

The Synergy of Inquiry

Table of Contents

Acknowledgments	5
Foreword	7
Introduction	9
Chapter 1: Defining and Describing Inquiry Teaching	15
Chapter 2: Planning for Inquiry Teaching	61
Chapter 3: Reflecting With Inquiry Teachers	107
Chapter 4: Managing the Inquiry-Based Classroom	145
Chapter 5: Serving Disengaged and Disenfranchised Students	183
Chapter 6: Transforming the School Through the Synergy of Inquiry	223
Appendix A: References Cited	245
Appendix B: Teacher Resources	258

What Is Inquiry Teaching?

In contrast to direct instruction or the transmission model where the teacher presents, explains, and illustrates the concepts up front as known finished products, inquiry teaching involves students in the creation and negotiation of ideas. Students begin by seeking answers to questions and are not given the answers. Student engagement is at the *core* of teaching and learning, at the *core* of classroom and school culture, and at the *core* of reaching all students in a school. Without inquiry, teaching approaches (for example, higher-order thinking skills, brain-based learning, or reader response) are difficult to put into practice and even more difficult to maintain. On the other hand, they are all an organic part of inquiry learning. Using inquiry teaching effortlessly creates a *synergy* between all of these other separate approaches; it becomes the structural context in which they all reside. More specifically, inquiry teaching is:

- the framework in which the most effective approaches to learning naturally occur; and
- a synergistic set of practices that together create an incredibly effective way for students to develop deep conceptual understandings, complex thinking skills, and enduring habits of mind.

How is that possible? This sounds like the miracle cure for all our educational woes. If it is so good, then why is everybody not already using it? Most educators have only tried some facets of inquiry teaching and learning and found only modest success. Unfortunately, they did not implement a number of the other facets so that each could support one another and together make the process self-sustaining for both the teacher and the learner. Implemented separately, each approach is just another add-on to the teacher's already busy workday.

Nonetheless, there are many teachers today who use the complementary set of practices that make up inquiry teaching. Furthermore, for many decades in the United States and throughout the world, teachers have demonstrated great success with inquiry teaching (Newmann 1996; Marx et al. 2004; Darling-Hammond et al. 2008). Undoubtedly, there are presently countless other teachers who are using some components but need a clear road map about how to operationalize inquiry teaching to a full extent in their classrooms. This book provides practical guidance for implementing effective inquiry teaching practices.

Why Is Inquiry Teaching Successful?

Inquiry teaching is a self-sustaining approach that is built around how people naturally learn. Notably, this includes how they learned before there were schools and how people still learn when formal schooling is unavailable and where daily life presents opportunities for skilled natural facilitators to assist in deep complex learning.

The inquiry approach starts focusing on what children or adolescents like to do and learn. It is what they naturally do when left to their own devices, or what children ask adults to help them with when they need assistance. Inquiry teaching builds on this background discovery and intrigue. For this reason, when inquiry teaching is effectively implemented in schools, children rush to school. Teachers do not have the task of getting them to do things that they do not want to do. Discipline problems diminish greatly. No longer is it the “us against them” syndrome. This does not preclude hard work. Learning is fun despite, and in some sense because of, the hard work (Jablon 1989; Ancess 2003; Barron and Darling-Hammond et al. 2008).

Think about how strongly students want to participate in sports teams that require tremendous amounts of commitment and hard, sometimes tedious, work. Likewise, consider their commitment to the drama club where students need to memorize hundreds of lines of dialogue, build huge wooden sets following blueprints, or learn electromagnetic physics principles to run automated lighting or sound boards. When inquiry teaching is extended into project-based production, it incorporates many aspects of the natural things that students want to do into the process of formal school teaching and learning. It is the reason that older students, who drop out of school, are then later successful in other schools that utilize inquiry teaching at their core.

Teachers who have successfully implemented inquiry teaching as the core of their teaching are not much bothered by each new expectation or mandate from the state or local district. The framework in which learning and socializing occurs in their classrooms provides the context for successful integration of additional approaches to instruction. Many of the inquiry-centered teachers I know are not intimidated by the expectations of the Common Core State Standards. Likewise, this was true of their experiences with universal design for learning, differentiated instruction, brain-based learning, the learning cycle, or cooperative group learning. Teachers needed to slightly modify what they were already doing, but each new development was already part of their regular classroom routines and approaches to instruction.

Why Is Inquiry Teaching Not the Norm?

So again the question must be raised, with all its success why is inquiry teaching not the norm in all schools? I have identified four factors that contribute to this situation.

- 1. Lack of effective models:** I have seen well-meaning teachers attempt things that people call inquiry-based learning, but the models are not well-planned. These efforts are often unscripted open discovery experiences in which students are not given sufficient time to work through their thinking. So since it “failed,” teachers may revert to the direct instruction model they were previously using even though it was not particularly effective. *The Synergy of Inquiry* clearly lays out the components of effective inquiry teaching, and the steps to

implementing them in any classroom. It will *actively* engage teachers in this process. This clearly-delineated inquiry teaching model also brings constructivist approaches into the *pragmatic realm* and differentiates inquiry teaching from discovery learning.

- 2. Lack of expectations for complex thinking:** Standardized testing during the past 30 years has not required higher level, complex thinking from students. Memorization and shallow understanding associated with direct instruction were sufficient. However, now the expectations of the Common Core and other new standards for subject areas (for example, the Next Generation Science Standards), require more complex levels of understanding and application. Inquiry teaching is an effective vehicle to enable students to meet the expectations of the new standards and new assessments.
- 3. Lack of coordinated implementation plans:** Inquiry teaching is usually introduced one subject at a time rather than as an effective, organic way to approach teaching and learning for all the subject areas. Once teachers see it as the organizing umbrella, the context in which the rest of these effective practices reside, they then not only embrace it completely, but also become staunch advocates for its use by their peers. That synergistic approach is a focus of this resource.
- 4. Lack of instructional time:** Traditional approaches to teaching have treated each of these strategies as separate strategies, possibly adding one or two approaches into a lesson. With implementation of the Common Core, this narrow goal of learning is no longer applicable in instruction or assessment. Whether in language arts, mathematics, science, or social studies, an inquiry approach to teaching will not only be the most effective but also the most time-efficient way to engage students in achieving the standards.

Once you, your students, and perhaps even their parents get caught within this synergy web, you will find it hard to believe that you ever approached teaching and learning any other way. It will certainly transform your students, your teaching, and perhaps even your whole school community.

How Will This Book Help Teachers?

The Synergy of Inquiry demonstrates, with concrete examples, the efficacy of inquiry teaching. Not only are there examples and templates for each subject area at various grade levels, but there are also examples of how implementing these techniques in all the curriculum areas in the school will create a synergy of thinking skills and an approach to problem solving that is universal. Embedded throughout the book are the voices and helping hands of many teachers who, through the example of their own effective practices, will guide you through the process of moving towards inquiry teaching. This resource is designed so that teachers reading this book will feel they are co-planning and co-teaching with these other practitioners.

The book consists of six chapters. Each chapter features examples of inquiry-teaching practices in various subject areas as well as supportive research which provides the rationale for this approach. A Digital Resource CD offers additional examples of unit and lesson plans, some of which extend examples described in the book.

- **Chapter 1: Defining and Describing Inquiry Teaching.** This chapter defines the key features of inquiry teaching—student exploration, small group learning, deep academic understandings and skills, problem solving, access to physical materials, relevance to student experience, and authentic assessment. Examples of inquiry teaching in practice and observations about the instructional practice offer opportunities for you to reflect on your own practice. Knowing how the brain works is a crucial understanding for teachers; it enables them to effectively engage their students in learning through inquiry teaching. This idea is briefly visited here, but is explained in much greater detail in the bonus chapter on the Digital Resource CD.
- **Chapter 2: Planning for Inquiry Teaching.** Building on the rationales, premises, and concepts presented in the preceding chapter, this chapter contains protocols and templates of inquiry-teaching unit plans and lessons. Four teachers describe their practices and offer insights into their thinking about the lessons.
- **Chapter 3: Reflecting with Inquiry Teachers.** I invited nine exceptional teachers to share their thoughts about inquiry teaching. In their reflections, they reveal their joys, struggles, insights, fears, hopes, and dreams.
- **Chapter 4: Managing the Inquiry-Based Classroom.** Students learn to self-manage in an inquiry classroom. This chapter offers a collection of strategies that create classroom environments where students can try out ideas, learn how to interact in group situations, and develop relationships. Additionally, the chapter provides guidelines for assessing group projects and designing the physical space in the classroom.
- **Chapter 5: Serving Disengaged and Disenfranchised Students.** Lessening the achievement gap in schools means addressing the needs of students who are not especially interested in typical classroom activities and those who have unique needs in language learning and behavioral development. Scenarios of student activities reveal the potential and possibilities for engaging students in activities that serve their emotional and intellectual needs.
- **Chapter 6: Transforming the School Through the Synergy of Inquiry.** Inquiry teaching produces a school culture in which teachers are at the center of curriculum planning. In this context, teachers, students, and leaders have choices to use their abilities to innovate, create, and grow. This chapter includes experiences of a high school principal and an elementary school principal to illustrate how the inquiry approach can transform teaching and learning in a school.

Helpful Features

This book has several features to add to its accessibility for readers:

- Sidebars provide resources that augment content in the text.
- “Thinking Space” is a feature that invites readers to reflect on their practice or to respond to selected content in the chapter.
- Templates for unit and lesson plans, rubrics for assessing student work, and rubrics for evaluating inquiry teaching lessons and unit plans provide support for both novice and veteran inquiry teachers.
- Figures illustrate important concepts.
- Charts extend concepts described in the text.

I am not naïve about the challenges facing teachers and schools who want to implement effective inquiry teaching and learning. For some, the implementation will not be a simple *procedural* change in their classrooms. It will not simply be doing a little more of one thing and less of another. This will be a *cultural* change, a shift in cultural practice. It is a change in thinking about how learning occurs in humans, what is most important to learn, and then finally how we implement a process by which students can uncover deep understandings *before* they are ever told about the rest of the world’s insights into these concepts. For example, the goal in an inquiry classroom in science is “understanding how to figure out how the natural world works.” While engaging in this well-planned environment of *understanding*, students will also obtain understandings of how the natural world actually does work. In addition, students will also acquire the skills and insights into balancing these scientific understandings with social norms, design principles, and economic realities to figure out how to approach solving local, national, and international environmental issues. This journey to the “synergy of inquiry” is identical (or parallel) in grades 1 to 12.

Learning to do inquiry teaching well is a journey. It is a journey I am still on after many decades, yet I began to reap the benefits of implementing it in my classroom almost immediately. It wasn’t a journey that I took alone. As with any journey, it will be helpful to collaborate with others when navigating through it.

Defining and Describing Inquiry Teaching

This chapter provides an overview of the components of inquiry teaching and describes classroom practices using these components. In this context, it is important to note that this approach does not ask you to abandon practices that work; the goal is to incorporate them into the inquiry teaching framework. Consequently, you can easily continue to use them.

You may find that you need to modify the size of the group with which you use a particular activity. Perhaps you will want to rearrange the sequence of activities in the learning process. For example, if you use Understanding by Design (Wiggins and McTighe 2005) as a planning format, you will discover that the model fits into inquiry teaching. Similarly, if you have your students working in cooperative groups, doing Socratic Seminars, or using a KWL (Ogle 1986) approach, you will see that these are compatible with inquiry teaching. Likewise, if writing partners, reader response, or arts infusion are elements of your practice, then inquiry teaching provides the perfect context for continuing these activities. Teachers who employ all the dimensions of inquiry teaching find that they have to alter very little, if any, of their day-to-day practices to address the relevant standards.

The Elements of Inquiry Teaching

Inquiry teaching is a method of facilitating learning where teachers provide situations in which students can successfully seek answers without being given answers. In the process of negotiating ideas amongst their peers with minimal assistance from teachers, students uncover concepts while simultaneously acquiring rational thinking skills.

Three over-arching goals or learning objectives provide a framework for the main features of an inquiry approach and should relate to:

1. Concepts—the relationship between ideas
2. Thinking skills—within and between disciplines
3. Habits of mind—thinking behaviors

All three goals are embedded in the small-group explorations and whole-class activities: they are not isolated in separate lessons. One learns to think academically by exploring something within and between disciplines. Students do the work of scientists, mathematicians, historians, sociologists, and writers or critics of literature. In doing so, they acquire conceptual understanding in each of the disciplines and across them, as well as developing problem-solving skills and habits of mind that foster effective learning.

Inquiry teaching has seven main features: student exploration, small-group learning, deep academic understandings and skills, problem solving, access to physical materials, relevance to student experience, and authentic assessment applications. Each feature is described as follows. Later in the chapter, you will find examples of how teachers at various grade levels have successfully employed these features.

Student Exploration

In an inquiry teaching approach, each lesson *begins* with students actively engaged in some authentic exploration in order for them to create their own naïve concepts surrounding any given question or topic area. Such lessons may take more than a day. Information about what the larger academic community knows on the same subject matter comes later. A brief introduction of five minutes or less *launches* the lesson and sets the context for the exploration, but there is virtually no new information given before students start their exploration. The creation and sequencing by teachers of these carefully crafted open-ended explorations is the most important aspect of inquiry teaching.

Small-Group Learning

These explorations almost always start with students working cooperatively in small groups of four or less. Learning can be a social activity. If the teacher effectively designs and facilitates the exploration, many students can learn more while working collaboratively than by working alone. Following the small-group activity, each group reports out its best thinking to the whole class. The teacher then facilitates the negotiation of these ideas among groups and students.

Deep Academic Understandings and Skills

Only during small-group explorations and whole-class discussions of ideas wherein students have deeply and thoroughly engaged in uncovering concepts and acquiring skills do they learn what the larger academic community has identified over the centuries. Students can now seek out from authorities the deeper, more complex answers to the questions they have formulated during their explorations and negotiations. They may extend their learning by reading, using media, or listening to the teacher. Students have already, during their explorations, created some relationships between factors, formulated some insights into the situation, and have a *landscape in their brain* that has missing

elements. Now what they read, hear, or see has real meaning and relevance as well as a rich environment in their brain in which to be synthesized.

Problem Solving

Teachers and students are interested in hearing how students are approaching the solution to a problem rather than being told the answer. “What is your thinking so far?” is the key question the teacher asks a student or a student asks a peer. “What are the factors you are considering, and how do you think they relate to one another?” is another example of questions the teacher or students may pose. Such statements as, “Whenever possible, physically show your thinking to all of us in the class,” encourage further discussion.

Access to Physical Materials

Whenever possible, explorations should involve manipulating physical materials. Because of their developmental stage, almost all elementary and middle school students need to manipulate physical materials to enable them to create abstract concepts that are generalizable. Most high school students’ brains and synaptic connections are ready for purely formal theoretical thinking. However, even they need opportunities to manipulate concrete materials in each subject area to create deep understanding of concepts. Studies demonstrate that most high school students have not had previous facilitated experiences with concrete materials and meaning making (Trifone 1991; Marek 1992; Kwon and Lawson 2000). In science and math, real materials can easily be found for students to use in designing and conducting investigations and finding approaches to solving problems. In social studies and English, primary source documents can be used for exploration. Having students engage in role-playing, doing simulations, interviewing, or engaging in reader response activities using quality literature provides appropriate experiences for exploration.

Relevance to Student Experience

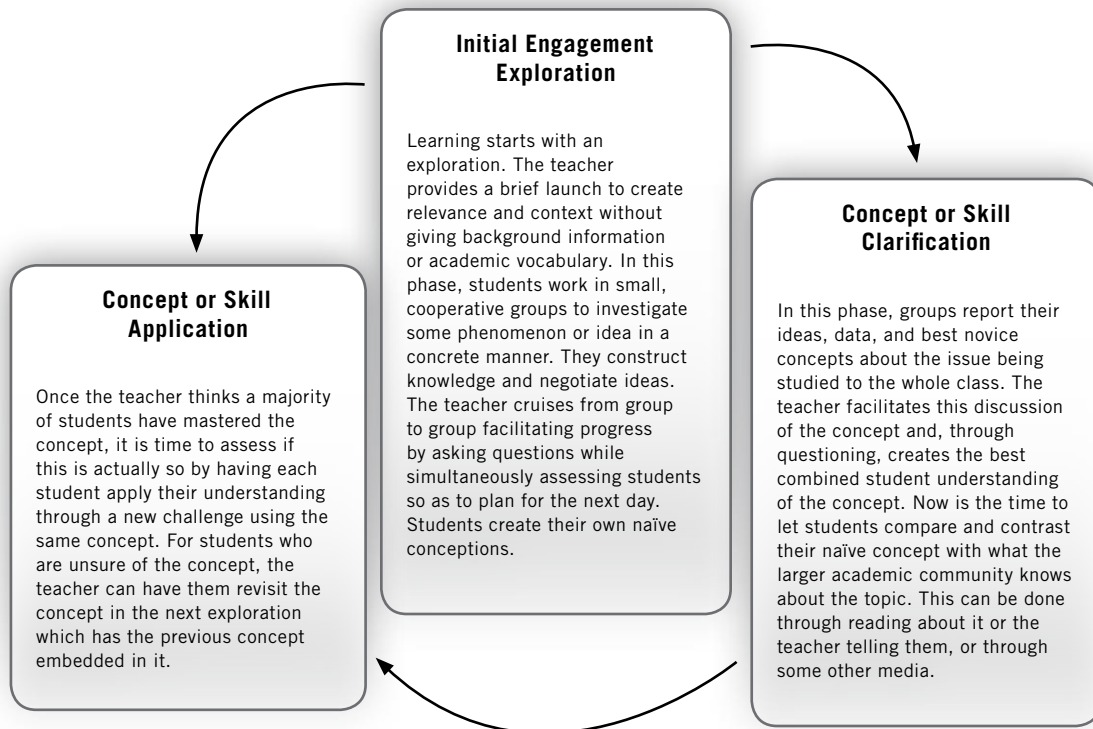
The materials, role-plays, simulations, or literature should contain or relate to themes or concepts that are important to the lives of students. The lessons need to be about the important issues related to students’ lives at their stage in development. All of the lesson objectives need to be embedded within this context so that learning is meaningful and can be applied.

Authentic Assessment Applications

It is necessary for students to demonstrate their ability to apply any learning related to these concepts and thinking skill objectives to *unique, new situations* before we can say that they have deep understanding or mastery of skills.

Figure 1.1 describes how these seven features come together in a three-phase cycle: exploration, clarification, and application. The cycle begins with initial engagement through exploration, followed by concept or skill clarification, and moves to concept or skill application.

Figure 1.1 The Inquiry Teaching and Learning Cycle



In the sections that follow, each element of inquiry teaching is elaborated on and classroom examples are provided in various subject areas and grade levels. The remaining chapters provide details about how to operationalize these ideas in your classroom and why each one is such an important component in helping students become masterful learners. Additional examples can be found on the Digital Resource CD.

Student Exploration

Inquiry teaching and learning begins with a student exploration. This may sound counterintuitive to those using transmission approaches to teaching, but this is the key component of inquiry teaching. The teacher designs an exploration where students, working in small teams, actually get to experience the concept that is the object of the lesson. As you will see in the examples that follow, students are given a challenge where they can intuit the concept from having experienced it, or they can design a solution or approach to a problem that builds on the last set of skills or understandings that they have just mastered. It is important that the exploration be carefully designed such that the desired concept or skill is the main focus and can surely be figured out by the group working together as they interact and create their best understandings.

Student Exploration in Practice: *Eighth-Grade Poetry Lesson*

“I picked this poem because I love the way the poet seems to paint with words. Where it says ‘patent leather streets,’ you can just see the streetlights glistening off of the rain-soaked streets without saying all of that. What a great comparison!”

The teacher, Sara, added two items the student noted—“Paints with words” and “Good comparisons”—to the list on chart paper. Sara then asked who wanted to go next. Many students were now eager to share their ideas knowing that these would be respectfully accepted and questioned only for clarification by the teacher or other students.

A student read another brief poem. It seemed that with each subsequent reading, students were taking more and more care to read them for meaning, or with emotion, or in this case, playing with the rhythm a bit.

“I picked this one for two reasons. It was one of the few poems that rhymes, and it almost has a rhythm to it like a song. It is far from rap, but it is the closest thing here to it.”

Sara added these two additional elements—“Rhyme” and “Rhythm”—to the chart labeled “Elements that Make Poetry Interesting.”

At the beginning of the period, Sara had placed 16 different poems in piles with five copies of each around the perimeter of the room. She then asked the 32 eighth graders in the class to walk around quietly and read each one and then pick the one that they liked the best. After making their choices, students returned to their seats and wrote down which aspects of the poem made them select it,

whenever possible referencing particular words or lines. Once they all had selected a poem, they first explained their choices to their small feedback groups of four where they practiced their reasoning. Next, they reported to the whole class. Other students spoke about “words in a row beginning with the same letters,” “emotions I felt from reading it, like love,” or “how the words were positioned all over the page—but for a reason. It made you think, and say them differently.” Everybody had their reasons and when ones were repeated, the teacher placed additional check marks on the chart next to those.

As the period was about to end, Sara asked students to copy down all of the reasons. For homework, they were to see if they could fit them into categories. The next day, students came back with suggestions of categories like “sounds of words,” “cool comparisons,” “musicality and rhythms,” and “intense emotions.”

Soon students had uncovered almost all of the elements of poetry. They had negotiated these ideas first in their small groups and then created knowledge as a whole class. Not all of the students owned every idea yet. However, since they participated in creating the concepts, many of them at least partially owned them. Later in the week, the teacher introduced the academic vocabulary, such as alliteration, that went with each of these concepts. If the teacher had started with the vocabulary, then students would think the vocabulary, not a deep understanding of the concept, was most important. This would have created the wrong focus.

Sara understood that this was just their initial exploration together into the world of poetry, and this would need to be followed by a spiral of further explorations for deeper understanding of each aspect. So began a discussion about why they had not all picked the same poem. This led to a discussion of why some students thought poetry was “dumb,” and why did the person not just write out what they wanted to say in a paragraph. Sara referred to one poem and said the poet said that when he could not express his emotions by speaking, he would write them down in a poem and give it to the person. Some of the students spoke about how they thought some of these poems weren’t so great. That led some other students to ask them if they could write better poems. “I’m only a teenager. What do you expect of me?” was a common answer.

Sara said they would be reading much better poems than these in the coming weeks and that the class would also be publishing an online book of their own poetry with drawings and photographs. Just as the class was about to end, Sara said, “By the way, all these were poems that I wrote when I was a teenager. I’m sure you will all do much better.”