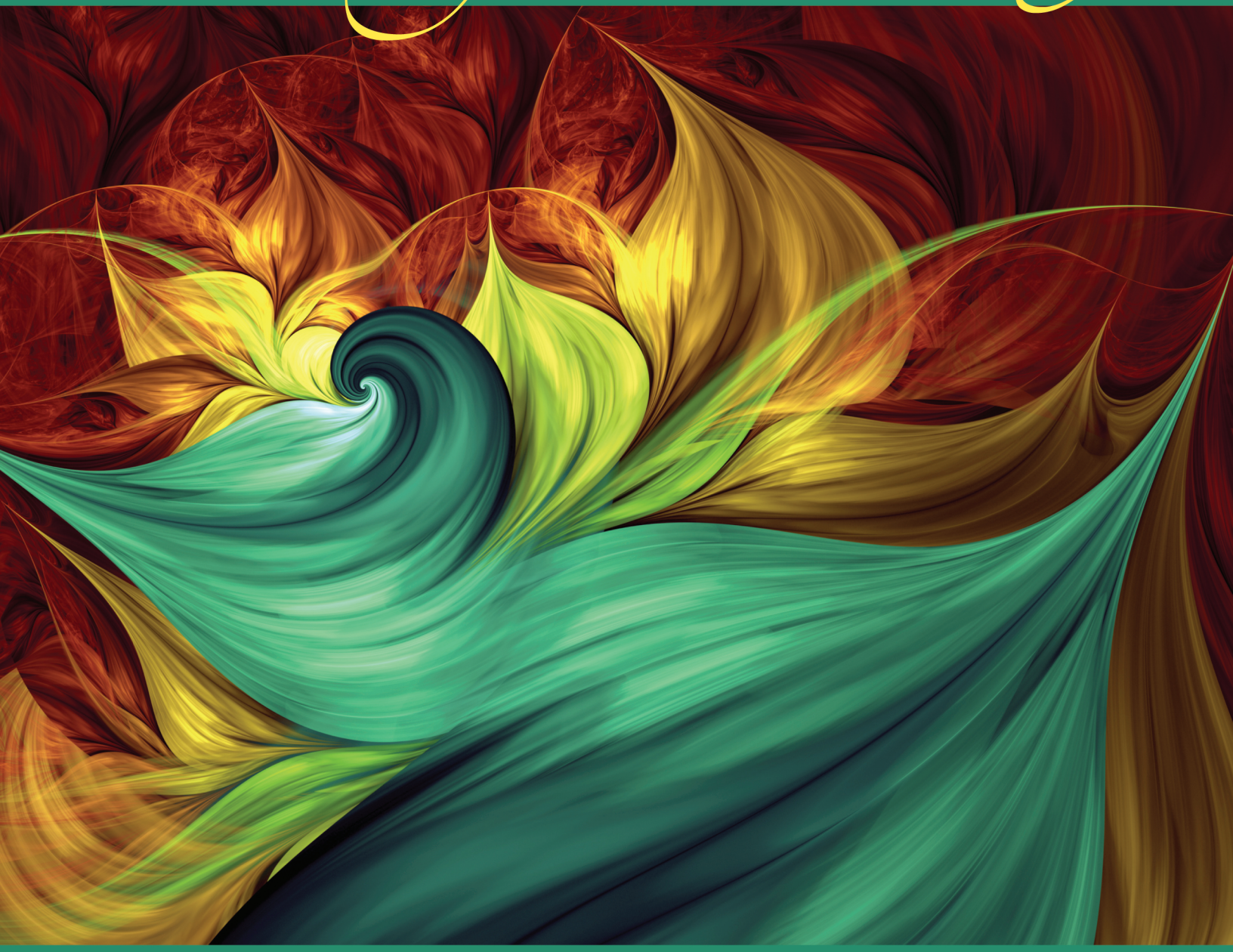
Eighth Edition

CONTENT AREA *Reading and Literacy*

Succeeding in Today's Diverse Classrooms



VICTORIA R. GILLIS GEORGE BOGGS

DONNA E. ALVERMANN

EIGHTH EDITION

CONTENT AREA READING AND LITERACY

Succeeding in Today's Diverse Classrooms

Victoria R. Gillis
University of Wyoming

George L. Boggs
Florida State University

Donna E. Alvermann
University of Georgia

Pearson

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For Joe—Victoria
For Elisha—George
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About the Authors

Victoria R. Gillis is a professor and Wyoming Excellence in Higher Education Endowed Chair in Literacy Education in the College of Education at the University of Wyoming. She graduated from North Georgia College with a BS in biology and from Emory University with an MAT in secondary science education. She taught science courses including life science, chemistry, physics, and physical science in Georgia, Florida, and South Carolina. In the early 1970s, she encountered the ideas and concepts in content area reading and tried them in her classroom. Her success in using content area reading strategies led her to return to graduate school after 20 years in the classroom to complete a PhD at the University of Georgia in 1994. She was director of the South Carolina Center of Excellence for Adolescent Literacy and Learning at Clemson University and was a volunteer for the Reading and Writing for Critical Thinking project in Latvia and Guatemala, where she worked with teachers, college professors, and ministry officials delivering professional development workshops in critical thinking and disciplinary literacy.

George L. Boggs is an assistant professor in the School of Teacher Education at Florida State University. He earned a BA from King College in English and Religion and a master's in classics and ancient history from the University of Durham, United Kingdom. He earned a PhD in language and literacy education at the University of Georgia. He taught grades 7 and up in the Slovak Republic, the Puget Sound area, and northern Georgia from 1999 to 2010, when he began to write about literacy, especially writing, in the digital age. Music, place, food, and history have been abiding features of his literacy teaching and scholarship. New Skyline Lounge is a collaborative digital project that welcomes teachers, writers, musicians, and researchers to learn together through sharing multimodal compositions.

Donna E. Alvermann is University of Georgia-appointed Distinguished Research Professor of Language and Literacy Education and the Omer Clyde & Elizabeth Parr Aderhold Professor in Education. Formerly a classroom teacher in Texas and New York, her research focuses on adolescent literacy in digitally mediated environments. Her coauthored/edited books include *Reconceptualizing the Literacies in Adolescents' Lives* (3rd ed.), *Content Area Reading and Literacy: Succeeding in Today's Diverse Classrooms* (8th ed.), *Adolescents' Online Literacies: Connecting Classrooms, Digital Media, & Popular Culture* (2nd ed.), and *Literacies in a Digital World*. Past president of the National Reading Conference (NRC), she serves on the Adolescent Literacy Advisory Group of the Alliance for Excellent Education and the Research Advisory Board for the University of Wyoming Literacy Research Center and Clinic. She was elected to the Reading Hall of Fame in 1999 and is the recipient of NRC's Oscar Causey Award for Outstanding Contributions to Reading Research, the College Reading Association's Laureate Award, and the American Reading Forum's and NRC's two service awards. In 2006, she was awarded the International Reading Association's William S. Gray Citation of Merit.

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Brief Contents

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Preface

The Greek philosopher Heraclitus said, "There is nothing permanent except change." How true. With this edition, we welcome a new author, George Boggs, to our team. George is a gifted writer, an extraordinary teacher, and a talented musician. He brings a fresh outlook and an interest in writing and New Literacies to the textbook. Other changes include an increased emphasis on writing with three writing chapters and the topic of diversity infused through all chapters.

With each new edition of *Content Area Reading and Literacy: Succeeding in Today's Diverse Classrooms*, we welcome the opportunity to bring into sharper focus the topics and issues that you, our readers, tell us you like or wish you knew more about. How do we learn about these issues? Sometimes it's through direct contact at a conference, an inquiring late-night e-mail, or, in rare instances, a telephone call. Anonymous reviews of the previous edition also inform us, as do our own intuitions about the field of literacy education—where it is and where it might be heading.

In this eighth edition of *Content Area Reading and Literacy: Succeeding in Today's Diverse Classrooms*, we continue to operate on the assumption that, far from being an add-on, content literacy is integral to every discipline and special subject area; to the teachable moments that make less stellar ones tolerable; and, most important, to each student's motivation and engagement with learning. Our aim is to provide ideas backed by research and tested in classrooms (our own or others') that will enable you to apply what is useful in your particular discipline. We are also interested in sharing what is current on several fronts in anticipation of the fact that knowledge is power and that powerful teaching, like powerful learning, depends on being well informed.

What's New in This Edition

- Diversity in language, culture, and social environment woven into each chapter rather than being isolated in a separate chapter.
- Increased attention to disciplinary ways of reading, writing, listening, and speaking following Hal Herber's principle of *content determines process*, including explicit discussions of disciplinary ways of thinking and learning in several additional chapters.
- Refined essential questions and the addition of guiding questions that point to specific sections in each chapter.
- Summaries organized around the essential question and the addition of guiding questions for each section of the chapter.
- More streamlined assessment chapter focused on disciplinary literacy assessment.
- Increased attention to text complexity and how that varies across the disciplines.
- Increased attention to *close reading* and how disciplinary differences play out in this comprehension strategy.
- Increased attention to writing with three chapters devoted to teaching writing, writing to learn, and writing to inquire.
- Sufficient information provided for users to locate websites.

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Chapter-by-Chapter Changes to the Eighth Edition

Chapter 1 addresses the current discussions in the field focused on content area reading and the use of generic strategies across the curriculum and disciplinary literacy with its discipline focused adaptation of strategies for specific concepts. An emphasis on the latter approach is woven throughout the chapter.

Chapter 2 is a new chapter with topics from Chapters 2 and 3 of the seventh edition and is focused on creating effective learning environments through the topics of affective characteristics that impact adolescent literacy and learning, language as a vehicle for creating community, diversity in language and learning, and teaching and learning in culturally diverse classrooms.

Chapter 3 now addresses planning instruction and has maintained the focus on the learning cycle from the seventh edition, which is carried out through the remaining chapters of the text. In addition, we have included a discussion of essential questions and their purpose in planning and have revised the section on structured frameworks for planning to include workshop-type formats.

Chapter 4 includes up-to-date information on international assessments related to adolescent literacy and has been streamlined to focus primarily on assessment of disciplinary literacy. We have retained the organization around purposes for assessment (assessment *of* learning, assessment *for* learning, and assessment *as* learning). The process of backward design is used for unit and long-term planning.

Chapter 5 uses the learning cycle as an organizing principle to situate the instructional principles related to preparing students to learn. New and updated examples of suggested strategies are included, as are specific examples of how teachers might create adaptations of the featured strategies.

Chapter 6 includes more explicit information on reading to learn across the disciplines, with an added discussion of each of the four core content areas and how disciplinary ways of thinking influence reading in these content areas. Close reading and text complexity are two additional topics addressed in this chapter.

Chapter 7 focuses on vocabulary and includes updated references and strategy examples. The chapter continues the organizational use of the learning cycle to present ideas for addressing vocabulary teaching and learning.

Chapter 8 addresses reflecting on learning through discussion and includes new examples of strategies, including an expanded section on discussion webs with several adaptations for a variety of disciplines.

Chapter 9 is a new chapter focused on teaching writing, with an emphasis on teaching argumentation. It also addresses responding to and assessing writing as well as understanding writing as an element of academic culture.

Chapter 10 is a new chapter that addresses using writing to learn and includes information on note making, interactive notebooks, and structured notes as they relate to knowledge structures. Topics addressed also include writing strategies that foster discipline-appropriate thinking and creative writing-to-learn strategies. New examples of writing strategies discussed are also included.

Chapter 11 is a new chapter focused on writing to inquire and includes information on understanding writing in context, including 21st-century literacies; preparing to write; collecting and organizing information; writing a report, including an extended discussion of paraphrasing and revising; and alternatives to traditional reports.

Chapter 12 addresses developing lifelong readers and has been updated to include more multimodal and digital literacies.

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Acknowledgments

Although our mentor, friend, and former first author, Donna E. Alvermann, is no longer an active contributor to this eighth edition, those of you who have used the text previously will find much of her thinking and writing in the following pages. Donna has been an inspiration for us, who owe much to many. We only hope we can live up to her high standards as we carry on the tradition of excellence she set with the first edition of this textbook.

As in previous editions, we would like to express our appreciation to the teachers and students who agreed to share examples of their work, making *Content Area Reading and Literacy: Succeeding in Today's Diverse Classrooms* dynamic and practical. A special thanks to Ann Van Wig, graduate student extraordinaire, who helped with a wide variety of tasks with calm professionalism and grace, no matter how frantic we were.

Expressions of gratitude also go to the team at Pearson, including Meredith Fossel, Johanna Burke, Miryam Chandler, Vineta Lewis, and Maria Feliberty. A special thanks to Karen Mason, who answered every question and kept us focused throughout this process. Your patience and professionalism are much appreciated. Thanks, too, to the reviewers of the eighth edition: Dr. John D. Beach, St. John's University; Hilary Gates, American University; Dr. Ann M. Harvey, Western New Mexico University; Dr. Douglas Knick, Luther College; and Dr. Christy Reed, Wayland Baptist University. Finally, we express our thanks to Raghavi Khullar, who supported us through every stage of the production process.

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CHAPTER

1

Content Literacy and the Reading Process

CONTENT LITERACY AND THE READING PROCESS

Assumptions Underlying Content Teaching

- Subject Matter
- Role of the Textbook
- Active and Independent Readers
- Fluent Readers
- Fluency with Information Technology

What It Means to Be Literate

- Literate Thinking
- Content Literacy
- Disciplinary Literacy
- The New Literacy Studies

The Reading Process

- A Cognitive View
- A Social Constructionist Perspective
- The Role of Motivation

Essential Question

- How do teachers' theoretical beliefs influence instruction and thus student learning?

Guiding Questions

- How do teachers' assumptions about content teaching influence their instruction?
- What does it mean to be literate in today's culture and in the various disciplines?
- How do teachers' views of the reading process influence their instruction?

Anticipation Guide

Directions: Read each of the following statements. Place a checkmark on the line in the "Before Reading" column if you agree with the statement; leave it blank if you disagree. Then predict what you think the chapter will be about and jot down on a sticky note (or post online) any questions you have. Read the chapter, then return to the statements and respond to them as you think the authors of your text would. Place a checkmark on the line in the "Authors' Stance" column if you believe the authors would agree with the statement. If you discuss these statements with other people online, in class, or at the family dinner table, return to the statements and check any items you agree with in the right-hand column, "After Discussion." If your thinking changed, what caused that change?

Before Reading	Authors' Stance	Statement	After Discussion
_____	_____	**1.** Textbooks provide unbiased content.	_____
_____	_____	**2.** Textbooks provide accurate and up-to-date information.	_____
_____	_____	**3.** Every teacher is a teacher of reading.	_____
_____	_____	**4.** If students learn to read in elementary school, they should be able to read their textbooks in middle and high school.	_____

Victoria, one of the authors of this edition, remembers her first encounter with reading and science in the following vignette.

• • •

In 1974, I had six years of teaching experience in junior high and high schools under my belt. I considered myself a good science teacher. In the fall of that year, I was asked to attend a district-level meeting on content area reading. After all my efforts to evade the meeting failed, I grudgingly went, taking papers to grade so that I could at least accomplish something while I endured what I believed would be a useless meeting. I was, after all, a science teacher—not a reading teacher. What did I need to know about reading? My students seemed to be illiterate (they did not read their assignments and rarely did their homework). I believed I could teach science without reading—I taught a hands-on activities-based course.

During that meeting, Joy Monahan presented instructional ideas that she claimed would help students learn content. I was singularly uninterested until she challenged us to try "just a few of these strategies" for two or three weeks and report the results to her. At the time, I was teaching in a school that tracked students according to academic achievement. I taught both ends of the spectrum—students designated "basic" and those designated "gifted." I decided to show this Ms. Monahan that she could teach me nothing about teaching science.

That particular year I had a student, Amy (pseudonym), who had been a thorn in my side since the first day of school. She had learned to remove all the bolts securing the legs to the tops of the science tables in my room and did so with regularity. When the bolts were removed, the next student to enter the room and throw his or her books on the table had to move quickly to avoid the collapsing table. I never could catch her at this game. Amy was one of those students who by her very presence in the classroom was disruptive. I had a lot to teach Amy, and, as it turned out, she had much more to teach me.

In the ensuing few weeks, I selected two of the instructional ideas presented by Ms. Monahan (they were the ideas that required the least amount of effort on my part) and tried them with my "basic" classes, teaching the "gifted" classes in my normal (and brilliant) way. I gave both groups the same test, designed for the "gifted" class. I reasoned that I could allow the "basic" students to drop one test grade, and thus my little experiment would do them little harm.

When I graded the tests for both classes, I was astounded. The "basic" group's average was higher than that of the "gifted" class. I was transformed from a cynic to a convert in the time it took to grade those papers. My "basic" students had learned material that I previously thought too difficult for them. In fact, I had also noticed that these students were doing their assigned reading and homework and actively participating in class. Most important to me, their behavior had changed from apathetic to cooperative. This little experiment was a turning point in my life.

• • •

Imagine teaching an athlete like Venus Williams to play tennis until third or fourth grade and, because she is the best young player in the world, concluding that she needs no more instruction. Now imagine that after three or four years with little to no instruction, Venus Williams is expected to play tennis, and play well, at Wimbledon—a different context from the one in which she originally learned to play the game. There is a large crowd, the court is grass, and the stakes are very high.

Although this scenario seems unimaginable, think of children in elementary schools, learning to read using narrative text. After several years with little to no instruction in reading expository text, they are expected to read high school textbooks with comprehension. There are parallels in these two scenarios that are difficult to ignore. Think about these parallels as you consider the assumptions underlying content area teaching.

Assumptions Underlying Content Area Teaching

Most content area teachers assume it is their responsibility to cover their subject matter in a timely, accurate, and effective manner (Alvermann & Moore, 1991; Moore, 1996). They also assume, for the most part, that textbooks are necessary for teaching and learning content (Wade & Moje, 2000). Finally, content area teachers tend to assume that by the time students enter middle and/or high school, they are strategic in their approach to reading and learning (Alvermann & Nealy, 2004). These assumptions influence teachers' instructional decision making, their use of textbooks, and their perceptions of active and independent readers.

Subject Matter

The historical roots of content area reading instruction go back several decades. Prior to the twentieth century, the dominant mode of instruction in U.S. secondary schools was one of imitation and memorization. In the early part of the twentieth century, the work of humanist educators such as John Dewey and developmentalists interested in individual growth factors began to emphasize child-centered curricula over rote memorization. With the cognitive revolution in psychology in the early 1970s came the notion that reading and writing should be taught as thinking processes rather than in the mechanical manner advocated by the behaviorists, who had preceded the cognitivists. Although other writers at that time were beginning to publish books on reading at the secondary school level, Herber's 1970 text *Teaching Reading in the Content Areas* is generally regarded as the first to demonstrate how teachers can simultaneously teach content and process (reading). It is also one of the first content area methods texts to emphasize the importance of teachers' decision making.

As a content area teacher you take pride, and rightfully so, in knowing a lot about the subject matter you teach and how best to engage students in learning. You also recognize that you are responsible for monitoring students' learning and pacing their instruction accordingly. If these were the only two factors you had to take into consideration when making instructional decisions, it would be a relatively simple task to decide what to teach, when, and at what pace. Unfortunately, instructional decision making is complicated by what Newmann (1988) refers to as the "addiction" to coverage:

> We are addicted to coverage. This addiction seems endemic in high schools . . . but it affects all levels of the curriculum, from kindergarten through college. We expose students to broad surveys of the disciplines and to endless sets of skills and competencies. . . . The press for broad coverage causes many teachers to feel inadequate about leaving out so much content and apologetically mindful of the fact that much of what they teach is not fully understood by their students. (p. 346)

Addiction to coverage is dangerous because it tends to produce a false dichotomy between content knowledge and process knowledge. When knowing *what* takes precedence over knowing *how*, as it typically does when preparing students for standardized tests, it pressures teachers to cover a wide variety of topics in an inadequate space of time. Students are deprived of the opportunity to learn how bits of knowledge fit

together and generalize to other areas of the curriculum or to real life. Tovani (2000) views this mile-wide, inch-deep curricular approach as watering down the curriculum. In short, students are denied the kind of instruction that leads to active and independent learning.

Role of the Textbook

Textbooks and other learning materials provide a focus for several chapter sections in this book. For example, in Chapter 2, we explore how hypertext and other forms of electronic media have led to a new relationship between text and reader. In Chapter 3, we consider the decision making involved in choosing appropriate materials to use in planning content literacy lessons or longer units of instruction. Here, however, we focus on three assumptions underlying the use of textbooks.

One assumption is that textbooks will help to structure loosely coupled curricular goals and objectives. The Common Core State Standards were expected to address this issue, but schools are using textbooks published prior to the standards that do not correspond with current standards (Cogan, Burroughs, & Schmidt, 2015). Thus, even though new standards are in place, use of these standards is mediated by textbooks. Twenty-five years ago, textbooks structured from 67 to 90 percent of all classroom instruction (Woodward & Elliott, 1990), and we suspect textbooks are still relied on to a great extent. However, reliance on textbooks varies according to the type of instructional approach—transmission or participatory—that teachers espouse (Wade & Moje, 2000).

A second assumption is that students will use their textbooks to learn course content, whatever "course content" means. Content does not exist in isolation—it is inextricably linked to discipline-appropriate practices, including literacy practices. Disciplines are communities of practice, and their knowledge cannot easily be distinguished from their language (Moje, 2008). The assumption that students will use their textbooks to learn content may or may not be borne out. It depends on whether students view their textbooks or their teachers as the ultimate source of knowledge. Some researchers (Hinchman & Zalewski, 1996; Smith & Feathers, 1983a, 1983b) have found that students perceive their teacher, not the textbook, as the primary source of knowledge. Students generally find their teacher easier to understand than the textbook, especially if they believe they will be tested on what the teacher says in class. Other researchers (e.g., Fournier & Graves, 2002) have found evidence that teachers put the responsibility for acquiring the information contained in the text squarely on their students' shoulders. Still other researchers (Ratekin, Simpson, Alvermann, & Dishner, 1985) have reported that in some content area classrooms, it is the custom for teachers to use the textbook as a "safety net"—something to fall back on—rather than as a vital link and a basis for class discussions. When teachers use texts as safety nets, more often than not they substitute lecturing for discussions of assigned readings.

A third assumption is that textbooks will present the content in a coherent and unbiased fashion. We know from experience that this is not always so. If you have ever attempted to read a poorly organized text, one in which the author seems to jump from one topic to another, then you know what we mean when we say coherency cannot be taken for granted. Similarly, if you have ever discovered biases in a textbook's content, then you know that textbook authors, like everyone else, have particular ways of viewing the world and reporting on it. However, given appropriate planning strategies, even the most biased of texts can lead to excellent classroom discussions in which students learn to look at both sides of an issue for sources of possible misunderstanding. We firmly believe that in today's diverse classrooms, opportunities for students to respond to biased texts should be welcomed. Taking advantage of such opportunities can contribute toward building appreciation for individual differences.

Using textbooks wisely requires teachers who know both the content and the processes needed to understand that content. In the opening vignette, Victoria recounted how she discovered that her students could read their textbooks; it had been her teaching

methods that had resulted in her students' appearing uninterested and illiterate. As the year progressed and she implemented content area literacy strategies as a vehicle to teach science, students in her class became actively involved in their own learning.

Active and Independent Readers

Content area teachers love their subject matter. Why else would someone choose to spend five days a week immersed in science, history, music, mathematics, or literature? We want our students to use science, history, music, mathematics, and literature to understand their world and even to choose to read and learn about our subjects independently. What do active and independent readers look like?

Evidence-Based Research

ACTIVE READERS Readers who engage in an active search for meaning use multiple strategies, including self-questioning, monitoring their understanding, organizing, and interacting with peers. In each instance, researchers believe, it is the cognitive processing that is induced in the strategic reader—not the strategies themselves—that is responsible for promoting active reading (Dole, Duffy, Roehler, & Pearson, 1991; Pearson & Fielding, 1991).

Active readers generate questions before they read, as they read, and when they have finished reading. Before reading a chapter in a social studies book, for example, active readers ask themselves what the selection is likely to cover, whether they know anything about the topic or are interested in it, and what they intend to do with the information presented. As they read, they question the meanings of unfamiliar words or ask how a certain event is likely to trigger a reaction. After reading the chapter, active readers ask whether their prediction of what the chapter would cover was accurate, whether they learned anything new, and how they might apply what they learned to something they already know. In fact, a fairly robust finding by researchers is that teaching students to generate their own questions leads to active learning and improved comprehension of text (National Reading Panel, 2000; Wade & Moje, 2000).

Research on disciplinary literacy practices, discussed later in this chapter, suggests that self-questioning is qualitatively different in different content areas (Moje, 2008). When historians are presented with a primary source, they ask who wrote the document, under what circumstances, and what his or her biases are (Wineburg & Reisman, 2015). They are also mindful of their own biases as they read (Shanahan & Shanahan, 2008). Scientists will question the procedures of a research report to be sure they understand each step of the experiment. Mathematicians will focus on every word of a proof or problem and pay attention to prepositions used as technical terms (e.g., *of*).

Active readers monitor, or periodically check, their understanding of what they have read. Although monitoring can include self-questioning, it is used here to describe the two-part process that readers go through when they (1) become aware of a breakdown in comprehension and (2) apply fix-up strategies to regain understanding.

Active readers attempt to make sense of the large body of facts, interpretations, and principles presented in their various textbooks by organizing such information into meaningful units. They may do this in one of several ways: by graphically organizing the information so as to form a semantic map or structured overview, by writing summaries, by constructing outlines and taking notes, or by elaborating on the text by drawing from their background knowledge and past experiences whatever associations seem most helpful in bridging from the known ("in the head") to the unknown ("on the page").

Regardless of which organizing strategy they choose, active readers are skilled in separating important information from unimportant information. When students experience difficulty in organizing what they have read, it is quite often because they are insensitive to what is important. Sometimes this insensitivity is due to a reader's inability to identify information that an author deems important; at other times it is due to a reader's strong sense of personal relevancy. Another explanation might be *inattentional blindness* (Mack, 2003), which has been documented in instances of pilots preparing to land concentrating on the plane's instrument panel, failing to notice another airplane

occupying the runway. Inattentional blindness might account for automobile accidents when drivers are distracted by texting or account for adolescents not hearing parents when they are focused on a movie. The key element in inattentional blindness is attention; unless students' attention is focused on important information in the text, they are likely to miss it. Another factor involved in young adolescents' difficulty organizing large bodies of information is guessing at what the teacher wants rather than "disciplined" thinking.

Although we recognize that readers often reflect on what they have read and actively construct meaning from texts without the benefit of peer interaction, there is growing support for placing greater emphasis on socially constructed meaning (Gee, 1996; Echevarria & Graves, 2010; Zwiers & Crawford, 2011). Engaged readers, whether in gifted, regular, or basic-level classes, enjoy opportunities for open-forum discussions, in which a free-flowing exchange of ideas enriches and refines their understandings of what was read and heightens their motivation to read further (Alvermann, 2000). Discussions of this type, unlike lectures and recitations, provide English learners with excellent opportunities to practice English and learn content simultaneously (Echevarria & Graves, 2010). Interactions with peers also enable students from diverse cultural groups to learn from one another. Discussions, guided by teachers, become opportunities to develop or try on the mind-sets of disciplinary insiders. Britton (1983) said it best: "Reading and writing float on a sea of talk" (p. 11).

INDEPENDENT READERS Independent readers typically are independent learners and vice versa. However, independence does not mean alone; it means being able to negotiate with bodies of knowledge and groups that produce it without *direct* input from a teacher or advanced peer. Independence can be developed by capitalizing on the following five principles:

1. *Independence comes from practice.* Readers develop independence when they have sufficient opportunities across the curriculum to establish their own purposes for reading, to make connections between their own experiences and those they read about, to use valid criteria in making judgments about the quality and value of what they read, and to apply what they have learned in one content area to another.
2. *Independence develops by design, not chance.* As students grow in independence, they require less and less in the way of structured learning activities. In the beginning, however, they are dependent on teacher modeling and guidance to show them how to apply the reading and reasoning processes necessary for understanding important concepts. As time goes on, responsibility is gradually released, as students assume more and more of the responsibility for applying what they have learned to new areas of study and new materials (Pearson & Gallagher, 1983).
3. *Independence is a relative state.* This is true for all of us. As a science teacher, Victoria feels confident in reading texts related to biology and chemistry. However, even a simple mathematics text baffles her! How many of us can read an insurance document or a credit card agreement with ease? Teachers must keep in mind that in order to develop and nurture independence, the maturity level of the student must be matched with appropriate resources.
4. *Independence can be achieved in groups.* Herber and Nelson-Herber (1987) advocate small-group learning experiences to develop students' independence in reading. We agree with their view "that students can be as much in charge of their reading and reasoning processes and their use of ideas when interacting in cooperative groups as when working individually" (p. 586). There is ample research to support this view on cooperative learning, which we discuss in Chapter 8.
5. *Independence means forever "becoming."* No one is ever totally independent as a learner. Fundamentally, we all rely on others to help us interpret, clarify, or elaborate on what we read. Helping students become independent readers and learners will require time, skill, and patience.

Fluent Readers

What does it mean to read fluently, and what assumptions do we often make about older readers' fluency (or lack thereof)? First, a common definition of fluency in relation to reading in the content areas focuses on students' ability to comprehend texts of various types with speed, accuracy, and appropriate expression (National Reading Panel, 2000). Another less common definition is one that focuses on students' fluency with information technology (American Association of University Women Educational Foundation, 2000). We believe both are important in terms of their implications for content literacy teaching and learning.

An assumption that is often made about older students is that they have attained a satisfactory level of fluency in reading assigned content area materials. Unfortunately, this is not always the case. In fact, among readers who struggle to comprehend, difficulties with fluency are often the culprit. Why is this so? Theoretically, readers have only a limited amount of attention, and when that attention is diverted to decoding words and pausing in appropriate places, overall comprehension suffers (LaBerge & Samuels, 1974). Slow and laborious decoding at the word level also hampers students' ability to monitor their reading. Klenk and Kibby (2000) venture that when text processing at the word level is not automatic, readers will not "know how it sounds and feels to read text fluently" (p. 673).

One aspect of reading in mathematics that is often overlooked is that of fluency with symbols (Rubenstein & Thompson, 2001). Fluency in reading mathematical expressions aloud indicates understanding. Rubenstein and Thompson have identified several challenges related to fluency in reading mathematical symbols, including symbols that require the reader to verbalize phrases (± is read "plus or minus"), expressions that may be read in a variety of ways (x − y may be read as "x minus y" or as "x take away y" or as "y less than x"), and differences in directionality; that is, symbols are not always read left to right, as is text (e.g., fractions have a numerator and denominator, both of which must be read—they are often presented vertically). Reading in mathematics is further complicated by the fact that inappropriate translations of symbols can create confusion and misunderstanding, as happens when −y is read as "minus y" rather than "negative y."

In science, fluency involves gaining information from print, diagrams, illustrations, graphs, and other modes of communication and synthesizing the important ideas into a cohesive whole (Shanahan, Shanahan, & Misischia, 2011). When reading science, the multiple modes of representation are treated equally and read recursively.

SPEED, ACCURACY, AND APPROPRIATE EXPRESSION The underlying assumption of fluency instruction, defined in terms of a reader's speed, accuracy, and appropriate expression, is that teachers will view it as a means to comprehension and not as an end in itself. Because adequate comprehension is essential for effective studying to occur, it is clear that fluency plays a pivotal role overall. The National Reading Panel (2000), while acknowledging that fluency instruction is often neglected in day-to-day classroom instruction, found sufficient research evidence to suggest that guided oral-reading procedures have a positive impact on students' fluency and comprehension across a range of grade levels and in a variety of regular and special education classrooms. Examples of these procedures are included in Chapter 6.

Fluency with Information Technology

One of several new terms to make its way into the field of reading education as a result of the information explosion associated with today's computer age is *information literacy*. It refers to what is generally defined as the ability to access, evaluate, organize, and use information culled from a variety of sources. Not to be confused with computer literacy, which reflects a technological know-how in manipulating software packages,

TECHNOLOGY **TIP**

Media Standards

National Educational Technology Standards for Students (2007) focus on communication and collaboration, research and information fluency, and critical thinking, problem solving, and decision making. The standards are available at the International Society for Technology in Education website. Similar standards are advocated by multiple national educational organizations, such as the National Council of Teachers of English (2008, 2013).

information literacy requires, among other things, knowing how to formulate a search strategy for zeroing in on needed information. The topic of Internet search strategies will be discussed later. For now, it is sufficient to link information literacy to fluency with information technology.

In a report focused on how to educate students in the computer age so that they become tech-savvy and capable of participating fully in e-culture (American Association of University Women Educational Foundation, 2000), the argument is made that fluency with information technology is much more than static listings of how to become more proficient at word processing or e-mailing. Instead, the authors of the report note that "fluency goals must allow for change, enable adaptability, connect to personal goals, and promote lifelong learning" (p. xi).

These goals will require that all students become fluent in skills such as designing a home page, organizing a database, communicating with others whom they may never meet in person, and evaluating personal privacy concerns. A useful set of nonprint media standards for helping students achieve fluency with information technology was developed at the National Research Center on English Learning and Achievement by Karen Swan. The nonprint media standards are divided into basic skills, critical literacies, and construction skills for each of three grade levels: elementary, middle, and high school (Swan, 2000). The importance of fluency with information technology is underscored by the addition of the Technology and Engineering Literacy Assessment to the National Assessment of Educational Progress (NAEP) in 2014, discussed in Chapter 4. Examples of strategies for promoting fluency with information technology are found in Chapter 11.

In summary, content area reading instruction involves much more than covering the subject matter in a particular specialty area. It includes dealing with assumptions about the role of the textbook, promoting active and independent reading, and developing readers' fluency. Students who self-question, monitor their reading, organize information, and interact with their peers possess some of the strategies necessary for becoming fluent readers and independent learners. However, their overall sense of themselves as learners will depend to a large extent on how they see themselves as readers and what it means to be literate in a fast-changing world.

What It Means to Be Literate

As individuals, we tend to approach literacy with our own agendas: We are in pursuit of something. Depending on our ideological frameworks, our educational backgrounds, and our social, economic, and political status in life, we may hold quite different perceptions of why we are in pursuit and what it means to be literate (Roberts, 1995). For many, literacy is something to value for its intrinsic worth; for others, it may be a symbol of achievement or a means for social change; and for still others, it is something to