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Are You Smarter Than a Fourth Grader?

To answer that question, we need to know what a fourth grader can do.

By the time a child has reached Grade 4, the funds of knowledge (Moll, Amanti, Neff, & Norma, 1992) accumulated from home experiences, community life, and social situations are well developed. These funds of knowledge inform and enhance how a student responds to and interacts with their community and peers, and school learning experiences. Throughout these early-learning years, and onward through any learner's life, optimal learning conditions occur when a student's life experiences and developing funds of knowledge are acknowledged, visible, and inform engaging and student-responsive pedagogy.

The Progress in International Reading Literacy Study (PIRLS) provides us with some insight about the expectations for and progress of Grade 4 students in Canada and throughout the world. PIRLS, an international assessment that measures trends in reading achievement of Grade 4 students, as well as the impact of policies and practices related to literacy, provides evidence of this success. The TIMSS & PIRLS International Study Center conducts regular international comparisons of student achievement in reading literacy in more than 60 countries, including Canada.

What is Reading Literacy?

UNESCO (2011) defines reading literacy as "the ability to identify, understand, interpret, create, communicate and compute, using printed and written (and visual) materials associated with varying contexts" (p. 1).

PIRLS describes reading literacy as "the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment" (Mullis & Martin, 2015, p. 12).

Clearly, learning to read begins as a complex task and continues to increase in complexity. Those who continue to demonstrate proficiency in reading literacy are able to navigate, interpret, analyze, and synthesize a range of genres and text formats in increasingly complex ways.

PIRLS provides clarity about this complexity by describing the purposes of reading as:
a) for literary experience, which includes narrative text, such as short stories and novels, and
b) to acquire and use information, which includes texts that recount events (biographies), procedural texts (instructions), expository texts (textbooks), and persuasive texts (advertisements).

To illustrate these two purposes for reading, PIRLS has released texts that were used in previous administrations of the study.

PIRLS: Reading for Literary Experience

"**Enemy Pie**,"[1] by Derek Munson.

In "Enemy Pie," Tom takes an immediate dislike to a child who has moved into the community. Tom's dad assures him that a serving of Enemy Pie is a good way to deal with this interloper. Tom agrees to try his dad's plan and is surprised by the result. The full passage is available at the end of this paper.

Some comprehension questions about "Enemy Pie" required a) focusing and retrieving explicitly stated information or b) making straightforward inferences.

For example:

Focusing and retrieving explicitly stated information:
1) Write one ingredient Tom thought would be in an Enemy Pie.

Making straightforward inferences:
2) What did Tom think could happen when his enemy ate Enemy Pie? Write one thing.

While these questions may seem relatively easy, the ability to answer this level of question comprises and responds to all facets of the definition of reading literacy. This age marks an important transition period when children have learned how to read and are now reading to learn, and the sample questions above are also designed to assess this transition. To capture an accurate picture of Grade 4 reading ability, PIRLS includes questions requiring students to interpret and integrate ideas and information as well as examine and critique content and textual elements.

For example:

Interpret and integrate ideas and information:
3) Use what you have read to explain why Tom's dad really made Enemy Pie.

Examine and critique content and textual elements:
4) What kind of person is Tom's dad? Give an example of what he did in the story that shows this.

In addition to reading for literary experience, Grade 4 students must read with the goal to acquire and use information. This skill requires not only the strategies used for literary text, but also content-specific vocabulary and a broader range of background knowledge (Liebfreund, 2015).

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[1] https://timssandpirls.bc.edu/pirls2016/downloads/P16_FW_Appendix_B.pdf (available in English only)

For example, "**The Giant Tooth Mystery**," a nonfiction text released from previous administrations of PIRLS, traces the development of scientific study from a time when questioning knowledge could lead to a prison sentence to a time when scientific curiosity is embraced. The full passage is available at the end of this paper.

Examples of comprehension questions for this nonfiction text include:

Straightforward inferences:
  1) What was Bernard Palissy's new idea?

Interpret and integrate ideas and information:
  2) Gideon Mantell thought the tooth might have belonged to different types of animals. Complete the table to show what made him think this.

Type of animal	What made him think this
A plant eater	The tooth was flat with ridges
A giant creature	
A reptile	

Examine and critique content and textual elements:
  3) Look at the two pictures of the iguanodon. What do they help you to understand?

What Gideon Mantell thought an Iguanodon looked like

What scientists today think the Iguanodon looked like

Based on these examples, it is clear that the expectations for reading in Grade 4 are significant. To have achieved this sort of reading proficiency, a student must have acquired a well-developed vocabulary; facility with oral and written language structures; a wide range of previous and ongoing experiences that provide the background knowledge necessary to engage with texts written about a wide range of topics; an understanding that reading requires the flexible use of various strategies to make meaning; an automaticity with simple and complex word-solving strategies; and the ability to articulate their ability to retrieve, infer, integrate, examine, and critique text orally or in written form.

The most recent and comprehensive information we have about the reading of Canadian students in Grade 4 is available through the results of the 2016 administration of PIRLS. A random sample of Grade 4 students participated, representing a wide range of school districts in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador.

The results of PIRLS 2016 are reported in terms of advanced, high, intermediate, and low international benchmarks. Table 1 provides a description of each level of reading achievement.

TABLE 1   PIRLS 2016 – Description of the international benchmarks for reading achievement

Advanced international benchmark (625 points)	
When reading *literary texts*, students can:	**When reading *informational texts*, students can:**
• begin to evaluate the effect on the reader of the author's language and style choices • interpret story events and character actions to describe reasons, motivations, feelings, and character development with full text-based support	• distinguish and interpret complex information from different parts of text and provide full text-based support • integrate information across a text to explain relationships and sequence activities • begin to evaluate visual and textual elements to consider the author's point of view
High international benchmark (550 points)	
When reading *literary texts*, students can:	**When reading *informational texts*, students can:**
• locate and distinguish significant actions and details embedded across the text • make inferences to explain relationships between intentions, actions, events, and feelings, and give text-based support • interpret and integrate story events and character actions, traits, and feelings as they develop across the text • recognize the use of some language features (e.g., metaphor, tone, imagery)	• locate and distinguish relevant information within a dense text or a complex table • make inferences about logical connections to provide explanations and reasons • integrate textual and visual information to interpret the relationship between ideas • evaluate and make generalizations about content and textual elements
Intermediate international benchmark (475 points)	
When reading *literary texts*, students can:	**When reading *informational texts*, students can:**
• independently locate, recognize, and reproduce explicitly stated actions, events, and feelings • make straightforward inferences about the attributes, feelings, and motivations of main characters • interpret obvious reasons and causes, recognize evidence, and give examples • begin to recognize language choices	• locate and reproduce two or three pieces of information from text • make straightforward inferences to provide factual explanations • begin to interpret and integrate information to order events
Low international benchmark (400 points)	
When reading *literary texts*, students can:	**When reading *informational texts*, students can:**
• locate and retrieve explicitly stated information, actions, or ideas • make straightforward inferences about events and reasons for actions • begin to interpret story events and central ideas	• locate and reproduce explicitly stated information from text and other formats (e.g., graphs, diagrams) • begin to make straightforward inferences about explanations, actions, and descriptions

Source: Mullis, Martin, Foy, & Hooper (2017) pp. 52–53.

Table 2 provides a comparison of Canadian and international students attaining each benchmark in literary and informational reading on texts with similar levels of difficulty as "Enemy Pie" and "The Giant Tooth Mystery."

TABLE 2 Percentage of students reaching the international benchmark levels in PIRLS 2016

International Benchmarks	Canada	International Median
Advanced	13	10
High	37	36
Intermediate	33	31
Low	13	13

These results are positive indications that many Canadian Grade 4 students are meeting or exceeding the international expectations for reading achievement (intermediate level or higher).

Literacy expectations for Grade 4 students, however, now go beyond print and written materials.

Today's students have grown up in a digital world. In addition to reading and interacting with traditional text, digital text has been, for many 8–10-year-olds, omnipresent. While comprehension of digital text requires similar comprehension strategies and skills to those used in print text, there are differences in text structure and organizational features. In print, text structures include logic, argument, chronology, and topic. In digital text, text structures include these aforementioned facets, as well as the possibility to navigate within and among multiple websites.

In print, text is often organized with headings, subheadings, text boxes, graphics, etc. Digital text employs these organizational structures, with the added dimensions of multiple tabs, links, popup windows, and animation.

While traditional forms of print texts provide the student with structure and organizational features, digital text also often includes various modes of interactivity, including the increased challenge of how to make decisions about how to best navigate the text.

Digital technologies and digital texts have become ubiquitous in modern society. Given this, ePIRLS, first administered in 2016, was designed to provide information about how well Grade 4 students interact with and comprehend nonfiction or informational digital text. For an example of informational texts and comprehension tasks designed for digital presentation, please visit: Take the ePIRLS Assessment.[2]

The results of the ePIRLS 2016 administration are also reported in terms of advanced, high, intermediate, and low international benchmarks.

For the first administration of ePIRLS, British Columbia, Ontario, Quebec, and Newfoundland and Labrador participated. Table 3 provides the Canadian and international ePIRLS results for informational digital text.

TABLE 3 Percentage of students reaching the international benchmark levels in ePIRLS 2016

International Benchmarks	Canada	International Median
Advanced	12	12
High	37	37
Intermediate	33	31
Low	14	12

As the results demonstrate, Grade 4 students read digital texts very well.

And while this is certainly good news, we should also ask, given that "although Canadian students are among the most proficient readers in the world (OECD, 2016) and Canadian Grade 4 students obtained strong results in

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2 http://pirls2016.org/epirls/take-the-epirls-assessment/ (available in English only)

PIRLS" (Mullis, Martin, Foy, & Drucker, 2012), why does a significant percentage of youth remain without "the necessary knowledge and literacy skills to adequately benefit from educational opportunities" (Brochu, O'Grady, Scerbina, & Tao, 2016, p. 5)?

Grade 4 students are still young, of course. With time and with student-responsive and focused instruction, some students not currently meeting the higher benchmarks will catch up; however, a percentage of students will not. The Pan-Canadian Assessment Programme (PCAP) 2016 data includes a reading assessment of students in Grade 8 (Secondary II in Quebec), which reveals that 12 percent of participating Canadian students in Grade 8 do not meet the baseline level in reading (O'Grady, Fung, Servage & Khan, 2016). The Programme of International Student Assessment (PISA) results also confirm this. In the 2015 administration of PISA, 11 percent of participating Canadian 15-year-olds can be considered low achievers in reading (O'Grady, Deussing, Scerbina, Fung, & Muhe, 2016).

This data reveal that a minimum of one in 10 Canadian Grade 4 students does not meet the grade-level expectations for reading. It is also important to acknowledge that due to PIRLS policy on exclusions from assessment, students with functional or intellectual disabilities and students who are unable to read or write in the language of the assessment were excluded from the assessment. These exclusions accounted for an additional 6.5 percent of students of the target population of Grade 4 students who did not write the assessment, and this figure increases the proportion of Grade 4 students who may be reading below the expectations in Canada.[3] This is cause for concern and we must ask why.

The fourth-grade slump

As early as the 19th century, child psychologists have noticed a shift in student engagement at the age of nine. In 1990, Chall, Jacobs, and Baldwin named this observed dip in learning trajectory the Fourth Grade Slump. Chall et al. attributed the fourth-grade slump to a lack of fluency and automaticity with reading skills and strategies.

While fluency and automaticity are often interpreted as speed and accuracy, successful readers are much more than fast and correct. Clay (2013) described automaticity as the student's development of a "self-extending system," where "the reader can apply what he knows to similar items, and he has a way of working on new items…by solving a novel feature, the competent reader not only gets the message but at the same time may extend his capacity to tackle new messages" (p. 35). To develop the fluency and automaticity of a self-extending system, instruction is focused, strategic, and embedded in engaging, meaningful text; this type of instruction reflects a student-responsive pedagogy, not a prescriptive program.

Some educators disagree and attribute the fourth-grade slump to the lack of a specific instructional technique or program. Disagreement concerning pedagogy, the fourth-grade slump, and the attainment of automaticity and fluency have led to what is referred to as "The Reading Wars" (National Education Association, n.d.). The source of the "wars" is the following question: Why is it that so many students in K–3 experience success in reading without developing the self-extending system to face the challenges of increased complexity of reading at the Grade 4 level?

The PIRLS Student Questionnaire provides important insight into this question. The data collected from the PIRLS questionnaires provide us with evidence from the source—the students themselves—that helps us understand the factors that influence student achievement in reading.

The PIRLS Student Questionnaire gives students a place and opportunity to share their thoughts about the reading process: Do they like reading? Do they find reading engaging? Do they feel confident about reading? As part of the questionnaire, students were also asked a series of questions concerning attitudes towards reading. Tables 4 and 5 provide the PIRLS 2016 questions focused on whether or not students like to read and the frequency that they read outside school.

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[3] For a full discussion of the PIRLS exclusion policy, please refer to Brochu et al., 2016.

Table 4 shows the eight questionnaire items used to ask students about their enjoyment of reading. There were four response options: agree a lot, agree a little, disagree a little, and disagree a lot.

TABLE 4   **PIRLS 2016 Student Questionnaire items: Do students like reading?**

| What do you think about reading? Tell how much you agree with each of these statements. |
| --- |
| a) I like talking about what I read with other people. |
| b) I would be happy if someone gave me a book as a present. |
| c) I think reading is boring. |
| d) I would like to have more time for reading. |
| e) I enjoy reading. |
| f) I learn a lot from reading. |
| g) I like to read things that make me think. |
| h) I like it when a book helps me imagine other worlds. |

Students were also asked two questions about the frequency of their reading outside school, as shown in the table below.

TABLE 5   **PIRLS 2016 Student Questionnaire items related to out-of-school reading**

How often do you do these things outside of school?			
	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I read for fun.			
b) I read to find out about things I want to learn.			

The results of this section of the 2016 PIRLS Student Questionnaire are presented in Figure 1 below. The results clearly reflect "…that positive attitudes toward reading and high achievement are related, and in a bidirectional way—that is, better readers may enjoy reading more than poorer readers. This can lead to better development of reading comprehension skills and strategies…" (Mullis et al., 2017, p. 294). The PIRLS 2016 results confirm this conclusion. When compared to achievement data, the impact of enjoying reading is clear. On average, students who indicated they liked reading very much had higher reading achievement than those who did not like reading (Figure 1).

**FIGURE 1**   **Results for the Students Like Reading index**
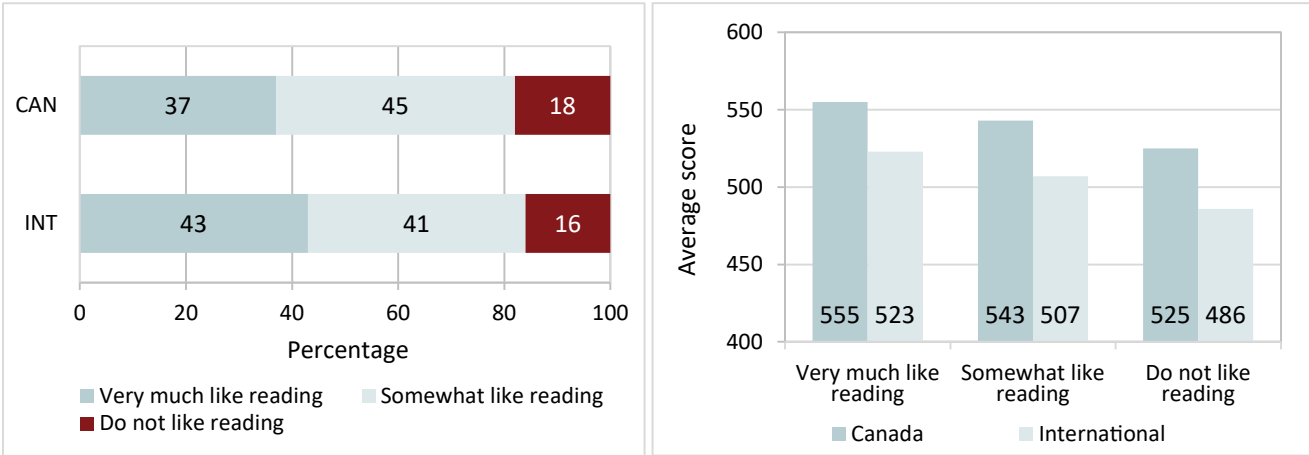
The importance of liking reading is clear, but, to go further, what role does engagement—described as cognitive, emotional, and physical immersion—play in student reading achievement? The questions in Table 6 address this question. There were four response options for these questions: agree a lot, agree a little, disagree a little, and disagree a lot.

TABLE 6 PIRLS 2016 international and Canadian data: Do students find reading engaging?

How much do you agree with these statements about your reading lessons? Tell how much you agree with each of these statements.
a) I like what I read about in school.
b) My teacher gives me interesting things to read.
c) I know what my teacher expects me to do.
d) My teacher is easy to understand.
e) I am interested in what my teacher says.
f) My teacher encourages me to say what I think about what I have read.
g) My teacher lets me show what I have learned.
h) My teacher does a variety of things to help us learn.
i) My teacher tells me how to do better when I make a mistake.

When reading engagement is compared to achievement in reading, students who reported being very engaged had higher achievement than their counterparts who reported being less than engaged (Figure 2).

FIGURE 2 Results for the Student Engagement in Reading index
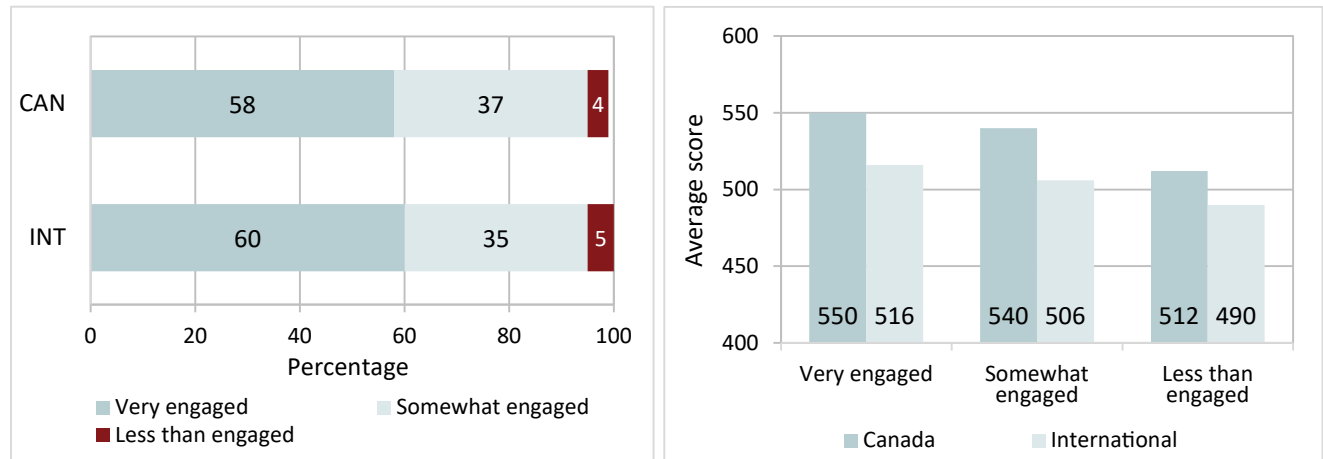
Connected to the concepts *liking reading* and *being engaged in reading* is student confidence in reading. The PIRLS 2016 Student Questionnaire provides insight into this third item.

The results from the Student Confidence in Reading index overall show a much larger proportion of students who self-report being very confident in reading, compared to students who report non-confidence in reading. See Figure 3 for comparative results between Canada and total international figures. High levels of confidence correlate with reading achievement, and this correlation may provide us with insight with respect to how much students are self-aware of their reading skills.

FIGURE 3   Results for the Student Confidence in Reading index
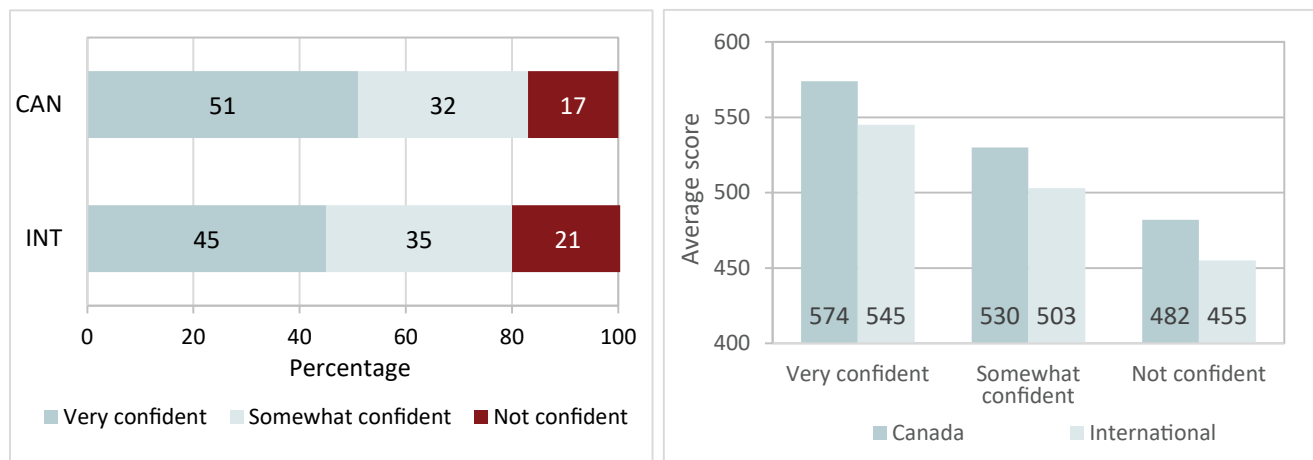
So, the students have spoken, and their comments provide us with the next question.

How can this information be used to mitigate the fourth-grade slump?

To mitigate the fourth-grade slump, we need information to answer the question, "Why is there a fourth-grade slump?" Reflecting on information gathered through various forms of assessments provides a starting point. In Canadian schools, teachers regularly engage in conversations that focus on the questions, "What do the results tell us?," "How do we use this information to inform our instructional practice?," and, perhaps most importantly, a final reflection that focuses on "Why are we making this decision about our instructional practice?" In so doing, we confront and analyze our long-standing assumptions and beliefs about best practices and focus on how to make pedagogical practice more student responsive.

This deep analysis of the data is referred to as double-loop reflection. A double-loop reflection has its origins in Argyris, C., & Schön, D.'s (1978) organizational theory of double-loop learning and is shown below in Figure 4.
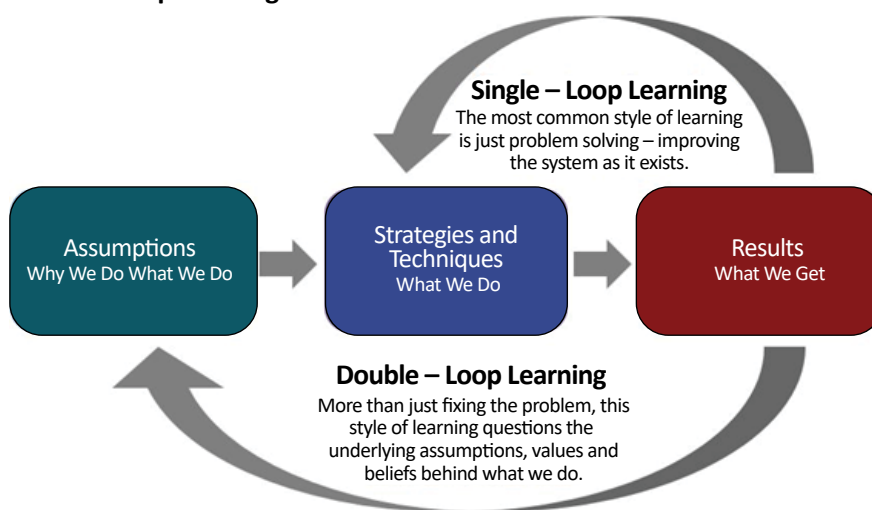
FIGURE 4   Double-loop learning

Image retrieved from: https://wp.inf.ed.ac.uk/casestudiesdesigninf1/archive-2017-2018/materials-and-readings-week-by-week/s08-1-reflective-practice/.

The PIRLS Student Questionnaire makes this type of analysis possible; teachers and stakeholders reflect on and question not only their own practice, "but also the historical power structures that operate within schools" (p. 5).

In Canada, this double-loop reflection has resulted in promising practices that respond to the evidence of the positive impact of student enjoyment, student engagement, and student confidence in reading achievement, while maintaining a focus on learning and monitoring for continuous progress.

More and more, educators are taking into account their students' funds of knowledge and interests as they make decisions about their classroom practice. Increasingly, information about a student's interests is used to purchase and create classroom reading materials, and such decisions are backed up by a body of research. When students see their interests reflected in the classroom library, students see themselves in their learning, enjoy reading more, and are more engaged. Enjoyment and engagement lead to increased time reading, which leads to increased success in reading.

The pedagogical implications of this statement are increasingly visible in classroom instructional models that value a balanced and student-responsive approach to reading instruction. In these models, explicit instruction provides exposure to and practice in not only the discrete skills of reading, but also the strategic processing necessary to ensure that those skills lead to meaningful interpretation and application of text. Since these models are in use as early as Kindergarten, a reduction in the percentage of students experiencing the fourth-grade slump should be attainable.

What does this look like? Let's review two important components of reading instruction, which the International Literacy Association (2018) refers to as "a fundamental cornerstone of literacy": Interactive Read Aloud and Independent Reading. In Interactive Read Aloud, the teacher reads aloud an exemplar text, with a storyline or content that reflects student interests, to teach a specific reading skill or strategy. As the teacher reads aloud, they pause regularly and invite students to consider a section of the text that provides an example of the focus of the day's lesson. Focus points include, for example, student self-monitoring for errors when reading; how punctuation impacts meaning; and the various ways authors capture the attention of the reader.

During the Interactive Read Aloud, the teacher's questions, which are carefully constructed to engage students in thoughtful and critical reflection of the text, provide an opportunity to guide students to view the text in one of multiple layers provided in the text. As students respond, the teacher gathers information about the students' knowledge of the topic; how they are using what they've heard to inform their learning; their questioning; their vocabulary, etc.

This shared experience with text is followed by an opportunity to practise what they have learned during Independent Reading Time. Students are provided with a choice of books on a variety of topics to read independently. As they read independently, they are applying the learning gained during the Read Aloud. During this time of independent reading, the teacher circulates among students, engages individual or small groups of students in conversations about the text and the topic, provides prompts, and gathers further information about student progress. Once the Independent Reading Time is complete, students respond to and/or share their learning in a variety of formats, such as written, oral, dramatic, or visual. Each student learns to use a variety of formats to share and/or reflect on their learning. The teacher reviews each student response and gathers information about how effectively the student has applied the focus of the lesson to the chosen text. The purpose of this review is two-fold: 1) it provides information about student progress, and 2) it provides the teacher with feedback about the effectiveness of the lesson. Having gathered this information, the teacher is able to reflect on not just the what and how of the lesson, but also the why of the lesson.

The apparent simplicity of this model is deceptive; the planning is actually quite complex. To choose books that provide excellent examples of the focus of instruction, the teacher must have not only knowledge of a wide range of titles that reflect a variety of genres, but also be able to draw from a diverse range of authors and experiences. To best ensure students have access to engaging texts on which to practise their reading skills, the teacher should know each student's community and family funds of knowledge, language use, interests, and background knowledge about the instructional focus. Throughout the Interactive Reading experience, Independent Reading Time, and sharing and reflection activities, the teacher continues to gather information about their students and their students' learning.

Does this method require a lot of expertise? Yes. Is the planning time consuming? Yes, but only initially. With time, practice, and evidence of increased student progress, this instructional design develops a natural flow. Both teacher and students become engaged and confident. Student interest in reading and associated learning from time spent

reading increases, and the possibility of reducing the percentage of student impacted by the fourth grade slump should decrease.

What are the implications of this practice for the gender gap in reading achievement?

PIRLS 2016 results indicate the gap between boys and girls achieving the advanced and high benchmarks is seven percentage points higher in favour of girls. This is a significant difference, but it's not unexpected and has unfortunately become predictable. And despite a plethora of educational products aimed at capturing the attention of boys, e.g., boy-themed books, boy-themed activities, boy-themed conversations, boy-themed manipulatives, the gap in reading achievement between boys and girls has not been closed.

A double-loop reflection of this trend leads us to question classroom practice and historical assumptions. In so doing, we must first acknowledge that the binary separation of boys and girls is not only limiting, it reinforces stereotypical assumptions. "When research focuses on differences and when differences are all that is reported, difference-based stereotypes are reinforced and continued" (Campbell and Storo. n.d.).

For example, there's a common belief that boys like nonfiction and girls like fiction, but when faced with a well-stocked classroom and/or school library, and the opportunity to explore and sample various genres and authors, anecdotal evidence suggests that boys and girls often make decisions based on their interests and not on what is expected. Although anecdotal, these sorts of observations provide a valid reason to ask why we continue to make assumptions about which books are best for boys and which are best for girls.

Connecting this to the results of the PIRLS Student Questionnaire, it seems likely that the more opportunities for personal choice, the more engaged, confident, and successful all students will be, regardless of gender. As mentioned earlier, choice is a significant component of optimal learning conditions, and optimal learning conditions are achieved when a student's life experiences and developing funds of knowledge are acknowledged, visible, and inform engaging and student-responsive pedagogy. When teachers monitor that learning, provide students with feedback about their learning, and adjust instructional decisions, such as the effective use of interactive Read Aloud and Independent Reading to build on that learning, the self-extending system described by Clay (2013) develops, strengthens, and has a positive impact on student learning and the development of an effective self-extending system.

And now, back to the title of this article, Are You Smarter Than a Fourth Grader? As stated at the outset, that depends on what a Grade 4 student can do. We now know that many Canadian Grade 4 readers are thinkers, problem solvers, and appliers of information. So, if the reading of this paper has provoked that type of thinking and engaged you in an opportunity to pause, reflect, and question, then you're at least as smart as a fourth grader. And if your questions include "Why?" you are a welcome addition to the discussion about educational change.

REFERENCES

Argyris, C., & Schön, D. (1978). *Organizational learning: A theory of action perspective*. Reading, MA: Addison Wesley.

Bishop, R. (1990). Mirrors, windows and sliding glass doors. *Perspectives, 1*(3), (ix–xi).

Bridges, L. (2015). *The joy and power of reading: A summary of research and expert opinion*. New York, NY: Scholastic.

Brochu, P., O'Grady, K., Scerbina, T., & Tao, Y., *PIRLS 2016 Canada in context: Canadian results from the Progress in International Reading Literacy Study*. Toronto: Council of Ministers of Education, Canada. Retrieved from https://www.cmec.ca/Publications/Lists/Publications/Attachments/385/PIRLS2016-Report-EN.pdf.

Campbell, P.B., Storo, J.N. (n.d.) *Girls Are. . .Boys Are . . . Myths, Stereotypes and Gender Differences.* Office of Educational Research and Improvement, U.S. Dept. of Education.

Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crisis: Why poor children fall behind*. Cambridge, MA: Harvard University Press.

Clay, M. (2013). *An observation survey of early literacy achievement* (3rd ed*.).* New York: Pearson.

Goodwin, B. (2011) *Research says…Don't wait until the 4th grade to address the slump. Educational Leadership, 68*(7), 88–89.

International Literacy Association. (2018). *International literacy association brief: Literacy coaching for change. Choices matte*r. Retrieved from https://literacyworldwide.org/blog%2Fliteracy-daily%2F2018%2F03%2F14%2Fila%27s-latest-brief-helps-literacy-coaches-choose-the-right-instructional-model.

International Literacy Association. (2018). *International literacy association brief: The Power and Promise of Read Alouds and Independent Reading.* Retrieved from: https://literacyworldwide.org/docs/default-source/where-we-stand/ila-power-promise-read-alouds-independent-reading.pdf.

Liebfreund, M. (2015, September 3). *Informational text comprehension* [Blog post]. Retrieved from https://www.literacyworldwide.org/blog/literacy-now/2015/09/03/informational-text-comprehension.

Miller, D., & Moss, B. (2011). *No more independent reading without support*. Portsmouth, NH: Heinemann.

Moll, L.C., Amanti, C., Neff, D., & Norma G. (1992) Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory Into Practice*, *31*(2), 132–141.

Mullis, I. V. S.& Martin, M. O. (Eds.). (2015). *PIRLS 2016 Assessment Framework, 2nd Edition*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College Retrieved from https://timssandpirls.bc.edu/pirls2016/framework.html.

Mullis, I. V. S., Martin, M. O., Foy, P., & Drucker, K.T. (2012). *PIRLS 2011 International Results in Reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College. Retrieved from https://timssandpirls.bc.edu/pirls2011/international-results-pirls.html.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). *PIRLS 2016 International Results in Reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College. Retrieved from http://timssandpirls.bc.edu/pirls2016/international-results/.

National Education Association (n.d.). The Reading Wars. Retrieved from http://www.nea.org/home/19392.htm.

O'Grady, K., Fung, K., Servage,L., & Khan,G. (2016). *PCAP 2016 Report on the Pan-Canadian Assessment of reading, math and science.* Toronto: Council of Ministers of Education, Canada. Retrieved from https://www.cmec.ca/Publications/Lists/Publications/Attachments/381/PCAP-2016-Public-Report-EN.pdf.

O'Grady, K., Deussing, M., Scerbina, T., Fung, K., & Muhe, N. (2016). *measuring up: canadian results of the OECD PISA study: the performance of canada's youth in science, reading and mathematics. 2015 first results for Canadians aged 15.* Toronto: Council of Ministers of Education, Canada. Retrieved from https://www.cmec.ca/Publications/Lists/Publications/Attachments/365/PISA2015-CdnReport-EN.pdf.

Organisation for Economic Co-operation and Development (OECD). (2016). *PISA 2015 Results (Volume I). Excellence and Equity in Education.* Paris: OECD Publishing. Retrieved from https://www.oecd.org/education/pisa-2015-results-volume-i-9789264266490-en.htm.

UNESCO (n.d.). *UNESCO in Brief: Literacy.* Retrieved from https://en.unesco.org/themes/literacy.

UNESCO. (2003). *Education Position Paper: Education in a Multilingual World.* Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000129728.

UNESCO (2011). *Digital Literacy in Education. Policy Brief, May 2011.* Retrieved from https://iite.unesco.org/files/policy_briefs/pdf/en/digital_literacy.pdf.

Enemy Pie

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It was a perfect summer until Jeremy Ross moved in right next door to my best friend Stanley. I did not like Jeremy. He had a party and I wasn't even invited. But my best friend Stanley was.

I never had an enemy until Jeremy moved into the neighbourhood. Dad told me that when he was my age, he had enemies, too. But he knew of a way to get rid of them.

Dad pulled a worn-out scrap of paper from a recipe book.

"Enemy Pie," he said, satisfied.

You may be wondering what exactly is in Enemy Pie. Dad said the recipe was so secret, he couldn't even tell me. I begged him to tell me something—anything.

"I will tell you this, Tom," he said to me. "Enemy Pie is the fastest known way to get rid of enemies."

This got me thinking. What kinds of disgusting things would I put into Enemy Pie? I brought Dad earthworms and rocks, but he gave them right back.

I went outside to play. All the while, I listened to the sounds of my dad in the kitchen. This could be a great summer after all.

I tried to imagine how horrible Enemy Pie must smell. But I smelled something really good. As far as I could tell, it was coming from our kitchen. I was confused.

I went inside to ask Dad what was wrong. Enemy Pie shouldn't smell this good. But Dad was smart. "If it smelled bad, your enemy would never eat it," he said. I could tell he'd made this pie before.

The oven buzzer rang. Dad put on oven mitts and pulled out the pie. It looked good enough to eat! I was beginning to understand.

But still, I wasn't sure how this Enemy Pie worked. What exactly did it do to enemies? Maybe it made their hair fall out, or their breath stinky. I asked Dad, but he was no help.

While the pie cooled, Dad filled me in on my job.

He whispered. "In order for it to work, you need to spend a day with your enemy. Even worse, you have to be nice to him. It's not easy. But that's the only way that Enemy Pie can work. Are you sure you want to do this?"

Of course I was.

All I had to do was spend one day with Jeremy, then he'd be out of my life. I rode my bike to his house and knocked on the door.

When Jeremy opened the door, he seemed surprised.

"Can you come out and play?" I asked.

He looked confused. "I'll go ask my mom," he said. He came back with his shoes in his hand.

We rode bikes for awhile, then ate lunch. After lunch we went over to my house.

It was strange, but I was having fun with my enemy. I couldn't tell Dad that, since he had worked so hard to make the pie.

We played games until my dad called us for dinner.

Dad had made my favourite food. It was Jeremy's favourite, too! Maybe Jeremy wasn't so bad after all. I was beginning to think that maybe we should forget about Enemy Pie.

"Dad", I said, "It sure is nice having a new friend." I was trying to tell him that Jeremy was no longer my enemy. But Dad only smiled and nodded. I think he thought I was just pretending.

But after dinner, Dad brought out the pie. He dished up three plates and passed one to me and one to Jeremy.

"Wow!" Jeremy said, looking at the pie.

I panicked. I didn't want Jeremy to eat Enemy Pie! He was my friend!

"Don't eat it!" I cried. "It's bad!"

Jeremy's fork stopped before reaching his mouth. He looked at me funny. I felt relieved. I had saved his life.

"If it's so bad," Jeremy asked, "then why has your dad already eaten half of it?"

Sure enough, Dad was eating Enemy Pie.

"Good stuff," Dad mumbled. I sat there watching them eat. Neither one of them was losing any hair! It seemed safe, so I took a tiny taste. It was delicious!

After dessert, Jeremy invited me to come over to his house the next morning.

As for Enemy Pie, I still don't know how to make it. I still wonder if enemies really do hate it or if their hair falls out or their breath turns bad. But I don't know if I'll ever get an answer, because I just lost my best enemy.

The **GIANT** Tooth Mystery

A fossil is the remains of any creature or plant that lived on the Earth many, many years ago. People have been finding fossils for thousands of years in rocks and cliffs and beside lakes. We now know that some of these fossils were from dinosaurs.

Long ago, people who found huge fossils did not know what they were. Some thought the big bones came from large animals that they had seen or read about, such as hippos or elephants. But some of the bones people found were too big to have come from even the biggest hippo or elephant. These enormous bones led some people to believe in giants.

Hundreds of years ago in France, a man named Bernard Palissy had another idea. He was a famous pottery maker. When he went to make his pots, he found many tiny fossils in the clay. He studied the fossils and wrote that they were the remains of living creatures. This was not a new idea. But Bernard Palissy also wrote that some of these creatures no longer lived on earth. They had completely disappeared. They were extinct.

Was Bernard Palissy rewarded for his discovery? No! He was put in prison for his ideas.

As time went by, some people became more open to new ideas about how the world might have been long ago.

Then, in the 1820s, a huge fossil tooth was found in England. It is thought that Mary Ann Mantell, the wife of fossil expert Gideon Mantell, was out for a walk when she saw what looked like a huge stone tooth. Mary Ann Mantell knew the big tooth was a fossil, and took it home to her husband.

When Gideon Mantell first looked at the fossil tooth, he thought it had belonged to a plant eater because it was flat and had ridges. It was worn down from chewing food. It was almost as big as the tooth of an elephant. But it looked nothing like an elephant's tooth.

Fossil tooth sketched life-sized

Gideon Mantell could tell that the pieces of rock attached to the tooth were very old. He knew that it was the kind of rock where reptile fossils were found. Could the tooth have belonged to a giant, plant-eating reptile that chewed its food? A type of reptile that no longer lived on earth?

Gideon Mantell was really puzzled by the big tooth. No reptile that he knew about chewed its food. Reptiles gulped their food, and so their teeth didn't become worn down. It was a mystery.

Gideon Mantell took the tooth to a museum in London and showed it to other scientists. No one agreed with Gideon Mantell that it might be the tooth of a gigantic reptile.

Gideon Mantell tried to find a reptile that had a tooth that looked like the giant tooth. For a long time, he found nothing. Then one day he met a scientist who was studying iguanas. An iguana is a large plant-eating reptile found in Central and South America. It can grow to be more than two metres long. The scientist showed Gideon Mantell an iguana tooth. At last! Here was the tooth of a living reptile that looked like the mystery tooth. Only the fossil tooth was much, much bigger.

Iguana

A life-sized drawing of an iguana's tooth from Gideon Mantell's notebook

Now Gideon Mantell believed the fossil tooth had belonged to an animal that looked like an iguana. Only it wasn't two metres long. Gideon Mantell believed it was over thirty metres long! He named his creature *Iguanodon*. That means "iguana tooth".

Gideon Mantell did not have a whole *Iguanodon* skeleton. But from the bones he had collected over the years, he tried to figure out what one might have looked like. He thought the bones showed that the creature had walked on all four legs. He thought a pointed bone was a horn. He drew an *Iguanodon* with a horn on its nose.
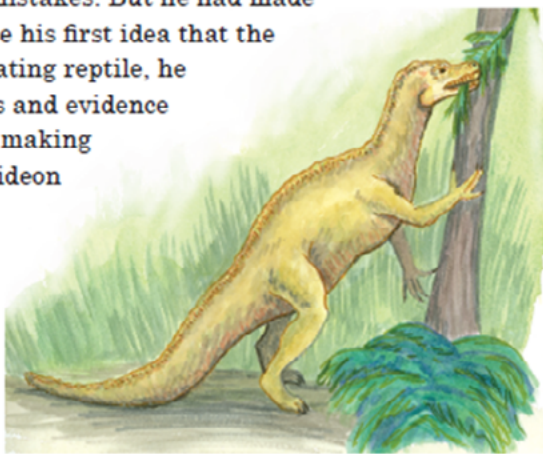

What Gideon Mantell thought an Iguanodon looked like

Years later, several complete *Iguanodon* skeletons were found. They were only about nine metres long. The bones showed that it walked on its hind legs some of the time. And what Gideon Mantell thought was a horn on its nose was really a spike on its "thumb"! Based on these discoveries, scientists changed their ideas about what the *Iguanodon* looked like.

Gideon Mantell made some mistakes. But he had made an important discovery, too. Since his first idea that the fossil tooth belonged to a plant-eating reptile, he spent many years gathering facts and evidence to prove his ideas were right. By making careful guesses along the way, Gideon Mantell was one of the first people to show that long ago, giant reptiles lived on earth. And then they became extinct.

What scientists today think the Iguanodon looked like

Hundreds of years before, Bernard Palissy had been thrown in prison for saying nearly the same thing. But Gideon Mantell became famous. His discovery made people curious to find out more about these huge reptiles.

In 1842, a scientist named Richard Owen decided that these extinct reptiles needed a name of their own. He called them *Dinosauria*. This means "fearfully great lizard". Today we call them dinosaurs.