

# THE MISSING LINK IN READING COMPREHENSION & ACADEMIC ACHIEVEMENT

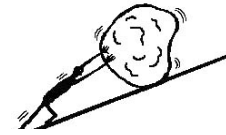
by Jason Caros

## The Big Idea

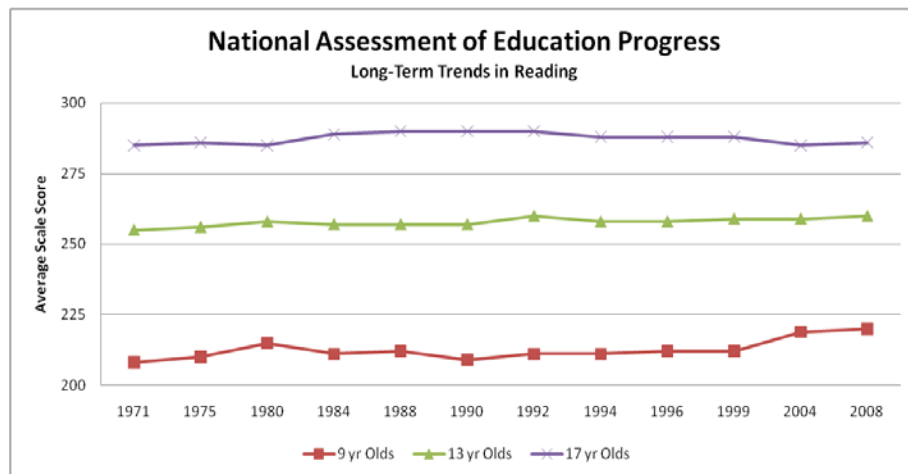
*Reading comprehension and overall academic achievement can be greatly improved, and learning gaps closed, by systematically increasing the amount of academic background knowledge students learn beginning in the elementary grades.*

## The Sisyphean task

In ancient Greek mythology a king named Sisyphus was cursed by the gods to roll a giant boulder up a hill, but just as he reached the top the boulder would roll back down. Poor Sisyphus would have to repeat the labor throughout eternity. I sometimes wonder if educators are engaged in a Sisyphean task when it comes to their approach to improving student reading comprehension.



Teachers have been hard at work for decades aiming to improve student reading using the latest research in student literacy, cutting edge teaching resources, and barrels of educational funding. What has been the result? Elementary student reading scores have been rising since the 1970s, and this has been due, in large measure, to a growing understanding about the best early instruction in how to read. Unfortunately, reading scores for middle school students have improved only slightly, and scores for students in high school have remained relatively unchanged for the past 40 years.



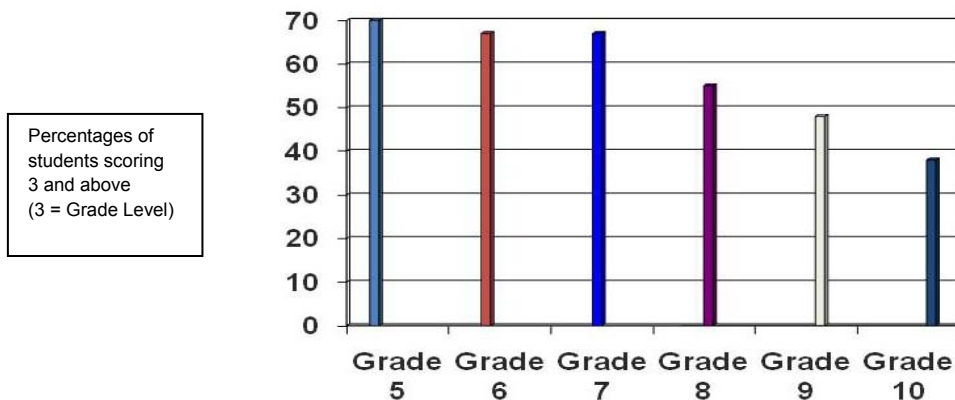
**Source:** U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress, Long-Term Reading Assessments.

In the state of Florida where students take the rigorous FCAT assessment each year beginning in grade 3, reading score data is consistent with nationwide trends. There is no doubt reading instruction has improved in the state over the last 15 years and

reading scores at the elementary level show some commendable gains, but despite the best efforts of Florida educators and policy makers, the reading gains made at the elementary level are not seen in student FCAT assessment scores at the middle and high school levels. In fact, a striking downward trend in reading achievement is evident starting in middle school that mirrors national results. When comparing FCAT statistics on the numbers of students earning what are considered by the state to be grade level reading scores of 3 and above in fifth grade, to the numbers of students earning scores of 3 and above in tenth grade, the decline is dramatic. Sixty-nine percent of fifth grade students test at level 3 and above while only 39% of tenth graders score at or above level 3. Looking at long-term trends, in 2005 63% of fifth graders scored a 3 or above on the FCAT Reading assessment; only 39% of those same students scored a 3 or above as high school sophomores in 2010.<sup>1</sup> Why such a big decline? Where have educators gone wrong?

Some people question the merits of tests such as National Assessment of Educational Progress (NAEP), or state examinations like Florida’s FCAT, when seeking to describe the large disparity in scores between fifth grade and high school. Others suggest student apathy is partly to blame. While there may be some truth to these ideas, there is another tangible reason we can point to. One of the factors in the decrease of student reading performance can be attributed to the escalation of informational text and cognitive complexity in the reading passages from the fifth to high school exams. In Florida’s FCAT, informational text accounts for 50% of fifth grade readings, 60% of seventh grade readings, and 70% of tenth grade readings. Cognitive complexity also increases with each grade level. Studies of textbooks and other teaching resources have revealed much of the reading elementary students engage in at school is fiction. These studies affirm how the transition to more informational text requiring increased amounts of academic knowledge often makes comprehension of non-fiction texts very difficult for middle and high schoolers.<sup>2</sup>

**2011 FCAT Reading Scores**



**Note:** Informational text accounts for 50% of the fifth grade readings, 60% of the seventh grade readings, and 70% of 9<sup>th</sup> grader readings. Cognitive complexity also increases with each grade level. Source: Florida Department of Education (<http://fcats.fldoe.org/fcatscor.asp>).

For years teachers and administrators have been working very hard at moving the literacy boulder up the hill, using the best available research and resources, but they have not achieved the desired results. The fault has not been with these educators, but rather with the conventional wisdom that has guided the way they have approached literacy instruction. Until they think about literacy differently and act accordingly student reading ability and overall academic success will not improve much.

In 2006, Stanford University's Koret Task Force, charged by then Florida Governor Jeb Bush to review Florida's K-12 educational system, determined that Florida's dynamic reading initiative, known as Just Read, Florida!:

*has done much to enhance reading instruction, first in the elementary grades and then at the middle school level. It now requires that any students in grades 6 through 12 who have phonological problems enroll in an intensive reading course. As it continues to implement these policies, it should both seek student mastery of phonological skills (through 12th grade, if needed) and the acquisition of appropriate knowledge at each grade level, an aim that is not currently emphasized in the "Just Read, Florida!" guidelines but is an essential element in enabling students to read at grade level as they advance to middle school and high school.*<sup>3</sup> (emphasis added)

In The Koret Task Force's report can be found the root cause and solution to the reading comprehension crisis, and departments of education and school districts across the nation should take notice. The bottom line is the missing link in reading comprehension and academic achievement can be found in a proper emphasis on academic background knowledge encouraged by The Koret Task Force and leading researchers who have written comprehensive studies on this topic such as E.D. Hirsch, Robert Marzano, and Daniel Willingham.<sup>4</sup>

### **What is reading comprehension?**

The National Reading Panel has identified key elements of effective reading instruction that include letter recognition, phonemic awareness, phonics, fluency, vocabulary, and reading comprehension. Schools that have truly focused on all these elements have seen positive results; however, some educators have viewed the ability to read as a matter of teaching students to decode fluently, and once children have this skill down they can understand words by using formal comprehension strategies. The reality is, good readers are effective decoders, they are fluent, and they have a broad vocabulary and background knowledge. Being a fluent decoder does not mean one will become a skilled reader because reading comprehension depends upon knowledge of 'words' and 'the world.'<sup>5</sup> Students need a broad and rich knowledge base to recognize and understand the meaning of words and ideas they read throughout their years in school and beyond.

Experts estimate one needs to understand at least 90% of words in a passage to infer the meaning of the other 10%. When word knowledge falls below 90% in a given passage, comprehension falls greatly.<sup>6</sup> Interestingly, 90% of the reading difficulties of adolescents are due to problems with comprehension, only about 10% are due to accuracy, decoding, or word level difficulties (e.g. dyslexia).<sup>7</sup> Many of our students just do not have enough broad academic background knowledge in social studies, science, and other content areas to read well, and formal comprehension skills can only take them so far. Content knowledge, and vocabulary acquired through learning about content, is what enables comprehension ability to increase. In fact, no amount of reading “comprehension skills” instruction can compensate for lack of knowledge.<sup>8</sup> Let’s put this assertion to the test.

**Use your “skills” to understand the text**

Directions: Use your reading comprehension skills to understand the passage and answer the questions below.

**Corandic**

Corandic is an emurient grof with many fribs; it granks from corite, which garkers excarp by glarcking the corite and starping it in tranker-clarped storbs. The tarances starp a chark, which is expanged with wortes, branking a storp. This storp is garped through several other corusees, finally frasting a pragety, blickant crankle: coranda.

Coranda is a cargurt, grinkling corandic and borigten. The corandic is nacerated from the borigen by means of loracity. This garkers finally thrap a glick, bracht, glupous grapant, corandic, which granks in many starps.

Questions (Main Idea and Supporting Details):

- What is corandic?
- What does corandic grank from?
- How do garkers excarp the tarances from the corite?
- What does the slorp finally frast?
- What is coranda?<sup>9</sup>

*Answers can be found  
in the endnote.*

You probably answered the questions correctly, but still do not understand what you read, right? Your experience reading *Corandic* is similar to what many students experience on a daily basis. They are given assignments to read and respond to but because they do not have the background knowledge to understand the text they are almost clueless. Like you in this exercise, students can often figure out answers because they have been trained to. In other words, they have been taught necessary reading skills but do not have enough content knowledge to really understand what they are reading like good readers would be able to do. They can answer some questions, but comprehend little about what they’ve been assigned to read and learn.

The following is a social studies passage students in 6<sup>th</sup> grade could be asked to read. Consider what readers need to know to understand it:

Farmers in ancient Egypt thought of the year as having three seasons: flood time, seeding, and harvest. Each year the Nile River would flood. This was good news for farmers because Egypt is mostly desert, and not enough rain falls to grow crops. The annual flood would last for a few weeks, and then the water level would drop, leaving a layer of fertile, black mud. This mud fertilized the soil, and the flood water was stored in a series of canals. A special government department was in charge of making sure the canals were kept in good repair.<sup>10</sup>

What background knowledge is assumed here? Students that have had opportunities in elementary school to learn some basic history and science related to Egypt, landforms, farming, seasons, and waterways have a distinct advantage over students that have to make sense of concepts they did not have a chance to learn in Science and Social Studies. Again, no reading skill is going to make up for a lack of background knowledge. Students without necessary domain knowledge may sound out the passage just fine, but really struggle to comprehend it.

### **Going beyond definitions**

There is a good deal of talk among educators about teaching explicit vocabulary strategies, however, the need for background knowledge extends beyond mere definitions. Reading comprehension depends upon combining ideas in a passage, and combining ideas from a passage with prior knowledge (not just comprehending each idea on its own). Inferences people make when they read are based upon situation models particular to each experience; they are derived by relating what you have read to information you already know about the domain of the passage.<sup>11</sup> For instance, when you read the statement, “We won, Williams sacrificed and knocked in two runs in the bottom of the ninth,” you probably understand the phrase since it pertains to an American pastime. More than vocabulary knowledge is needed to understand it; the reader needs some background knowledge about baseball. The specific background knowledge is known as domain knowledge. Domain knowledge helps readers make sense of word combinations and allows them to choose among multiple word meanings.<sup>12</sup> Read the line about baseball to a citizen of Great Britain and he may understand each word individually but have no idea what the sentence as a whole is about. This happens even though the Brit obviously speaks English. Here is an example most Americans would find difficult:

*England’s openers labored 34 balls before scoring their first boundary as Strauss cracked two fours through the leg side. Cook made a patient start before laboring past his skipper.*

No amount of reading strategies are going to help people lacking background knowledge related to the game of cricket.<sup>13</sup>

One more for fun... Read the sentence below and try to figure out the meaning before going on to the next sentence:

*The difficulty of your set could be increased if you do a jam followed by a peach.*

The sentence above is rather simple if you know about competitive gymnastics. This sentence actually means, "The point values you can earn on your gymnastics routine can be greater if you include, in sequence, two particular skills on the uneven parallel bars: the "jam," which leaves the gymnast sitting on the high bar; and the "peach," where the gymnast moves from the high bar to the low bar."<sup>14</sup>

Examples like the ones above can be repeated ad infinitum in any subject area because the reality is - *background knowledge is the key ingredient to making a good reader.* The successful reading of one passage does not equate to performance in another. Reading comprehension is not a repeatable skill like sounding out words or typing letters (if it was, test creators wouldn't need to include so many passages on reading assessments).

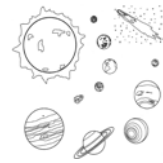
You may think the examples used in this paper are sensible, but ask if there is any scientific research to support them? The answer is yes. Multiple studies have shown people understand what they read much better if they already have some background knowledge about the subject. There is a direct correlation between knowledge of topics and reading comprehension scores, school grades, and other measures of reading skill.<sup>15</sup> In one eye-opening study researchers tested middle school students who were either good or poor readers, according to a standardized reading test. Half were good readers and half were poor readers. In each group half knew a lot about baseball and half knew only a little. The students read a passage written at a 5<sup>th</sup> grade reading level that described a half-inning of a baseball game. Periodically the students had to stop and replicate on a game board what had happened and describe what they read. Many educators might be surprised by the result. The researchers discovered knowledge of baseball had a significant effect on performance. The "good readers" who didn't know a lot about baseball got 18.8 correct out of 40 possible, whereas the "poor readers" who knew a lot about baseball got 27.5 correct out of 40 possible.<sup>16</sup>



### **Looking things up and reading**

Students are often assigned to go look up definitions like the one below, but the task is often difficult for students. Why? Read this definition of the word planet:

*Any of the non-luminous bodies that revolve around the sun. The term planet is sometimes used to include the asteroids, but excludes the other members of the solar system, comets and meteoroids. By extension, any similar body discovered revolving around another star would be called a planet.*



It has been popular in recent years to disparage and deemphasize the importance of knowledge because we live in an information age. Have you heard anyone say something like this before: *There is just too much to try to learn so we shouldn't focus on learning content so much. We should instead focus on skills that enable us to learn what we need, right?* Wrong. Building a broad knowledge base is essential to the reading process and overall learning. In order to understand a simple definition we need some contextual knowledge. Think about the definition of planet above. If you told a middle school student to look this up, would he understand it? Never mind figuring out where to look it up. Would he know what an asteroid is? How about comets and meteoroids? Are comets and meteoroids types of planets? What does revolving around another star mean? Would the student know the sun is a star? How about a luminous body? A solar system?<sup>17</sup> You already need to know something about the subject, in this case a bit about astronomy, to look up and make sense of the definition.<sup>18</sup>

There is an interesting paradox observed in the cognitive sciences: “it takes knowledge to gain knowledge.” The more you know, the more analogies and points of contact you have; background knowledge



provides building blocks for faster and more complex thinking. In a research area from the cognitive sciences known as expert-novice studies, a famous experiment conducted by W.G. Chase and Herbert Simon called “Perception in Chess” effectively illustrated the paradox. Expert and novice chess players were shown a series of brand new chess moves. In the study the experts and beginners looked at the chess board for a short time. The masters could reproduce the moves with great accuracy while the novices could not reproduce them for more than a few pieces. The differences could not be explained by stronger memory because in randomized positions the effect disappeared with masters only reproducing a few pieces on the board. Conventional thinking might have suggested the experts would have learned little since they already knew so much, and the novice players would have learned a lot since they knew very little to begin with. The opposite turned out to be true.<sup>19</sup> The difficulty faced by novices is the human mind can only take in a few new items at a time before information begins to fade from short term memory.<sup>20</sup> When experts review something in their field of knowledge they only need to pay attention to a small number of items for integration into their prior knowledge. Think about reading the definition of planet in light of the “Perception in Chess” findings. Background knowledge is critical. The chess master who quickly

learns new chess moves but who knows little about astronomy would experience the same trouble with a new astronomy concept just as the novice student in class learning a newer concept would.

### **Facts, creativity, and reading**

Teaching students background knowledge might suggest they will be learning many facts. What about critical thinking? Isn't this what we really want students to be able to do well? Research from the last 30 years in the cognitive sciences has shown the types of skills teachers want for students, such as analyzing, interpreting, etc, require extensive background knowledge. Factual knowledge must precede skill. Additionally, critical thinking in one subject (chess or biology) doesn't equate to critical thinking in another subject (history or mathematics). *Thinking processes are intertwined with knowledge that is stored in long-term memory.*<sup>21</sup>

Here in the U.S. we pride ourselves on focusing on creativity and critical thinking as compared to instruction in other places such as Japan or India, where, it is said, they focus more on memorization and "rote learning." In various educational articles and on many posters in classrooms I have observed the following Albert Einstein quotation used to elevate the importance of critical thinking: "Imagination is more important than knowledge." This quote, while true in a sense, is somewhat fallacious when used to devalue learning academic background knowledge because that very knowledge is the *prerequisite* for imagination, or at least the kind that leads to problem-solving, decision-making, and creativity. Facts without the skills to use them are of little value. On the other hand, thinking effectively *requires* factual knowledge.<sup>22</sup>

There is an applicable anecdote on the topic of facts versus creativity in Thomas Friedman's award-winning book, *The World is Flat: A Brief History of the Twenty-First Century*. In a chapter entitled "The Quiet Crisis" Friedman recounted a discussion with software giant and education reformer Bill Gates:



*When I asked Bill Gates about the supposed American education advantage in education that stresses creativity, not rote learning, he was utterly dismissive. In his view, those who think the more rote learning systems of China and Japan can't turn out innovators that can compete with Americans are sadly mistaken. Said Gates, "I have never met the guy who doesn't know how to multiply who created software... Who has the most creative video games in the world? Japan... I never met those rote people... Some of my best software developers are Japanese. You need to understand things in order to invent beyond them (emphasis added). One cannot stress enough: Young Chinese, Indians, and Poles are not chasing us to the bottom. They are racing us to the top..."*<sup>23</sup>

I am in no way suggesting American education should move toward rote learning, but use this anecdote as another example of how important content knowledge is to education. It is important to point out the word "rote" used in Friedman's excerpt. There is a difference between "memorization" and "rote learning." Students and adults



memorize things all the time. Memorizing is an essential part of learning as all humans call on long-term memory every minute of their waking hours. Rote learning is memorizing something you don't understand. The use of the phrase "rote learning" in the discussion was really more of a reference to the strong emphasis in learning academic knowledge and memorizing content as a stepping stone to more conceptual knowledge. There certainly is a stereotype about "rote" methods used in other parts of the world, and there is some rote learning that takes place in other systems, but even here in the United States young students learn some things by rote. Times tables are usually learned by rote to their benefit.

Summing up, there is no such thing as generalized reading ability. Reading comprehension is domain specific; it requires broad knowledge of words and the world.<sup>24</sup> If students are going to become successful readers and academically successful overall, they will need a solid and broad knowledge base. Knowledge is essential to reading comprehension and thinking.<sup>25</sup>

### **Teaching content is teaching reading**

Research from the last few decades shows how reading and thinking well requires wide background knowledge, and not just any background knowledge. It requires broad academic knowledge that is meaningful – when it is conceptual and when facts are related to one another. Sometimes knowledge acquisition can be incidental,<sup>26</sup> and even surface level knowledge can be helpful,<sup>27</sup> but helping students become higher-level readers cannot happen unless there is a systematic effort to teach more content in the early grades, and students must learn to read in *all* content areas.<sup>28</sup> The reality is that this is just not happening in elementary schools where two of the four core subject areas are often severely neglected and the Arts are sometimes eliminated. In 1<sup>st</sup> grade classrooms across the nation only 2% of class time is dedicated to Social Studies (history, civics, geography and economics) and 4% to Science. In third grade, students are taught Social Studies 5% of the time and Science is also taught 5% of the time. Compare the percentages to Reading/Language Arts which is taught 62% of the time in first grade and 47% of the time in 3<sup>rd</sup> grade.<sup>29</sup> One of the ramifications of neglecting academic background knowledge in elementary schools, beyond mere reading comprehension difficulties, relates to a proper hierarchy of learning; instruction in the various content areas at the elementary grades involves essential foundational or building block learning many students are not getting. The reason students go to school for many years is it takes a long time to build up the vast knowledge and vocabulary we need to become effective readers and thinkers. Cognitive science affirms learning is slow and cumulative. All learning is built upon previous learning.

To use an example from Social Studies, students need to acquire the civic skills and dispositions commensurate with a responsible citizenry, but they must first absorb

fundamental civic knowledge early on. If neglected in the elementary grades, civic education begins at the middle school level in a remedial manner when students aren't as open to instruction, often times preventing students from completing the step-by-step process that should culminate in high school with students engaging in more advanced discourse and activity. Many students are, in fact, graduating with a middle school level education in certain subjects. This lack of instruction and learning contributes to the general civic ignorance and apathy prevalent in our culture today. It is readily apparent many Americans have no clue about the most fundamental historical knowledge or principles our nation was founded on, and the same could be said about ignorance relating to important scientific information, and knowledge pertaining to the Arts.<sup>30</sup>

There is a base of knowledge taken for granted in the language community, and proficiency in reading depends on processing the broad knowledge shared by other educated people within the community. Providing students with foundational background knowledge prepares them for more advanced learning in the secondary grades, and helps them become strong readers in a variety of ways. It provides necessary vocabulary and contextual knowledge that enriches their frames of reference.<sup>31</sup> It helps students bridge logical gaps, enables understanding of allusions and other symbolic language in readings, and resolves ambiguities in texts writers might assume readers will get.\* It allows for chunking of content, which increases room in working memory, and makes it easier to tie ideas together.<sup>32</sup>

**\* How do readers deal with allusions in texts?** Without broad background knowledge readers will find it difficult to make sense of the many historical and literary allusions that appear in readings. A few examples of famous allusions follow. What does it mean to be a *scrooge*, or a *prodigal son*? Why wouldn't you want a *Trojan Horse* as a gift? Why would it be bad for someone *to meet their Waterloo*? What does it mean *to wash your hands of something*? Why are *draconian* measures disliked? If someone is *fiddling while Rome burns* is that a good thing? What does it mean to be *sold down the river*, or to call someone a *Benedict Arnold*? If someone or something is *as old as Methuselah* is that very young or very old? What does *the world is a stage* mean?

**How do readers make sense of ambiguity in language?** *With background knowledge.* Read this example: *The hunter said "There's a grouse across that field maybe 100 yards away." His friend said, "well, shoot."* The sentence does not mean "fire your gun." Background knowledge = shotguns aren't accurate at 100 yards. A grouse that has flown from cover is gone. "Well, shoot" means "too bad we missed it."<sup>33</sup>

### **The 'Matthew Effect' on students from disadvantaged homes**

In the social sciences the Matthew Effect is a term used to describe the phenomenon whereby the rich get richer and the poor get poorer, comparatively speaking. The

Matthew Effect is an allusion to a biblical passage from Matthew 25:29 which reads:

*For to all those who have, more will be given, and they will have an abundance;  
but from those who have nothing, even what they have will be taken away.*

In the field of education The Matthew Effect was popularized by Keith Stanovich, a psychologist who has conducted extensive research in reading and language disabilities.<sup>34</sup> The idea behind the effect in reading is the rich get richer and the poor get poorer as time goes on. There is a cumulative advantage phenomenon that takes place with good readers. An economics example involving compounding capital helps illustrate this effect. Richer readers gain increasingly rich vocabulary due to compounding just as wealthy investors can financially increase their savings faster than the poor:

- ✓ *Person "A" invests \$10 in a bank at 5% interest*
- ✓ *Person "B" invests \$100 in a bank at 5% interest*
- ✓ *The \$90 difference grows to \$146 in 10 years*
- ✓ *Vocabulary growth is similarly affected*<sup>35</sup>

The gap widens between the rich investor and the other by economic forces. When dealing with "intellectual capital" the advantage is greater and the gap widens even more. Students who have a good amount of background knowledge in a given subject area are likely to learn new information readily and quite well. The converse is also true.<sup>36</sup> When young students lack a solid vocabulary and do not acquire broad background knowledge they suffer as they progress through the grades where they encounter more and more complex and rich informational text in a variety of subjects.

#### **Who is struggling the most, and what can be done about it?**

The most recent NAEP results in reading indicate a general lack of reading proficiency among all students, as previously illustrated, but the results also reveal a startling achievement gap found among African American and Hispanic students (the gap is also seen in FCAT and SAT results).<sup>37</sup> In the reading assessment, White students were 41% proficient, Hispanic students were 15% proficient, and African American students were 12% proficient. We can assume a general lack of academic background knowledge for all three groups, but the learning gap evident in NAEP scores is alarming considering this knowledge impacts more than simply "school learning." Background knowledge is closely linked to occupation and overall income as well.<sup>38</sup> Reading is a gateway to knowledge and overall academic success so educators are compelled to meet the challenge of improving literacy for all students. As Secretary of Education Arne Duncan has stated multiple times since his appointment, quality education is the civil rights issue of our generation and it is the one sure path to a more equal, fair, and just society.

The good news is research lends credence to the belief that schools can make a difference! In the 1966 Coleman Report, the largest educational study in U.S. history, researchers concluded the home is the decisive influence on academic outcomes, and schools do almost nothing to improve the economic chances of disadvantaged children. The exceptions cited were situations where students were in extremely good schools. Subsequent reevaluations of the Coleman Report confirmed earlier findings and reports such as *A Nation at Risk* contributed to the idea that public education was not only not helping students the way it should have been but failing students across the country. In a recent work entitled *What Works in Schools, Translating Research Into Action*, Robert Marzano cited analysis of research conducted over a 35-year period demonstrating highly effective schools produce results that almost entirely overcome the effects of students' backgrounds. Marzano's study showed there are indeed schools around the country making a difference and beating the odds by following research on "what works." Marzano's salient argument concerning why these schools were so successful was related to curriculum. He specifically said the meta-analysis of 35 years of educational research indicated "a guaranteed and viable curriculum" is the school level factor with the most impact on student achievement.<sup>39</sup> In a related work produced the next year Marzano asserted:

*...given the relationship between academic background knowledge and academic achievement, one can make the case that it should be at the top of any list of interventions intended to enhance student achievement. If not addressed by schools, academic background can create great advantages for some students and great disadvantages for others.*<sup>40</sup>

Building academic background knowledge should be *at the top* of interventions intended to enhance student achievement? That is a powerful statement about what works in schools. In *Building Background Knowledge for Academic Achievement, Research on What Works in Schools*, Marzano cited the well-researched connection to, and the direct correlation between, a student's level of background knowledge and that student's academic achievement.<sup>41</sup> Other researchers have noted the correlation between academic achievement and general knowledge as being (.81), a very high correlation. Remember what the Coleman Report said about the influence of family background? Well, the correlation between academic achievement and socioeconomic status (.42) is only about half the correlation between academic achievement and general knowledge.<sup>42</sup> Disadvantaged family background does not have to be a millstone around students' necks. Highly effective schools can overcome the effects of students' backgrounds, and building students' background knowledge starting in the early grades is one of the essential ways to do this.

### **Poverty and The Fourth Grade Slump**

Students' lack of background knowledge, and the deficit in language associated with it, is the cause of a phenomenon many children from underprivileged homes experience

known as the fourth-grade slump. There is a large disparity in vocabulary levels and general background knowledge between children from poverty and children from more affluent backgrounds. By age three children from more privileged families have heard approximately 30 million more words than children from underprivileged homes. According to Betty Hart and Todd Risley, this phenomenon helps account for the major differences in rates of vocabulary growth and success in reading. The researchers have pointed out the correlation between vocabulary size of three year olds and reading test scores of 3<sup>rd</sup> and 4<sup>th</sup> graders; vocabulary levels at age three predict achievement for eight and nine year olds.<sup>43</sup> In an important book called *The Reading Crisis: Why Poor Children Fall Behind*, Jeanne Chall and others observed how children from low-income families generally read at grade level until 3<sup>rd</sup> grade and suddenly fall behind in 4<sup>th</sup> grade; they continue to fall further behind with each grade level. This is not because children suddenly take a step backward. It's because students in the early grades mainly learn how to decode texts and read narrative passages. But in grade four when students are given more informational and complex content to read in class and on tests, the knowledge deficit and their limited comprehension of language that began with the 30 million word gap, begins to impact their success in school in a significant way.<sup>44</sup> The large word gap that exists before these students enter school, and the lack of instruction in building background knowledge for them in the early grades, helps account for their large learning gaps in fourth grade achievement scores.<sup>45</sup>

There is no reason why large learning gaps need to persist. Educators have it within their ability to close the gaps, and some schools are already doing it.<sup>46</sup> The way to improve reading comprehension and overall academic success for all students, poor and non-poor, Black, Hispanic, and White, is to build up, beginning in the early years of schooling, the academic background knowledge they need to understand what they read and to lay the groundwork for achievement in subjects such as civics, history, literature, and the arts and sciences.

### **The knowledge to achieve**

What specific knowledge do all students need? E.D. Hirsch, Robert Marzano, and others have created guides showing essential content students should learn by grade level and subject. There is certainly room for debate on the essential nature of this content, but generally speaking, the knowledge required for effective reading can be boiled down to the information writers assume readers know. A minimum target is knowledge needed to read newspapers and books written for an educated general public on topics such as politics and science, and it should include the essential concepts of core subjects in schools.<sup>47</sup>

State standards should be revised to emphasize the importance of academic knowledge, systematized and coherent, especially but not limited to the elementary

grades. Elementary and secondary level teachers must ensure a proper balance between formal literacy strategies and content instruction with the former emphasis declining over time.<sup>48</sup> Students should 'learn to read' in the primary years and progressively 'read to learn' (keeping in mind that young children can and should learn content before they learn to read).

Targeted professional development for elementary teachers should be provided in core areas such as civics and history, literature, and the sciences with a focus on integrated instruction so teachers can effectively deliver essential content and teach students required reading skills. Elementary students should have the opportunity to learn and enjoy the arts,<sup>49</sup> and finally, students must be taught and then assessed, with formative and summative curriculum-based assessments, on general knowledge learned during the school year that leads to improved reading comprehension.

Research from cognitive science reveals a powerful correlation between academic achievement and general knowledge (.81).<sup>50</sup> If schools want to see meaningful increases in student achievement, educators must take up the focus of building student knowledge in a more systematic manner.

### **Getting students to like school<sup>51</sup>**

Most of our nation's highest performers are on the lower end of the top of the achievement ladder compared to students in other industrialized nations,<sup>52</sup> and among students from developed nations, American students are near the bottom in reading progress made between the ages of 9 and 14.<sup>53</sup> One thing that makes it difficult for today's educators and students is they live in an anti-academic culture. In some places students who pursue academics actually feel peer pressure to avoid studies from students who dislike school. Students, perhaps more than ever, have many things competing for their time and interests; however, building student background knowledge beginning in the early grades would greatly increase the number of students that enjoy and want to succeed in school. Academic success typically breeds positive dispositions about learning and causes students to want to work through more challenging activities. John Rawls' "Aristotelian Principle" comes mind. It expresses the idea that people take more pleasure in doing something as they become more proficient at it. With this idea in mind, an essential way to improve students' high school experience is to prepare elementary students to be successful there. More students would achieve academic proficiency in the secondary grades if they gained a broad vocabulary and background knowledge early on.

It appears from widespread research on academic achievement that the academically successful students with the stronger analytical skills and positive dispositions are the ones with greater academic background knowledge. Knowledge really is power, as Bacon's aphorism goes. Perhaps if Sisyphus of ancient Greek lore only had a bit more

prior knowledge concerning the wrath of the gods, he might have avoided his terrible fate. Fortunately, in the real world of reading and learning, educators now have knowledge of how all students may academically achieve, and together they can push the literacy boulder up and over the hill once and for all.

***The Big Idea:*** *Reading comprehension and overall academic achievement can be greatly improved, and learning gaps closed, by systematically increasing the amount of academic background knowledge students learn beginning in the elementary grades.*

Jason Caros is the K-12 Social Studies Curriculum Specialist for Volusia County Schools and past president of the Florida Association of Social Studies Supervisors. He can be reached at [jcaros@volusia.k12.fl.us](mailto:jcaros@volusia.k12.fl.us). Thanks to Jack Bovee, former Social Studies Supervisor in Collier County, for thoroughly reviewing this paper, and to Robert Sheffield from The College Board, for his contribution on deficit thinking and schema development (endnotes 31 and 45).

---

<sup>1</sup> The following information traces the reading path of a third grader to 10<sup>th</sup> grade, as measured by FCAT (percentage reading at grade level, Level 3, and above):

• As	3 <sup>th</sup> Graders in 2004	70%
• As	4 <sup>th</sup> Graders in 2005	66%
• As	5 <sup>th</sup> Graders in 2006	64%
• As	6 <sup>th</sup> Graders in 2007	63%
• As	7 <sup>th</sup> Graders in 2008	53%
• As	8 <sup>th</sup> Graders in 2009	47%
• As	9 <sup>th</sup> Graders in 2010	39%
• As	10 <sup>th</sup> Graders in 2011	38%

<sup>2</sup> Studies since the mid-1980s have consistently shown basal readers include very little informational text. Flood and Lapp (1986) looked at eight basals finding that narrative selections accounted for more than 66 percent of the pages. Smith (1991), looked at content of three basals for grades one, three, and five, found that 15 to 20 percent was nonfiction content. In 2002 Moss and Newton examined how many selections from international trade books were included in six popular basal readers published from 1995 to 1997. Informational literature is relatively sparse, approximately 15% in second grade, 17% in fourth grade, and 20% in sixth grade. Cited in "How We Neglect Knowledge and Why," by Susan Newman, *American Educator* Spring (2006): 24-27. In recent years textbook publishers have made efforts to include more non-fiction in basals. A major problem remains. The non-fiction text is not necessarily aligned to the grade level standards in Science or Social Studies.

<sup>3</sup> "Reforming Education in Florida: A Study Prepared by the Koret Task Force on K-12 Education, 2006." Hoover Institution. Web. 01 Aug. 2009. <<http://www.hoover.org/publications/books/3895672.html>>.

<sup>4</sup> Three essential books to read on this subject are Hirsch's *The Knowledge Deficit: Closing the Shocking Education Gap for American Children*, Marzano's *Building Background Knowledge for Academic Achievement: Research on what Works in Schools*, and Willingham's *Why Don't Students Like School: A Cognitive Scientist Answers Questions About How the Mind Works and What it Means for the Classroom*.

<sup>5</sup> E.D. Hirsch. *The Knowledge Deficit Closing the Shocking Education Gap for American Children*. (Boston: Houghton Mifflin, 2007), 3-16.

---

<sup>6</sup> Ibid, 60.

<sup>7</sup> "RTI in Secondary Schools: Key Literacy Strategies for Middle and High School Programs." Teleconference by Denise Gibbs. *National Teleconference*. 10 Sept. 2008.

<sup>8</sup> AFT - Publications - American Educator - Spring 2006 - Knowledge: The Next Frontier in Reading Comprehension." *AFT - American Federation of Teachers*. Web. 01 Aug. 2009. <[http://www.aft.org/pubs-reports/american\\_educator/issues/spring06/editorsintro.htm](http://www.aft.org/pubs-reports/american_educator/issues/spring06/editorsintro.htm)>.

<sup>9</sup> Thanks to Mitch Rosin from Wright Group/McGraw-Hill for sharing *Corandic* with me. [Answers: What is corandic? *an emurient grof with many fribs*; What does corandic grank from? *Corite*; How do garkers excarp the tarances from the corite? *by glarcking the corite and starping it in tranker-clarped storbs*; What does the slorp finally frast? *a pragety, blickant crankle: coranda*; What is coranda? *a cargurt, grinkling corandic and borigten*]

<sup>10</sup> The passage can be read in its entirety at [http://www.suite101.com/article.cfm/ancient\\_egypt\\_for\\_children/110180](http://www.suite101.com/article.cfm/ancient_egypt_for_children/110180)

<sup>11</sup> In the cognitive sciences, theorists have suggested for some time that people use schemata to organize knowledge and provide a framework for future understanding. According to this model, people learn by sorting information into categories and making connections among categories. The building blocks for a student's schema consist of knowledge about people, places, things, or events. As a student reads, she draws from existing schema to make inferences concerning the content being read. The connections made between what they already know and what is being inferred leads to "comprehension."

<sup>12</sup> Hirsch, *The Knowledge Deficit Closing the Shocking Education Gap for American Children*, 17.

<sup>13</sup> "TeacherTube Videos - Teaching Content Is Teaching Reading." *TeacherTube - Teach the World | Teacher Videos | Lesson Plan Videos | Student Video Lessons | Online Teacher Made Videos | TeacherTube.com*. Web. 01 Aug. 2009. <[http://www.teachertube.com/viewVideo.php?video\\_id=74780&title=Teaching\\_Content\\_Is\\_Teaching\\_Reading](http://www.teachertube.com/viewVideo.php?video_id=74780&title=Teaching_Content_Is_Teaching_Reading)>.

<sup>14</sup> "ReadingQuest | Background Knowledge Example." *ReadingQuest | Reading Strategies for Social Studies*. Web. 01 Aug. 2009. <[http://www.readingquest.org/bkgd\\_ex.html](http://www.readingquest.org/bkgd_ex.html)>

<sup>15</sup> G.J. Kosmoski. "Cultural Literacy and Academic Achievement." *Journal of Experimental Education* 58.4 (Summer 1990), 265-72.

<sup>16</sup> D.R. Reicht, and L. Leslie. "Effect of prior knowledge on good and poor readers' memory of text." *Journal of Educational Psychology* 80 (1988): 16-20.

<sup>17</sup> E.D. Hirsch. "'You Can Always Look it Up'... Or Can You?" *American Educator* (Spring 2009): 4-9.

<sup>18</sup> G.A. Miller, and P. Gildea. "How Children Learn Words." *Scientific American* September (1987): 94-99.

<sup>19</sup> William G. Chase, and Herbert A. Simon. "Perception in Chess." *Cognitive Psychology* 4 (1973): 55-81.

<sup>20</sup> Daniel T. Willingham. *Why Don't Students Like School: A Cognitive Scientist Answers Questions About How the Mind Works and What it Means for the Classroom*, (San Francisco: Jossey-Bass, 2009), 3-18.



---

<sup>21</sup> Willingham, *Why Students Don't Like School*, 19-39.

<sup>22</sup> Ibid.

<sup>23</sup> Thomas L. Friedman. *The World Is Flat A Brief History of the Twenty-first Century*. (New York: Picador, 2007), 365.

<sup>24</sup> Hirsch, *The Knowledge Deficit*, 38-50.

<sup>25</sup> In Willingham's book, *Why Student's Don't Like School*, the cognitive scientist explains how our minds are not really designed for thinking, believe it or not, and that we are not really thinking most of the time. What we usually take for thinking is actually memory providing us with answers, or guiding us on courses of action we have taken before. While humans enjoy thinking, thinking is difficult. The conditions have to be right for people to want to engage in this activity. When students are working through problems with no sense they are making progress, chances are they will not stick with it. What does Willingham suggest teachers do to help students enjoy solving problems? One of the recommendations is to provide students with sufficient background knowledge. Read chapter one for more information on this specific topic.

<sup>26</sup> Willingham, *Why Don't Students Like School*, 38.

<sup>27</sup> Marzano, *Building Background Knowledge for Academic Achievement*, 17, 29-30.

<sup>28</sup> Rafael Heller and Cynthia L. Greenleaf. *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*. (Washington D.C.: Alliance for Excellent Education, 2007) 7-25. See also - Rachel Billmeyer, and Mary Lee Barton. *Teaching Reading in the Content Areas: If Not Me Then Who? 2nd Edition*. (Alexandria: Association for Supervision & Curriculum, 2002) 17, 19-23.

<sup>29</sup> "TeacherTube Videos - Teaching Content Is Teaching Reading." *TeacherTube - Teach the World | Teacher Videos | Lesson Plan Videos | Student Video Lessons | Online Teacher Made Videos | TeacherTube.com*. Web. 01 Aug. 2009.  
<[http://www.teachertube.com/viewVideo.php?video\\_id=74780&title=Teaching\\_Content\\_Is\\_Teaching\\_Reading](http://www.teachertube.com/viewVideo.php?video_id=74780&title=Teaching_Content_Is_Teaching_Reading)>. See also Florida specific data: in a statewide survey conducted in 2008 by the Florida Association of Social Studies Supervisors and the Florida Joint Center for Citizenship results showed the average elementary school teacher in Florida spends about 51 minutes a week, or 10 minutes a day, on all Social Studies. For more details about the survey visit [www.fasss.org](http://www.fasss.org).

<sup>30</sup> Data taken from NAEP, various state level assessments such as FCAT, Advanced Placement, etc, show low achievement levels in Science and Social Studies.

<sup>31</sup> See note 10 about schema. Also, "a skills or strategy based approach to reading comprehension assumes a student possesses the necessary schema to uncover the meaning within text. Teachers can provide students with the raw materials to construct meaning from text through purposeful, systematic instruction. This instruction is built upon the organization of knowledge into pre-constructed schema sometimes known as "Big Ideas", "Essential Questions," or "Organizing Principles." A curriculum designed and built to deliver academic knowledge, along with the analytical skills needed to process and extend this knowledge, is necessary to ensure students possess the cognitive tools for more advanced reading" (Robert Sheffield, Spring Board District Administrative Coach, The College Board).

<sup>32</sup> Willingham, *Why Don't Students Like School*, 28.

---

<sup>33</sup> Willingham uses this example in "Teaching Content is Teaching Reading."

<sup>34</sup> Keith E. Stanovich. *Progress in Understanding Reading Scientific Foundations and New Frontiers*. (New York: The Guilford, 2000), 184-188

<sup>35</sup> Hirsch, *The Knowledge Deficit*, 14.

<sup>36</sup> Robert J. Marzano. *Building Background Knowledge For Academic Achievement Research On What Works In Schools*. (Alexandria: Association for Supervision & Curriculum Development, 2004), 3.

<sup>37</sup> A new NAEP report will be available in the fall of 2011. The results of the 2010-2011 FCAT Reading and SAT Critical Reading exams reveal large gaps among White, African American, and Hispanic students. FCAT results show a difference of 30% between Black and White students when it comes to scoring at or above grade level, and a difference of 14% between Hispanic and White students. On the SAT White students scored 103 points higher than African American students and 71 points higher than Hispanic students. FCAT data can be found on the FL Department of Education web site, or in the EDFacts State Profile for FLORIDA. SAT data can be found in "Total Group Profile Report" on the following College Board site: [http://professionals.collegeboard.com/profdownload/cbs2011\\_total\\_group\\_report.pdf](http://professionals.collegeboard.com/profdownload/cbs2011_total_group_report.pdf)

<sup>38</sup> Marzano, *Building Background Knowledge for Academic Achievement*, p. 31.

<sup>39</sup> Robert J. Marzano. *What Works in Schools Translating Research into Action*. (Alexandria: Association for Supervision & Curriculum Development, 2003), 22.

<sup>40</sup> Marzano, *Building Background Knowledge for Academic Achievement*, 4.

<sup>41</sup> Ibid, 1-4.

<sup>42</sup> D. Lubinski, and L.G. Humphreys. "Incorporating General Intelligence into Epidemiology and the Social Sciences." *Intelligence* 24 (1997): 154-202.

<sup>43</sup> Betty Hart, and Todd R. Risley. "The Early Catastrophe." *American Educator* Spring (2003): 4, 6-9.

<sup>44</sup> Jeanne S. Chall, Vicki A. Jacobs, and Luke E. Baldwin. *The Reading Crisis: Why Poor Children Fall Behind*. (Cambridge: Harvard UP, 1990), 27-54, 146-164.

<sup>45</sup> Unfortunately, Hirsch's recommended path is not the one many school districts have traveled. "Instead *deficit thinking* has sometimes been applied to these students that have fallen behind, assuming them to be *in need of everything*. Educators often fail to recognize their potential for success, and in turn, construct and allow for inadequate learning environments for their potential. Noting that they lack much of the prerequisite knowledge and skills needed for long-term school success, we collectively invest millions of dollars and professional hours into remediation that can only be characterized as *low and slow*. Our own thinking limits students from poverty to a greater degree than their background. Deficit thinking hinders teachers from developing and maintaining environments that provide the one thing that these students need the most: academic knowledge" (Robert Sheffield, Spring Board District Administrative Coach, The College Board).

<sup>46</sup> For further research - the following are examples of a couple of schools with curricula that emphasize building broad content knowledge for all their students. The Capitol View School in Atlanta has a student population that is 95% Black, 3% Hispanic, and 88% poor. They have 100% grade level proficiency in

---

Reading, Math, Science, and Social Studies (<http://apskids.org/capitolview/>). Roxbury Preparatory Charter School has 200 students of color, 68% qualify for the free and reduced lunch program. The percentage of Roxbury students advanced or proficient was higher than that of the state's White students, and on the 8<sup>th</sup> grade math assessment the school had the highest average of students scoring advanced or proficient in the state (94%) beating out the prestigious Boston Latin School (<http://www.roxburyprep.org/>).

<sup>47</sup> Ibid, 36-37.

<sup>48</sup> Daniel T. Willingham. "The Usefulness of Brief Instruction in Reading Comprehension Strategies" *American Educator* 4 (Winter 2006/7), 39-45, 50. Willingham cites data from two meta analyses that show how students can learn strategy instruction relatively quickly and that longer programs do not add to the effectiveness of reading strategies.

<sup>49</sup> Using FL Department of Education data, Dr. Steven Kelly from Florida State University created a report showing the following relationships between visual and performing arts enrollment and student achievement: for the general student population, the more music and arts classes taken, the higher the student achievement in all measures; for students on "free and reduced lunch," an indicator of socioeconomic levels, the more music and arts classes taken, the higher the student achievement in all measures; for students divided by ethnicity, the more music and arts classes taken, the higher the student achievement in all measures; and the more arts classes taken, the less likely a student is to drop out of school. Dr. Kelly's presentation can be found at <http://www.flmusiced.org/dnn/Advocacy/12GradeCohortFineArtsEnrollmentComparison/tabid/113/Default.aspx>

<sup>50</sup> D. Lubinski, and L.G. Humphreys. "Incorporating General Intelligence into Epidemiology and the Social Sciences." *Intelligence* 24 (1997): 154-202.

<sup>51</sup> Willingham's entire book is about this topic and it should be recommended reading for all educators today.

<sup>52</sup> This argument is detailed in "2 Million Minutes." American students are usually seen studying while watching television, or spending more time working or playing sports than on studies. Students from China and India; however, are in school even on weekends striving to get accepted into top engineering schools. Educators may also wish to review "The Google Generation," a recent study conducted by the University College London, and *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future*, the somewhat controversial work by Emory University's Mark Bauerlein. These studies have found young peoples' information literacy has not improved with widening access to technology, and the latter argues the Google Generation are *less literate and informed* than previous generations. Instead of benefiting from the information superhighway youth are spending most of their time on sites such as Facebook, MySpace, and YouTube.

<sup>53</sup> See data from the National Center for Educational Statistics. Also, read the August 18<sup>th</sup> report from Secretary Arne Duncan on the release of the U.S. Students' Rankings on International Assessments of Student Achievement: <http://www.ed.gov/news/pressreleases/2009/08/08182009.html>