Classrooms
of
WONDER
and
WISDOM

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Dr. Thein Lwin

Thinking Classroom
Foundation

[Logo]
Dedicated to
Greg,
Molly, &
Julia,
three remarkably unique
and
wonderful
people.
Classrooms of WONDER and WISDOM

Reading, Writing, and Critical Thinking for the 21st Century

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PREPARING STUDENTS FOR THE 21ST CENTURY

Today, we are witness to an information explosion of unprecedented proportions. The volumes of new information gathered every hour dwarfs even the most outrageous predictions from only 10 years ago. The February 27, 2010, *Economist* special report on the “data deluge” provides some startling examples. “Everywhere you look,” the article reported, “the quantity of information in the world is soaring. According to one estimate, mankind created 150 exabytes (billion gigabytes or two to the 60th power bytes) of data in 2005. This year, it will create 1,200 exabytes” (Cukier, 2010, p. 11). Mind-bending evidence is offered from all corners of the human experience. For instance, consider the following:

- Facebook is home to 40 billion photos.
- Wal-Mart processes one million customer transactions every hour, entering data into a 2.5 petabyte (two to the 50th power) database, which is 167 times larger than all the books in the Library of Congress.
- In 2000, the Sloan Digital Sky Survey collected in a few weeks more data than had been collected previously in human history. By 2016, the next generation telescope will collect that much information every five days.

At the present rate, the amount of information available increases tenfold every five years. As the article in the *Economist* (Cukier, 2010) concludes, this surge of information “…is already starting to transform business, government, science and everyday life.” (p. 11)

The extraordinary production of information coupled with unprecedented information access for most makes it impossible to conclude that enough content can be taught in schools to make a sizable dent in available knowledge. Direct content instruction will constitute only a small fraction of any content-area information base and represent only a fraction of the information students will need to know throughout their lifetime.

As more and more societies wrestle with the transition to and the fallout from a global economy, the central question educators must ask is “How can we best prepare students for life in the 21st century?” While learning content is essential, understanding learning processes is equally important. It is imperative that students acquire the skills for learning, take responsibility for their own learning, and recognize that learning is only fully accomplished when their knowledge level is sufficient to foster critical thought and informed actions (Meredith, 2002). Students must be prepared to successfully engage with and manipulate new information.
while seeking, through deliberate inquiry, answers to their own questions. Their own independence will rely on their capacity to consider information and ideas irrespective of others and act in accordance with their own informed judgments, making information not only useful but life sustaining. Their prosperity and their contribution to society will depend on their ability to examine new ideas from multiple perspectives and make judgments about the veracity and value of various ideas based on their individual and community needs and purposes. In short, if we are to prepare our students to manage and benefit from the incredibly exciting flow of information and ideas that populate their universe and, at the same time, protect them from the harm that can come from being unable to sort information into the useful or the useless—or as the Economist suggests, “pluck the diamonds from the waste”—then they will need experiences interacting and managing complex ideas and information. Responding to these 21st-century demands requires introducing into classrooms alternative constructs for teaching and learning. This text offers an alternative instructional approach founded upon what teachers already do well while leading students through the kinds of learning experiences that prepare them to cope with 21st-century demands.

The instructional model offered here is offered knowing, in fact counting on, practicing teachers and other participants being a protective and careful lot. Each year, teachers are challenged by a disparate cohort of students who inhabit their classrooms and who are entrusted to their care. Each class presents its own set of demands, needs, eccentricities, and each must travel from an array of starting points toward a somewhat uniform destination. The tasks and skills required to get everyone from here to there are numerous and complex. We are distant from the time when we thought the old-fashioned cattle drive model might accomplish the job. Today, when teachers gain skills and employ strategies that successfully guide students toward some of the myriad goals set for them, they are not likely to easily discard them. Thoughtful instructors engage a dynamic instructional model intended to move students seamlessly through a series of strategies to achieve a particular learning outcome. Often, there are strategies that work well but that may coexist with others that are less successful. How do we separate those successful practices from those others we know serve our students less well? How do we add new skills and strategies to an already existing instructional construct so we can take advantage of new understandings about teaching and learning without abandoning what is already working? How do we know why a strategy works in one situation but is not right in another? Upon what basis does a teacher select an instructional approach for the content at any given point in the learning process? Knowing when, why, and how to employ a particular strategy is critical to effective instruction and student learning but is not always easily determined. This text will disclose a model for instructional decision making that informs teachers about where students are in their learning process. Equipped with this information and a model for understanding how, when, and why specific instructional strategies work, teachers are able to successfully guide learners through the learning process to reach achievement goals.

SYSTEMATIC AND SUPPORTIVE CHANGE EXPERIENCE

Accommodating to a new model involves change, and sometimes change is uncomfortable. This text is structured to lead readers through a change experience that is
systematic and supportive. It is organized so participants may work independently, in book groups or in larger district professional development settings.

Responding to new demands and new realities requires changes not only in how we teach but also in how we organize and think about teaching and how we think about ourselves as teachers. Successfully navigating a change process demands careful planning and delivery and must respond to adult learning needs. We believe there are two key characteristics of the change process that must be present from the beginning for practicing educators to engage in an agreeable and lasting change process.

The first is that the process must build and sustain teacher confidence. Confidence can be compromised as we engage in change. Change engenders uncertainty and confusion for some. We ask ourselves if what we were doing before was wrong or perhaps inadequate. This is invariably not the case yet is a common concern as we approach professional development experiences. There are two important ways in which confidence is sustained through this change experience. Participants must be invited into the process with the confidence that what they are already doing well will be respected and protected. We begin here by acknowledging the exceptional instruction already being delivered in classrooms everywhere. As a participant, be assured you are engaging in a learning experience from a position of equality with your peers and with the authors. To support this contention, this text is presented as a conversation among educators rather than something delivered to educators. It is framed as a shared professional experience anticipating collective growth and will rely on the insights of participants to make the experience whole.

Another type of confidence we address is the confidence teachers demand before implementing something new for their students. Teachers must believe in the potential for success of any new approaches and must have confidence that they are adequately prepared for implementation. We strive to build confidence by sharing the voices of teachers engaged in instructional practice change all over the world. The professional development sequence offered here has not simply incubated in a laboratory. It has been implemented in literally thousands of classrooms and at all levels of instruction in countries around the world. From classrooms in the United States to those in Europe, Asia, and Central America, teachers have been engaged with this professional development model. These many extraordinary teachers have not been passive participants. Indeed, that has not been permitted. Participants have been partners in the development of this experience, giving their voice to content and process. They have implemented the model and strategies contained here and have done so successfully but not without making the practices their own and fashioning them, in collaboration with their peers, to meet the needs of their students. They participated in a series of integrated learning experiences drawn together by a powerful model for teaching and learning that classroom teachers have employed in their instruction with great success. Confidence also comes from and is sustained by providing authentic learning opportunities where strategies are modeled within the context of content-specific instruction.

The second key characteristic of successful, lasting change is derived from this latter source of confidence and relates to time and opportunity. Teachers must be given adequate time and opportunity to develop mastery of models and strategies before engaging their students. The professional development sequence that unfolds here allows you opportunities to learn through direct experience and then through practice with your own curriculum to become comfortable with just how to
implement new approaches in your own classroom. This enables' you to proceed, knowing you have the necessary skills and understanding to be successful.

The audiences for this text include, among others

- inservice and preservice teachers,
- district professional development specialists,
- curriculum development specialists,
- school administrators,
- university teacher preparation faculty, and
- interested educators.

The text is presented so an individual reader can follow the sequence, applying the content to his or her instructional practice. However, we encourage readers to come together in book groups or other forms of learning communities where questions can be raised, experiences shared. Importantly, throughout the process, dedicated inservice and preservice teachers can find support for an instructional approach that promises to lead to both enhanced student learning and enhanced student capacity to be effective lifelong learners.

PROFESSIONAL DEVELOPMENT
SEQUENCE STRUCTURE

This course of study is designed for immediate implementation. It blends theory with practice to provide implementers with substantiation for their teaching while detailing instructional approaches for classroom implementation across grades and content areas. Being practice oriented, it leads to immediate changes in classroom practice. Because changes occur immediately, school administrators must be informed as to what changes are taking place so they will recognize positive growth in professional practice. Administrators can inhibit positive change when uninformed. Their involvement in the change process not only provides sanction, it also allows them to make informed judgments about implementation process and success, enabling them to provide an ongoing, positive contribution to professional development outcomes.

At this point, it is probably clear that here you will encounter a teaching-learning model experientially. The text is organized so you will first experience the various strategies within a lesson embedded within a model framework. This first encounter is followed by a careful deconstruction of the lesson to make the underlying functions of the applied strategies and the learning experience whole and transparent. Then, you will be asked to consider how the methods or strategies might be implemented in your classroom within your curriculum. If working within a cohort or book group, foundational to success is creation of a positive learning community. You are encouraged to enter into your learning community with an open, positive frame of mind. This does not suggest you enter without a fair degree of skepticism. Open and positive merely imply a willingness to hear, understand, consider thoughtfully, and try out in practice what is being shared. As we emphasized from the beginning, good teachers weigh carefully new instructional approaches before incorporating them permanently into their instructional retinue. Care and caution are warranted. What is asked here is simply that, as a participant,
you commit to implementation in good faith in your own practice using your own content. After several implementations and appropriate modifications, if best judgment and student responses indicate implementation of a strategy is ineffective for you, then it should be discussed honestly in your learning community and, if other modifications are not offered, discontinued.

The three-phase instructional model that underscores this text is well supported, reflecting research on how people learn best. Models approximating the thinking and learning processes have been presented in numerous forms by numerous authors and researchers; some of whom include Temple and Gillet (1996); Vaughn and Estes (1986); Ogle (1986); Tierney, Readence, and Dishner (1985) and Herber (1970). The model here elaborates a means by which teachers can think about, organize, and guide students through the cognitive process in which learners must engage so that they might truly benefit from that learning experience.

In the first portion of this Professional Development Sequence (PDS), one activity is modeled at each stage of the framework for illustrative purposes. It is important to realize that the strategies and activities modeled at each stage of the framework are not limited to those presented in these model lessons. There exists a host of strategies that can be used effectively at each stage. Throughout the text, more strategies are added to each framework phase with the goal of building a large repertoire of strategies by phase. The number of strategies for each phase is, however, limited only by the imagination and creativity of teachers and students to design and implement more strategies.

CHAPTER BY CHAPTER

Chapter 1 provides a clear picture of how this professional development sequence unfolds. It will describe a linear process, conceptualized within a framework for teaching and learning that is cyclical in nature and intended to pattern more closely how people actually learn. From the outset, participants are expected to take an active role in the professional development process by engaging with the text and the tasks outlined. The authors’ assumptions about teaching and learning and the philosophical perspectives underlying conceptual framework of the PDS are also described. Each chapter will build on the previous chapters with respect to applications of the framework for thinking and learning to the classroom instruction. Each chapter begins and ends with clear expectations for learning along with the development of plans for immediate implementation. Finally, each chapter provides opportunities for participants to work together and reflect on the content and its impact on their teaching.

Chapter 2 presents the first experiential lesson through which the basic framework for teaching and learning is presented. Participants will experience a content lesson as students of that content and then debrief the experience as pedagogues. As participants do so, the framework is exposed within a genuine learning environment. Participants are then asked to begin developing plans for application of the framework to their own teaching. This sets the pattern for the remainder of the PDS of genuine learning experience followed by analysis, planning, and practice.

In Chapter 3, the framework is applied to a narrative text experience. Readers are engaged in a multiliteracy application of the framework with questioning at the heart
of the guided reading lesson. The critical role of questioning and engaging students at multiple levels through self-interest is addressed in practical ways. A variety of instructional strategies are modeled within the framework application, making transparent when and why particular strategies are employed.

Chapter 4 details how critical thought is best incorporated within classroom instruction and why. Critical thinking is presented as a complex, multilayered event that must be planned for rather than hoped for. Readers will experience an enhanced lecture on critical thought proffered within the framework, modeling strategies for student engagement.

Chapter 5 focuses on writing for thinking and models three writing for thinking strategies. Additional strategies are also presented within the three phases of the framework. A discussion of the importance of using writing as a tool for thinking in content-area studies is presented.

Cooperative learning and additional emphasis on fostering critical thought underscore the work in Chapter 6. Along with practical strategies, some discussion is offered regarding what is implied when a classroom becomes an environment for thinking and how cooperative-learning strategies can contribute to such an environment.

Chapter 7 introduces a way of thinking about literacy (reading, writing, speaking, listening, and thinking) as a tool for critical thought rather than as a subject of study. Readers’ workshop is used as the format for experiencing how the tool of literacy can be used to enhance learning across content and grade levels. In this chapter, a science lesson is modeled along with the now familiar debriefing. Explicit rules for engaging in a readers’ workshop type experience are provided to guide planning.

Chapter 8 further explores writing for thinking approaches for content-area learning and guides learners through several framework-based strategies for content-area study. The writing process is discussed in greater detail here to make more evident the power of writing for thinking. And in Chapter 9, participants reflect on the PDS experience, develop specific plans for further implementation, and identify additional needs for continuing professional development. Participants are asked to reflect on the personal goals they identified from Chapter 1 and consider whether they have attained these goals and objectives and if not, what is needed to reach them.
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Introduction

To become a better teacher, I must nurture a sense of self that both does and does not depend on the responses of others.

—Parker J. Palmer

SOME HISTORY

We owe an enormous debt of gratitude to the thousands of educators with whom we have worked over the decades. These opportunities to share teaching experiences and learn from one another have been incredibly enriching. We believe it is important to share part of this background so you will have some insight into how our thinking about teaching and learning evolved. During the 1980s, we were privileged to be working with teachers across the United States in school restructuring efforts. We worked collaboratively with teachers of all grades to try to reshape instructional practice to better meet students’ learning needs and improve achievement. As is always the case when we engage in professional development activities, these experiences are all at once intense, complicated, hilarious, moving, inspiring, and daunting. Each day is full of tough questions, cautious acceptance, outright rejection, creative adoption, wonderful stories, and enormous care. In the end, the push and pull of these efforts always comes down to what is best for students and, for us, what we learned from our partners in the professional development process that makes us better at what we do.

Through this work, we met thousands of educators across the country. We shared stories, spoke of hardships and successes, lamented the state of things, celebrated the resiliency of teachers and students no matter the “state of things,” and spoke with hope and optimism about the future. It was also through this work that we were invited to engage in something we never imagined. We were invited to the Republic of Slovakia (originally the state of Slovakia in the Czechoslovak Federation) to assist the Ministry of Education with the transformation of the education system from a communist to post-communist one that nurtured democratic thought and behavior. The whole story of this humbling and exhilarating experience is for another time. What is significant here is that through this work, we met thousands of Slovak educators and subsequently we had the great fortune to work with many thousands more over the next decade or so, as our work there expanded to another 30 nations.

As you might imagine, we had more to learn than to teach as we shared teaching experiences with educators in countries from Lithuania and Estonia to Bosnia-Herzegovina and Azerbaijan and Mongolia, and from the Burmese refugee camp
schools in Thailand. In each setting, the school culture reflected the unique character of the national culture, creating fascinating ways to think about and organize learning experiences. In school after school, we would encounter ways of teaching that informed us about how versatile we are as people, how able we are to open ourselves to opportunities, and how many wonderful means there are for accomplishing great and small things.

Of course, along with the myriad differences, we discovered how easy it was to find common ground. A discussion of teaching always begins with an abiding sense of responsibility for the personal and educational well-being of students. Discussions of teaching rarely dwell in the abstract. Teaching is grounded by the realities of the faces of students, whether eager or anxious, cautious or expectant, engaged or disenfranchised and what these expressions demand, if our teaching mission is to truly be accomplished. In tandem with the strong commitment to students is an equally dogged commitment to the content of learning, to the subject matter to be taught. Universally, teachers believe in their work and are committed to bringing knowledge to students that will enhance their capacity to live fruitful and fulfilled lives.

We have been on an extraordinary journey, one wholly unanticipated as it took us from our local school district to faraway places we never imagined. We met educators working to meet the needs of their students while dealing with staggering obstacles. We worked with teachers who had not been paid in seven months yet were enthusiastic to learn how they might better serve their students. What has always been most inspiring has been the ingenuity, the sheer cleverness of teachers to find ways to make instruction better. As you work through the pages of this text, it is our hope that you will work with other inspired educators, and together, we can continue to make instruction better.

COLLABORATION

Over the many years partnering with teachers, we have constantly been amazed by the remarkable conversations teachers hold about teaching when given the opportunity and time to discuss their profession in an atmosphere of trust and mutual respect. Teachers from across cultural, economic, and political divides easily identify with one another and enter into deeply resonant discussions about how best to practice their craft. One remarkable example unfolded before us as we had occasion to work with multiple teams of teachers in a weeklong intensive seminar. The timing for the seminar was just after the war between Armenia and Azerbaijan. We were meeting in Budapest, Hungary, to work with a number of teams. Due to visa problems for several teams attempting to enter Hungary, the two groups who made it to the seminar were from Armenia and Azerbaijan. As you might expect, the atmosphere in the room on day one was extremely tense. Undaunted, we moved forward, holding fast to our conviction, buoyed by years of experience working with teachers, that the universality of teaching and the unequivocal care and commitment to the well-being of young people ever present in dedicated teachers would overcome these tensions. It was not easy to overcome the powerful sentiments held by our participants, but we plowed forward, and in the end, we were right. By day three, teachers were meeting in mixed groups to discuss the anguish for both groups for not being able to meet student needs in the aftermath of conflict. Better still, they were speaking about what to do to solve the situation in their respective classrooms.
By day four, they were working together in the evenings to develop grade-level plans that worked across their two distinct cultures. By day five, they were determined to work together to bring about something better for both peoples. One year later, our teachers from Armenia were the first Armenians in the aftermath of hostilities allowed to drive across the border separating Armenia from Azerbaijan. There, they were met by their Azerbaijani colleagues to continue the collaboration begun in Budapest. This experience and so many others have convinced us that instructional change is not only possible but also welcome and that teachers working together accomplish whatever they set about to accomplish.

We have witnessed over and over how effectively teachers work collaboratively to bring about change. School culture as a manifestation of the status quo is deeply ingrained and often appears as an immovable object. Great force is required to impact something so intractable, great force applied not merely to the institution but as well to our own inclinations to do as we have always done. Collaboration offers a context for change that allows for differences to exist while still insisting that all participants are responsible for ushering through their classroom doors the core instructional changes needed to effect real growth in student achievement. There is more than anecdotal evidence that a collaborative model serves change process best. In an investigation of which teacher change models best result in student achievement growth, Goddard, Goddard, and Tschannen-Moran (2007) summarized their results: “The more teachers collaborate, the more they are able to converse knowledgeably about theories, methods, and processes of teaching and learning, and thus improve instruction” (p. 2).

As you progress through the text, you will form numerous partnerships. The text is structured to support individual learning experiences, book groups, or large groups. As you proceed, you might be working in partnership with grade-level peers, building peers, or district partners. Whichever approach you take, we look forward to being your first partner in this process and to partnering with you throughout your experience.

INTERESTEDNESS

Our experience taught us something else educators have in common around the world. It seems all of us recognize that students come to us, come to school, full of wonder. Early on, this presents as unbridled interest in discovery. We understand that it is one of our essential tasks to sustain such interest. Yet we hold common the recognition that while sustaining interest is one of our most important tasks, it is also one of our greatest challenges and one that we too often fail. We all have watched as interest dims in the bright eyes of our students. The exuberance young learners naturally bring to school too often succumbs to other pressures, to misplaced priorities, to misunderstandings about what truly matters. There is tragedy in the loss of interest, as it is a powerful force for learning. The desire to know coupled with the exquisitely elegant feeling that comes from a sense of knowing propels human learning and exploration better than any other means we have and sustains learners long after they have left us and formal instruction. As powerful a force as interest is, it is remarkable how easily we can miss it altogether and how disappointed those in our charge can be when we do miss it. This experience of, at first missing a child’s interest, is caught beautifully in the delightful poem “Coconut” by Paul Hostovsky.¹

¹. Reprinted with permission from Paul Hostovsky.
Coconut
Bear with me I
want to tell you
something about
happiness
it's hard to get at
but the thing is
I wasn't looking
I was looking
somewhere else
when my son found it
in the fruit section
and came running
holding it out
in his small hands
asking me what
it was and could we
keep it it only
cost 99 cents
hairy and brown
hard as a rock
and something swishing
around inside
and what on earth
and this was happiness
this little ball
of interest beating
inside his chest
this interestedness
beaming out
from his face pleading
happiness
and because I wasn't
happy I said
to put it back
because I didn't want it
because we didn't need it
and because he was happy
he started to cry
right there in aisle
five so when we
got it home we
put it in the middle
of the kitchen table
and sat on either
side of it and began
to consider how
to get inside of it.

You will see as you enter this PDS that considerable energy is committed to either uncovering or creating interest. From the beginning of Chapter 1, you will be called upon to think about your purposes for learning: what questions you have, what big issues you want to address, what direction you want to go, what possibilities you want to consider, what moves you to explore, what inspires you, and just what catches your fancy. We should confess though that our notion of interest might be agreeable in some ways but less so in others. We believe in exploring the inner secrets of coconuts when and where we find them. Not tomorrow, not in science class, but right now! There are a couple of kinds of ways of thinking about interest. One way of thinking about interest is that it is something that is under our control. That is to say, it comes from within us as something we have determined through reason or reflection that we are interested in learning about. We then make plans to pursue that interest, follow our plans, and explore the topic in some orderly, perhaps well-mapped-out strategy or procedure. This requires sustained (on task) and attenuated attention. The kind of attention we typically associate with self-control and discipline. This kind of interest is, of course, quite useful and is the "stuff" of discipline studies.
There is a second kind of interest or interestedness that we also encourage. We see enormous value in spontaneous interest that is immediate and pressing, a kind of interest that may not be affiliated with any long-term purpose such as a good job or a better grade. This kind of interest is not an interest carefully considered from within but results from encounters with the world. We believe in the strength of these spontaneous sparks of intrigue as also defining who we are and as the means by which we remain intimately linked to our world.

You will see as we progress through the text that we explore a number of seemingly dichotomous psychological or pedagogical constructs. We examine how these can be joined together in real instructional experiences that exploit both, seemingly opposite, ends of a continuum. We do this because we believe we are all of one mind with multiple interconnected realities and that learning best occurs across these realities rather than in spite of them or with deference to one over another. We consider many of these apparently dichotomous relationships are more aptly understood as compatible co-contributors to more complete understandings. For example, David Wong (2007) suggested, with respect to our discussion of interest, that while it appears we have one interest that is self-driven and one that is environmentally driven, we are better to think about the "...‘interface’ between person and situation" (p. 5) and what each kind of interest brings to us. We will seek as well to address what Rosenblatt referred to as the efferent and the aesthetic—the rational and the emotional, what Steven Pinker referred to as the creative versus reality-testing, and what John Dewey called the doing and reflective undergoing and how they might matter in our teaching practice.
Beginning a Professional Development Journey

The first word, "ah" blossoms into all others.

—Kuhai

EVOCATION 1

In his *New York Times* review of Steven Pinker’s book *The Stuff of Thought: Languages as a Window Into Human Nature*, William Salehan (2007) summarizes one of Pinker’s key points. He writes that “... creativity and reality-testing has taken us far beyond other animals and can take us farther. The next step is to dump our most natural and mistaken metaphor—education as a filling of empty minds—and recognize that we learn by extrapolating, testing, modifying, and recombining mental models of the world” (p. 14). In this book, we seek to create opportunities for you to experience firsthand a framework for thinking, teaching, and learning along with numerous sample-supporting strategies. Our aim is for you then to test these experiences in your own classroom, modify and extrapolate as you build, and rebuild mental models of teacher-learning practices.

Note: Why we begin with the word *evocation* will become clear as you work through the first few chapters. Once you understand how we are using evocation here, you will agree that it would be impossible for us not to use it right from the very beginning.
In this first chapter, we will share our philosophy of professional development; we hope as well to join you in a co-equal and collaborative partnership aimed at prolonging the ongoing global conversation among educators about how best to serve our children's educational needs in the 21st century. Whether you are an inservice, preservice, or other educator, we take as given your commitment to ongoing professional development as part of our shared journey toward instructional excellence. This chapter will offer a description of a professional development model and outline what will be required of you to take full advantage of the process. You will be encouraged to keep a journal of your learning experiences, as it is an extremely important part of the learning process and is one means by which you will observe the building and rebuilding of your own mental models of teaching and professional practices.

Throughout this Professional Development Sequence (PDS) you will be asked to engage in a variety of writing-for-thinking tasks. Each will be explained, and in most instances, you will write in your journal. The writings have two purposes, as does much of what you will do throughout the text. The first purpose is to engage in writing as part of a firsthand learning experience. The second is to provide a tool for stepping back to observe yourself as a learner. In doing this, try to gauge in some way how the writing tasks facilitate your own learning. Attempt to operate at both levels throughout the text, as you will be asked in the final chapter on writing whether and how your writing experiences impacted your learning.

OUTCOME EXPECTATIONS

At the end of this chapter, you should

- be aware of the underlying assumptions of the authors regarding professional development,
- understand the professional development model proposed here and what your role is in the learning process,
- have a writing journal in hand with some early entries,
- be aware of the link to critical thinking underscoring the model proposed here, and
- be engaged fully as a partner in this professional development and change process.

EVOCATION 2

Throughout the text, you will be guided to engage in specific activities. These activities are indicated by the lighthouse image in the margin. The first activity follows and asks you to first think about a topic related to thinking and learning, then asks you to share your thoughts. This pattern will be repeated throughout the text.

Let's begin by thinking about your view of the ideal classroom. It is best to do this with your eyes closed, so read on to understand the type of image you are seeking to envision, then close your eyes and bring your image to the fore. When you begin to create your image, do so in a way that
enables you to create a detailed vision. Think for a moment about how your ideal classroom looks: the sunlight through the windows, the desk or table arrangement, colors, and sounds. Picture the resources available around the room. Now, imagine how you and your students interact, the kinds of interactions you have with students, and the interactions among students. Imagine how your instruction unfolds and how your students respond. There may be other elements to your vision. Think about this until you have a clear image, clear enough for you to describe the setting along with the interactions and the teaching-learning process under way. You need take only a minute or so. Now, close your eyes and imagine until your image is clear.

**RULES FOR FREEWriting**

Freewriting is a brainstorming procedure. When freewriting, begin with a fresh sheet of paper and an open mind, and follow these few basic rules.

1. Set a time limit, five or seven minutes, let’s say, and write the entire time. Do not stop writing. If ideas stop flowing momentarily, doodle or write something like, “I can’t think what to say right now,” or “I’m stuck for now.” Soon enough new ideas will come.

2. Write whatever comes to mind. Do not edit as you write. Ideas that come to mind should find their way to the paper.

3. Do not worry about spelling or punctuation. The writing must be legible, interpretable, that’s all.

When your image is clear, if you are with other teachers, turn and share your vision with a partner. If you are alone, take a moment to capture your vision on paper with a quick freewrite. When you are finished, hold those images in your mind’s eye, as we will return to them from time to time as you progress through this professional development journey you have joined. You may want to write your thoughts as your initial entry in your own professional development journal. We encourage keeping such a journal as it serves to chronicle changes in your thinking and your practice over time.

**THE CHANGE PROCESS**

Learning itself is a change process, so it is not so surprising that our profession is constantly entertaining ideas of change and growth. It is important to monitor these various changes to be certain they are in the best interest of our students. The final test of any educational change idea is always how it plays out in the classroom. How students react, their learning progress, and the satisfaction teachers have in their work and with their classroom environment are the final determinants of successful instructional change. For this PDS, we have been listening to teachers’ reactions and collecting their comments for many years.

Linda, one of our colleagues, is a sixth-grade teacher. We listened to her comments during one of the monthly meetings of teachers participating in a districtwide professional development opportunity. “What most surprised me was how much my sixth graders think about things,” Linda said to her fellow teachers.
gathered around the table in a small discussion group. “It was a total surprise so many would have strong opinions on anything, but there we were discussing topics I never dreamed we could speak about, and my kids were taking stands on issues. I am really surprised! When I left our last meeting, I took my skepticism with me, thinking there was no way my kids were going to be ‘engaged’ in dialogue about important topics. Now, I am here to tell my kids were great; they were thoughtful, and they notice more than we think about their world. They have great ideas. I think we just think their opinions do not matter or that they don’t have any when they really do!” Matilda, sitting to her left, smiled, silently nodding her agreement.

Like so many great teachers, Linda has been teaching for years and knows her craft well, yet she eagerly volunteered to participate in the district professional development experience. Her motivation? Simply to continue to develop her teaching skills and remain informed. Linda is not about to abandon wholesale what she believes about teaching and what she knows works well and is best for her students. She is also not about to miss an opportunity to serve them better and grow professionally in the process. She always arrived at meetings full of news of the work going on in her classroom. She openly shared the good with the not so good. This day she acknowledged her discovery that sixth-grade students are critical thinkers with ideas and opinions to share. Her students, she discovered, have strong views, hold to ideas, ideals, and beliefs, and willingly offer to others. Matilda teaches second grade. Her motivation is much the same as Linda, but Matilda is quiet. To understand her, you must look for subtle signs: a head nod, a smile, a slightly furrowed brow, or raised eyebrow. When she nodded toward Linda, it was Matilda shouting that her experience with her second graders was similar.

Patrick Shannon (1989, 2007) cautioned about the “de-skilling” of teachers. His concern was that “bureaucratically” developed instructional text, such as basal readers, reduced classroom teachers’ role to a mere clerical function. He noted that the political and organizational response to concerns about student performance on standardized tests resulted primarily in reductions in teacher responsibility and choice along with the imposition of routines in order to standardize instruction. By controlling input (teaching), it was thought output (student test performance) would somehow be dependable and predictable. By relying on “expert authors” to develop what amount to routinized instructional texts, outputs would include increased performance on standardized measures. This simplistic formula has yet to live up to its promise, yet in many districts, the illusion that there exists a single simple “remedy” for low student achievement drives instructional design (Darling-Hammond & Bransford, 2005). Our teacher, Linda, as you could probably predict, was not about to become a clerk. She knew, as almost all good teachers do, that student performance is primarily a function of teacher instructional practices, classroom interactions, and teacher decision making.

You are about to embark on a professional development journey. There are many approaches to teachers’ continuing professional development, and each one operates from a set of assumptions, beliefs, and expectations. For many, these are implied but not made explicit. Here, we will attempt to lay some assumptions on the table so you will know and understand the basis for your experience. We will attempt to make transparent the beliefs about teaching and learning upon which this experience is constructed. We will also clarify expectations by describing the change process as it is applied here, how the PDS is delivered, and the role you will have in this professional development process.
ABOUT THIS TEXT

You have already learned that this text is written for use in several types of settings and with several audiences. The content of the text includes a discussion of an instructional change process that began in the United States and was eventually implemented successfully in over 30 countries and with well over 75,000 teachers (Meredith, 2002; Klooster, Steele, & Bloem, 2002). The instructional change model begins with a framework based on sound, well-documented instructional theories of practice (Steele, 2001). The framework acts as an umbrella under which an array of practical instructional strategies is organized. The framework guides the instructional process, leading students from a pre-awareness level through genuine and thoughtful encounters with academic content, resulting in genuine learning experiences—the kind that enable practical applications of content and thorough understandings that facilitate critical thought and the creative reordering of knowledge.

The instructional model we are encouraging cannot simply be discussed. The model advocates that learning occur at two levels simultaneously: process and content. (See Figure 1.1.) Process refers to the means and procedures by which information is introduced to a learner and the steps the learner takes to take ownership of content, making it personal, practical, applicable, and accessible within multiple contexts.

Figure 1.1 Learning on Two Levels

Content represents the ideas, information, and concepts, the nitty-gritty, to which learners are exposed both formally and informally. Content includes both the intended information and material developed purposely for instruction and considered to represent the intended curricular content and the content that emerges through dialogue within the learning community, what Eisner (2002) called the operational curriculum. Content also includes the prior knowledge relevant to curricular content held by learners at the outset of instruction. In this text, content and process will be presented on parallel tracks, as they are intrinsically linked. While reading the text, remain cognizant of the content and process connection and be actively experiencing both during the various model lessons. As a participant, you will be both a student of that particular content and a student of pedagogy, interested in the instructional process as it unfolds. Engaging as a learner allows you to experience and understand how your students will learn when you apply the teaching-learning approaches with them.
As suggested in this text, instructional practices will be modeled then described. This is most often accomplished in an inservice context but can be accomplished through text if we agree to be partners in this process and work together. It requires your commitment to active participation in the various guided strategies that make up the preponderance of the text. We believe strongly that learning is an active, involved, and demanding process. Yet learning is also personal, driven primarily by seeking answers to your own questions, connecting what you know to new and perhaps different or conflicting knowledge, and engaging in experiences that create a larger, richer universe of understandings and possibilities. This text will lead readers through an experiential learning sequence to both model and inform an instructional framework and companion strategies that, in aggregate, define a way of thinking about, organizing, and implementing instruction. Rather than as separate subjects, the model defines reading, writing, speaking, and listening as tools for learning across grade levels and content areas. Consequently, the model framework offered here, though literacy based, is intended for application across content areas.

As will become evident, we place high value on learning communities and believe in the power of dialogue and shared experiences as a way to facilitate discovery and long-term learning (Yangchen, 2009). We encourage critical inquiry and spirited discourse. In life, it is essential that we ask hard questions, seek solutions to our most vexing problems, and attempt to resolve our most intractable dilemmas in order to move forward to better ways of thinking and living. So too must we encourage academic communities to address their most pressing issues.

ASSUMPTIONS, VALUES, AND BELIEFS

Students need to tell each other and the world what they know—in order to find out what they know. Through the telling, they will learn. Through the telling, they will interpret the world as they see it to the rest of us.

—Judith Renyi

As we have suggested, this PDS experience is best described as literacy based in that it employs reading, writing, speaking, listening, and thinking as tools for learning across all content areas. There is tacit acknowledgment that the central component of learning is language based, social, and centered on the mediated construction of meaning between, say, an author (teacher) and learner. Relying on the work of Rosenblatt (1978) and many others, teachers and students will be actively engaged in the social act of creating and sustaining dynamic learning communities where responsibility for teaching and learning is shared. Often, the proclamation of a literacy-based PDS centered on reading and writing alarms content teachers, concerned they may be expected to become reading teachers. This professional development construct does not suggest this and encourages content teachers to remain focused on content and determine how best to apply the framework and strategies constructively and creatively to that content.

The premise here is that effective content teaching involves grounding instruction in the effective application of the framework and strategies so students gain not only specific factual information but also working knowledge of content. In other words, students will be able to reforged information into resources for problem
solving, for practical or creative application, independent analysis, or opinion formation. Alfred North Whitehead (1957) wrote in *Aims of Education* something about what to avoid in higher education that now seems to apply to all of education today. He said, “So far as the mere imparting of information is concerned, no university has had any justification for existence since the popularization of printing in the fifteenth century” (p. 138–139). What he deplored, of course, was the idea that teaching or learning is somehow complete with the sharing of facts. We agree and view learning as the process whereby we develop agency, in the way Maxine Greene (1994) speaks of agency as the capacity to act with knowledge in ways that utilize knowledge to advance our own constructive purposes.

Content knowledge, then, is compressed into two symbiotic elements or attributes. The first comprises the vocabulary, concepts, and information base on which the content area is defined and constructs itself as a quasi-identifiable entity. The second element contains the language and thinking skills necessary to successfully understand, assign meaning, manipulate, judge, create, and apply. In other words, content must come to us, to borrow a word from tech world, bundled. That is, for content to be made meaningful and lasting, it needs to be packaged and presented with a process that leads to an increased capacity for learners to connect to the knowledge encountered and make it useful as an agent for advancement. When this is not accomplished, there is overwhelming evidence that long-term learning is less likely to occur. Here we seek to provide the means for bundling content, if you will, to make the outcome of study not simply the acquisition of information but the development of informed thinkers and doers.

In the book *The Discoverers* (1983), David Boorstin wrote, “The greatest obstacle to discovering the shape of the earth, the continents, and the oceans was not ignorance but the illusion of knowledge” (p. 86). In the final analysis, our students will join a global culture. They will be confronted by new technologies, a continuing information explosion, unprecedented cross-cultural global encounters, unimagined career paths and skill expectations that will demand both a sound information base and advanced independent thinking and learning skills. Preparing young people adequately for this reality requires an educational experience rich with opportunities to reconceptualize knowledge to accommodate heretofore unforeseen demands, new discoveries.

**EXPECTATIONS**

We begin with the basic assumption that most teachers are engaged in teaching at a highly professional level and are typically applying instructional strategies believed to be effective methods for teaching and learning. This PDS begins with the idea that most participating teachers do not need to radically alter their teaching, nor should they consider tossing out those approaches they know to be effective. Rather, we are building on a foundation of solid instructional practice. To be sure, this PDS represents a change process. There are clear expectations that teaching practices will change. What is anticipated is that instruction will evolve as a cogent, comprehensive, and systematic activity that addresses the fundamental needs of today’s learners and raises their learning horizons.

Thomas Szasz (1974) wrote, “Every act of conscious learning requires a willingness to suffer injury to one’s self-esteem. That is why young children, before they are aware of their own self-importance, learn so easily” (p. 18). Change is threatening because it
is fraught with personal risk and uncertainty. Yet we are asking you to take these risks. The instructional model requires students to be active, engaged, and co-responsible for their learning; so too does the PDS you have now joined. Best results demand you be fully engaged with your learning community and in the experiential components offered. Your contribution is vital to your development and to your learning community. Your thoughts, opinions, experiences are all essential content. The good news is that many colleagues have already completed this process, and they suggest the risk is minimal while the rewards are great.

THE ROLE OF CRITICAL THOUGHT

There is reason to believe one of the highest goals we have for our students is for them to develop the skills of critical thought and with them the capacity to apply their knowledge and experiences to solve the vexing problems facing humanity. And vexing problems there are. In an article in the Chronicle of Higher Education (June, 2009) McArthur and Sachs suggest that “...the world faces many...challenges that will require concerted and highly skilled policy efforts in coming years. Those interwoven challenges include the mitigation of climate change, the control of emerging diseases, the reduction of extreme poverty, the development of new and sustainable energy sources, and the sustainable management of water and food systems” (p. 64). If we agree that teaching students to think critically is essential, then it must be introduced into teaching practice systematically (Zelina, 1994). It cannot be assumed that students will come to thinking critically naturally. It is also not enough to simply make critical thinking a part of the content of the curriculum. We have learned that critical thinking does not occur by teaching, say, “the seven steps to critical thinking” or other prescriptions for thoughtful behavior. It comes when students are first modeled critical-thinking processes, guided to think critically themselves, and then given time to do so. Thinking is a process similar to reading, writing, speaking, and listening. It is an active, coordinated, complex procedure, involving thought about something. Critical thinking is best learned by experiencing thought as a way of approaching content—that is, as something that is part of and an expected outcome of the daily curriculum. Research concerning critical thinking and learning suggests that a model focusing on teaching isolated skills and fact learning minimizes critical thinking. One group of researchers (Brown, Palincsar, & Armbruster, 1984) argued that learning skills separate from real-world tasks and purposes may allow students to do well on an objective test but leave them unable to apply those skills in new situations. The reality of high-stakes testing and satisfying multiple stakeholders dictates that critical thinking come packaged with content mastery. What we do know is that we learn and remember better that which we think about and link to our own contextual frames. Throughout this text, thinking will be incorporated with reading, writing, speaking, and listening for learning.

OUTCOME EXPECTATIONS

General

Successful professional development sets target outcomes and goals so participants understand where they are headed and are clear when they have
arrived. Setting target goals is not always as simple as it sounds. This particular PDS seeks to facilitate change by guiding readers through an orchestrated change process. However, the outcomes will vary from one reader to the next as settings and practices differ. Furthermore, in a collaborative model, dictating specific outcomes in advance removes from participants the power to set individual and group outcomes. We prefer to see the process as one of “unfolding design,” a phrase coined some years ago by a colleague, Brian Shirley, responsible for professional development for schools in Augusta County, Virginia. That is, we have a set of outcome expectations but encourage readers to set personal outcome expectations and modify them as needed in response to individual professional development progress and the subsequent reality of changing goals as a result of working in learning communities.

Stop Now. In your journal take 5 to 10 minutes to think about and then write your own set of target outcomes for your work with this text. Some are listed below, but we suspect you have goals of your own that will help you measure the success of your work.

Some expectations for participants are that you will do the following:

1. Increase the capacity of students to think critically, engage in critical reflection, take responsibility for their own learning, and form independent opinions
2. Successfully apply practical methods of teaching based on philosophically consistent and theoretically sound ideas, which fully engage students in the learning process
3. Teach within a comprehensive instructional framework that guides instructional decision making and reflects the true value and purpose for lessons and context
4. Experience increasing confidence in your own teaching based on successful implementation of the framework and strategies in your own educational setting and content
5. Become master teachers, able to serve as instructional models and resource people within your own professional setting

CHAPTER REFLECTION

In this chapter, we discussed the need for continuing professional development. We also disclosed our philosophy of professional development as supportive of a practical yet theoretically sound model that thrives best within a partnership where all partners are active and fully engaged. We began by detailing some basic assumptions and beliefs that underscore the model implemented here. Those include the notion that whether you are an inservice or preservice teacher, you have a commitment to professional service. For inservice teachers, the basic assumption is that your professional practice is already highly skilled, yet you retain an appreciation for the importance of ongoing professional development. We have made a commitment to offering a pragmatic, experience-based PDS readily implementable in your classrooms with the intention of improving student learning. This chapter also offered discussion on the importance of critical thinking.
Finally, with journal in hand and your image of an ideal classroom in mind, dive in. The succeeding chapters will engage you in learning activities at both content and process levels. Be prepared to think on both levels.

**JOURNAL ENTRY**

At this point, you may have some questions about this chapter, your role, how the process will unfold, or something else you are wondering about. Before you turn to Chapter 2, ask yourself if you have any questions at this point, and write down any that come to mind.
A Framework for Teaching and Learning

Knower and known are joined, and any claim about the nature of the known reflects the nature of the knower as well.

—Parker J. Palmer

EVCATION

Consider for a few moments that you are now about to teach a content you have never before taught. You have some time to prepare, so you know you will become knowledgeable of the content, if you are not already. With mastery of the content, you now need to decide how to teach it to your students. There are many decisions to make.

For now, though, think a bit about how you determine what to do first, second, and so on. What will you do to introduce your students to the content? How will you go about selecting particular teaching strategies? Why do you choose one over another? After you have thought about these questions, write down your thoughts, and in small groups, share what you have written. See if there is consensus as to how you all might start. If not, is there a pattern or perhaps no apparent method in the madness? Hang on to your ideas about putting a lesson together. We will now experience a content lesson together and then take it apart. You can compare your approach to this one. Be sure everyone shares his or her approach; then read on.

Developing a practical understanding of a framework for teaching and learning requires experiencing the framework within an instructional context. Chapter 2
presents the foundational framework for teaching and learning on which this professional development process is built. The framework is experienced within a guided instructional lesson. Following an introductory rationale, readers are led through using a brief content text. Taking active part in the lesson will give you the learning experience you need to understand what your students will experience when you use the framework with them. Discussion of the lesson and framework in which it is embedded leads to considerations regarding instructional implications for teaching and learning. Chapters 2 through 8 are organized in this fashion so you will first experience the framework strategies modeled and then reflect on your experience in order to analyze their pedagogical structure and the steps to implementation. You will also be asked to reflect on how you felt as a learner as you experienced the lesson.

OUTCOME EXPECTATIONS

At the conclusion of this chapter you should be able to

- understand and describe the three stages of the framework for teaching and learning;
- place various teaching strategies presented in Chapter 2 in the appropriate phases of the framework;
- prepare classroom lessons based on the framework, using present curriculum and available materials; and
- apply the framework and the various teaching strategies in your classrooms.

Drawing from many teachers' experiences with implementation, we offer one caution. When students' learning history is defined primarily by passivity and deferred responsibility, students may, when first invited to become actively involved, hesitate to do so. It is not uncommon for teachers to be confronted by silence when interactive instructional practices are first introduced. Students conditioned to a more teacher-directed instruction will not know how or whether to respond. Reactions vary: Students are sometimes cautious, sometimes distrustful, or refreshingly responsive from the start. Younger students respond more quickly than older students, as they have not spent as much time being silent and passive in school. Usually, several attempts are required before students accept that expectations for their active participation and shared responsibility are real.

RATIONALE

No one questions the importance of factual knowledge. There is a great deal people must know to successfully negotiate daily commerce. However, the idea that a specific knowledge set exists that will adequately prepare students for their future becomes less and less supportable the more rapidly societies change and information flow multiplies. Furthermore, this rapidly expanding knowledge base is
increasingly available to everyone. With electronic communications extending into almost all cultures around the world, every school and home is an information center with immediate access to the global information base.

What is required of students to be successful in our changing world is the ability to sift through information and make decisions about what is and is not important. They will need to understand how information is linked and how it can be manipulated to serve multiple purposes. Their future success will be determined by their ability to place new ideas and knowledge in context, to assign relative value to new encounters, and to reject irrelevant or invalid information. Students will be challenged to make meaningful—in critical, creative, and productive ways—that part of the information universe they encounter.

To manage information well, students have to be adept at applying a set of practical thinking skills that enable them to sort information efficiently and transform it into practical behaviors. Students will develop this capacity when instruction is embedded in a framework for thinking and learning that is systematic and self-evident—systematic so students can come to understand and apply the process consistently, self-evident so students can recognize where they are in their own thinking and learning in order to monitor and manage these processes independently. When students independently apply the framework to their own thinking and learning, they are able to

- contextualize their knowledge by adding new information to what they already know,
- actively engage in new learning experiences, and
- reflect on how new learning experiences change their understandings.

The model presented is based, in part, on a model first described by Vaughn and Estes (1986) and modified and expanded by Meredith and Steele (1997). Actually, the model is quite similar to many learning cycles. In his seminal work, Herber (1970) introduced an instructional framework for content area that incorporated both the content and literacy objectives of a lesson. The phases had different titles from the one presented here but were similar in that the ultimate goal of instruction was student independence.

Science educators proposed a learning cycle early in the 1960s (Atkin & Karplus, 1962). Their three-phase model, based on the psychological theories of Piaget, was used as the basis for instructional design in Science Curriculum Improvement Student (SCIS). The 5E Instructional Model (Bybee, Powell, & Trowbridge, 2008) is based on the early learning cycle work and has five phases: engagement, exploration, explanation, elaboration, and evaluation.

Although the various cycles have different numbers of phases and different names of the phases, the rationale is basically the same. The major difference here is that the framework is presented experientially first. We present the model experientially first because we know that you will learn it better and understand it more fully if you experience it yourself. The model is both a teaching and a learning framework. We will not say more now because we want you to experience it first. In debriefing the experience, you will be asked to reflect on how you responded as a learner and what you observed pedagogically as you went through the lesson. It is presented at the outset to provide coherence for all subsequent experiences.
EXPERIENTIAL FRAMEWORK LESSON

You are about to begin the first experiential lesson. Whether you are a participant in a professional development inservice, independently created learning community, class, or are an individual reader, please follow the text instruction so your experience will be genuine and serve you well as a source for later reflection.

In a moment, you will read a short article titled “The Sea Turtle.” Before reading the article we will do some thinking about sea turtles. Begin now by choosing a partner for discussion. In the next three or so minutes, first independently and then with your partner, make a list in your journal of all you know or think you know about sea turtles. It is important to write down everything that comes to mind about sea turtles. It does not matter if what is written down is accurate or not. What is important is to write down all that comes to mind, thinking about what you already know or think you know about sea turtles. Please begin making your list now, and when you and your partner have completed your independent lists, share and discuss. Look for similarities and for new ideas. When this is done, return to this text.

Now, partners, share your knowledge of sea turtles with the larger group. Have someone keep track of all the ideas shared on a board, overhead, poster paper, or some other medium. Any disagreements should be brought to the surface by checking from time to time whether all agree with what is being said. For example, there is often disagreement over the number of eggs sea turtles lay, what sea turtles eat, how large they grow, or how long they live. If these issues do not surface, it is fine to speculate about these questions now. It is quite good to encourage discussion, friendly disagreement, and taking stands on one side or the other. Where there are disagreements, indicate with a question mark by the item in your brainstormed list.

When the class ideas are all out, it is time to prepare to read the article. There are some actions you should be taking while reading. As you read, you will be making some marks in the margins of the article using the Interactive Notating System for Effective Reading and Thinking (INSERT) developed by Vaughn and Estes (1986).

<table>
<thead>
<tr>
<th>INSERT</th>
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<tbody>
<tr>
<td>The marks should be used as follows:</td>
</tr>
<tr>
<td><strong>✓</strong> Put a “✓” (check) in the margin next to something you read that confirms what you knew or thought you knew.</td>
</tr>
<tr>
<td><strong>−</strong> Put a “−” (minus) if some information you are reading contradicts or is different from what you already knew or thought you knew.</td>
</tr>
<tr>
<td><strong>+</strong> Put a “+” (plus) in the margin if a piece of information you encounter is new information for you.</td>
</tr>
<tr>
<td>**?” Place a “?” (question mark) in the margin if there is information that is confusing to you or there is something you would like to know more about.</td>
</tr>
</tbody>
</table>
As you read, you will be placing four different marks in the margin according to your own knowledge and understanding. You will be marking in the margins using "✓", "−", "＋", and "?” as appropriate to your own knowledge base. It is not necessary to mark each line or each idea, making your mark reflective of your relation to the information in general. You may end up with three or four markings per paragraph, sometimes more or less. "The Sea Turtle" can be found in Appendix A. Now read the article, making sure to mark as you read.

Once you have read the article, pause for a moment to recall and consider what you read; then turn to your partner and discuss the article. Discuss what knowledge was confirmed for each partner and what beliefs or understandings were disconfirmed. Check with each other to determine what was new or surprising. Also determine what you have questions about. Take time to look over your lists and go back over the article to look at your marks. Your markings will serve as convenient reference points for information confirming or disconfirming your previous knowledge. Your markings will also reference new or confusing information or ideas about which you would like to learn more.

When discussion is finished, make an individual chart of the markings to categorize information similar to the example in Figure 2.1:

<table>
<thead>
<tr>
<th>(√) Confirms</th>
<th>(−) Contradicts</th>
<th>(+) Is new</th>
<th>(?) Question or more information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young left to survive on own</td>
<td>Lays 50 to 100 eggs</td>
<td>Eats plants and fish</td>
<td>Where do the young go?</td>
</tr>
<tr>
<td>Lays eggs</td>
<td>Lays eggs several times per year</td>
<td>Travels great distances</td>
<td>How do they find the same beach each year?</td>
</tr>
<tr>
<td>Returns to same beach each year</td>
<td></td>
<td>Sheds tears</td>
<td>Are mothers really crying to keep sand out of their eyes?</td>
</tr>
</tbody>
</table>

Now, as a group, discuss the article, returning to the large-group brainstorm written on the poster paper on the wall or overhead. Review agreements and discuss disagreements. Discuss whether the article resolved them or other sources are needed.

This can be an elaborate and enjoyable conversation if questions arise or disagreement persists. This entire experiential lesson should take no more than one to one and a half hours and can be shortened with practice. If questions persist, various members of the learning community can take responsibility for finding answers to bring back to the group. If fact, this is the last step in this lesson, with the exception that new information will be brought back to the group for later discussion.
EXAMINING THE FRAMEWORK

Evocation Phase

You have now experienced firsthand instructionally and in terms of strategy application a brief application of the framework. Let’s examine what has occurred. To do this, first, think back to the very beginning just before reading about sea turtles. What were you asked to do? Take some time now to recall your experience. Try to list everything you recall from the lesson in the order it happened. Think what was asked of you and what you experienced as a learner. Then, share your list with your partner. Keep your list, as we will go over it together. You might want to make a T-chart with learner responses and pedagogical observations as headings for the columns.

As you remember, after introducing the topic, sea turtles, the very first thing you did was to recall everything you knew or thought you knew about sea turtles and you made a list. Then, you shared your list with a partner. Next, you followed a group discussion and sharing. So what was going on at this point? At this point in the lesson, it was important to bring to awareness everything you thought or understood about sea turtles without concern for whether it was right or wrong. Raising awareness of prior knowledge is a primary objective of the first phase in a three-phase framework for teaching and learning that will guide our thinking about teaching and learning for the remainder of the text. This first phase is referred to as the Evocation (E) phase.

During the evocation phase, students are introduced to new material or new learning experiences through questioning or through other connected themes that prompt thought about a topic or issue. In the sea turtle lesson, brainstorming was used first individually, then in pairs, and finally with the large group. With the large group, brainstorm ideas were written on a board or poster, and, as was modeled here, all ideas are accepted without concern for their veracity. Minimal direction was offered by eliciting some ideas or by exploring issues not raised otherwise but relevant to the text. In our example, we suggested considering what sea turtles eat, how many eggs they lay, and other qualities. This enables teachers to guide readers to the content of the reading. Despite these brief assists during this stage, it was important that you did your own thinking, generated your own lists of known or thought-to-be-known information. The teacher’s role was mostly to listen carefully to students’ ideas and guide occasionally.

Rationale for Evocation Phase

The first purpose of the evocation phase is to energize students to learn. Learning is an industrious enterprise not well supported by student passivity. Yet students often view learning as a passive endeavor. So energizing them to be active and then sustaining that energy is what will drive the learning process. Students’ learning experiences often resemble a subway ride. Students hop on, let’s say, the Sea Turtles line. They sit for a while before hopping off at the next station. A while may pass before the train comes by again, and they hop on for another short journey, only to exit at the next attractive station.
Early on in the sea turtle lesson, learners were actively engaged in recalling what they knew or thought they knew about the topic. This helped turn attention toward the topic you would soon be exploring in detail. Active engagement of this sort illuminates students' prior knowledge of the topic, making it available for scrutiny and for scaffolding to higher or richer understandings. Of primary importance in $E$ is that through this initial activity, learners establish a momentary baseline of personal knowledge to which new knowledge can adhere. Learning is a process of connecting the new with the known. Learners build new understandings from the foundation of previous knowledge and beliefs (Roth, 1990). As Figure 2.2 illustrates, learning is essentially a process of building bridges between what we know and the new we encounter. Thus, when we prompt students to rediscover previous knowledge and beliefs, the broadest foundation can be established on which long-term understanding of new information is built. Bringing prior knowledge to light also serves to illuminate misunderstandings, confusion, and misconceptions that might otherwise go unnoticed without active examination of held knowledge and beliefs.

**Figure 2.2  Building Bridges Between Known and New Knowledge**

![Diagram showing known and new knowledge]

Equally useful, prior knowledge comes to us as contextualized thought in the form of schema. Schema represents our previously established constructs about our assembled thoughts or ideas (Rumelhart, 1982). Schemata, the plural of schema, are the capsules our ideas travel in, but as Marshall McLuhan (1964) might suggest, the medium here is also the message; that is to say, as prior knowledge becomes accessible, so too our schema for that knowledge is in part revealed. The importance of this is understood when we realize that learning is ultimately all about altering our schema. So enabling learners to make conscious attributions and modification to existing schema is necessary for the incorporation of new knowledge. Schema helps to connect new information to known because the context for understanding is made self-evident. Facilitating permanent changes in understandings to reflect new knowledge requires linkages between new information and existing schemata.

The next purpose of the evocation phase is to set interest and establish purpose for study. Interest and purpose sustain engagement. However, as with cholesterol, there are two types of purposes, one better than the other. Teacher or text driven is one sort, self-directed another. Self-directed purposes are more powerful than those imposed from external sources. Self-directed purpose is more easily sustained both in and away from school. Without sustained interest, motivation and the energy required to reconfigure schema are less likely committed to the task. In our sea turtle
lesson, prior to reading the passage, it is not likely you were thinking much about
the lives of sea turtles. But brainstorming a list of thoughts and ideas and creating
questions to answer generated interest. Discovering alternative hypotheses, even
about the lives of sea turtles, can be intriguing and spark interest when deliberated
within a context of exploration and personal growth.

Evocation activities also serve another function. They are also useful to discern
students’ levels of understanding, the class knowledge base, and their various
perspectives and opinions. Divining student variations in knowledge and
understanding helps develop questions of interest and helps make instruction
personal, which can be a powerful motivator for reading for understanding. In fact,
Pearson and Fielding (1996) have suggested that the definition of comprehension is
having your own questions answered. Knowing students’ topic knowledge informs
teachers as to students’ readiness to engage the topic productively as well. Where
there is evidence of insufficient prior knowledge, a base must be built from what
students already do know.

Realization of Meaning (R)

The second phase of the three-phase framework for thinking and learning is
Realization of Meaning (R). It is in this phase that the learner first encounters the
new—new information, new ideas, or new experiences. This encounter can involve
text, as in the sea turtles example. It can also be through watching a film; listening to
a presentation; conducting an experiment; participating in a field trip; engaging in
debate; teaching with an interactive DVD, website, or video; involvement in a round
table discussion; or any other medium where we encounter something new.
Significant for instruction, this phase of learning offers teachers the least
opportunities for influencing learner behavior. What happens in Realization of
Meaning occurs in the mind of the learner, and what is happening in the mind of the
learner is not readily transparent. It is here that learners must share responsibility for
sustaining active engagement.

Rationale for Realization of Meaning Stage

Recent studies are disconcerting regarding student learning from text (NEA,
2004). Studies examining the learning outcomes of students following reading from
informational text suggest that many students in the upper elementary and high
school grades are not benefiting sufficiently from text. In fact, it seems often when
students read scientific or other narrative materials that directly contradict or correct
student factual errors and misunderstandings, they are unaffected by their reading,
leaving their erroneous conception and misunderstandings intact. This rift between
student “reading” and student comprehension is a major obstacle to achievement.

To understand how a reader can be so disconnected from text content while
reading, recall your own reading experience. Can you recall a time when you read
a page or perhaps many pages of text only to suddenly realize you have absolutely
no recollection of what you just “read”? More frightening are those times, and we
all have had them, when while driving, we are jolted by the realization that we have
no real awareness of the last 10 miles or so. Both are examples of operating without
active cognitive engagement either with text or, in the latter case, with the road. For
reading, this precludes the possibility of comprehending what we are reading, not
to mention the possibility of monitoring comprehension while reading. A second
inhibitor of comprehension is that we all look first for that which agrees with what we already know or believe. Most people find disagreement, well, disagreeable. Too often, students approach reading and other learning experiences anticipating no real cognitive engagement or need for change. The significance for teachers of the realization of meaning phase comes first in recognizing how ineffective student encounters with any content are without students’ active cognitive engagement with the content coupled with persistent comprehension monitoring and an inclination to learn.

The essential tasks of the realization of meaning phase are to sustain engagement, maintain interest and momentum created during the evocation phase, and support learners’ efforts to monitor their own comprehension and change. Passive learners often ignore lapses in understanding, unaware of or indifferent to their confusions or misunderstandings. We know good learners are efficient learners, busy monitoring their own understanding as they encounter new information (Pressley, 2002). When reading, good readers reread or apply other effective strategies if comprehension wanes. Listeners, attending to a presentation, will ask questions or note confusions or misunderstandings for later clarification. Students monitoring their own comprehension actively reference new information against their established schemata, purposively connecting the new with the known.

Practicing teachers know well how often students become lost as they wade into new content. A mask is seemingly drawn down over their otherwise alert faces. We know that without activation of prior knowledge and setting purpose for learning, there is little hope the shade will lift, yet these steps alone will not sustain engagement. Many students fail to understand that they are bored by their learning experience precisely because they are disengaged. They look to outside sources for their disenfranchisement and see only that their classroom, their text, or other medium, no matter how cleverly developed, offers no cure for their detachment. The realization of meaning phase is a partnership phase intended to bridge the gulf between teacher control of the learning process and student responsibility for contributing the energy and intention needed to fully engage with content.

There are a number of teaching strategies available to assist student efforts to sustained engagement. In the sea turtles example, the reader was instructed to apply the INSERT method to sustain cognitive involvement during reading. The INSERT strategy is an excellent tool for helping readers monitor comprehension (Vaughn & Estes, 1986). Asking students to consider whether the information they are encountering is new, confirming, counter to present understanding, confusing, or intriguing as they read demands attention to content and ongoing interface of the new with the known. Some may struggle with the idea of marking a textbook. We suggest students mark lightly in pencil so marks can be easily erased and have had success with this with students as young as third grade. However, a colleague of ours, Victoria Ridgeway, uses sticky notes—a practice that can work once students have experience with and understand how to use the method. Incidentally, the number of marks students use in classrooms varies according to the age and maturity of the students. It is recommended that students in Grades 1 to 4 initially use no more than two marks. In our example, we suggested using four. It may take some practice for students to attend to four marks without distraction. What the marks represent may also vary, depending on the purpose for reading and student experience with the marking system.
What students mark, what they are looking for in text is dependent on what you decide is most important in the text. It is up to you to decide what your goals are and what you believe students should take from their reading of the text.

Too often, we take for granted that students will somehow benefit from reading no matter what. The evidence is clear that this is not the case, so we need to consider how we involve students as we engage them in planned learning experiences. Work now in small groups or pairs to discuss the realization of meaning phase of learning. Think about the importance of cognitive engagement for your own learning and the necessity of metacognitive engagement to sustain what Rosenblatt (1978) referred to as a stream of aha moments. Share your thoughts with colleagues and list some ways you already work to sustain student engagement.

Reflection (R)

The final phase in this three-phase model of teaching and learning is the Reflection (R). Recall now what was done following your reading of the sea turtle article. You will recall you first completed an individual brainstorm. This was followed by a paired brainstorm and then, if in a large group, you did a group brainstorm. You then read the article employing the INSERT method. When finished reading the INSERT, markings and group brainstorm served as the basis for further discussion of the topic. Revisiting the group brainstorm, you looked for confirmation of previously held beliefs, reconciled some unresolved questions, and acknowledged inconsistencies or errors in knowledge as a group. INSERT offered an opportunity to categorize these observations at an individual learner level and generated a number of still unanswered questions for future research. In the process, you also looked for anything surprising in what you read.

Before reading on, take a minute to consider the discussion following reading the sea turtle text. What did it do for you as a reader and learner? How did the various activities impact your connection to the topic and the text? What effects were there on short- and long-term learning? What was required of you to complete the INSERT chart in terms of revisiting the text? Share your thoughts and keep them and your own experience with these strategies in mind as you explore the purposes of the reflection phase.

The reflection phase is most often omitted from the learning process, yet it is equally critical to long-term learning. During reflection, learners consolidate new learning by actively restructuring their schema to accommodate new learning. In this phase, learners truly make new knowledge their own. Learning is an act of changing, of becoming in some way different. Whether that difference is seen in terms of new understandings, a new set of behaviors, or new beliefs, learning is characterized by genuine and lasting change. This change occurs when learners restructure their schema and develop the necessary vocabulary to assure schema accessibility. So it is in the reflection phase that lasting learning is secured. In the sea turtles lesson, the reflection phase came following the reading of the article and involved all the subsequent activities related to the brainstorm, INSERT, and any further research done to answer additional questions.
Rationale for Reflection Stage

There are several essential purposes for the reflection phase. They include the following:

- Maintaining student engagement in the lesson and, in the sea turtle example, with text
- Orchestrating overt efforts to connect what is already known with new information
- Encouraging student ownership of new knowledge
- Becoming different
- Creating opportunities for multiple encounters with essential content
- Facilitating expression of new knowledge in students’ own language and making new vocabulary part of expressive vocabulary
- Allowing time for students to actively process new learning so that it moves from awareness to long-term memory

The Reflection phase is best understood by understanding its intended outcomes. There are two primary outcomes. The first is change. Teaching is foremost about guiding students to become someone other than who they are. This is why teaching carries such great responsibility and why it is critical that before each lesson, we have a clear sense of why we are teaching what we teach and what change we are seeking. For all learners, lasting learning is reflected in the changes that occur in our schema as it is altered to accommodate to the new. The second primary outcome is ownership. For learning experiences to be lasting and practical, students must consciously believe the knowledge is theirs and under their control, and that they can act or build on that knowledge with confidence.

We have all experienced those times when we use our knowledge to accomplish a new task. It might be mastery of a new digital camera, learning to salsa dance, the troop movements during the battle of Gettysburg, how to cross-stitch, or crossbreeding plants in a lab. The knowledge is truly owned when learners use the requisite knowledge to make something happen.

Orchestrating the Reflection phase of the framework requires attention to students at multiple levels. As with evocation and realization of meaning, reflection requires a sustained commitment to the task. Altering schema, becoming different, is energy intensive and tiring. Successfully propelling students through the process of change relies on energized students who remain fully engaged to the end of the lesson.

We know from experience and learning research that multiple exposure to new information dramatically enhances long-term learning. Yet we also know that simply insisting students review or memorize lists will not get this done. One need only guess at the number of lists we have all learned throughout our schooling and how many we can recall today. Repeated encounters with the new are useful when they are purposeful and driven by interest.

Some students seem naturally inclined to build connections between held knowledge or understanding and new experiences that require reconfiguring those
understandings. "Hey, demoting Pluto to a lesser planet makes the jingle I learned for the planets obsolete." "The melting polar cap does make me think differently about the possibility of global warming." But for many, especially those who perceive learning to be random acts of memorization, the process of building connections is not automatic and needs conscious facilitation.

When we express new learning in our own words, we lay claim to this new territory as part of our own knowledge base. Just as our use of new vocabulary makes it part of our functioning lexicon, opportunities to elaborate on our knowledge give form to new schema.

We learn to remember when new learning comes to us as a part of something larger and more conceptually clear. Knowledge of details is more likely secured if it underscores our understanding of something bigger, more categorical. Taking ownership of knowledge and moving learning experiences to long-term memory are most often the result of deliberate action. We can facilitate the process by involving learners in actions we know are necessary for long-term memory. Repeated encounters and incorporating new learning into expressive language are two early steps of long-term learning. The first serves learning by moving new from new to familiar. The second provides accompanying personal conceptual frames that enable retrieval and application. Contextualizing knowledge offers learners understanding about what sort of change is required to make knowledge permanent (Pearson & Fielding, 1996). I do not need to change my global thinking about the solar system, but my notion of what constituted a planet needs to change if I am to understand what is being said about Pluto and the larger moons of the larger planets.

Since reflection is a time of change, of reconceptualization, another goal of this phase is in generating a robust exchange of ideas between students. Exposure to multiple ways of integrating information offers exposure to creative, thoughtful constructs and solutions, which might be more practically applied or might represent intriguing ways of thinking.

THE ERR FRAMEWORK REVISITED

Teacher Experience

You have now experienced the beginnings of what we will refer to as the ERR framework. Understanding ERR is foundational for your understanding of the teaching-learning framework, for the application of strategies, and for the model of critical inquiry instruction to follow; so some considerations of its worth to instruction and the benefits to teachers and teaching from implementing ERR should be shared. Students come to class mostly occupied by their own lives outside of class. They do not walk into class hoping to examine the secret lives of sea turtles. We can all easily imagine, however, students walking into class thinking about something that just happened in the hallway between two friends and the ripple effect of that event during the lunch hour to come. Our task at this point in their lives is to persuade our 20 or 25 or 30 or more students first to refocus their attention on sea turtles or Shakespeare or the Civil War or algebra or weather systems or whatever else and to allocate enough energy to compel them through their study to an endpoint of change and growth. Not an easy task with the sheer number and power of competing distractions that fill the lives of students. The ERR framework provides a mechanism for organizing instruction and applying systematically the
best strategies for teaching your particular lesson, enabling you to engage students in an effective learning sequence that is intended to energize students' involvement and solicit them as partners in their own learning experience.

Teacher time is limited. ERR offers teachers a means of organizing lessons in a timely way that provides an instructional guide through the phases of learning each student must pass through to learn permanently. Lessons often seem to emerge out of the ether or fade at the end without a sense of a real purpose or at least a beginning, middle, or end. This leaves teachers and learners wondering whether anything was accomplished. Through application of the framework, a clear beginning, middle, and end unfold, and in many instances, a clear transition to succeeding content emerges rather self-evidently. The ERR teaching-learning framework provides instructional routine, allowing management of the basics of teaching; good lesson planning, well-conceived goals and objectives, targeted standards, and support for all students to perform well on assessments by creating relevance for content through instruction linked to individual experience and learning history. It offers an instructional approach teachers are comfortable modeling because students typically respond with increased interest and energy, making instruction more enjoyable and classrooms more creative, constructive, positive communities.

As discussed earlier, there are numerous instructional frameworks for engaging students actively in their own learning (Vaughan and Estes, 1986; Vaccaro & Vaccaro, 2008). The ERR framework offers an instructional paradigm that employs reading, writing, speaking, and listening as tools for learning as described by Meredith and Steele (1996); Meredith, Steele, & Temple (1998); Steele (2001); and Meredith, Steele, & Kikusova (2001). The model integrates practical instructional methods into a framework for thinking and learning that embody the fundamental findings of literacy research about teaching and learning across grade levels and content areas.

**ERR provides teachers with a context in which they do the following:**

- **Activate student thinking**
- **Set purposes for learning**
- **Motivate student learning**
- **Actively engage students in the learning process**
- **Expose learners to varied opinions**

- **Help students to ask their own questions**
- **Provide rich discussion**
- **Stimulate change**
- **Stimulate reflection**
- **Encourage self-expression**
- **Facilitate critical thinking**

These models all seek to accomplish similar instructional goals of a practice that actively and equitably evokes voice, establishes purposes for learning, shares power, and recognizes the need to allow time for taking ownership of knowledge. By facilitating the transfer of contextualized knowledge (Meredith & Steele, 1997) students can practically apply, teachers are transformed from lecturer to partner, and classrooms are neither teacher nor student centered but learning centered. In such a setting,
students are expected to bring to the learning environment active minds and sufficient energy to make the personal changes required for the acquisition of lasting knowledge.

The ERR framework is a concise, transparent, yet powerful instructional model. Students moving through the framework routinely experience a definitive sequence of learning behaviors, which lead them toward successful integration of new information with previous knowledge. Student time in the classroom is limited, with the preponderance of learning ultimately taking place outside formal instruction. Through a transparent instructional model, students learn the skills and processes necessary to become effective and efficient learners throughout their lives. Because it is transparent, ERR allows students to come to understand the steps required for their own learning and what to do to transition through the learning process.

Furthermore, by using the ERR framework, teachers plan lessons based on how people learn. Hana Kostálková (2003), Director of Reading and Writing for Critical Thinking (RWCT) of the Czech Republic, describes how she sees the framework infused into lesson planning.

The framework for teaching learning: Evocation—Realization of Meaning—Reflection, permeates the whole RWCT program (see http://www.rwctic.org/ for more information). It helps us to plan the lesson, and when we as teachers experience it fully, it becomes our “educational nature.” We stop to think about ERR, and we plan instruction so that it respects natural processes that take place in a learner’s brain. Our instruction becomes effective because it corresponds to the needs of the learners giving them enough intellectual and emotional stimuli in a way that stirs students’ interest in learning. Thanks to the methods through which the individual phases are realized, students get an opportunity to practice their skills critical for their life in a democratic society, and at the same time, they learn a lot of factual information and understand their relationships. (p. 3)

CRITICAL THINKING AND THE FRAMEWORK

How is this framework for teaching and learning linked to critical thinking? Chapter 4 will examine critical thinking in greater detail. However, here it is useful to build a link between the framework and critical thought as an evocation for Chapter 4. Critical thinking requires the ability to understand and reflect at multiple levels on what one knows and thinks. To some extent, critical thinking requires a level of command over our knowledge that enables us to manipulate, defend, promote, or hypothesize. For this to happen, students must bring their knowledge and understandings to an awareness level, the central purpose of evocation. Failing to activate prior knowledge and the schemata in which it is embedded, learners end up entertaining vague, confusing, or even conflicting thoughts simultaneously. The beginning point for thought, then, is coming to know what one already knows.

Critical analysis of what we know, think, and believe requires thoughtful, often inventive deliberation over new knowledge and how applicable it is to previous understandings or about how previous understandings may be accommodated. Students are most motivated to thoughtfully deliberate when they sense they have some control over their learning. When students realize they have control over their own cognitive and metacognitive processes, they become better able to hear and
understand new ideas and new ways of integrating information and concepts. They are then more able to manage new information because they have greater confidence in their ability to successfully integrate new knowledge with previous knowledge.

Confident students able to engage in metacognitive processes are typically more open to new ideas and influences that can be productively incorporated into their existing schemata. Some worry that students will too easily alter their belief system if left to their own devices. Actually, the opposite is the case. David Wong (2007) writes, “In my opinion, though, metacognitive experience is a feeling about whether something makes sense or not, rather than a feeling about what sense something could make” (p. 5). It is the metacognitive that opens our minds, makes us receptive by determining that we sense sense. It is active cognition in a reflective process that helps us determine beliefs. It is far more possible to toss away all we presently believe in if we are not cognizant of our existing beliefs, thoughts, ideas, or ideals and constructs supporting them. By becoming more cognizant of our knowledge, understandings, and beliefs, we also take more ownership of them and are less able to disregard them in the face of flimsy alternatives. Finally, critical thinkers are able to more freely combine ideas and information because they are starting from a familiar and self-evident knowledge base. By being aware of their knowledge, which starts with evocation, students are better prepared to make creative use of that base to solve problems, formulate opinions, and generate new ideas, which is the outcome we seek in reflection.

FRAMEWORK STRATEGIES ORGANIZATIONAL CHART

As a concluding activity, make a chart similar to the one below to organize the strategies encountered so far. Turn your journal lengthwise and place the phases of the framework at the top of the page and list the strategies in the appropriate phases (see Figure 2.3). You are encouraged to maintain this chart throughout your work with the text, adding new strategies to each phase as they are experienced. The initial charting is done below. As strategies are presented, it will be a useful exercise to always consider where in the framework the strategy best fits. You will see strategies that may fit in several phases. Where they fit depends on how they are applied instructionally and what goals for instruction you intend. So, for example, the strategy Group Brainstorming was used in our sea turtle example in the Evocation phase. It can be applied equally effectively in the Reflection phase, the determining factor being whether the intent of the strategy application is to provide a means of organizing prior knowledge or to categorize new knowledge and prior knowledge as a means of integrating the new with the known.

<table>
<thead>
<tr>
<th>Evocation</th>
<th>Realization of Meaning</th>
<th>Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paired reading</td>
<td>INSERT</td>
<td>Individual brainstorm</td>
</tr>
<tr>
<td>Group brainstorming</td>
<td></td>
<td>Group and paired discussion</td>
</tr>
<tr>
<td>Individual brainstorming</td>
<td></td>
<td>Group brainstorm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INSERT chart</td>
</tr>
</tbody>
</table>
CHAPTER REFLECTION

Chapter 2 began with a discussion about how you organize content into a sequence of effective lessons. We thought about how to sequence encounters with content knowledge, what strategies to select to effectively deliver instruction, and why. This chapter then offered an experiential application of the ERR framework. Foremost, the framework serves as a conceptual umbrella under which we can assemble an instructional sequence that reflects the learning process all learners must pass through before they are able to take full ownership of new learning. As such, the ERR framework provides a flexible structure for planning and implementing instruction. At its core is a clearly articulated learning sequence, yet the strategies used may be as varied as the number of effective strategies a teacher has in her or his quiver. What the framework offers at a basic level is a way of understanding why one strategy may serve better than another at a particular point in the teaching-learning process.

There is an old, wise, and familiar saying, “The road to hell is paved with good intentions.” This can easily be rephrased, “The road to instructional disaster is paved with great teaching strategies.” The right strategy at the wrong time will lead to disappointing outcomes every time. As we go through the text, you will encounter increasing numbers of teaching-learning strategies. It will be important to situate these within the ERR chart so their utility as facilitators of instruction and learning will be evident.

However, before proceeding, stop to consider the implications of the framework; think how its implementation might change your own teaching. Share your thinking with a partner and speculate some about how the framework can facilitate your own lesson development. Think about what you already do or how you already conceptualize your lessons that might incorporate the framework at some level.

Then think about a content area and a one-class-length topic you already teach, and with your partner, develop a lesson plan for this content using the framework and strategies from this chapter or others with which you are already familiar. Then, share these lessons with the large group and discuss how they might or might not work.
Narrative Text and the Power of Questioning

Perhaps the most effective way to involve a large number of learners is through vivid, dramatic narrative.

—Howard Gardner (1999)

EVOCATION

In Chapter 2, we read from an informational text. It is important that informational text be introduced to even the youngest readers. There is evidence (Yopp & Yopp, 2000) clearly indicating that young students can manage such text and, in fact, find it motivating (Kleitzen & Dreher 2003). Sill-Briegel and Camp (2000) described a “twin text strategy,” blending thematically similar narrative and nonnarrative text so students will come naturally to see the link between nonfiction and narrative text.

In Chapter 3, we will explore working with narrative text, experiencing a narrative text lesson in which the ERR framework is applied at multiple levels. This somewhat more complex framework application yields a more layered lesson, enabling students to examine text in greater detail while developing more complicated images and understanding and, consequently, a more intrinsically rewarding outcome.

As with the sea turtle lesson, as you proceed through this lesson, attend to it at two levels. One is as a student of literature, so attend carefully to the text and participate in the conversation regarding the text, building understanding as you read. The second is as a student of pedagogy. At this level pay particular attention to the teaching-learning process as it unfolds during exploration of the text and the subsequent
instructional activities. Be mindful as well of the ERR framework and how it is applied. Finally, for this lesson, pay some attention as well to the way in which questions drive the lesson. Observe how they guide your thinking and the kind of thinking you are asked to engage in as you read or consider content. Attending to all these variables is a tall order, so you will be busy.

As with sea turtles, when the lesson is complete, we will take time to examine the lesson in some detail. You will be asked to think about how you responded as a learner during various points in the lesson and your view of the strategies and the lesson in general pedagogically. We will also examine the role of questioning in the lesson and its impact on learning.

OUTCOME EXPECTATIONS

At the conclusion of this chapter readers should

- be able to engage a class in guided inquiry using multiple question formats;
- understand the value of questioning students at various levels;
- understand the thought processes associated with various question levels;
- understand the relationship between questioning and critical thinking;
- understand the importance of teacher questioning for promoting critical thinking; and
- be able to present a narrative text to a class, blending the ERR framework with skilled questioning practices, stimulating various types and levels of cognitive processes necessary for students to interact with text at increasingly sophisticated levels.

TEACHER QUESTIONING

Think for a moment about the typical questions you ask your students. What prompts those particular questions? Where do they come from? That is, what makes you ask one question and not another? What are your purposes for asking questions? Think about these questions for a few minutes; then discuss with a partner or enter your thoughts in your journal.

Now, as you read this next section, see if what you thought about questioning and its sources and purposes connects with the text.

Questioning is a powerful tool for eliciting information and ideas, for setting great acts in motion. Used properly, questioning propels thinking forward, uncovers underlying beliefs, strikes at the heart of issues. Television talk show host Larry King’s long and successful career is built around his capacity to use questions to drive compelling conversation and tease out new information, new revelations, or new insights. Over and over, we have examples of how a single question set an enormous chain of events in motion. During the Watergate hearings, the basic question asked over and over again was, “What did you know, and when did you know it?”
But the question that changed the nation was, “Are you aware of any recording devices recording conversations in the Oval Office?” The lives of the authors of this text were forever changed by a single question. Following the fall of the Berlin Wall, the Education Minister for the then state of Slovakia in the Czechoslovak Republic came to America to an education forum and asked, “How do you teach democracy?” This single question led these authors to implement a national school reform effort in Slovakia (see http://www.zdruzenieorava.sk/xmap/index_en) that ultimately reached over 32 nations around the world.

The kinds of questions teachers ask establish the intellectual climate of the classroom. Questions determine what is most valued; how right and wrong are defined; and who and what are, or are not, sources of information and knowledge. The types of questions asked can teach students that knowledge is not fixed and that ideas are malleable. Or questions can limit student thinking to simple recitation, constraining thought and informing students that their own thinking is superfluous. Questions that invite students to reflect, speculate, reconstruct, imagine, create, or weigh carefully elevate the level of student thought and confirm for students that their thinking is valued, that their views constitute a contribution to their learning community.

Studies of classrooms in the United States suggest that over 60% of the questions teachers ask students are literal-level or factual questions, 20% are procedural, and the remaining 20% are at a higher cognitive level (Cotton, 2003). Whether the subject matter is science or literature, the questions students confront most often require only single-word or simple-phrase responses. Questions like name a four-legged animal; what is the name of the village in a story just read; or how many, what color, how far, what date, and so on exemplify classroom questioning. With so many literal-level questions being asked, it is no surprise that students value factual information above all other forms of knowledge and attend most to this level of thinking.

However, literal-level questions require only minimal use of language, do not involve meaningful conversation, and demand only a superficial awareness of content along with words or phrases borrowed from a text. Many students develop the capacity to recall factual information without ever coming to understand the central ideas for which the factual information is provided in the first place. They are able to memorize without being meaningfully challenged or changed by their learning experience. Yet having been fed for years on a strict diet of literal-level questions, we find that altering our pattern of questioning is nearly as difficult as giving up an addiction. Despite the difficulty, it is imperative that we give up our dependency on recitation questions so our students will develop the necessary skills to think through the hard questions 21st-century life presents.

Turn to your partner or to your journal and review what you thought already about questioning and then discuss how the ideas shared here concur with, disagree with, or perhaps add to your thinking about classroom questioning purpose and practice. We will return to questioning later, following a narrative lesson, so keep your ideas about questioning in your mind as you engage in the next lesson.

**MODEL ERR LESSON WITH A NARRATIVE TEXT**

The following guided reading activity is intended to engage students in reading text while involving them in critical analysis of the text. The ERR framework, demonstrated
here with narrative text, is the same as that presented in Chapter 2, though implemented differently using expository text. As you experience this model lesson, note the differences and similarities between it and the expository lesson.

In this lesson, you will again play two roles: first, as a student, by participating fully in the guided lesson. This way you will be prepared to reflect on it as a learner. The second role is that of a student of pedagogy. Notice how the various activities within the lesson impacts your learning so you will be able to recall these experiences during part two of the lesson. This model lesson uses the short story “The Sniper” by Liam O’Flaherty (Appendix B). (Our thanks to Beth Whetmore for developing the segmentation of the story and many of the prompt questions while she was at the University of Virginia.)

In a moment, you will begin this lesson by reading a short story. The text is divided into four segments. You will read one segment and stop to reflect on and discuss that segment before reading further. Do not read ahead in the story, as you will be reading in a particular sequence. Reading ahead will distort your learning experience.

Before you start reading, we need to say something about the author. If you are in a learning community, someone should read aloud the introductory piece about the author. If not in a learning group, read the author information and then stop. This should take only a few minutes. Then take a few minutes to speculate about how the author’s life experience might inform you about his writing. After this deliberation and some brief additional instruction, you will read only as far as the indicated first stop. In this first reading, read only the first two paragraphs. Again, it is important not to read past the stopping point. Please read the introductory comments about the author now and think about how his life experience might influence his writing.

Now, as you prepare to read the short story, notice the sensory contrast between the first two sentences and the last three sentences of the first paragraph. The first paragraph seems to present a deliberate contrast. Please go ahead and read the first paragraph. If you are in a learning community, signal one another when you have finished reading.

Now that you have read these first two paragraphs, let’s think about them. How did you feel after reading the first few sentences? Did you feel any sensory changes? What did you see? What did you hear? (Translation)

There is no correct answer, of course, so share your feelings and sentiments. In groups of responders, it is important to listen and acknowledge the credibility of all responses. So what is the contrast as you understand it? Is there something here about the natural world and the human world?

Based on your brief reading so far and your knowledge of the author, wonder for a time about what you think might be the main problem in this story. What big issue or issues might be at stake? Why do you think so? (Interpretation)

In a moment, read to the next stop. As you read, try to picture the scene in your mind in as much detail as possible. (Translation) Remember to read only to the stopping point and signal others when you are finished reading.

Now that you have read to the second stop, take a few moments to reflect on what you have read. When done, conjure up the image you have created in your mind. What do you see? (Interpretation) In your group, share images of the scene. Be detailed so others can see vividly the images imagined. Think now as well about the main character, the sniper. What do you think the sniper was feeling? How do you
feel about the sniper? Do you like him or not like him? Was it okay to shoot the “old lady”? Why or why not? What must it have felt like to pour iodine on the wound? Oh, do you know what a parapet is? (Memory)

Now, before reading on, ask yourself what you now think this story must be about. What do you think will happen next? (Analysis) Do you think the sniper will get out alive? What makes you think so? (Synthesis) When you have thought and perhaps discussed your responses, think about what is to come. You may guess this story will develop a bit of a twist and then another close after the first. Look for those points in the next section of the story where you sense a twist of some kind. (Interpretation) Read now until the next stop. Signal colleagues when done.

Well, there is certainly a lot to consider and a lot going on for such a short story. Did you see the twist and then a bit of a twist again? Yes, what about the sniper’s change of mind both times? What do you think was going through the sniper’s mind? Is there something good about what is happening? What might not be so good? Why do you think so? (Evaluation)

Well, everything is now almost done in this story, but the author will not finish for another 200 words or so. Thinking of what has happened up to now, can you predict how the story will end? Jot down some thoughts or share how you might end this story. Why? Discuss different views and why you think as you do. Do not limit this conversation, as it can be full of fascinating insights and informative perceptions.

As you now prepare to read the last section of the article, think about what is at issue in this story. If you were the sniper, how would you feel right now? What would you do and why? (Synthesis) Okay, read on and signal when you are finished.

Well, it’s done. Did it end as you thought it would? Share your thoughts with others or jot down your immediate reactions and read them aloud to see and hear them. This will bring more clarity and power to your own thoughts. Now, wonder if this story were to continue what would happen next. What would the sniper do? Will the sniper survive? What evidence is there in the story to support what you think? How do you feel about the sniper now?

Now, consider what you think the big issue is in this story. Is it warfare, civil war, brotherhood, or something else? What about the concept of brotherhood? Is it limited to blood brothers, or is it inclusive; can we attribute brotherhood to all humankind? Share your thinking with others and listen to what others say and think about “The Sniper.”

“The Sniper” is a powerful story. O’Flaherty has managed to say a lot in a short amount of time. The story ending typically strikes readers viscerally. It is clear the author has written the story to make a point beyond the detailing of the events in the tale itself. O’Flaherty had a larger purpose. Certainly, he intended to stimulate thought about war and peace. This is one reason why we would want our students to read the story. So our work with this story is only just beginning. So now, we want to expand our thinking by contemplating how this story fits into our thinking on the broader issue of war and peace. To stimulate our thinking and to lay our ideas out where we can view them to perhaps understand more precisely their implications, we will do some writing. Read first the following two quotes. Think about them for a few seconds and then select one of the quotes to respond to.

“"The tree of liberty must be refreshed from time to time with the blood of patriots and tyrants.” Thomas Jefferson

“Suppose they gave a war and nobody came.” A poster commonly displayed during the Viet Nam War.
After selecting a quote, consider how it might relate to "The Sniper" and your views on war and peace. Write for no more than eight minutes. However, for this writing, use the freewriting technique discussed in Chapter 1. Remember to follow the three basic rules of freewriting.

Begin writing now and write for eight minutes.

In your learning community, take time now to share your writing with a partner. Partners should read their writing. When reading, do not paraphrase but read what is written. After you have read all your writing, begin a discussion about why you believe as you do. Following this paired sharing, as a larger group, determine how many have written from each of the quotes. Listen to the writings of some volunteers willing to share. You can then begin a larger discussion of the various beliefs expressed by colleagues. Be sure to reflect on "The Sniper" and the messages you might have drawn from the text.

If you are working independently, you will find it useful to consider now the quotation you did not originally select and try to take the stance this quotation encourages. When done, examine the two positions, attempting to negotiate a point of view that accommodates the two disparate beliefs.

**NARRATIVE LESSON ANALYSIS**

Recall the application of the ERR framework for the sea turtle lesson. Think for a moment how the elements of the framework, as you understand that at this time, are evident in this lesson.

This lesson contains two primary elements. First is the application of the framework for learning from narrative text, and the second is the systematic use of questioning as a guide to learning by prompting thinking at various levels and from various perspectives. We begin our analysis by recalling first what happened in the lesson. Take a moment to reflect on the lesson just experienced. In your journal, make a list of the instructional steps you recall. Remember, this lesson began with a reading of introductory remarks about the author. What followed? Continue your list, and with it, we will deconstruct the lesson with an eye on how it incorporates the ERR framework. With your list at the ready, look at the lesson.

The first activity, discussing the author and his context, was done as a general evocation activity. Its purpose was to stimulate thinking about the universe of the author, the time, location, and some likely themes as possible clues to meaning. It was intended to be general, as more specifically targeted Evocation activities were to be introduced during the reading. It represents a means of approaching the story globally. We will say more about this later.

Instructionally, the next step was to ask readers as they read to look for some specific shifts in the text, some contrasting sensory images. Why these questions? These questions are intended to invite readers to begin to immerse themselves in the text, alerting them to read carefully, to be watchful of content and mindful of their capacity to connect to text at multiple levels as they build understanding. This was a prompt for the Realization of Meaning phase. It is intended to activate readers' cognitive and metacognitive processes so reading for meaning becomes a conscious, almost physical act.

Next, you read to the second stop and where you were asked to reflect on the contrast and how the reading made you feel. Stopping to deliberate meanings
and implications and discuss reactions involved you in the work of the Reflection phase.

You can see, then, that the ERR entire framework was applied to the first reading segment. Activating engagement through these microapplications of ERR as exemplified here, by working through the entire framework sequence within segments of text, is a robust means of maintaining engagement with text while instigating critical analysis from the beginning. There is little justification for postponing cognitive engagement with either narrative or expository pieces, or any other lesson format for that matter. We know comprehension is a process of mediating meanings between what an author or composer may intend and what the learner ultimately constructs. The less artificially confined and more critically considered we approach text, the greater the potential for more elaborate, more eloquent constructions.

As reflections regarding the reading were concluding, you were invited to think about the big picture idea. You were asked what you think might be at issue in the story. This constitutes the Evocation for the next reading segment. After answering questions about the first reading, you were asked, again while reading, to create a detailed vision of the scene unfolding in the story. This story is particularly visually powerful, so a visual prompt is appropriate for this author. Readers cannot help generating mental images while reading if they are involved, but encouraging attention to this act brings it to a more conscious, potentially more vivid, level thereby serving to sustain reader engagement at a more thoughtful level. The image is, of course, personal, intentional, and malleable, adjusting to the story line as the reader proceeds through the text.

Immediately, questioning, at the next stop about your vision, helps to keep your vision fresh. Beginning in this way also confirms that the task assigned during Realization was serious, reinforcing expectations for engagement. Furthermore, discussing your vision requires transformation of your visual image into descriptive language and places the representations in the public domain for other students to consider and respond to. Gathering feedback offers opportunities to see if your image is a shared image or a unique representation. This comparative experience enlightens readers to the array of possible of interpretations.

Interestingly, it was during this stop that the only literal-level or memory question was asked. Do you recall what it was? It was, “Do you know what a parapet is?” Juxtaposed here in the lesson against the richness of the preceding questions, this question stands in stark contrast to the others. It is easy to see in this context how literal- or memory-level questions neither promote nor assess meaning making at a thoughtful or critical level. Understanding what a parapet may be informative, but it is certainly not essential to understanding the story.

Next, readers were invited to engage in continued critical analysis by preparing for plot twists or a change of some kind. The intention here of course is to make uncovering the mystery an added purpose of reading. When this reading was completed, questions were asked to capture the full consequences of this section of text.

By your own list of sequenced lesson activities, you can see that the remainder of the reading portion of the lesson unfolded through a series of framework applications. The lesson then ended with a writing-for-thinking task. Presented with two quotations, you were asked to make a choice and write in response to your choice. Juxtaposing these quotations within the context of this particular story creates a fund of immediate experience with the issues raised by the quotes from a literary source. The story immediately becomes a resource supporting thinking, in this case about war, and aids in the development of opinion formation. Employing reading in
service of critical thought personalizes the experience and reinforces students' understanding of the role of reading as a powerful resource for personal growth and intellectual development. The reader now makes use of the message of this short story as the author intended, that is, as stimulus for thought and a medium for posing questions for conscientious deliberation.

In a moment, we will engage in a further analysis of this lesson as there are a number of elements to this lesson that are less apparent. Before we continue, walk back through the lesson once more and recall what you did and how it affected you as a learner. Consider at each step whether the process increased your motivation to read or your engagement with the text. That is, were you more engaged in the text as you read than you otherwise might have been? Think as well about how your students will respond. Do you think they might be more involved, intrigued, engaged? Were you eager for the questions to stop so you could continue reading? When you have thought about those matters, consider how this model lesson differs from the one modeled in Chapter 2 using expository text. How are they similar? Share your thoughts with your partner or in a small group.

ERR AS A MULTITIERED MODEL

At first glance, this lesson appears rather straightforward and perhaps unremarkable. However, much is happening here, and when the various elements of the lesson become transparent, the lesson is more sophisticated than it might initially appear. It offers a multipurpose guide to content lesson development. As your own experience attests, this lesson sustains reader engagement as it guides learners through a complicated text. It enables readers to monitor their own comprehension, provides opportunity for feedback about their thinking as meaning is being constructed from the text, and builds connections to personal understandings and beliefs. These are all actions good readers perform to comprehend text.

Let's examine the details. In this lesson, the ERR framework is applied at two levels. The first is at an overarching or global level. Reading about the author and speculating on possible themes represent initial engagement in the evocation phase. Global Realization of Meaning unfolded through a guided reading framework. Finally, Global Reflection occurred during the final writing and discussion activities. This global framework application walked us through the various learning phases and would by itself serve us well. However, careful reading of complex text offers readers a more richly textured understanding and enables students to consider the central issues and themes, the big ideas of a curriculum, so it is important to commit the time needed to a more complex instructional process. In our example, we examine the text in greater detail by applying the ERR framework to text segments. Consider the flow of the lesson. The text was divided into four segments. Each segment contained, in some fashion, a whole idea or story element, with stops situated at a poignant point or when there was some element of suspense. Within these segments, questioning guided the reader through the ERR process so readers engaged in evocation activities by speculating on what was to come by making predictions. Then readers explored the text, looking for particular themes, visions, answers to questions, challenges, or points of interest. This was followed by reflections on the implications of that segment for character, story and/or broader themes, and always involved revisiting the initial Evocation and the Realization of Meaning reading goal.
Applying the framework in an increasingly complicated manner is possible because the framework is nonlinear. Most content and certainly human thought are decidedly nonlinear, so instruction is most effective if it too is structured to accommodate to this nonlinear reality. In the sea turtle example, we applied the framework globally. That lesson followed a course represented by something like Figure 3.1.

Figure 3.1

The sea turtle lesson concluded with learner recognition of both new knowledge and the difference between what learners understood after learning relative to their prior knowledge. In ongoing learning environments, say, a biology class, the study of sea turtles may be part of a larger lesson on reptiles or ocean life or endangered species, or the effects of the recent oil-well blowout on the ecology of the Gulf of Mexico. The arrow leading away from the initial ERR cycle leads to the next concept or topic.

Let’s imagine the study of sea turtles was part of a lesson on ocean life with the next unit of study examining ocean currents and how they support ocean life. The sea turtle study then serves as an evocation activity for the larger study of ocean life (see Figure 3.2).

The ERR framework represented in Figure 3.1 becomes part of a larger representation of a more complicated instructional process in which the sea turtle is embedded but with the same basic elements. “The Sniper” lesson application of the framework represents another variation and can be visualized differently. Using the framework as guide to a series of text encounters, the framework application in “The Sniper” lesson is represented by Figure 3.3.

In this latter configuration, Realization of Meaning becomes a series of whole framework applications because we want the benefit of all the various learning phases throughout the text. This enables us to continuously evoke ideas and
understandings to maintain text-reader connections. The text is certainly compelling but also dense with implication. It is important that readers monitor comprehension, but we can enhance this by focusing attention on the various themes as they emerge. We facilitate deeper understanding by targeting our gaze at elements of particular interest as complex understandings evolve. With complicated text, it is helpful to know what you know, think, and understand as you travel
from start to finish. Hikers, meandering along a challenging mountain trail, must, from time to time, stop to catch their breath. So too, readers, engaged with difficult text, must stop for a comprehension breather, reviewing where they have been and pondering the trail ahead. With some chance for renewal, they are better prepared to set out again for the summit. The periodic reflections and evocations of “The Sniper” lesson serve this purpose. They also serve as opportunities to orient learners’ attention toward the concepts and issues that drive the lesson in the first place. There must be a learning purpose for everything in the curriculum. This process makes this transparent while retaining teacher and learner focus.

“The Sniper” model also reveals how integrated continuous application of ERR can be. As you think about how you will implement the framework, it will become increasingly apparent that the model provides a mechanism for facilitating fluid transitions from idea to idea and from one topic to another when sequenced carefully. The model demonstrates how evocations and reflections are blended so that reflections, resulting from one content, concept, theme, or experience, become evocations for another. Figure 3.4 offers a model for thinking through a coherent sequence of learning experiences that will move students through a purpose-driven course, while offering individual learning experiences that are in themselves coherent. The model allows instruction to explore tangents—immediate interests or passions—and detours yet maintains focus on the intent of, let’s say, the course and the desired outcomes of instruction. More important, this model offers a vision of how to engage students in what Dewey (1987) would describe as a complete learning experience that embodies both the rational and the emotional or aesthetic. Wong (2007), referencing the work of Dewey and Rosenblatt, speaks of motivation as “that which animates the learner” (p. 8). Citing Dewey, Wong described learning as the relationship between elements of active learner control and receptiveness to environmental input, or “doing and undergoing.” Wong wrote,

...motivated learning involves both the rational and the nonrational elements, and learner control and its opposite, there is also something distinctive about the relationship between these elements. Dewey (1987) describes the relationship this way. “Moreover, at each stage, there is anticipation of what is to come. This anticipation is the connection link between the next doing and its outcome for sense [meaning]. What is done [action] and what is undergone [reception] are thus reciprocally, cumulatively, and continuously instrumental to each other” (L. W. 10.56). In other words, deep engagement is more than doing and undergoing, or acting on the world and the world acting on us. Deep engagement also requires a contingent, coherent, and evolving relationship between these elements. In each interaction, there is movement and direction toward some kind of culmination. And although the culmination is by definition at the conclusion of an event, its presence is felt throughout. According to Jackson (1998), “This consummation, moreover, does not wait in consciousness for the whole undertaking to be finished. It is anticipated throughout and is recurrently savored with special intensity. We anticipate the possibility of what might be—new perception of the world or a new way of being in the world—and are energized to move forward.” Anticipation is embodied in readers who cannot put a book down and must keep turning pages to learn whether an imagined possibility becomes a sensible actuality. Anticipation is the tension in the dramatic line that connects the “what if” to “what is.” The excitement of sensing and
opening to a possible world and the irresistible urge to move into the world best describes the motivation of a student who suddenly sits bolt upright in class and exclaims, "I have an idea! What if...?" (pp. 8–9)

Take a moment now to think about your own curriculum. Identify a reading task and think through how the ERR sniper model from Figure 3.3 might be applied to the passage. Or consider Figure 3.2. Think how you might construct a lesson sequence across some related themes that would resemble the lesson sequence exemplified by Figure 3.4.

**Figure 3.4**

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**QUESTIONING**

Recall now your thoughts about questioning from earlier in this chapter. Remember your thoughts about your own questioning history and how critically questioning is
linked to learning. Have your early thoughts out for reflection as you read the next few pages. You will want to return to them at the end of this reading. ERR served as instructional subtext for “The Sniper” lesson. Questioning served us differently. Like wind powering a schooner on the sea, questioning propels readers through a learning experience. Compelling questions motivate learners to think, stimulate curiosity, sometimes anger, or perplex, or trigger imagination. Yet with so much potential, classroom questioning is often conducted haphazardly, with little or no thought given to what kinds of questions to ask, when to ask them, or why. The example lesson in this chapter was driven by questions. The composition of those questions and their timing were not accidental. Rather, they were calculated to accomplish the following:

- Link reader experience to text
- Provide catalysts for ongoing comprehension of text
- Sustain motivation to understand
- Engage readers in multiple levels of cognition dependent on various types of thought processes

You will see that understanding the power and purpose of questioning provides yet another layer of sophistication to the lesson and, when implemented with care and purpose, provides teachers with a powerful instructional tool.

Adapting Bloom’s Taxonomy of Questions

The questions posed in this narrative example are derived from Sanders’s (1969) revision of Bloom’s taxonomy of questioning. You probably noticed while reading the text that many questions were followed by a term in parentheses. They represent the various types of questions Bloom and Sanders describe from the cognitive domain. The taxonomy also represents only one way of organizing questions. There are many other conceptualizations of question types. All are intended to guide learners through a variety of thought processes, preventing instruction from narrowing to a single or limited range of approaches to inquiry. Bloom’s and Sanders’s taxonomy suggests that guiding inquiry requires students to interpret information, synthesize ideas, analyze information, reconstruct or translate images, and evaluate and then apply their understandings and constructs to text or other instructional media as it evolves. For Bloom and Sanders, these various types of questions form a hierarchy, with memory or literal-level questions representing the lowest form of questioning and, consequently, a minimal type of thinking. Evaluation or judgment questions, in their view, invoke the highest level of thinking (see Figure 3.5).

Bloom (1956) addressed three domains: cognitive, affective, and psychomotor. Much has been written about these domains, and there continues to be considerable attention paid to Bloom’s work. The following websites offer a review of some recent discussion as well as applications of Bloom’s taxonomy.

While there is certainly minimal thought associated with memory questions and much more sophisticated thought is required for evaluative questions, we believe it more beneficial instructionally to think in less hierarchical terms. As we have suggested, well-considered questioning leads to different ways of thinking, prods differing thought processes, resulting in more enriched learning experiences. So it may be more productive to view questioning as a circle of options (see Figure
3.6) to draw from, understanding that each question type represents a unique angle of vision that provides access to different realities, which in turn may contribute to more elegant, more richly textured understandings. One legitimate goal of instruction is to engage students in all manner of thought as they deal with content. When questioning and thinking remain primarily at a literal or memory level, students'
knowledge represents only data storage, demonstrating no real evidence of understanding. Perhaps the best way to determine what questions to ask is to start with the big idea for the lesson and ask, “How can I lead my students to consider this big idea, and how do I want them to think about or approach the idea(s)? “What do I want them to do with the idea?” Or we find it helps focus questions on the big ideas by asking, “What do I want my students to know and be able to do in 10 to 15 years as a result of this lesson?”

**Figure 3.6**

![Diagram of Critical Inquiry](image)

**Multiprocess Questioning**

Since various types of questions engage thinkers differently, understanding the thought processes underlying question types enables better decision making about what questions to ask when making questioning a more powerful tool for guided inquiry. Following are brief descriptions of the various question types included in
Bloom’s and Sanders’s taxonomies and question prompts to stimulate the desired thinking.

**Literal level** questions—for example, “What is a parapet?”—seek factual information. They typically require simply rote recall. Respondents need only short-term, fragmented knowledge to successfully respond. Answers to literal-level questions are typically found in the text or presentation and require students merely to recite what has already been stated. Define, describe, duplicate, label, list, match, memorize, outline, quote, recall, repeat, recognize, reproduce.

**Translation** questions require reformulation of information. They ask students to picture in their minds a situation, scene, or event and describe what they see. Translation questions encourage students to restructure or transform information into different images. Students responding to translation questions imagine the sights, sounds, smells, or other sensations conjured up. “The long June twilight faded into night. Dublin lay enveloped in darkness, but the dim light of the moon that shone through fleecy clouds, casting a pale light as approaching dawn over the street and the dark waters of the Liffey. Around the beleaguered Four Courts the heavy guns roared” (from “The Sniper” by Liam O’Flaherty). Students translating text have to create their own sensory experience and then use their expressive language to describe their vision to others. It is an active, creative process of engagement. Picture, re-create, script, illustrate, imagine, invent, charge, draw, act out.

**Interpretation** questions seek to discover connections between ideas, facts, definitions, and values. Students must think about how ideas or concepts go together meaningfully, building various contexts into which ideas can fit. Interpretation questions ask students, “Why do you think the main character waited until her father came home?” or “What was the reason that catastrophe struck when it did?” This kind of questioning stimulates speculative thinking. Sanders (1969) considers interpretation questions to be core questions for higher-level thinking, and many (Vaughn & Estes, 1986) have suggested comprehension is interpretation. Why, how so, explain, defend, estimate, extend, predict, summarize.

**Application** questions offer students the opportunity to solve problems or further investigate problems of logic or reason encountered during reading or learning experiences. For example, “How does what we know so far help us understand why the decisions being made make sense?” Apply, change, choose, construct, demonstrate, dramatize, employ, interpret, operate, schedule, produce, show how, solve, use.

**Analysis** questions ask whether events are adequately explained or if information or circumstances might explain outcomes more reasonably. Might there be a better explanation for what is happening? For example, a reader might question a character’s motives or an experimenter’s research plan, or question the reasonableness of a historian’s conclusions. Analyze, appraise, compare, contrast, criticize, diagram, differentiate, deduce, discriminate, distinguish, examine logical consequences, outcomes, question, test what follows.

Responding to **Synthesis** questions involves creative problem solving using original thinking. While application questions ask students to solve problems based on available information, synthesis questions allow students the opportunity to bring the full range of their knowledge and experiences to a problem to solve it creatively. Synthesis questions ask students to create alternative scenarios. For example, “Given the evidence we have so far, what is another way this crime might have been committed?” or “What might the victims have overlooked in their immediate environment if they were looking at their resources creatively that could have saved
their lives as the Titanic was sinking?” Combine, compile, devise, design, generate, induct, reorder, reorganize, reexamine what’s missing.

**Evaluation** questions ask students to make judgments about good and bad or right and wrong according to standards the student defines. Evaluation questions may seek judgments about the behavior of a character in a story, determining whether a character acted rightly or wrongly in a situation or if a character acted fairly or unfairly. Such questions necessitate thorough understanding of content encountered along with its integration into a personal belief system from which judgments can be made. Evaluation questions ask students to judge the quality of information they have learned or, in some cases judge their own behaviors in light of new information, like, “Why don’t I brush my teeth every night before bed after what I just learned about tooth decay?” This level of integrated comprehension makes the learning process personal and enables learners to readily take ownership of cognitively agreeable new ideas and concepts. Appraise, assess, argue, criticize, critique, defend, formulate opinion, judge, justify, support, value, evaluate.

Returning for a moment to “The Sniper” lesson, recall that from time to time, some parenthetical terms were present following a number of questions. You probably noticed that those labels reflect the various question types found in Bloom’s taxonomy. Tracking the questions through “The Sniper,” you will observe that there was no obvious order to the questioning. In other words, there was no attempt to follow some specific sequence, say, from lower to higher level. Two ideas drove the questioning process here. First, the belief that text content will, to some degree, define the question sequence. A second guiding idea involved simply acknowledging the importance of including multiple forms of questions so students engage in various ways of thinking about the content.

As questioning expands beyond basic memory or literal-level questioning, students begin to respond to instruction with meaningful thoughts and ideas, integrating their own expressive vocabulary and learning histories with the language and vocabulary of the specific content area. The dialogue that develops out of such questioning exposes students to a broad range of perspectives and differing expressions, expanding their conceptual knowledge along with their capacity to articulate new and perhaps creative ideas.

Some suggest that complex thought is developmental and that young students should not be expected to engage in synthesis or evaluation or even interpretation activities. This is not the case. These questions do not simply represent a developmental sequence. Certainly, the sophistication of children’s responses reflects developmental characteristics. However, even kindergarten children eagerly respond to synthesis, evaluation, or interpretation of questions. Young people continually engage in synthesizing ideas, making judgments within their social, physical, intellectual, and emotional environments, actively applying newfound knowledge to understanding and negotiating these landscapes. It is what children are in the business of doing until we tell them to stop. Again, Kathleen Cotton (2003) in her meta-analysis of cognitive questioning research offers a more sophisticated view of the developmental nature of questioning. It seems lower-level cognitive questions can benefit primary-level students, provided the questions are at a level that enables most students to respond correctly to most (70%) questions. But there is no support for exclusivity of lower-level questions for this age group. For older students, increasing higher-level questioning beyond 20% substantially enhances learning and achievement.
Return to your own thoughts and experiences with questioning. See if you can detect a pattern in your own questioning approach. Do you tend to concentrate in one or two areas? If so, think about why this is so and how you might broaden your questioning processes. Share with your partners.

**Discussion as a Learning Tool**

Several teaching principles are important to note in the process of understanding the sample lesson. First, one of the primary types of thinking being encouraged in the example is prediction. Throughout “The Sniper,” you were asked to consider what you thought would happen next. The phenomenon of prediction is a powerful factor, affecting comprehension and critical thinking. Prediction increases interest and obliges learners to examine what is already known and not known, raising existing knowledge above the horizon, making it serviceable knowledge as opposed to merely accumulated knowledge. Prediction establishes learners’ purposes for reading and is a primary mechanism for promoting comprehension. Prediction poses a singularly purposeful question, “Will my prediction come to pass?” The act of seeking confirmation of our own thinking, having one’s own questions answered is, according to some researchers, the very definition of comprehension (Steele & Steele, 1991). Thus, prediction, hypothesizing, can serve as a central contributor to increasing comprehension. It is important to note, however, that it does not matter if predictions are correct. It only matters that one makes predictions, thereby beginning the process of searching for answers.

The second principle for directing learning experiences toward expanded levels of thinking is that there must be a coherent plan to guide student thinking. It is important, especially when teachers are just beginning, to develop an action plan for working through a text or learning experience that compels students to engage in various thought processes. However, any plan should be used only as a guide, as teaching is also reactive, so student responses should also guide classroom discussion. When we read a story with students, we follow a basic plan but let students’ ideas lead discussions to points of interest for them.

**Teacher as Commentator**

One additional important point about questioning has to do with teacher behavior and how it influences student thinking. Since teachers initiate the questioning process, students tend to respond directly to the teacher. Students look toward their teacher, paying less attention to classmates. If genuine classroom dialogue is to occur, this interaction pattern has to change. Teachers engage in several behaviors that support classroom behaviors that limit dialogue. The first and most important problematic teacher behavior is that of classroom commentator. When students speak, teachers typically believe they must respond. What emerges is a predictable conversation pattern. First, the teacher speaks, then student A, then the teacher, then student B, teacher, student C, teacher, and so it goes. What this amounts to is a series of one-on-one conversations between the teacher and a student. As long as teachers engage in this response pattern, students will not speak to one another. Students will continue the one-on-one conversation. What is more effective is for teachers to moderate and guide discussion among their students. So student A speaks, then student
B, then C, with teacher interdiction to redirect when necessary, provide corrections where appropriate, prod further exploration, challenge students to think more deeply, or simply act as one party to the discourse rather than as a conversational clearinghouse.

The second teacher behavior that sustains teacher-centered interaction patterns is the instant evaluator. We have all been there. It happens when a student speaks and we immediately pass judgment with such phrases as “Yes, that’s right.” or “No, someone else?” or “Excellent!” The latter of course crushing any further commentary, as who is going to follow up with a different thought when the previous utterance received the ultimate reply? This scenario is an easy trap when we are asking students to guess what is in the teacher’s head, when we are asking for the one right answer. More facilitative comments include “Who else has something to share?” or “What do others think about this?” or “Do we all agree with this?” or “Is there something we are missing?” Let’s think this through some more and see if there might be another way to look at the situation.” The goal is to remove the overriding evaluative context to free students to express their ideas.

**Stopping Points**

Important to “The Sniper” narrative text approach is determining how and where to segment a text. While stops should occur naturally, it takes practice to identify appropriate points. It is not as easy as it looks, and care should be given to selecting stopping points that allow students to reflect on the text and make predictions. Text segments should have a self-contained quality yet precipitate forward motion. That is, if at all possible, the end of one segment should in some way foreshadow what is to come. This of course facilitates prediction. The best examples of this come from television series where the segmentation of the story is intended to sustain interest sufficiently to secure viewer loyalty through the abundance of advertisements, from week to week and even season to season. For those old enough to remember the television show Dallas, “Who shot J. R.?” is perhaps the most dramatic example.

**Wait Time**

An important issue to consider when engaged in student questioning is the issue of “wait time.” Wait time refers to the time teachers wait after asking a question before they intercede by asking another question, moving on to another student, or answering the question themselves. Research on this topic suggests there is a direct relationship between the amount of time teachers wait after asking a question and the level of students’ thinking (Steele & Meredith, 1991). Teachers usually wait on average less than one second. But when teachers increase wait time to three seconds, levels of thinking and student response rates increase significantly (Dillon, 1983; Gambrell, 1980). It is only common sense that when thought-provoking questions are asked, students need time to think.

Finally, when teachers engage in multiprocess questioning, it is important to encourage all students to participate. To accomplish this, teachers must call on the less outgoing students by name and sometimes overlook the students who believe they must answer every question. Many students do not respond freely to classroom questioning because, as we have mentioned, it is typically evaluative rather than stimulus for discourse. As teachers move away from evaluative questioning and
toward questioning for critical thinking and learning, students more freely engage in open discussion. As students become accustomed to true discussion questions where ideas are valued, they are eager to express their thoughts.

Deciding What to Ask

It takes time and practice to divide text successfully and ask the kinds of questions that guide students through text. The multilevel questions presented here are intended to model possible types of questions and to underscore the type of thinking they elicit. When teachers prepare their own questions, it is not essential to use every question type for each lesson. We tend to approach questioning with a few basic ideas in mind. First, rather than attempting to create a series of questions that include all types, it is much better, as we have suggested, to let the natural flow of the content and the compelling purposes for examining the content in the first place determine the most appropriate questions. The second comes from the first and involves determining the purpose for investigating the particular content. This is truly the hardest part. Questions should emanate from the purposes we set for students, so careful thought must be given to "why." Why read O'Flaherty? Certainly, it is an example of great literature, but what makes it great? The powers of language, the skill of the writer to say so much so quickly are important considerations. More important perhaps is how O'Flaherty inspires readers to think and what he inspires readers to think about. O'Flaherty was not writing a historical piece to capture a moment in the Irish civil war. He was using this tragedy to confront readers with some realities of war, perhaps a caution when war is being considered a possible solution to a problem.

Before moving on, it is important to begin classroom implementation to see for yourself how what you have learned can work for you. Begin with a genuine text you are using in class or will use in class. By yourself or in small groups, segment the text and develop questions appropriate to these materials using the guide below. Ideally, your small group should be composed primarily of colleagues at the same instructional level or content area. Take time to examine the text and then plan a lesson, as the first implementation is always the most difficult.

Once reading material is selected, ask the following questions:

- Why do I want my students to read this material?
- What, if any, big issues or questions are posed by the text?
- What do I hope my students will understand when they are finished studying the text?
- What do I want my students to do when they have finished reading the text?
- What experiences do I want my students to have and share as they read?
- How will I determine students' academic success with this text?
- Where will my instruction take me from here, and how can I link to what is to follow?

Answering these questions will guide many of the questions asked during the reading of the text. As your small groups begin working, keep the following in mind:

1. There are no right or wrong dividing points.

2. Nothing is fixed after dividing the text. If it becomes obvious with use that other places would work better, then re-divide the text.
3. No questions are right or wrong.

4. Recall the question types presented and remember the importance of asking a variety of types.

5. Let the framework guide the process so students will be continuously engaged in evoking, anticipating, understanding, constructing meaning, and reflecting.

6. Do not subdivide the text into too many parts. It is important to maintain the flow of the text.

When done, if there are other groups working together, share the basics of your work, what text you are using, why you subdivided as you did (what guided your decision for this particular text), and what questions you will ask to guide reading. Also, speak to how you will follow this lesson. That is, what will you do to expand the impact of the reading beyond the text itself? Finally, go back and check to see that your lesson incorporates a global ERR framework application as modeled with “The Sniper.”

REFLECTION

Chapter 3 covers a lot of instructional ground. Beginning with some initial thoughts on questioning and common practice, the chapter leads through a narrative text ERR application that is much more complex than was the case for the sea turtle experience. Questioning is then re-examined in light of “The Sniper” lesson. When seen through the lens of a real narrative lesson, the critical pedagogical role of questioning emerges. From our point of view, questioning is central to instruction at two levels. One level is core to any lesson. At this level, we must ask ourselves what the fundamental questions we are seeking to answer are with this particular lesson. “What are our purposes?” At another level, we are using questions to guide learners toward our overarching goals while encouraging student questions that might, just as well, head the lesson in unanticipated directions.

We then took some time to consider the pedagogical and cognitive significance of question types. Using Bloom’s taxonomy as our departure point, we examined what various questions bring to the discussion, how they inspire particular kinds of thinking and facilitate broader understandings.

These two complex strands of narrative ERR and questioning were integrated within the context of a genuine instructional experience. It is useful, though, to take some time to consider them separately with respect to their instructional implications. Take time now to review and reflect on the various ERR models presented. See if the instructional implications, indeed curricular implications, for the various ERR representations are clear. Share in small groups your conclusions about these ERR applications and what they mean for lesson planning for daily lessons, for thematic lesson planning, and even for a term or for the academic year. It will be good to take some notes from this conversation in your journal, as the discussion is likely to touch on some intriguing ways to organize lessons and instructional sequences. Also, we will revisit this thinking near the end of the text, so a record of your thoughts at this point will be helpful.
Advancing Critical Thought

It is through listening that you will be able to cultivate wisdom and be able to remove ignorance... 

—His Holiness the Dalai Lama

OUTCOME EXPECTATIONS

At the conclusion of this chapter you will

- be able to implement an “Enhanced Lecture” strategy and understand the essential elements of the strategy, including how the ERR framework generates the strategy application;
- be able to use and teach others how to effectively employ the cluster notes strategy;
- understand some critical issues related to critical thinking and some steps for incorporating critical thinking into everyday classroom instruction;
- relate critical thinking to rigor and relevance rubrics;
- be able to implement the “10-Minute Essay” strategy in the reflection phase of instruction; and
- understand how critical thinking can be enhanced or inhibited through teacher behavior, classroom environment, and student psychology.

EVOCATION

Much has been said about the importance of critical thinking. Almost everyone writing about education today speaks to the essential need for students to develop
critical thinking skills. But what is meant by critical thinking, and why might it be so essential? Here, we will spend some time examining critical thinking. In so doing, we will also model several instructional strategies in a manner similar to our work with the sniper and our sea turtle friends. This discussion of critical thinking will be presented within an ERR framework application as a coherent lesson. As we have done previously, here, you will be asked to fully engage in the lesson to experience the framework delivered using a different combination of strategies and with new content. Also, take care to observe your own learning experiences as the lesson progresses so you can reflect on its relative worth for teaching and learning.

Before we begin our more detailed examination of critical thinking, it is important that we share, in brief, our ideas with respect to pedagogy. We see critical thinking as a process. Thinking is a process similar to reading, writing, speaking, and listening. It is an active, coordinated, complex process that involves thinking about something genuine. It is not something that can be taught out of context. Critical thinking is not best learned when it is separated from the general context of the school curriculum or daily life. Thinking critically in school is best learned by experiencing this type of thought as a way of approaching content, as something which is part of and an expected outcome of the daily curriculum. Research concerning critical thinking and learning suggests that a model focusing on teaching isolated skills and fact learning minimizes critical thinking. For example, Palinscar and Brown (1984) argued that learning skills separate from real world tasks and purposes may allow students to do well on an objective test but leave them unable to apply those skills in new situations.

We have spoken of the utility of the ERR framework across various instruction mediums. Whether instruction employs text, lecture, video, a field trip, or laboratory work, ERR offers a framework for the teaching-learning process. Here, we are limited to text. However, for the next model lesson, it will be useful to imagine the presentation delivered as an "enhanced lecture." This form of lecture is explained more fully in the box.

The critical thinking presentation will be accompanied by some PowerPoint slides to give you a sense of the flow of the presentation. Let's begin our exploration of critical thinking.

Think for a moment about a time when you were trying to solve a particularly difficult problem or situation. There are no limits here. The problem might be social or academic. It could be related to organizing something for your children or your class. It might be a problem with friends or relatives or children, anything really. First, recall the problem and then try to think through what you thought about and what you did to solve the problem. Maybe you did not solve it. Think about what steps you took or processes you went through to try to solve it. When done, take four or five minutes to share the details of this experience with a partner or small group. Then, with a partner or a small group, list the different approaches taken to reach a solution. Keep the list, as it will be useful later to compare this list with the list of steps or processes others suggest constitute evidence of critical thought.

Now, one more evocation activity. With a partner or a small group, talk for a few minutes about "critical thinking." Your conversation can be general, thinking about what is meant by the phrase. Eventually, come around to a discussion of why critical thinking might be a worthy goal of schooling. In other words, speak to why all
the fuss about critical thinking. Remember your conversation as the presentation to follow begins.

In addition to remembering your discussions, prepare to take notes during the “lecture.” Not unusual of course, but here you will take “cluster notes.” This note-taking strategy mirrors the clustering strategy presented in Chapter 5. However, this cluster is constructed as the lecture unfolds.

How to Take Cluster Notes

Borrowing the same concept and processes as brainstorming, begin by drawing a circle in the center of the upper half of a piece of note paper. In the circle, write the title or topic of the lecture, in this case, “critical thinking.” As the lecture proceeds, draw lines connecting the central topic to subsequent themes. Remaining true to the clustering strategy, you will be able to write only single words or brief phrases—only enough to remind you of the idea. Your cluster can be as full and complex as the presentation and your organization of the information suggest. Figure 4.1 below provides basic rules. Chapter 5 details clustering and presents an example.

As you cluster (this takes practice), you will have questions. Be sure to add question marks as these questions arise so you can ask them later. In fact, the lecture will pause after about 10 minutes to allow time for you to fully articulate your questions and to share with your partners what you are taking from the presentation.

Now, remembering to take cluster notes, let’s continue with our lesson on critical thinking.

Enhanced Lecture

Lecturing has been shown to be a rather ineffective instructional approach. Yet it is the most frequently used instructional approach to teaching in schools. One primary shortcoming is that students are usually passive recipients of information. Another is that the human capacity to listen and concentrate with real benefit is limited. Ten minutes is a good guide. Here, we will examine a means of enhancing a lecture by addressing these two obstacles to learning from lecture. There are times when a lecture can be useful. They include the following:

- When you want to provide students an introduction or an overview of a topic they are about to investigate actively
- When there is no easily readable written material available on the topic and direct inquiry is not feasible
- When you want to elaborate on a point that students have just encountered in an inquiry lesson
- When students’ prior knowledge of a topic is not yet sufficient to read a text on the topic

Figure 4.1  Rules for Cluster Notes

1. As concepts emerge in the presentation, use “key words” to capture them.
2. Build as many connections as needed.
3. Avoid long phrases.
4. Do not let process interfere with attention to content. Links can be retrofitted if they are unclear at the time.
5. Using multiple pages is fine.
6. Be sure to mark questions or uncertainties as they emerge.
REALIZATION OF MEANING

Critical Thinking “Lecture”

To discuss critical thinking, it is useful to understand what it is. It is also useful to know going in just why thinking critically might matter. So we will begin first by discussing a possible outcome of critical thought, with an eye to identifying potential benefits as a way to drive our inquiry.

One outcome of critical thought proposed here is innovation. What is proposed is that critical thought creates a pathway from a collection of individual or group understandings and insights through a creative process to a unique, innovative conceptualization. With this view, various pieces of content knowledge are ordered, like beads on a necklace, in some creative composition, which results in a unique pattern or design, resulting in a pattern effect that, taken as a whole, represents a new direction or new conceptualization of some kind.

In this way, critical thinking is linked to innovation via a creative process. What about innovation? Is it a worthy goal? Some suggest that innovation is central to survival, perhaps our most essential tool for survival. The capacity to innovate enables us to respond to unforeseen challenges that may even threaten our existence. Thomas Friedman (2005) in his book *The World Is Flat* suggested that innovation would be the key to economic survival. Whoever develops key innovations will determine which economies flourish and which do not.

How we arrive at innovations remains open to question, but it seems, for the most part, it comes at the intersection of mostly conscious critical thought. There is some indication that innovation arises rather spontaneously and with only limited conscious control. However, there has always been control over input and how inputs, that is, information and experience, are processed and stored for recall, manipulation, and use.

So what does critical thinking seem to involve? Many suggest it involves some or all of the following:

- Understanding or developing logical connections between data points, ideas, or constructs
- Identifying, constructing, and/or evaluating rationales
- Detecting inconsistencies and common mistakes in reasoning
- Developing and applying systematic problem-solving strategies
- Culling problems or component elements to identify and sequester essential elements
- Suspending, at least momentarily, any unnecessary self-induced limitations or constraints to thinking to the extent one is aware

Critical thought then seems to be coupled with a creative process that simultaneously seems to engage thinkers in the process of the following:

- Envisioning familiar things in new ways
- Seeking in the familiar previously undetected patterns
- Connecting previously unconnected phenomenon
- Sequencing multiple forms of thought such as the following:
  - Synthetic—divergent thinking, making connections
  - Analytic—convergent thinking—evaluative
• Transformative—reconfiguring, imagining across mediums
• Practical—from abstraction to application

There are some wonderfully illustrative examples of critical and creative thinking processes coming together for innovation. For example, Alexander Fleming’s discovery of penicillin, Archimedes’ discovery of displacement, or Röntgen’s discovery of radiation. Each discovery involved observing everyday events and asking, “What is really happening? What alternative idea(s) explain what is witnessed?”

We will review Alexander Fleming’s discovery process below. In the next day or so (Reflection), do some research to learn how Archimedes and Röntgen made their discoveries.

Alexander Fleming discovered what is regarded as the most efficacious, life-saving drug ever developed. He discovered penicillin, which transformed the world of medicine and incubated the now enormous pharmaceutical industry. Within a few decades, previously fatal diseases such as gangrene and tuberculosis were conquered. Like many discoveries, this one was partly luck and partly a good dose of critical thought. Fleming left a culture dish with Staphylococcus bacteria on a bench in his lab and left for a two-week vacation. Fortunately, a Penicillium mold found its way to the desk as well and began to grow in the dish. The Staphylococcus bacteria grew as well, and when Fleming returned, he noticed the mold growth and where there was mold, there was no bacterial growth. He could have tossed the dish aside, but he did not. Instead, he asked if there wasn’t some underlying reason why bacterial growth was inhibited near the mold. He correctly deduced that the mold released some sort of substance that retarded bacterial growth. Finding that substance, the active ingredient, turned out to be the most effective antibacterial agent known. Interestingly, he was not the first scientist to notice the same event surrounding the presence of mold. What was special about Fleming was that he saw this familiar event and acted on his observation in ways no one else had done previously. Equally intriguing, because Fleming lacked a background in chemistry, he was not able to take his discovery further. Not until more than 10 years later did others move Fleming’s discovery forward with the kind of breakthrough experimentation that would prove the curative powers of penicillin.

Stop now and look at your cluster notes. Add anything you think needs adding that you recall from the presentation so far. Check to see if any connections need to be made between ideas you might have missed originally. Look to see what questions you have. When done, turn to your partner and share your notes, discuss the connections you made and why. Ask any questions that have arisen and see if the two of you can answer them. If not, write them down for later discussion with the large group. Remember as well your earlier thinking on this topic. Discuss with your partner, exploring whether innovation as an outcome makes sense and how it connects in any way to your original thinking.

Before proceeding (Evocation) imagine someone engaged in critical thought. What is that person doing exactly? How is his or her mind operating? In what cognitive activities is he or she engaged? Keep this image as we move forward (Realization of Meaning) and be sure to take cluster notes.

Let’s continue now by looking at some examples that require problem solvers to alter perceptions or think more expansively. These examples
may be familiar. If so, recall your approach to problem solving the first time you encountered these problems.

Example 1: These four lines below form a figure with four 90 degree angles. Arrange these four lines, without bending or altering them, to create a figure with sixteen 90 degree angles.

Take some time to try to solve this puzzle. Try to remember as well your thinking as you tried to solve this puzzle. If you do not solve the problem, look in Appendix E. Monitor your thoughts when you first see the solution. This may reveal some reasons why you did not solve the puzzle. Often, the reason is rooted in self-imposed limitations.

Let's try another one.

Using only four, straight lines and connecting them end to end, arrange the lines so they pass through all the dots but each dot only once.

Take a few minutes to solve this puzzle. If you solved correctly, try to remember how your thinking progressed. If a solution escapes you for the moment, and this is so for many people, note your reaction when you first see the solution and speculate on what prevented you from reaching this solution independently. (The solution is found in Appendix F.)

It is not unusual for our own thought processes to interfere with our ability to think critically and innovate. Recent brain research offers one reason that this is so. Evidence suggests that what we often assume to be our own unbiased "objective" observation and recording of an event, a stimulus of some kind, is anything but. Examining brain activity levels when a stimulus of some sort is presented, we have learned that before information reaches our higher-level interpretive centers in our brains, our brains have already sent information from the interpretive center to the site of initial sensory reception in the brain to provide a preliminary interpretation of the raw data. In so doing, our brains are already "shaping" the information to fit preconceived notions or expectations before we engage in the kinds of cognitive work we do to make use of the sensory experience. In fact, we commit 10 times more brain activity to preconceiving the information than we commit to sending the information to our higher-order interpretive centers. In other words, we see or hear what we want to see and hear, making us potentially our own, in many cases, greatest inhibitor of critical thoughts. (Remember to keep cluster notes.)

So how do we teach to critical thought and innovation? Some simple steps include the following:

1. Teach beyond simple awareness to deep understanding. Knowledge is power for creative thought and innovation, though full mastery of information is not a prerequisite for innovation.
2. Demystify knowledge. All knowledge is transient, representing what is known at a given point in time. No knowledge is sacred, so nothing is off-limits for reconsideration.

3. Minimize rote recitation and recognize it as the lowest level of thought and of limited utility.

4. Integrate ideas across boundaries and borders. Demonstrate how ideas are linked across areas of study and fields of thought, and engage learners in active applications.

5. Help students understand that information is categorical. More complex language captures more sophisticated concepts. Teach to development of an active categorical vocabulary.

6. Demonstrate to students that knowledge is both content and a medium for understanding. That is, information can be concrete, but it can also serve as a means to understanding other concepts and content. As such, information is not static but represents a language of learning that is intellectual currency students use to invest in the construction of ensuing realities.

In classrooms it is possible to create psychological conditions that favor innovation. These involve the following:

- Encouraging students to see themselves as responsible initiators of ideas and actions
- Creating in students the sense that they are able to exercise considerable influence over their own learning and thinking processes
- Ensuring a psychologically secure and relatively risk-free learning environment
- Assigning projects that are challenging yet sufficiently contained for teams to work on effectively and see through to completion
- Providing structured opportunities for innovators to also share insights and knowledge with others in an atmosphere of respectful engagement

Finally, the cognitive psychologist Csikszentmihalyi (1975, 1997) speaks of the primary dynamic for innovation. He writes, “Understanding that innovating at the highest level requires personal reformation. That is, we must come to understand that who we are and how we think about and understand our world, even how we come to know, must be reorganized into something that has not yet been before” (p. 157).

Let’s stop here for a moment to reflect. Look over your cluster notes. Make any additions; draw any links you think appropriate. Review the prompts to see if they trigger any recollections of ideas or terms you want to include in your notes. Once you have made any changes or additions, turn to your partner and share your notes. Where necessary, be sure to explain and/or elaborate on your various notations.

As evocation for the next part of the “lecture,” begin a conversation within a small group about the implications of the critical-thinking presentation for your own teaching and for your students. What practical steps come to mind that you can take to increase student engagement in critical thought and innovation?
CREATING AN ENVIRONMENT FOR CRITICAL THOUGHT

Continuing our lecture, on the PowerPoint, you will see a list with some additional ideas for stimulating critical thought. Though there are no credible lists of steps leading to critical thought, there exists a set of classroom, teacher, and student activities and conditions that may promote the development of critical thinkers. As you hear them (Realization of Meaning), consider whether you think the list is exhaustive or you can add to the list.

<table>
<thead>
<tr>
<th>Teachers Must Do the Following:</th>
<th>Students Must Do the Following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide both predictable and spontaneous time and opportunity for critical-thinking experiences</td>
<td>• Develop self-confidence</td>
</tr>
<tr>
<td>• Give permission for students to speculate</td>
<td>• Appreciate the worth of their own opinions and ideas</td>
</tr>
<tr>
<td>• Accept various ideas and opinions as plausible</td>
<td>• Actively participate in the hard work of thinking</td>
</tr>
<tr>
<td>• Promote students’ active engagements in shared deliberation and contemplation</td>
<td>• Be prepared to either formulate or suspend judgments</td>
</tr>
<tr>
<td>• Assure students a risk-free environment, including a ridicule-free environment</td>
<td>• Take responsibility for their own intellectual engagement as well as their own response to the learning environment and the learning of classmates</td>
</tr>
<tr>
<td>• Express belief in students’ capacity to make critical judgments</td>
<td></td>
</tr>
<tr>
<td>• Overtly value critical thought and its occasionally “messy” outcomes</td>
<td></td>
</tr>
</tbody>
</table>

Teacher and Student Responsibilities

What comes next is a brief elaboration on the activities and/or conditions that may make critical thinking a reality in the classroom. Take a moment to consider the brief list of teacher and student activities and conditions just presented, as many will now be elaborated. The discussion again speaks to teacher and student roles and responsibilities. With what you have encountered and discussed already, read through the following suggestions for fostering critical thought. See if they are consistent with your own beliefs about what is needed to successfully encourage critical thought. As these ideas are shared, consider as well obstacles to implementation.

ESSENTIAL CLASSROOM ELEMENTS OF CRITICAL THINKING

Time

Critical thinking takes time. Before thinking through something new, we must first take time to discover what we already think and believe about a topic. Discovering our own thoughts involves some exploration of previous ideas, beliefs,
encounters, and experiences (Pearson, Hansen, & Gordon, 1979). Time too is needed to express thoughts in our own words to hear how they sound. Without time to think and share, there is no opportunity for hearing how well our ideas hold together. This also enables us to examine our biases and prepare us for processing new information.

Permission, Respect, and Responsibility

Students do not always speculate freely. More often, they wait for their teacher to give out the one “true” answer. Critical thinking is speculative, involving the development of tentative hypotheses, uniquely stringing together ideas and concepts. Some of these combinations will be more productive than others; some may seem reasonable at first but, upon reflection, become less so. Still other conceptualizations may appear foolish at first, only to become more valuable with refinement or changes in perspective. For this kind of thinking to occur, students need permission to speculate, create, state the obvious or the sublime. When students understand that this is acceptable, even encouraged, they will begin to engage in speculative thought.

We all learn from experience, and when teachers grant students permission to become critical thinkers, they must do so advisedly. That is, they must draw distinction between granting permission and being permissive. Granting permission to speculate does not grant students license to be frivolous or inconsequential thinkers. Not all contemplation is worthy contemplation; students deserve to be held accountable for the genuineness of their thought and the purposefulness of their contributions. This is done by providing honest feedback. Permission to think critically implies granting permission within the context of both a supportive and productive environment where there is genuine purpose for speculating and genuine student intent to learn and grow.

Certainly, there are occasions when there is one right answer, and we must be honest with our students. In these cases, what may differ is the means or processes by which individuals arrive at the answer. In most cases, process is as important as the answer itself. What is important to consider is that if most class time is spent looking for the one right answer, then thinking is not likely occurring at a meaningful level, and the outcomes of instruction will reflect these limitations. Limiting expressions of opinion, of course, limits student thinking. This does not suggest all ideas are acceptable, all views tolerated. Class is socially embedded, and conventions are an essential part of the prevailing social context. They too are to be respected, though conversations at the boundaries of convention often generate the most energy, bring the greatest clarity, or broaden those boundaries so that they are inclusive of community members.

The responsibility for engaging in critical thinking and learning ultimately rests with students. The classroom environment may enable students to engage in critical thought, but students themselves must act. We know when our students are engaging in critical thought as there are attributes and behaviors critically engaged students exhibit. Some behaviors we see include being more focused and, consequently, less distracted. Students ask questions and seek alternative resources, and they engage in topic-related conversation. The attributions to self-critically engaged students often make include identifying themselves as self-motivated, self-confident, and believing in self-control, and the capacity to manage their immediate environment.
Communicating to students that the outcomes of their own critical analysis are of value is essential to supporting critical thought. Schools, by the nature of the demands they place on students in terms of student performance feedback, communicate a great deal about what is most valued. When students are asked most often to simply retell what they have been told, either through classroom dialogues or testing, they quickly understand that basic recall of someone else’s ideas is most highly valued. If recall is not the only educational outcome we value, then, we must demonstrate what it is we do value by interacting differently with students, setting different expectations, and asking them for different kinds of feedback. The true measure of what we value is the amount of time we commit. The more time committed to thinking and sharing, the more evident it is that these are valued.

Confidence

Interest, investigation, beliefs, and opinions are what guide a thoughtful life, underscoring our everyday decisions and actions. It is through our beliefs, understandings, and opinions that we project ourselves into the world of others. They also provide the footings upon which individuals stand as they are buffeted by the overwhelming flood tide of information, ideas, and opinions young people confront today. When we are uncertain about the worth of our own thoughts and beliefs, when our footings are poorly constructed, we are unduly susceptible to the persuasive arguments of others. We hide our own ideas from view and can lose touch with them altogether. Confidence in our ideas and beliefs coupled with confidence in our capacity to weigh new ideas carefully and mediate our belief system in self-sustaining ways frees us to share with others and opens our mind to alternative views, without concern that they represent potential threats. Self-confidence enables learners to participate fully in discourse and experience the personal development derived from encounters with knowledge from a position of personal strength.

Active Participation

Mihaly Csikszentmihalyi (1975) demonstrated that when learners are actively engaged in the learning process at an appropriately challenging level, they express great pleasure in their engagement and experience an increased capacity for understanding and mastery. Students who experience complete absorption in a task, what Csikszentmihalyi describes as “flow experience,” come to understand that when they commit sufficient energy and effort to sufficiently challenging tasks, they will derive not merely a sense of pleasure but a powerful sense of personal fulfillment. Teachers are responsible for presenting students with challenges at an appropriate level. That is, challenges students are able to meet successfully when they commit themselves fully to a task. Students, however, must be responsible for supplying the energy and all of the skills at their disposal to accomplish that task.

Sharing

Sharing is a disciplined behavior. It requires the sharer to give up something for the sake of others. Parents teach sharing to young children as an important social and survival skill. Children come to accept the idea of sharing, however, not simply because parents expect it, but because they eventually experience the intrinsic
rewards of sharing. That is, they understand that in giving up something, there are
certain benefits to be gained. When learners commit to sharing, they are making a
commitment to the learning community, to their class, to their school. Sharing
beliefs, ideas, and opinions is risky, requiring learners to show themselves to others
as thinkers and believers, capable of great thought and humbling mistakes. Yet,
when sharing their thoughts responsibly, they learn more about what they are think-
ing and the impact of their thoughts on others and their world.

Listening

Sometimes the best kind of sharing is sharing our attention by attending to the
thoughts of others. Wise sayings abound with the same basic theme, for example,
"When I am speaking, I am not learning," or "I do my most active learning when I
am a most active listener," or "The wise man listens loudly and speaks softly." All
this wisdom simply suggests that learning and listening are companions. The kind
of listening we speak of is active listening—the kind of listening where judgments
are momentarily suspended as is the impulse to impose order on what is being said,
and where we actively, if only temporarily, accommodate our thinking to the mes-
sage being communicated so that we can interact with it constructively.

Now that the presentation is finished, take 10 minutes to write your
reactions to the critical-thinking presentation. You can use your cluster
notes to support your writing. Use them to summarize your thoughts
and then include some thoughts on what you will do to improve the
classroom environment to support students' critical thinking and what
can be done to overcome obstacles.

Now take 10 minutes to write your "10-Minute Essay" on critical
thinking. You will share this with your partner when finished.
Remember to include thoughts on how you will work to increase
students' critical thinking in your classroom. When 10 minutes have
elapsed, share your writing with your partner. Discuss in detail what was new
to
you in the lecture, what the lecture communicated to you about critical thinking,
what you agree or disagree with, what obstacles need to be overcome to increase
students' engagement in critical thinking, and what steps you will take to overcome
those obstacles. Observe as well the different responses you and your partner have
to the lecture and discuss them.

LESSON ANALYSIS

As is always the case, two lessons are occurring here simultaneously. One is about
critical thinking, and the other is about teaching, using an enhanced lecture format.
First, we will look at the critical-thinking lesson.

Evocation

This lesson began by asking the "listener" to examine his or her own problem-
solving history. You were asked to consider how you approach challenging situa-
tions. To capture these thoughts, you were then asked to list and discuss with your
partner the approaches and/or steps to problem solving each of you employs. As
part of a Realization of Meaning phase, you were then asked to hold onto this list for comparison purposes when listening to the details of the lecture to come. A second evocation task was then assigned. You were directed to discuss quite directly your thoughts on the specific topic of critical thinking. You were also encouraged to remember this conversation, as it directly relates to the content of the lecture.

Realization of Meaning

This phase of the framework was orchestrated in several ways. First, as mentioned above, listeners were encouraged to recall the content of thought and discussion about problem solving and critical thought and use it as a base understanding against which lecture content was to be held in relief, a conceptual backdrop, if you will. To this, a realization of meaning strategy was added in the form of cluster notes. This strategy is intended to enable listeners to remain engaged in the lecture while avoiding the distraction of lengthy narrative note taking. It also offers listeners opportunity to link information in a nonlinear format more conducive to how we speak, more reflective of how our minds work, and more flexible in more accurately depicting the complexity of the topic.

Reflection

The first reflection came at the midpoint of the lecture. Responding to the reality of listeners' capacity to attend, the enhanced lecture strategy includes opportunities to engage in shorter, more deliberate ERR applications that help listeners process the information they are hearing by engaging them more actively in the learning experience.

At the first stop in the lecture, listeners were asked to review their cluster notes and share them with a partner. Listeners were also encouraged to recall their own thinking about critical thinking. This was done to link existing perceptions and beliefs with incoming information. A story was also offered as part of the reflection processes so listeners could be witness to a rather famous example of critical thought leading to innovation. This brought together the basic tenets of the presentation in a memorable and readily accessible form. A follow-up assignment was also given to extend student involvement.

Evocation

The lecture continued with an invitation for participants to imagine someone engaged in critical thought.

Realization of Meaning

Students were then exposed to two problems requiring application of critical thought in order to engage in the process themselves. They were encouraged to be observers of their own problem-solving approach in order to be informed thinkers but also to discuss with others and compare approaches. Participants were able to experience firsthand how we sometimes limit our thinking unwittingly. Cluster note taking was also encouraged.
Reflection

Participants in this lesson were again asked to stop and review their notes and discuss what they mean, ask any questions, and build appropriate links.

Evocation

Listeners were then encouraged to consider implications for implementation of critical thinking strategies in their own classrooms. This was in anticipation of the discussion to come on implementation strategies.

Realization of Meaning

Beyond continuing to take notes, participants were asked to attend to a listing and determine whether it was complete in their view or if they might add to the list.

Reflection

A 10-Minute Essay was then assigned with specific expectations set for what the essay should include. Discussion ensued with partners to go over in detail each partner’s written response. In this manner, the ERR framework was employed to guide learners through a complex lecture, all the while intending to keep learners engaged yet recognizing the limits of the human capacity to attend.

The second piece to this lesson is the process lesson. Here evocation for the lesson appears in various guises. It was included, in part, in the introductory paragraphs and the expected outcomes. Here, it was made clear where the lesson was going and provided insight into what should be taken from it. There were also links built to previous applications of the ERR framework.

Realization of Meaning was manifest in the lecture itself, the application of cluster notes and the embedded discussions, while reflection was evident in the lesson analysis and discussion of future implementation of the strategies. Along the way, three strategies were presented. The more comprehensive strategy is the enhanced lecture strategy. This can be added to your chart as a Realization of Meaning strategy. Cluster notes, a strategy embedded here within the enhanced lecture, is also a Realization of Meaning strategy. The 10-Minute Essay is the third strategy and in this instance was employed as a Reflection strategy.

CHAPTER SUMMARY

Chapter 4 offers an approach to a frequently employed, and therefore important, instructional approach, lecturing. This approach enables application of the ERR framework, mechanisms for full student engagement, and mechanisms for monitoring student engagement. This chapter offers examples of how to implement three new strategies. They include the umbrella strategy known as Enhanced Lecture. The other two strategies implemented here to facilitate the enhanced lecture are Cluster Notes and the 10-Minute Essay. The enhanced lecture strategy is similar to the ERR for Narrative Text strategy applied earlier in the sniper lesson. Both strategies are implemented within the Realization of Meaning phase. Enhanced lecture is, of
course, applied during the body of the lecture presentation and involves cycling through the ERR framework. As with the sniper lesson, this approach provides repeated ERR cycles for multiple benefits. Those benefits include the following:

- Enabling the content to be segmented so learners can engage with manageable amounts of information
- Respecting the reality of limitations to the human capacity to attend and concentrate
- Providing opportunities to sustain engagement or re-engage learners as needed
- Maintaining the instructor’s role in guiding learners’ attention to essential content elements and primary purposes for learning
- Leading learners toward practical learning outcomes that sustain the relevance of the lecture content for learners

This chapter offers an overview of critical thinking and its link to innovation. Information was presented regarding the nature of critical thought, why it might be important to consider, and how critical thinking can be more effectively encouraged in classrooms. Ways by which thinkers themselves inhibit their own thought processes were described, and some practical solutions delineated. Student and teacher roles related to setting value, providing time, taking responsibility, and eliminating risk were discussed as essential elements in the construction of a classroom conducive to engendering critical thinking and innovation. In the end, it is clear that incubating critical thinking requires teamwork, trust, practice, and the understanding that knowledge is not stagnant and thinking is not painful. Rather, knowledge is effervescent and thinking a genuine and lifelong source for personal fulfillment.
Today, the Knowledge Society and the Knowledge Economy place cognitive resources at the center of human activity and social dynamics. —Mary Louise Kearney

OUTCOMES OF USING THE ERR FRAMEWORK

Evocation

As we have already discussed, the ERR Framework is an excellent tool for guiding students at all grade levels through learning experiences. We have shown how thoughtful questioning practices guide student learning, lending an overarching sense of direction and pointing toward specific learning goals, when offered within the framework. Providing such structure does not inhibit student inquiry, as carefully considered, well-targeted questions more often invite thoughtful speculation and reflection. The ERR framework, as we have seen, accomplishes several other important instructional tasks, including the following:

- Allowing students to clearly set purposes
- Maintaining students’ active cognitive and metacognitive engagement
- Provoking rich discourse
- Encouraging students to create avenues of inquiry
- Facilitating students’ expression of opinions
- Maintaining students’ interest and motivation to learn
- Creating a setting for reflection on what to value
- Serving as stimulus for change
- Setting expectations for students’ critical engagement
- Facilitating critical thought at increasingly sophisticated levels
Once you automate the process of thinking through the lens of the framework, an array of teaching strategies can be implemented at the various phases, allowing instruction to be altered to meet specific demands of the content or to satisfy student needs or specific instructional purposes. This chapter offers a set of strategies you can implement immediately within the ERR framework with almost any content. They include writing-for-thinking strategies that too are placed within the framework’s specific phases, facilitating their immediate implementation.

The following section includes a discussion of what is meant by writing for thinking followed by a discussion of three writing-for-thinking or more traditionally, writing-to-learn strategies: clustering, cinquains, and cubing. The section concludes with some general writing-to-learn strategies that can be used in content classrooms.

First, we will look at writing-for-thinking strategies, but before we begin, think first about what you already do, or plan to do, to encourage your students to use writing for thinking. Take a minute now to write down and then share your plans with a partner.

We have known for some time that writing is a powerful learning and communication tool (Langer & Applebee, 2007). We also recognize the numerous ways we can use writing in the classroom and in the learning process. Yet students do not come to these forms of writing naturally. They must be shown how writing contributes to their learning and how they can use writing at various stages in understanding and learning in order to move to more complex learning. Gunning (2007) wrote,

In writing, students don’t make progress until they are challenged to com-
pose more complex forms and are given instruction in how to do so. Students
need careful guidance, direct instruction, and experience writing in a variety
of modes. (p. 160)

Here, we will discuss writing-for-thinking strategies as one form of writing that facilitates readiness for study as well as advancing comprehension and the contextualization and communication of knowledge.

**Clustering**

Many may already be familiar with clustering (Rico, 2000). If you’re not familiar with clustering, then perhaps you are familiar with webbing or concept mapping or the many online web applications such as www.graphic.org/concept.html and http://classes.aces.uiuc.edu/aces100/mind/c-mz.html. Clustering is different from these but within the same family. (For a delightful description of an application of clustering to a civics lesson, read The Thinking-Writing Connection: Using Clustering to Help Students Write Persuasively by Steele and Steele, 1991.) Clustering is a teaching strategy that encourages students to think freely and openly about a topic. It entails only enough structure to stimulate thinking about an idea and the connections between subsets of related ideas. It offers a nonlinear organizational strategy more closely aligned with how our minds actively work rather than linear strategies for thinking.

Clustering has several uses. It can be used to stimulate thinking about a topic or used to summarize what has just been studied. It can be used as a way to build new
associations and as a way of graphically representing connections between ideas or themes. It is, as well, a prewriting activity that serves as a powerful tool for initial engagement with the writing process, especially for reluctant writers. (We will discuss this role more thoroughly later.) Clustering is also a powerful study tool, especially in preparation for testing. Mostly, however, clustering is a strategy for gaining access to prior knowledge, understandings, and beliefs.

As is our usual practice, we will first set the rules for the strategy; then you will experience clustering firsthand before we discuss the strategy further.

To begin, the steps for clustering are few and easy to remember:

1. Write a nucleus word or phrase in the center of a piece of paper, overhead transparency, chalkboard, or other writing surface (depending on whether you are doing an individual or group cluster).

2. Begin by writing down, in linked associations, words or phrases that come to mind about a target topic or the growing array of associated subtopics or attributes that emerge.

3. As ideas come to mind, write them in proximity to related ideas, draw a circle around each word or phrase, and draw connecting lines that link related ideas.

4. Write as many ideas as come to mind. Keep writing until either time is up or all thoughts are exhausted.

Every cluster is different, but the example here is representative.

There are just a few basic rules to follow when using clustering:

1. Write everything that comes to mind. Make no judgments about the thoughts; just put them down.

2. Do not be concerned about spelling or other writing constraints.

3. Do not stop until enough time has elapsed and all ideas are out. If ideas stop flowing for a time, doodle on the paper until new ideas come.

4. Let as many connections build as possible. Do not restrict the number of ideas, the flow, or connections.

Experiencing Clustering

Clustering can be performed individually or with a group. Now, select a topic that you or the group has interest in and some knowledge about. For demonstration purposes, it can be a topic such as your country, state, or a topic of study from your teaching. The sample in Figure 5.1 is a cluster done by a group of Slovak teachers on Slovakia. To begin, select your topic and place the starter term in the middle as instructed above. In your group, select your prompt now and begin
generating responses. Encourage random comments from all until the ideas ebb. Be sure to link responses to prompts or associated ideas.

After the initial group cluster, it is useful to do an individual cluster on a separate topic. This is an important next step, as it is through this that you can see the power and value of the process. The topic is important here, as it will need to be something familiar so you will have enough information for a full cluster.

For this experience, think of a loved one. You might consider a spouse, a significant other, a parent, sibling, friend, pet, car, or other object of affection. Recall the steps and rules again. Look at the example (Figure 5.1) and take five to seven minutes to develop your own cluster. When you are finished, share with your partner. Then, discuss your
experience with both the individual and group clusters. How they are similar and different. Speak as well about how this strategy might relate to writing for thinking and your own ideas about this you considered earlier. Consider too how this strategy might serve the beginning writing process. Then, discuss how you might use this in your teaching in the near future.

Debriefing Clustering

Steele and Steele (1991) described clustering as a flexible writing-for-thinking strategy. As a group activity, it can effectively capture a group’s ideas, providing students with exposure to the associations and relationships other students draw from a particular prompt. Clustering complements group brainstorming tasks since it is quick and permits all students, not just those who always put their hands up first, to actively engage in thinking. Experience has taught us, however, that when clustering individually, the topic should be one students know a fair amount about since they will not have the shared experience of the group to draw from. The benefit then for learners comes from bringing their own knowledge and schema to an awareness level to prepare them for further learning experiences.

Now, develop plans for using clustering in your own class. If possible, speak with a partner about the uses for clustering and discuss how you can implement the strategy in your class tomorrow. Consider the content of your next lesson. Imagine how students can be drawn into the subject matter by first accessing their own knowledge for consideration and seeing how their existing knowledge is organized.

When completing individual clusters in class, we suggest you cluster as well. Doing so shows you take the process seriously, and it prevents students from interrupting to ask questions, disrupting the thinking of others.

Finally, before moving on to the next strategy, think now about where in the ERR framework clustering should be placed. Take out your ERR chart and place clustering in the proper location. If you assigned clustering to either the evocation or reflection phases or both, you would be correct as clustering works well in both phases of the learning process. As mentioned, it works well in evocation as a strategy of activation and engagement with prior knowledge. In reflection, it serves as an organizing and restatement tool.

Cinquains

The capacity to summarize information, to capture complex thoughts, feelings, and beliefs in a few words can be terribly useful. It requires rich understanding and the ability to engage in thoughtful reflection about a particular strand of content and/or experiences. Constructing a poem requires a writer to express in the most parsimonious terms the outcome of reflections on complex matter. A cinquain is a poem that requires synthesizing information and experiences into concise expressions reflecting understanding. The cinquain poem was invented by Adelaide Crapsey (1876–1914). The cinquain used here is a modified version referred to as a modern or didactic cinquain.

The guidelines for writing cinquains are as follows:

1. The first line is a one-word description of the topic (usually a noun).
2. The second line is a two-word description of the topic (two adjectives).
3. Line three is three words expressing action of the topic (usually three ing words).
4. The fourth line is a four-word phrase showing feeling for the topic.
5. The last line is a one-word synonym that restates the essence of the topic.

**Cinquain Format**

Title (usually a noun)  
Describe (usually adjectives)  
Action (usually ing words)  
Feeling (phrase)  
Restatement of essence

**Experiencing Cinquains**

Cinquain comes from the French word for five and is a five-line poem. To understand the thought process involved in writing cinquains, it is necessary to write some to experience the process firsthand. Examples are always helpful, so here are two examples to give a flavor of how cinquains look and sound.

**Sample Cinquains**

Mexico  
Hot, tropical  
Mining, fishing, drilling  
Cultures, languages, history, together  
Spicy

Baseball  
Pastime, rivalries  
Pitching, hitting, fielding  
Greatest game of summer  
Home run

Take out a piece of notebook paper, or in your learning journal, find a clean sheet of paper. For your first cinquain, think of some event in which you have recently participated. Any event will serve here. It could be a show of some kind such as a play or musical event, a sporting event, or perhaps a party or other social event. A walk in the park or swim in a lake could serve as well. Think about the event: your reactions, feelings, sensations, and perspectives. Now, take a few minutes and, following the guidelines listed above, create one or two cinquains. When those are complete, share with a partner and discuss how you decided what to write.

During your sharing, be specific and detailed. Explain why you selected the words that appear in your poem. Recall as well some words of phrases that came to
mind that you did not select. In this discussion, you will begin to see the language involved in this strategy and what learners do to create their poems. Now select a topic in your content area. A seventh-grade class we worked with completed their study of Mexico by writing individual cinquains on the topic "Mexico," another on volcanoes. Your topic can be as general as Mexico or more specific, but be sure it is content based.

Debriefing Cinquains

When introducing cinquains to your students, first present the guidelines for writing the poem. Then offer some samples (as provided above in this section). Then have your students write cinquains on a single topic. Cinquains can be difficult for some in their first attempts, so an effective means of introducing them is to have the group divided into pairs. Provide a topic with which students are familiar. Allow five to seven minutes to complete the task individually. Next, ask partners to share and then assign them the task of creating a single cinquain by either taking from each cinquain terms or lines they both like or writing a totally new cinquain. This prompts conversation about why they wrote what they did, enabling further reflection and critical review of the topic. It also requires listening to others and pulling from the work of others' ideas both partners can relate to and agree with. These paired cinquains can then be shared with the whole group. It is often useful to have the paired cinquain written on the overhead and presented by the pair to the group. This can engender further discussion.

At this point, for our purposes, it is important to take a moment to think how you will use this strategy in your classrooms. Cinquains serve well as a tool for synthesizing complex information, a means of evaluating student understanding, and a means for creative expression. A cinquain is a quick yet powerful tool for reflecting on and summarizing concepts and information. As you might conclude, cinquains are most often used in the reflection phase of ERR. However, they are sometimes used during evocation but only on a topic students already know quite a bit about. Take a few moments now to think how you will use this strategy in a content lesson. Share your ideas with a partner. Remember to add cinquains to your ERR chart.

Cubing

Cubing (Cowan & Cowan, 1980) is a teaching strategy, like cinquains, that requires examining a topic from varying perspectives and encourages student thinking about a topic by using a variety of question types. It is called cubing because the mechanism for prompting student response is a six-sided cube students can either hand around, toss softly from one to another, or simply be rotated from side to side by the teacher or another student, exposing the various prompts written on the six sides. The cube is made by covering a small box, preferably four to six inches on a side, with paper. The standard cube has one of the following six prompts on each side:

Describe It. Think about the topic and describe it as you envision it. Perhaps your vision is similar to others; perhaps it is unique. Let's see.
Compare It. Write about what it resembles and what is does not resemble. This could refer to its shape or function of operation or implication.

Associate It. What is the first thing that comes to your mind when you hear the word or topic? Does it prompt some connection to something else familiar or perhaps strangely linked in your history? It can be events, inanimate objects, places, or people. Think freely, and see what comes up.

Analyze It. Describe what it is composed of, what happens in its inner workings, what its source of power or purpose is, how it came to be.

Apply It. State its use. You might state its intended use or some other purposes it might serve other than what it was originally designed to do. For example, a coffee can be used to bail water out of a canoe.

Argue for or Against It. Judge whether you believe it is useful, thoughtful, appropriate, helpful, well constructed, well considered, harmful, clever, efficient, or whatever you might decide about the topic and state your belief.

There are a few ways to use the cube. Here are two.

One. With a cube you can draw students into a circle and toss the cube gently around. The rule for this is that a student who catches the cube looks to see what prompt is facing up (or is under her or his left thumb or some other designation) and then hands the cube to the student to the left or right for his or her response.

Two. Teachers lead students through the process of cubing by having students freewrite for a brief period (2-4 minutes) from a given perspective on a topic. First, a topic is selected, then, students are directed to the first prompt, describe it, that is, look at the subject closely and describe the vision, including colors, shapes, or signs. With these directions in mind, students freewrite for the specified period of time. The process continues as above through all six sides of the cube.

Experiencing Cubing

It is your turn to try this strategy. The first application should be using timed freewriting, let’s say three minutes for each prompt. The first topic should be interesting and familiar and should be something useful as a model to get the idea across, as you will see how cubing can be applied to almost any topic. So have a blank sheet of paper ready and be prepared to cube on the topic: Teaching. Move through the various prompts, responding to each with your focus on teaching. So you will describe it, compare, associate, and respond to the other three prompts in turn as you consider teaching and what teaching means to you.

Following writing, share your responses to each side of the cube with your group. Have each person read her response to the first prompt. Discuss briefly and then move to the next. Discuss what is similar, different, surprising. In class, you would have your students share in this manner as well. It is likely time would not allow all to share each side, but a good sampling of responses for each side would
be informative. Often, sharing is done first with a partner. Each person selects three sides of the cube to share and reads his writing to his partner.

Next, get in a circle if you are in a group. Here, you will use a cube (so someone will have to make one). With the various sides labeled with the prompts, gently toss the cube across the circle to differing respondents. As each prompt comes up, speak to how it relates to the topic: \textit{escalator}. A strange topic, but you will see clearly how cubing can work for just about any topic. After each side of the cube has been responded to two times, stop and discuss what you noticed about the strategy from a pedagogical perspective.

\textbf{Debriefing Cubing}

There are usually a few questions at this point. Do you have to go through all six sides with small children? No, often three sides are enough with small children, but it depends upon the topic and the group.

Do you have to do the sides of the cube in a particular order, or can you just roll the cube? You probably noticed the prompts in the cubing modeled above closely follow Bloom’s taxonomy presented earlier. There may be some rationale for following the order, as it would lead learners from less through to more complex thought processes. However, it is not essential to order responses. Sometimes, you may use different prompts altogether. For example, we have used cubing after reading a play. In this instance, the sides of the cube represented characters from the play. In one example, the play students read was about a teenager who became pregnant. Sides of the cube were the young girl, the boy, the mother, the friend, the father, and the teacher. Students were presented with a thoughtful question from Bloom’s taxonomy that was applied to each character. Alternatively, one character could be selected with a set of six questions identified for that character. The question, in this case, could also reflect Bloom’s taxonomy of questioning. The sides of the cube can change depending upon the perspectives you wish to have your students consider and the purposes of your lesson.

To which phase(s) of the framework does cubing apply? After much discussion with many teachers who have implemented cubing in their instruction, we have agreed that is can be used well during the evocation or reflection phase. We discussed the importance of cubing on something about which students are knowledgeable, so topics should be selected carefully. One example topic we have used in science is connected with the study of photosynthesis. We observed a science teacher use cubing to introduce this topic. The teacher asked each student to bring a leaf to school. They cubed on their leaf in the evocation stage using the prompts as we did in the example above. Then, after studying photosynthesis, the students cubed on photosynthesis in the reflection phase. The teacher began with cubing on a leaf because students would not already know much about photosynthesis, but they would have lots of observations of leaves. By looking at leaves in detail, students were preparing for a closer analysis of what is happening in leaves and their life cycle. Cubing is effective when the topic is something about which one knows a lot. Yet the strategy can be used in the evocation stage when we want students to begin understanding what they know about something quite familiar that is intimately connected to where their studies will take them next. Cubing in this way affords the opportunity for students to experience how their existing knowledge is a valuable resource they can rely on for future learning.
Take time to consider how you will implement this strategy in your content lesson. Consider what questions you will ask. You will see that if you think about the important underlying purposes for your lesson, the questions you want to ask will come readily. Be sure to vary your question types so students engage in multiple ways of thinking. Share your example with your partner.

OTHER WRITING-FOR-THINKING STRATEGIES

Often, writing for thinking occurs in content classrooms where students wrestle with ideas, working hard to understand and learn. Writing for thinking is used to facilitate evaluating and reacting to instruction following a presentation, a film, or a reading or class discussion. Teachers can provide writing time, perhaps writing about “What was most important?” or “What was new to me?” or “What do I think?” How does this relate to what I have already discussed? Students’ written reactions can be shared and discussed in small groups or simply by writing for thinking for the writer only.

There are many writing-for-thinking strategies that can be used in content classes. The following list is not exhaustive. Before reading the list that follows, have a piece of paper handy, and as you read, think about the strategy and consider which strategy might work best for you. At the end of the list, write down that strategy and briefly state why you think it might work for you.

- Informing students at the beginning of class that at the end of class they will each write a paragraph describing what they believe to be the most interesting or important idea presented. Always inform students at the beginning of the class that they will have this assignment at the end of the class.
- Have students listen to a paragraph or meaningful fragment of text and write what it means to them in their own words. If students experience difficulty with the activity, have them tell another student before they write. Getting better at this will show up in improved note taking—a benefit students will see and appreciate in their own work.
- Before digging into a specific content lesson, show students a content-related picture and ask them to write an idea suggested by the picture. Or show an aerial picture of, say, a glacial river following a discussion of the forces of glacial movement in an earth sciences class and ask students to write about how they see using what they just learned to guide their thinking.
- Limit students to communicating with each other using only a question-answer format. Have each student formulate written questions derived from content material being learned. Collect papers, redistribute them randomly, and have each student answer in writing the question received.
- Have students write questions they would like the teacher to answer at a future time, stating why a question or set of questions intrigues them. When responding, give a statement recapturing the background the student brought to the question. For example, after studying about sharks, a student might write a question asking the teacher if sharks eat people. The background might be that the child had an uncle who went scuba diving and told her that
he saw a shark, but it just swam by him, so now the student wonders, "Do sharks eat people?"

Teachers in all content areas can improve students' subject learning and give
them practice in the basic cognitive operations of summarizing, clarifying ideas,
examining relationships, seeing errors, and remembering through writing. In addi-
tion, basic thinking processes that call on more than one operation, including infer-
encing, interpreting, thinking like experts, making multiple comparisons, and
forming new concepts, are enhanced through the use of specific writing techniques
such as those discussed above.

For the Evocation Phase

There are numerous writing-for-thinking strategies. Following is a brief presen-
tation of a few. They are presented according to the framework. Be sure to add those
you find useful to your framework chart.

Scrambled Sequences

This strategy can be used with young writers, but with complex text, the strate-
gy can be used with older students to facilitate and/or assess understanding. With
this strategy, the teacher may write five or six individual events from a sequence of
events or from a cause-and-effect chain, on separate pieces of paper, which are
scrambled. In larger groups or among small groups at tables, students work to
assemble the pieces into the order they think best. Another way to implement is to
ask students to come forward one at a time and place one item in what they think is
its proper place. When that's completed, students are asked to scrutinize the text
source to determine whether the students' order approximates the text.

Semantic Feature Analysis

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<th>Seafood</th>
<th>Vegetables</th>
<th>Insects</th>
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<td>-</td>
<td>+</td>
<td>-</td>
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</tr>
<tr>
<td>Fish</td>
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<td>+</td>
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<td>-</td>
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<td>Snakes</td>
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<td>+</td>
</tr>
<tr>
<td>People</td>
<td>+</td>
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<td>+</td>
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</tbody>
</table>

Another strategy for activating and developing background knowledge is
semantic feature analysis (Anders & Bos, 1986). This strategy is useful when
students are studying a topic about which they have little background knowledge.
The essence of the strategy is to compare the features of the new and lesser known
item or topic with those of two more familiar items or topics.
A chart to guide this activity is prepared in advance by the teacher and presented on a transparency or a large piece of paper. The names of the three to five items are listed in a column down the left side of the chart, and a series of features on which the items will be compared are listed in a row across the top of the chart (see previous chart).

As a preliminary activity (evocation phase), the students discuss the two familiar items and suggest the appropriate markings ("+" for "yes" and "-" for "no") for each item under each semantic feature. Then, before reading, hearing a lecture, or otherwise studying the new topic, the students also suggest marks for that topic's semantic features ("+" for "yes," "-" for "no," and "?" to indicate that they are unsure of a feature). At this time, the teacher presses students to make predictions about the topic, even when they are unsure. Students now read or explore the new topic (realization of meaning). Following the exploration, they discuss what they learned. As a follow-up activity (considered part of the reflection phase), students return to the chart and confirm or suggest corrections for the markings they made during the preliminary activity.

The semantic feature analysis works nicely with lessons that are not text based. The strategy has many applications in the sciences and in math.

**For the Realization of Meaning Phase**

*ReQuest Procedure*

When students need support reading text for information, one way to provide that support is to use the ReQuest procedure (Manzo, 1969). With this procedure, two students read through a text, stop after each paragraph, and take turns asking each other questions about it. It helps a great deal if their teacher serves as a partner when the technique is first introduced. The first time the strategy is implemented, teachers should model the procedure for the entire class. After the first paragraph of a reading is completed, the teacher can model asking questions that probe for understanding or build connections to other ideas or character or events, identifying what is most important. The questions can model skills good readers use to understand text. These skills include developing coherent representations of text, deciding on relative importance, and building connections. After answering the teacher's questions, both teacher and students read the next paragraph. Now, it is the students' turn to ask the teacher questions about the reading. This cycle is then repeated. After this introduction of the strategy, the teacher sets up pairs of students to ask questions of each other.

ReQuest may be used with a whole class. One way is for the class to read one or two paragraphs from the text, as in the example above. Students then pause and close their books, and students take turns asking the teacher all the questions they can think of. Following that, they read a new paragraph and the roles are reversed. After several such exchanges, the teacher may shift the activity to ask students to predict what the rest of the assignment will be about and to state why they think so (Vacca & Vacca, 2008).

*Reciprocal Teaching*

It is well known that the act of teaching is the best way to learn. Reciprocal teaching, like the ReQuest procedure, was developed to enable all students to experience
the role of teacher in leading others through a text. The procedure is especially well suited to informational text.

Reciprocal teaching (Palincsar & Brown, 1984) is done in groups of four to seven students. The students all have copies of the same text and take turns being the teacher, a role that requires them to perform five tasks. After the students have read a paragraph (usually silently), the person acting as teacher

1. summarizes what has just been read,

2. thinks up two or three questions about the passage and elicits the students’ answers to it,

3. clarifies issues the other students are unclear about,

4. predicts what the text will say in the next passage, and

5. assigns the next passage for everyone to read.

As an example, assume that a teacher and five students are reading text.

First, the teacher serves as discussion leader for the initial paragraph. Students are encouraged to attend to the reading and participate in subsequent discussion. They should also observe carefully how the teacher conducts the lesson. So each student will be able to play the role of discussion leader when subsequent paragraphs are read. It is useful to have a chart listing the five teacher tasks, so students can refer to it as they lead the discussion.

The text used must be read in units of paragraphs that facilitate five- to six-minute discussions. When they are finished, the teacher might give a verbal summary of the paragraph and ask if students would summarize the passage the same way. Alternately, the teacher can ask for a volunteer to provide a summary statement and then see if this is how others might summarize.

Next, the teacher formulates a question, taking care to elicit ideas that demonstrate the art of questioning. Questions might address a complicated idea explicitly stated in the text, probe an unspoken implication, or ask students to compare an assertion made by the text with their own commonsense ideas.

Next—although this often happens simultaneously with the preceding step—the teacher attempts to clarify to students any parts of the passage that are unclear, pointing out disagreements.

Now, the teacher makes a prediction as to what comes next in the text. If time allows, others may make for their predictions as well. Then, the next section of text is assigned.

If this is the first time this activity has been used with a participating group of students, the teacher may take another turn conducting the discussion. The extra turn is to make sure students fully understand how to enact the teacher role when it is their turn.

Reflection

*Save the Last Word for Me*

Save the Last Word for Me (Short, Harste, & Burke, 1996) is an activity that facilitates postreading reflection. It provides a framework for class discussion of either
narrative or expository text. This strategy is particularly helpful in getting the quieter and more reluctant students to participate in class discussions.

The steps of Save the Last Word for Me should be explained as follows:

1. While reading a piece of text, students are asked to find one or more quotations that they consider particularly interesting or worthy of comment.

2. The student writes the quotation on an index card or small piece of paper, being sure to include the page number citation.

3. On the reverse side of the card, the student writes a comment about the quotation. The student may choose to disagree with the quotation, elaborate on it, or whatever he or she chooses.

4. The teacher calls on someone to read her or his chosen quotation aloud. (It helps if the student tells everyone what page in the text the quotation came from, so that everyone may follow along.)

5. After the quotation has been read, the teacher calls for comments and reactions from other class members. Be sure to keep the discussion on target and limit comments if they are caustic or petty.

6. To conclude the discussion of the quotation, the teacher has the student who chose it read his or her comments aloud. Here’s the catch: There can be no further discussion. The student who chose it gets to have the last word. (Teachers, you will find it very difficult at times to keep from interjecting some final comment, but no fair! That’s against the rules.) We have seen the discussion of controversial issues spill into the hallways and continue into the lunchroom.

7. The teacher now can call on another student to share his or her quotation and begin the process anew. It is unlikely that the teacher will want to call on every class member to present a quotation in the same class period but will select a few students each time.

_T-Chart_

The _T-chart_ is a versatile graphic organizer for recording binary (yes or no, pro or con) or comparison and contrast or beneficial or harmful effects responses to a discussion. After reading an editorial on the benefits and detriments of television viewing, for example, pairs of students construct a T-chart, like the one shown in Figure 5.2, and in five minutes, list on the left-hand side of the chart as many benefits as they can think of for watching television. Then, for five minutes, they should list as many detriments as they can think of. Then for another five minutes, students can compare their T-charts with those of another pair. Later, the teacher can lead the whole class in developing a class T-chart.

_Venn Diagram_

A _Venn diagram_ is derived from mathematics and composed of two or more large, partially overlapping circles. It can be used to compare and contrast ideas to show commonalities between ideas, events, and concepts. Suppose, for example, that
students are comparing characteristics of sea creatures and land animals. A Venn diagram with two overlapping circles would enable the class to compare and contrast behaviors, habitat, diet, and reproduction and see the outcome on a visual representation.

The teacher might ask pairs of students to construct Venn diagrams by filling in only the two parts of the circle devoted exclusively to land and sea creatures, respectively. Then, pairs could join other pairs, and the foursomes could compare their diagrams and then list in the middle section common features (see the example in Figure 5.3).

Now, select one strategy you think you would implement most successfully in your classroom. Describe the strategy; state how you would use it and why you think it to be particularly effective. Share with a partner.
CHAPTER REFLECTION

Many new strategies have been presented in Chapters 4 and 5. It is important to include them in your ERR chart. Go back through the chapters and identify the various strategies presented. Make a list in your journal and, if possible, compare it with a partner to be sure you have them all. Once listed, go through them and decide where on the ERR chart they best fit. Come to consensus with your partner before placing it on the chart. One bit of advice. You will notice that sometimes it might seem a strategy, or part of a strategy, might fit in all three phases of the ERR framework. Think about where in the learning sequence you would first introduce the strategy. Also, some strategies may be applied in the evocation or reflection stage equally well. However, their application to either phase is in response to differing outcome expectations for learners. Be sure to think these differing outcomes through and note them in your journal.