of students who were considered at risk of reading failure early in their educational careers (Juel, 1988; Partanen & Siegel, 2013; Simmons et al., 2008).

A review of the literature revealed a lack of longitudinal research that analyzed the college and career readiness of students formerly at risk of reading failure (ACT, 2013a, Camara, 2013, Conley, 2014). The lack of literature in these key areas left several unanswered questions:

1. Do students who receive a systematic, research-based early intervention meet the definition of college and career readiness by the time they graduate from high school?
2. Are struggling students who reach the reading level of their peers as a result of a research-based early intervention able to maintain a reading level similar to the average level of their peers until they enter high school?

Chapter 3: Methodology

Introduction

The purpose of this study is to examine whether 2011, 2012, and 2013 high school graduates who successfully completed the Reading Recovery program as first-grade students met the college and career readiness standards outlined by ACT (ACT, 2008a). When students completed the Reading Recovery program after 12–20 weeks of instruction, their reading skills were assessed and they were found to have met the average reading level of their peers (RRCNA, 2009).

The goal of the Reading Recovery program is to provide enough research-based intensive intervention that the student has reached the average reading level of his or her peers in first grade and no longer needs additional reading interventions (RRCNA, 2009). Dr. Marie Clay's early literacy research argues that students who receive successful reading intervention in Kindergarten and/or first grade are able to maintain pace with their peers throughout school until graduation (RRCNA).

The study takes place in a large suburban school district of approximately 18,000 students. The district is located in a socioeconomically middle-class Midwestern suburb. There is little diversity in the student population with 95% of the students being Caucasian. The sample included only those students who met the average reading level of their peers after completing 12-20 weeks in the Reading Recovery program, a program that was first adopted in the school district in the year 2000. The students in this population met the criteria for Reading Recovery in first grade and became high school graduates in the years 2011, 2012, and 2013.

The study examined data from the students' PLAN scores, a predictor of future ACT success, ACT scores, and whether the students were enrolled in college preparatory coursework in high school. The data was analyzed to determine whether students who were former Reading Recovery students meet college and career readiness standards similarly to the general population of their peers (ACT, 2008). In addition, the study analyzed student reading scores from the GMRT over time to determine whether students sustained the reading gains they made in first grade (MacGinitie, 2000).

Why the Reading Recovery Program?

The Reading Recovery program is one of the most systematic, consistent, research-based programs available in elementary schools. The program has very specific protocols and teachers are expected to follow them, ensuring that there is little variance in practices. This makes analyzing data for groups who received this intervention more consistent (RRCNA, 2009). As a result of the specific protocols and lesson structures, teachers receive a great deal of ongoing professional development from trained Reading Recovery personnel (RRCNA, 2009). Teachers are consistently monitored, evaluated, and updated on the lesson structure, data analysis, and instructional planning to ensure the program is consistently delivered to all students (RRCNA, 2009). Lessons are taught to students behind two-way glass at least twice a year to receive feedback from peers and the teacher leader as well. This makes the data for the program fairly reliable for analysis purposes because of its consistency across schools and teachers. Gay Su Pinnell, who is a leading authority on literacy instruction, conducted a comprehensive study of the Reading Recovery program, which was published in 1989. Pinnell's findings support the theories of early literacy intervention and RTI outlined in the literature review.

This quantitative study using archived student achievement data examined whether students who received this intervention as first-grade students were able to maintain pace with their peers and meet the ACT college and career readiness benchmarks for the nation and the state of Missouri by the time they graduated (ACT, 2013b). The data used for this analysis included ACT PLAN and ACT test data. Furthermore, it examined whether students met Missouri college preparatory requirements at the average rate of their peers, and enrolled in AP courses at the average rate of their peers. Data indicating whether students earned the Missouri College Preparatory Certificate, their GPA, and the number of AP courses each former Reading Recovery student took were used for this analysis.

Population/Sample

The sample of students in this study attended school in this district from kindergarten through 12th grade. At the time these students were in elementary school, the district's sole means of reading intervention was the Reading Recovery program. This meant that only K-1 students received any type of intensive reading intervention. After first grade, no systematic reading interventions were in place. As these students entered high school, the school district implemented the CCSS that focused on college and career readiness for all students.

The 252 students initially included in the sample for this study were high school graduates from three high schools of approximately 2,000 students each who were enrolled in a Midwest, middle-class, suburban school district. The district is primarily residential with little revenue coming from commercial industry. District revenue comes from state funding and local property tax with limited retail sales tax. The total

enrollment in the district averaged approximately 18,000 students in grades K–12 with a 98% Caucasian racial profile. Similar to the D. Fuchs and L. Fuchs (2006) study, this district put formal structures in place to address student reading intervention. All of the students were struggling readers and received the Reading Recovery intervention for 12–20 weeks and successfully reached the average level of their peers in reading which deemed them “successfully completed” from the Reading Recovery program in their respective elementary schools. At the time of the students’ Reading Recovery intervention, the district had ten elementary schools. Those ten schools varied in terms of socioeconomic status and demographics. (Missouri Comprehensive Data System, 2016).

Table 5

Socioeconomic Status of 10 Elementary Schools

% of Students Receiving Free or Reduced Lunch	# of Schools
Less than 10%	4
15-20%	4
35-45%	2

The sample actually used in this study consists of 119 students who remained consistently enrolled in the district from first grade through graduation—72 males and 47 females. In order to meet the definition of *successfully completed* from the Reading Recovery program, students needed to meet two criteria: they had to reach the average reading level of their peers as indicated by Reading Recovery bi-annual random sampling of students across the country from schools who participate in the Reading Recovery program, and they had to complete the Reading Recovery program in 12–20 weeks (RRCNA, 2009).

Instruments

This study analyzed archived student performance data using several research-based, nationally recognized instruments.

The ACT is a national exam that students elect to take. Typically, students take the exam in order to be considered for college admissions during their junior and senior years in high school. However, students as early as middle school are able to take the test to qualify for gifted or summer programs. The test measures student proficiency in the areas of reading, English, mathematics, and science. Student scores range from 0–36. ACT also provides students with information about their college readiness by issuing college readiness benchmarks for each of these subtests (ACT, 2013a).

The PLAN test is a test developed by ACT that is given to 10th-grade students in order to predict later college and career readiness. The PLAN test is administered during the school day by schools and districts that purchase this testing option. If the district provides the test, students who are present on test day take the test; they typically do not have the option of self-selection. As is the case with the ACT, there are college readiness benchmarks issued by the PLAN test which provide students with an idea of strengths and weaknesses in their college and career readiness (ACT, 2009). This particular sample of students consisted of three graduating classes. The Class of 2011 had an average ACT score of 20.1, the Class of 2012 had an average ACT score of 20.3, and the Class of 2013 had an average ACT score of 19.6.

At the time the students graduated, Missouri issued the Missouri College Preparatory Certificate to high school graduates who met specific course enrollment criteria. The state of Missouri no longer issues such certificates due to the increased

focus on college and career readiness for all, and the fact that the state graduation requirements for all students now mirror what once was considered to be a pathway that only college-bound students followed. In order to receive the certificate, students had to complete the following four requirements:

1. Complete a high school course load that includes the following:

Table 6

Course Requirements for College-Bound Students

Subjects	Units
English/Language Arts	4
Mathematics	4 (Algebra I and higher)
Science	3
Social Studies	3
Fine Arts	1
Practical Arts	1
Health	0.5
Physical Education	1
Specified Core Electives	3 (2 World Language recommended)
General Electives	4

2. Earn at least a 3.0 grade point average (GPA) in the combined subject areas of English, mathematics, science and social studies;
3. Score above the prior year’s national composite mean on the ACT; and
4. Maintain a 9–12 attendance rate of at least 95%.

The number of AP courses that students take also contributes to their college and career readiness. Students who enroll in AP courses are more likely than their peers to develop college-level skills while in high school. They also tend to earn college degrees on time in comparison to their peers (College Board, 2014). This study compared the

average AP enrollment of former Reading Recovery students to their peers in the school district (Department of Elementary and Secondary Education, 2013).

The GMRT is a nationally normed reading assessment that assesses a student's vocabulary and comprehension skills. The timed test is given in a large-group setting. In this particular school district, students take the GMRT in Grades 3–8 each year in March. It is used for placement in honors courses, and reading intervention courses as well as placement in content area supports in high school.

Procedures/Data Analysis

To test the first null hypothesis, H_0 : *There is no difference between students who successfully completed the Reading Recovery program and their peers when examined for college and career readiness based on three separate measures: ACT criteria for college and career readiness, the state of Missouri's College Preparatory Certificate, and the proportion of the group taking at least one AP course*, three separate tests were performed (Gall, Gall, & Borg, 2007).

First, a t test was conducted on the sample data to determine whether there is significant evidence that the mean ACT composite for all former Reading Recovery students is different from the national mean ACT composite and the Missouri mean ACT composite. Next, a z test was conducted using the sample data to determine whether the proportion of former Reading Recovery students who earn the Missouri College Preparatory Certificate is significantly different from the proportion of students in the district where they reside who earn the Missouri College Preparatory Certificate. Finally, an additional z test was conducted to determine whether the proportion of former Reading

Recovery students who take at least one AP course is significantly different from the proportion of students who do so in the state where they reside (Gall et al., 2007).

To test the second null hypothesis, H_0 : *There is no difference between the Reading Recovery cohort and their peers on GMRT scores in Grades 3–8*, a *t* test was conducted using the sample data to determine whether there was significant evidence that the mean GMRT score for these students are below grade level from third through eighth grade (Gall et al., 2007).

Summary

A sample of 119 students, 72 males, and 47 females who attended a Midwestern, suburban school district of 18,000 students were assessed to determine the level of their college and career readiness as they graduated from high school. All students in the study successfully completed 12–20 weeks in the Reading Recovery program as first-grade students. When they completed the Reading Recovery program, they were reading at the average level of their peers.

The eighth-grade reading levels of the sample population were also examined to determine whether they were still at the average level of their peers as they entered high school.

Additional factors used to determine college and career readiness were also examined including whether the student enrolled in rigorous coursework, enrolled in AP courses, or met the college benchmarks set for the ACT.

Chapter 4: Data Analysis

Introduction

The research questions, hypotheses, data analyses, and results are discussed in chapter 4. The purpose of this study was to examine whether first-grade students who received a formal, systematic, research-based intervention program—in this case, Reading Recovery—early in their educational experiences graduate from high school reaching several benchmarks that indicate college and career readiness. College and career readiness, in this study, is defined as taking rigorous coursework measured by those who achieved the Missouri College Preparatory Certificate, those who enrolled in Advanced Placement courses in high school, and those who reached college readiness benchmarks on the ACT.

Data from the ACT, PLAN, and Gates-MacGinitie Reading Assessment were collected on the student sample ($n=119$). In addition, the number of AP credits earned in high school were logged. All data were collected in a spreadsheet and the student names were replaced with random codes generated by www.random.org. Next, ANOVA was used to look for significant differences between the groups in terms of test scores, grades, and course enrollment by school and by graduation year.

There were two research questions posed in this study. The first research question focused on the college and career readiness of students who received early, systematic, and intensive literacy intervention as first-grade students. The second specifically focused on the reading level of these students as they entered high school. The questions are:

1. Do students who receive a systematic, research-based early intervention meet the definition of college and career readiness by the time they graduate from high school as twelfth graders?
2. Are struggling students who reach the reading level of their peers as a result of a research-based early intervention able to maintain a reading level similar to the average level of their peers until they enter high school as ninth graders?

Data Analysis for Research Question 1

Four separate statistical analyses were completed in order to analyze this question. ACT, PLAN, Missouri College Prep Certificate attainment, and AP course enrollment were all examined in response to this question because they are indicators of college and career readiness.

First, *t* tests were conducted to determine whether there is significant evidence that the mean ACT composite of the students who completed the Reading Recovery program is significantly different from the general population of students who took the ACT at both the state and district levels.

Additional *t* tests were conducted to determine whether there is significant evidence that each mean ACT subtest score of the students who completed the Reading Recovery program is significantly different from the corresponding ACT benchmark scores provided by ACT. Each subscore serves as a benchmark indicating a student's level of college and career readiness.

Table 7

Sample ACT Scores vs. National ACT Scores

ACT Subtest	ACT benchmark	Mean	Standard Deviation
English	18	18.6286	4.4107
Math	22	20.2286	4.34115
Reading	22	19.5286	4.02788
Science	23	10.4571	2.51768

Second, an Analysis of Statistical Variance (ANOVA) was conducted at 95% confidence level to determine whether there is significant evidence of a difference in the mean ACT composite scores when comparing the ACT scores of the various subgroups within the sample, as determined by graduation year or high school of enrollment. A confidence interval at the 95% level was calculated to estimate the mean ACT composite score for all students who successfully completed the Reading Recovery program in districts with similar demographics.

Descriptive Summary Statistics of three high schools in the study for ACT

Table 8

Mean ACT Score by District High School

	Mean ACT	SD ACT
School A		
Traditional HS	19.9286	3.11423
School B		
Traditional HS	20.0476	3.801
School C		
Traditional HS	20.2	3.70774

Descriptive Summary Statistics of 3 graduation classes in the study for ACT

Table 9

Mean ACT Score by Graduating Class

	Mean ACT	SD ACT
Class of 2011	20.1724	3.36015
Class of 2012	20.25	3.15172
Class of 2013	19.64	3.8284

Next, *t* tests were conducted at a 95% confidence level to determine whether there is significant evidence that each mean PLAN subtest score of the students who completed the Reading Recovery program is significantly different from the corresponding PLAN benchmark scores provided by ACT.

Table 10

PLAN Scores and Median PLAN Scores

Subtest	PLAN benchmark	Mean	SD
English	15	14.9091	2.83344
Math	19	16.2273	3.32811
Reading	18	12.9545	4.74561
Science	20	14.5818	4.8621

Next, a confidence interval was calculated at 95% to estimate the proportion of students receiving the Missouri College Preparatory Certificate among all students who successfully completed the Reading Recovery program in districts with similar demographics. The Missouri College Preparatory Certificate serves as an indicator of whether or not students are enrolled in rigorous coursework—one indicator of college and career readiness.

Lastly, while a hypothesis test will indicate whether there is evidence for a particular prevalence enrolled in AP coursework, it was desirable to go beyond testing a

hypothesis by estimating the prevalence of AP coursework for students like those in the study. Enrollment in AP coursework is one factor that is often considered a measure of college and career readiness. It was determined that the proportion of the sample who took at least one AP course was 27.73%. A confidence interval of 95% was calculated to estimate the proportion of students who enrolled in at least one AP course out of all students who successfully completed the Reading Recovery program in districts with similar demographics. This 95% confidence interval was 19.69% to 35.77%. This indicates that less than half of such students are taking AP coursework.

Findings for Question #1: ACT

The ACT for this group of students was a self-selected test. Students choose to register to take the test outside of the school day. They must register and pay for the test. Students who have no plans to attend college typically do not choose to take the test. In this student sample, only 70 of the 119 students opted to take the ACT ($n=70$). With a sample mean ACT score of 20, standard deviation of 3.45 ($SD=3.45$) and a standard error of 0.41 ($SE=0.41$), there is significant evidence ($p=0.00012$) that the mean ACT composite of all successful graduates of this program from this state who would opt to take the ACT is lower than the state average ACT (21.6). Additionally, there is significant evidence ($p<0.0001$) that the mean ACT composite for all graduates of this program from this state who opt to take the ACT is lower than the district average ACT (22.6). It is estimated with a 95% confidence interval that the mean ACT composite for all graduates of this program from this state who would opt to take the ACT is between 19.177 and 20.823.

Table 11

ACT Composite Scores

ACT Composite vs.	<i>t</i> statistic	<i>p</i> value
District	-6.302	<0.0001
State	-3.878	0.00012

Table 12

ACT Subtest Scores

ACT Subtest	<i>t</i> statistic	<i>p</i> value
English	1.192	0.88
Math	-3.414	0.00054
Reading	-5.134	<0.0001
Science	-41.68	<0.0001

Findings for Question #1: PLAN

The PLAN test, a sample ACT test purchased by schools or districts and administered during the school day, was administered to this group of students and the other members of their respective graduation classes during their sophomore year. If students were absent during the designated test date, there was no makeup test scheduled. Therefore, 110 students from the 119 in the sample took the PLAN test.

Table 13

*Summary of *t* tests for Mean PLAN Subtest Scores*

PLAN Subtest	<i>t</i> statistic	<i>p</i> value
English	-0.3365	0.37
Math	-8.738	<0.0001
Reading	-11.15	<0.0001
Science	-11.69	<0.0001

Findings for Question #1: Missouri College Preparatory Certificate

As the data plan for this study was developed, the intention was to compare the proportion of students who successfully completed the Reading Recovery program and

earned the Missouri College Preparatory Certificate to the proportion of students who earned the Missouri College Preparatory Certificate in the state. Two situations prevented this part of the analysis from being conducted. First, the number of Reading Recovery students who successfully completed the program ($n=119$) and completed the requirements to receive the Missouri College Preparatory Certificate was too small in each of the district high schools to satisfy the conditions for conducting z tests to compare these high schools in pairs. Secondly, it was not known that previous to this study, the Missouri Department of Elementary and Secondary Education did not maintain records of the proportion of students who received this designation. Therefore, because the parameter for conducting a z test was unavailable, it cannot be determined whether or not the scores of the 119 students in this study provide evidence that Reading Recovery students who successfully completed the program and completed the requirements to receive the Missouri College Preparatory Certificate did so at a rate significantly different from the unknown rate that would apply to the state's students as a whole. However, using the data from all the students in this study, it can be estimated with 95% confidence that the proportion of all graduates of the Reading Recovery program from this state who would have met the requirements for the Missouri College Prep Certificate is between 4.04% and 14.45%. Based on this confidence interval, it is estimated that fewer than 15% of former Reading Recovery students in districts with similar demographics would have met the requirements for the Missouri College Preparatory Certificate. The Missouri College Preparatory Certificate indicates that a student has enrolled consistently in rigorous coursework throughout high school. Rigorous coursework is considered an indicator of college and career readiness.

It is important to note that Missouri Department of Elementary and Secondary Education dropped the Missouri College Prep Certificate in 2012 because graduation requirements now closely reflect the credit standards that were required for the certificate. The state goal is now to ensure that all students are deemed college and career ready by the time they graduate high school.

Findings for Question #1: AP

The College Board maintains and reports information about the number of AP exams written, but does not collect information on the number of students enrolled in AP courses. Hence, the parameter for conducting a z test was unavailable; it cannot be determined whether the 119 students in this study provide evidence that Reading Recovery students who successfully completed the program enroll in AP coursework at a rate significantly different from the rate seen among the state's students as a whole. However, using the data from all the students in this study, it can be estimated with 95% confidence that the proportion of all graduates of this program from this state who enrolled in at least one AP course is between 19.7% and 35.8%. Based on this confidence interval, fewer than 36% of former Reading Recovery students in large suburban middle-class homogeneous school districts in the state take at least one AP course. Enrollment in AP coursework is considered rigorous coursework. Rigorous coursework is an indicator of college and career readiness.

Data Analysis for Research Question 2: Eighth-Grade Reading Level

Table 14

GMRT Vocabulary Subtest Percentile Rank by Gender

	Females	Males	Total
Mean percentile rank	45.2812	52.4762	49.3649
SD percentile rank	18.8649	17.3757	18.2641
SE percentile rank	3.33488	2.68112	2.12316
Min percentile rank	1	22	1
Q1 percentile rank	32.5	37	37
Median percentile rank	44	55.5	47.5
Q3 percentile rank	61	68	63
Max percentile rank	83	83	83
<i>n</i> =	32	42	74

Comparing the percentile ranks of the 42 males in the sample to 32 females in the sample, the males tended to have higher Gates vocabulary subtest percentile ranks, as indicated by the higher mean, minimum, quartiles, and median.

To determine whether these samples provide evidence of a difference between males and females in the larger populations of males and females, a 2-sample *t* test was conducted. The *t* statistic, -1.681, with 63.855 degrees of freedom and *p* value 0.09756 indicates that there is no significant evidence that there is a difference in the mean percentile rank on the Gates vocabulary subtest for males and females who have successfully completed the Reading Recovery program in districts with similar demographics. To estimate the difference in mean percentile rank on the Gates vocabulary subtest for males and females who have successfully completed the Reading Recovery program in similar districts in this state, a 2-sample *t* interval for the difference of means was constructed at the 95% confidence level. This interval, -15.74 to 1.3537, indicated that we are 95% confident that the difference in mean percentile rank on the Gates vocabulary subtest for males and females who have successfully completed the

Reading Recovery program in similar districts in this state is between -15.74 and 1.3537. Again, this interval provides no significant evidence of a difference in these mean percentile ranks.

Table 15

GMRT Comprehension Subtest Percentile Rank by Gender

	Females	Males	Total
Mean percentile rank	45.4375	49.1429	47.5405
SD percentile rank	22.9191	20.7935	21.6638
SE percentile rank	4.05157	3.20851	2.51837
Min percentile rank	1	13	1
Q1 percentile rank	30	32	32
Median percentile rank	44.5	51	47.5
Q3 percentile rank	57	62	62
Max percentile rank	94	94	94
n=	32	42	74

Comparing the percentile ranks of the 42 males in the sample to 32 females in the sample, the males tended to have higher Gates comprehension subtest percentile ranks, as indicated by the higher mean, minimum, quartiles, and median.

To determine whether these samples provide evidence of a difference between males and females in the larger populations of males and females, a 2-sample *t* test was conducted. The *t* statistic, -0.717, with 63.262 degrees of freedom and *p* value 0.476, indicates that there is no significant evidence that there is a difference in the mean percentile rank on the Gates comprehension subtest for males and females who have successfully completed the Reading Recovery program in similar districts in this state. To estimate the difference in mean percentile rank on the Gates comprehension subtest for males and females who have successfully completed the Reading Recovery program in similar districts in this state, a 2-sample *t* interval for the difference of means was constructed at the 95% confidence level. This interval, -14.03 to 6.6215, indicated that

we are 95% confident that the difference in mean percentile rank on the Gates comprehension subtest for males and females who have successfully completed the Reading Recovery program in similar districts in this state is between -14.03 and 6.6215. Again, this interval provides no significant evidence of a difference in these mean percentile ranks.

Table 16

GMRT Total Raw Score Percentile Rank by Gender

	Females	Males	Total
Mean percentile rank	47.5	53.119	50.6892
SD percentile rank	20.3613	19.401	19.825
SE percentile rank	3.5994	2.99364	2.31129
Min percentile rank	1	19	1
Q1 percentile rank	39	36	39
Median percentile rank	47	50	48
Q3 percentile rank	55	69	66
Max percentile rank	89	87	89
n=	32	42	74

Comparing the percentile ranks of the 42 males in the sample to 32 females in the sample, the males had a higher mean, minimum, median, and third quartile, while the females had a higher first quartile and maximum.

To determine whether these samples provide evidence of a difference between males and females in the larger populations of males and females, a 2-sample *t* test was conducted. The *t* statistic, -1.200, with 65.15 degrees of freedom and *p* value 0.2344 indicates that there is no significant evidence that there is a difference in the mean percentile rank on the Gates total raw score for males and females who have successfully completed the Reading Recovery program in similar districts in this state. To estimate the difference in mean percentile rank on the Gates total raw score for males and females who have successfully completed the Reading Recovery program in similar districts in

this state, a 2-sample t interval for the difference of means was constructed at the 95% confidence level. This interval, -14.97 to 3.73, indicated that we are 95% confident that the difference in mean percentile rank on the Gates total raw score for males and females who have successfully completed the Reading Recovery program in similar districts in this state is between -14.97 and 3.73. Again, this interval provides no significant evidence of a difference in these mean percentile ranks.

The 74 students given the Gates-MacGinitie Reading Assessment in eighth grade scored an average normal curve equivalent (NCE) of 50.3243 (SD=12.6221). These 74 students have an average NCE similar to the national average NCE of 50. This indicates that on average, the 74 students who took the GMRAT in eighth grade were reading at a level similar to that of their peers. To make inferences about the population based on this data, a t test was conducted. The t test was used to determine whether such student scores provide significant evidence of a difference from the mean national score of 50 NCE. The t statistic is 0.221 with 73 degrees of freedom $p=0.83$, indicating no significant evidence that students who have successfully completed the Reading Recovery program have reading scores that differ significantly from the national average. Based on the sample of 74 students given the Gates MacGinitie Reading Assessment, the 95% confidence interval for estimating the mean score for all such students who successfully completed the Reading Recovery program in similar districts is 47.4–53.2 indicating that students are able to maintain a reading level consistent with the average reading achievement level of their peers.

Summary

The first research hypothesis suggests that students who successfully completed the Reading Recovery program in the first grade and reached the average reading level of their peers were able to achieve a series of benchmarks used to indicate college and career readiness. A second hypothesis states that in the eighth grade, Reading Recovery students would score reading test results on par with the average level of their peers on the Gates-MacGinitie Reading Assessment. The research data indicates that Reading Recovery students who successfully completed the program in first grade and met the median reading level of their peers, were able to maintain median reading levels with their peers when they were assessed as eighth graders. However, by the time the sample of students graduate high school as twelfth graders, they rarely met college and career readiness benchmarks. Chapter 5 will discuss the research findings in the context of the literature reviewed and research results. Chapter 5 and provides recommendations for schools to address this population of students in the future in order to better prepare them for college and career readiness.

Chapter 5: Discussion and Recommendations

Discussion

Data on international assessments has placed a renewed focus on college and career readiness in American schools (Kelly et al., 2013). As a result, the rigor of coursework has increased, and schools are using ACT college and career readiness benchmarks to plan instruction that provides students with skills necessary to meet the workforce demands of the future (Kena et al., 2014). Literacy is a key component of college and career readiness. Reading demands are increasing in career and technical fields, and the jobs of the future will require students to read at college levels even in jobs that do not require a college education (Carnevale et al., 2010). Whereas, the literature is rich with recommendations for schools to ensure students are college and career ready, few address what schools can do to assist students who are struggling readers as they work toward the same college and career readiness goals of their peers.

The data in this study showed that students who successfully completed the Reading Recovery program, meaning they achieved a reading level equal to the median level of their peers, were able to maintain similar reading levels by the time they completed eighth grade, as measured by a standardized reading assessment. However, few of these students were actually able to reach benchmarks of college and career readiness including enrollment in rigorous coursework and meeting ACT benchmark scores by the time they were seniors in high school.

College and Career Readiness and Reading Ability of Former Reading Recovery Students

This study researched the college and career readiness of students who received a systematic, intensive reading intervention as first grade students. Students completed the program successfully when they met the median reading level of their peers. Based on the data analysis, this particular group of students was able to maintain reading levels equivalent to the median reading level of their peers as they entered high school. These findings are indicative of the multitude of studies that point to the longitudinal impact of early literacy intervention (Juel, 1988; Partanen & Siegel, 2013; Simmons et al., 2008). Such studies maintain that providing students with systematic, focused early intervention in literacy will result in reading gains that students are able to maintain until they graduate from high school (RRCNA, 2009). The students in this study did not participate in formal intervention protocols after first grade. However, it is possible that individual buildings or teachers provided students with additional reading supports.

Unfortunately, few of the students involved in this study actually enrolled in rigorous coursework during their high school year . As a result, few met the college and career readiness benchmarks outlined by ACT by the time they graduated as twelfth graders (ACT, 2009).

Table 17

Sample ACT Scores vs. National ACT Scores

ACT Subtest	ACT benchmark
English	18
Math	22
Reading	22
Science	23

Whereas lack of rigorous coursework is concerning, even more concerning is the discovery that the majority of these students were still reading at grade level by the time they were ready to enter high school. They were not struggling readers as they entered high school, yet they were not enrolled in rigorous coursework. In fact, very few of these students took on the challenge of an AP course.

There could be several reasons that Reading Recovery students did not enroll in rigorous coursework. First, because the progress of these students was not monitored in a systematic way after first grade, there is a lack of information provided to teachers. Students took the Gates-MacGinite Reading Assessment in earlier grades, but the data was not systemically shared with buildings and teachers. Because of this, teachers and counselors may have been unaware that this group of students was keeping up with their peers. Additionally, there was no systematic way of identifying these students within school records that teachers and counselors would regularly access. Therefore, there was no indicator that these students might need additional support as they progress through school.

Second, even though there were no systematic identifiers for these students, there may have been teachers who did know that these students were, in first grade, labeled struggling readers. It is unclear the extent to which this information was passed down to each grade level as students progressed through the school system. Based on that knowledge, assumptions may have been made about their reading progress even though there was no additional formalized reading data until the third grade to support it whether intentional or unintentional.

Research Question Two: Eighth-Grade Reading Levels

Despite poor performance on the reading section of the PLAN and ACT tests as high school students, this group of students was identified as being at grade level in eighth grade at the same rate as their peers as measured by the Gates-MacGinitie Reading Assessment. Whereas this appears to be significant in terms of reading ability, when viewed in terms of the college and career readiness data, the eighth-grade reading achievement appears to be perplexing. If students are reading at grade level when they enter high school, why are they not achieving college and career readiness standards before they leave? There could be several reasons for this situation.

First, the standards put forth by the Common Core State Standards call for all students to be college and career ready. These standards have a heavy emphasis in reading and writing in all content areas (National Governors Association Center for Best Practice, 2010). If students are not prepared to meet these standards, they may have difficulty in their postsecondary learning endeavors, or in securing future employment (Carnegie Corporation of New York's Council on Advancing Adolescent Literacy, 2010).

It could be assumed that the 70 students who took the ACT had ambitions to pursue college coursework. However, their actual ACT scores indicate a lack of academic preparation needed to succeed in college. Discussions and exposure to college along with what it entails to prepare for it need to begin much earlier in school. Such conversations cannot be relegated to the “above average” student. Students who are performing at grade level need exposure to such activities.

Recommendations for Future Struggling Readers

Monitoring the progress of struggling readers is critical to ensuring they are challenged. This work begins with teachers who have the mindset that all students can learn at high levels. In his work outlining strategies that have the most impact on student learning, Hattie points to student expectations as the single most impactful influence on student achievement (Hattie, 2012). Student expectations are defined as teachers and students having the belief that students will succeed.

It is recommended that schools work to build a culture where all adults believe their students can learn. While this may seem obvious, building a culture where the collective efficacy focuses on student learning and the general mindset is that all students are capable of learning is key to student success. When such a culture exists, students are provided with opportunities to take challenging coursework, progress is tracked, and families are consulted when educational decisions are made.

Having a schoolwide Response to Intervention model would also benefit student initially labeled as struggling readers (Fuchs & Fuchs, 2006). First, it provides a safety net of sorts for students who, over time, may need additional supports or interventions. Student success is not left up to chance because student progress is monitored on a consistent basis and data analysis of all students takes place. Had an RTI system been in place in this district, students would have been monitored from first through eighth grade by teachers and counselors. In turn, this might have provided more exposure to college and career options, and the adults working with these students may have had a different perspective on the abilities of these students.

Recommendations for School and District-Level Administrators

The results of this study point to some larger issues that may be occurring in many school systems. First, school systems have to adopt a mind-set that all students can learn at high levels. This starts with building and district leadership. In the past, adults within the school system have made judgments, and decisions about children's futures based on those judgments. For example, if students do not read above grade level, enrollment in an honors or AP course is not typically recommended. However, AP guidelines would suggest that students with grade-level reading abilities benefit from enrollment in more challenging coursework simply by being enrolled in the course (College Board, 2015). Additionally, AP suggests that students are enrolled in challenging coursework prior to enrolling in an AP course (College Board, 2015). It is recommended that schools begin discussions about academic challenge early in students' school careers. Counselors need to explain options and the consequences, both intended and unintended, of academic choices. Such information needs to be shared with both students and parents. It is not acceptable for schools to make academic decisions for families without their input and without educating them on their options.

Bold discussions of student ability and the limitations placed on students in the school setting must take place. Students should not be relegated to courses intentionally designed to push them through the system in order to achieve graduation. School personnel must engage in a paradigm shift that college and career readiness is not a goal for a selected few, but the goal for all. Understanding that it is the academic institution's responsibility to provide scaffolds and supports to ensure all students are college and career ready is critical. Had more adults believed that students with average reading

abilities could have access to challenging coursework and should be focused on college and career readiness, this group of students may have attained college and career readiness at high levels. Because so many of these students chose to take the ACT, it is evident they had a desire to attend college. However, there appears to have been a disconnect between a system that did not intentionally focus on the college and career readiness of these students, and the desire of the students and their families who appear to have had a goal of college attendance.

A further recommendation is to track student reading progress throughout each student's school career. It is important that systems are in place for teachers analyze and discuss this reading data, determine necessary interventions and extensions, and monitor student progress.

Finally, teachers need more professional development on teaching students with average achievement test scores. Having average reading abilities does not mean that a student is incapable of learning or should not be challenged. Teachers need to understand that students with average reading assessment scores need to be pushed to read at higher levels. It is not enough to take struggling students to reading at grade level. They must achieve beyond grade level in order to achieve college and career readiness.

Recommendations of Further Research

More research needs to be conducted on students who read below and at grade level and the perceptions of those students by the adults who teach them. It appears that the adults within the school system may be making assumptions about the abilities of students with average test scores. It would be interesting to see how many students across the country are pushed to enroll in challenging coursework when, in fact, their

achievement test scores are average. Exploring what the term “average” means to educators and the opportunities presented to students who are considered “average” would be fascinating.

It would be equally interesting to explore the effect labels have on overall student achievement. When a student is labeled as a struggling reader early in their formal schooling, do they forever wear that badge? Are perceptions of their ability created based on that label? Are limitations of their options put in place based on their perceived abilities?

Researcher Reflections

Whereas, it was encouraging to see that this particular group of former Reading Recovery students were reading at grade level in eighth grade, it was disappointing to see how few of them actually met the conditions of college and career readiness. All students should be provided the opportunity to take challenging coursework. Student self-perception of themselves as academics should not be predetermined in a system that offers opportunity to some and not others based on perceived ability. This requires a significant mind-shift within the public school system and a renewed focus on individual student needs. Getting to “average” is not enough.

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