Ways of Knowing:

Exploring Artistic Representation of Concepts

by Timothy J. Duggan

Teachers have the ability to give students opportunities to produce alternative, artistic responses to concepts they learn in school. Such opportunities may be used to foster specific talents and to provide expanded perspectives for thinking about schoolwork. When a student writes a poem for a character in an assigned story, creates a drawing to illustrate an event in history, or writes a skit to clarify a scientific idea, the classroom becomes a more interesting space, and students think in new ways. For gifted children, such opportunities can mean the difference between an enriched, challenging experience and just another dull day in class. Differentiated instruction can provide the context for artistic representations of knowledge that show many ways of knowing and engage gifted students in meaningful learning construction.

According to popular models of differentiated instruction (Roberts & Inman, 2007; Tomlinson, 1999; VanTassel-Baska & Stambaugh, 2006), teachers can differentiate content, process, and products to meet the needs of academically diverse learners. Differentiating content and process often requires modifications in teacher input and instructional strategies. Differentiating products that the students produce to demonstrate their understanding, however, often will force the issue of differentiated process and content without the teacher's input. By making the choice to, say, write a poem about a science concept, the student engages in a different process of learning by linking references to the concept with poetic diction, and may be led to explore dimensions of the science concept not otherwise covered in the standard content.

Engaging in the processes associated with artistic production requires increased time and focused attention to learning material, which often leads to deeper and more satisfying understanding of concepts, as well as the opportunity to develop abilities in the chosen artistic form and to receive feedback on the artistic products. With this in mind, products that the students are invited to produce in order to demonstrate their understanding of essential concepts learned in school can and should vary. According to Howard Gardner, whose theory of multiple intelligences (1983) supports a differentiated approach to instruction, students should be offered options for assessment, even within the structure of discipline-based course offerings. In *Intelligence Reframed* (1999), Gardner asserted that a common curriculum and differentiated assessment are not mutually exclusive:

> All young people should study the history of their country, the principles of algebra and geometry, and basic laws that govern living and nonliving objects. A commitment to some common knowledge does not mean that everyone must study these things in the same way and be assessed in the same way. (p. 152)

Many teachers are hesitant to differentiate student work products because they perceive an increased workload of having to evaluate those products against a set of criteria developed with conventional assessments in mind, such as tests and/or essays. But, for gifted students, the opportunity to exercise individuality and creativity in the design and development of novel products demonstrating understanding of school concepts serves three functions. First, students can give what Wiggins and McTighe (1998) call "evidence of understanding" of the target concepts. Second, students can approach school work independently or collaboratively, and finally, students can develop talent in creative areas, giving occasion for feedback in the area of expression. Realizing these benefits for gifted students, teachers may be willing to expand their repertoire of assessment tools to include artistic options.

Teachers in all grade levels and subject areas easily can generate opportunities for students to produce creative responses to school topics, whether those opportunities stand in the stead of a traditional assessment, or whether they require students to produce work beyond the traditional assessment. Such opportunities increase engagement and lead to innovative expressions of understanding. Informal or formal preassessment can help teachers to identify artistic inclinations in their students, and specific learning profiles for gifted students can help teachers make informed choices when considering alternative, artistic work products to suggest.

Although artistic representations of knowledge may be seen as merely "play" to those not used to addressing problems inherent in an artistic approach, evidence indicates that creative production provides the kind of mental challenge and "ill-structured problems" (Sternberg & Lubart, 1991) that children need to develop as creative thinkers. Furthermore, providing outlets to "display . . . talents through performance, exhibition, and publication" (Robinson, Shore, & Enerson, 2007, p. 48) is considered best practice in gifted education. Robinson et al. (2007) recently reaffirmed the importance of the arts in curriculum and called for schools to infuse the arts into traditional classrooms early and often. They also claimed that students must be taught "to recognize and clarify problems and new ideas, reorganize knowledge, purposely seek alternatives, evaluate ideas and solutions, and monitor their own activity" (p.

What significant and specific benefits for gifted students may be gained from the process of representing school-encountered concepts artistically?

83). Attempting to produce an artistic response to an abstract concept from the core school subjects provides such a challenge.

If students are encouraged to seek such possibilities of creative production, and to think about their learning in novel ways, they will be in good company. Phillip Frank, in writing about Albert Einstein (as quoted in Gardner, 1991), said,

> When Einstein had thought through a problem, he always found it necessary to formulate this subject in as many different ways as possible and to present it so that it would be comprehensible to people accustomed to different modes of thought and with different educational preparations. He liked to formulate his ideas for mathematicians, for experimental physicists, for philosophers, and even for people without much scientific thinking, if they were at all inclined to think independently. (p. 247)

When we begin to consider the possibility of infusing our assessment practices with artistic alternatives, we should ask the following questions: How many options do we (currently) give students to demonstrate their understanding of what they learn in school? How can we benefit from broadening the possibilities for representation of concepts in the school setting? How do we foster and develop our students' creativity through our assignments and our assessments? How can our students benefit from examining the different perspectives from which they encounter problems and develop solutions? How can artistic representations of concepts promote collaboration between students? What significant and specific benefits for gifted students may be gained from the process of representing school-encountered concepts artistically? Certainly, students with identified strengths in artistic areas benefit from increased opportunities to practice and develop those talents within the context of school assignments, because they otherwise are confined to only the time typically allotted for study and practice of the arts.

Theoretically, any unit of study in any school subject can provide opportunities for students to create artistic responses to demonstrate knowledge. Teachers can examine their current assessment practices and look for areas where alternatives may be infused. For example, Carri Hales, a science teacher in Yankton, SD, exercised such flexibility in studying the periodic table of elements with her ninth graders. She assigned each student to present one element to the class, and to include details of its discovery, its history, and its properties. She gave them the option to present the element through a poster, a poem, or through other choices. One of her students, Cody Perk, created a poem to show his knowledge of radon (see Figure 1).

Cody's poem could be assessed for what it reveals of his knowledge of Radon, which was Ms. Hales' primary concern. But, the poem also afforded Cody an opportunity to practice and develop his poetic craft, and thus Ms. Hales could comment on the poem, or, if she felt unqualified to offer feedback, an English teacher in the school could have provided such feedback based upon commonly accepted criteria of poetics. Teachers in schools who develop these alternative assignments are engaging in best practice for students like Cody who need and deserve something more than multiple-choice unit tests. Cody's fellow students then have the benefit of hearing his poem read to the class, and Cody doesn't have to restrict his drive to create literary art to only his creative writing class.

Even agencies outside of the classroom can encourage artistic production within the classroom. In a recent scholarship contest for the South Dakota Governor's Camp and Ambassadors of Excellence Camp, two summer programs for middle and high school gifted students, respectively, students

To Radon, *which is the Eighty-Sixth of Elements.*

Ah! killer! liar! Element so vile!
Thou Noble Gas, yet villain all the while!
Take not my home, nor body, as a tenant:
I recognise thy banner,—Death—thy pennant!
    We've known thee full one hundred years and six,—
Yet but for twenty-two years known thy tricks—
For eighty years and three call'd thee by name,
In which time thou hast gain'd deceptive fame:
For men and beasts that see this earth four days
Accomplish naught;—but thou hast thine own ways.
    Did we once think thee curative?—How stupid!—
And love thee as if we were join'd by Cupid?—
Ah, God! though ignorance be no offence,
How many souls hath it exiled hence!—
For thou dost take thy fellowship with Cancer,
And, as thy friend, Uranium doth answer;—
How Now! Good Element, thou Ninety-Second,
To come, when this malicious Poison beckon'd
From water, soil, the air, or atmosphere,—
I thee accuse, for turning no deaf ear!
Yet in thy soul, as all, there's also evil;
So I will play no hypocrite, nor devil;
But to my point.—
    For all we know of thee,
Thou wilt not be detected easily:
Thou art the heaviest Noble Gas, we know,—
Yet variance with the air thou wilt not show,
E'en in colour, as no hue nor shade
Will e'er betray thy presence, ere it's made
As cold as human blood can stand, and colder.—
Then Death doth raise his hand against the shoulder
Of any man that find thee any way.—
Then God from Radon us defend, we pray!

—Cody Perk
Utica, SD

Figure 1. Poem on radon.

were invited to compete for tuition scholarships based upon the following directions:

> Take a concept, principle, or event that you have learned about in school this year and construct a representation of that concept, principle, or event using visual art, music, theatre, or some other creative form (You may also represent the concept mathematically ONLY if the concept is NOT a mathematical concept). The goal is to create representations of what we know that cut across subject boundaries. For example, you may show what you've learned about types of sentences in your English class by writing a song about them or painting a picture. Likewise, you may demonstrate your knowledge of a scientific idea, like cell division, by writing a skit or creating a film. You may even write a math equation to represent the plot of a story you have read. You may create photo essays, audio recordings, poems, skits, Web pages, cartoons, pantomimes, architectural drawings, sketches, or *any* other *creation that demonstrates your knowledge of the concept.*

The idea behind the contest was to stimulate what Eisner (1979, 2002) referred to as alternative "modes of response" and what Harste (2001) spoke of when calling for a redefinition of literacy instruction to include multiple literacies and "ways of knowing," incorporating a variety of media and forms. According to Eisner (2002),

> . . . the forms through which knowledge and understanding are constructed, stored, and expressed are considerably wider than verbal or written discourse. What can be known, say, about autumn can take form in scientific propositions that deal with chemical changes in trees, in astronomical propositions about the location of our planet in relation to the sun, in poetic expression disclosing the smell of burning autumn leaves, in visual images that present to our consciousness the color of a Vermont landscape, in auditory forms that capture the crackle of leaves under our footsteps. Autumn, in short, is known in a variety of ways and the ways in which it can be known are expressible in a wide range of expressive forms. (p. 147)

In response to the scholarship contest, students from across South Dakota provided examples of novel work produced in conjunction with core classes, using artistic or more broadly creative response techniques. Some of the entries were provided from work students had done at their classroom teacher's request (such as Cody's poem in Figure 1), and others were generated in response to the contest prompt itself. One entrant to the contest was Terese Skinner from Mitchell, SD, who took the concepts she was learning in 10th-grade biology at Mitchell High School and turned them into a brochure for an animal cell "amoozement" park (see Figure 2). In her explanation of the idea, Terese wrote,

> I chose the concept of animal cells for this project because Biology is my favorite subject this year. I find it

is really interesting to learn about cells, cell organelles, and their functions. With that in mind, I created a travel brochure about an animal cell amusement part located in Lamina—that's animal backwards. Each part of a basic amusement park was changed to represent the different parts of a cell. Since I love to travel and like amusement parks, it was really fun to reinforce learning by creating this brochure.

Having chosen an animal cell, I incorporated various animal sounds into my brochure. As you might know, the cell membrane is semi-permeable to some solutions so it is a "neighcessity" to have a ticket to get into the front gate. My favorites are the lysosomes (organelles that kill bacteria/handwashing station with antibacterial soap), the cytoplasm (liquid in which organelles live/the hotel), mitochondrion (provides energy for the cell/restaurant), Golgi Apparatus (packages proteins/shop with gift wrapping), and the vacuole (helps with intracellular digestion/restroom).

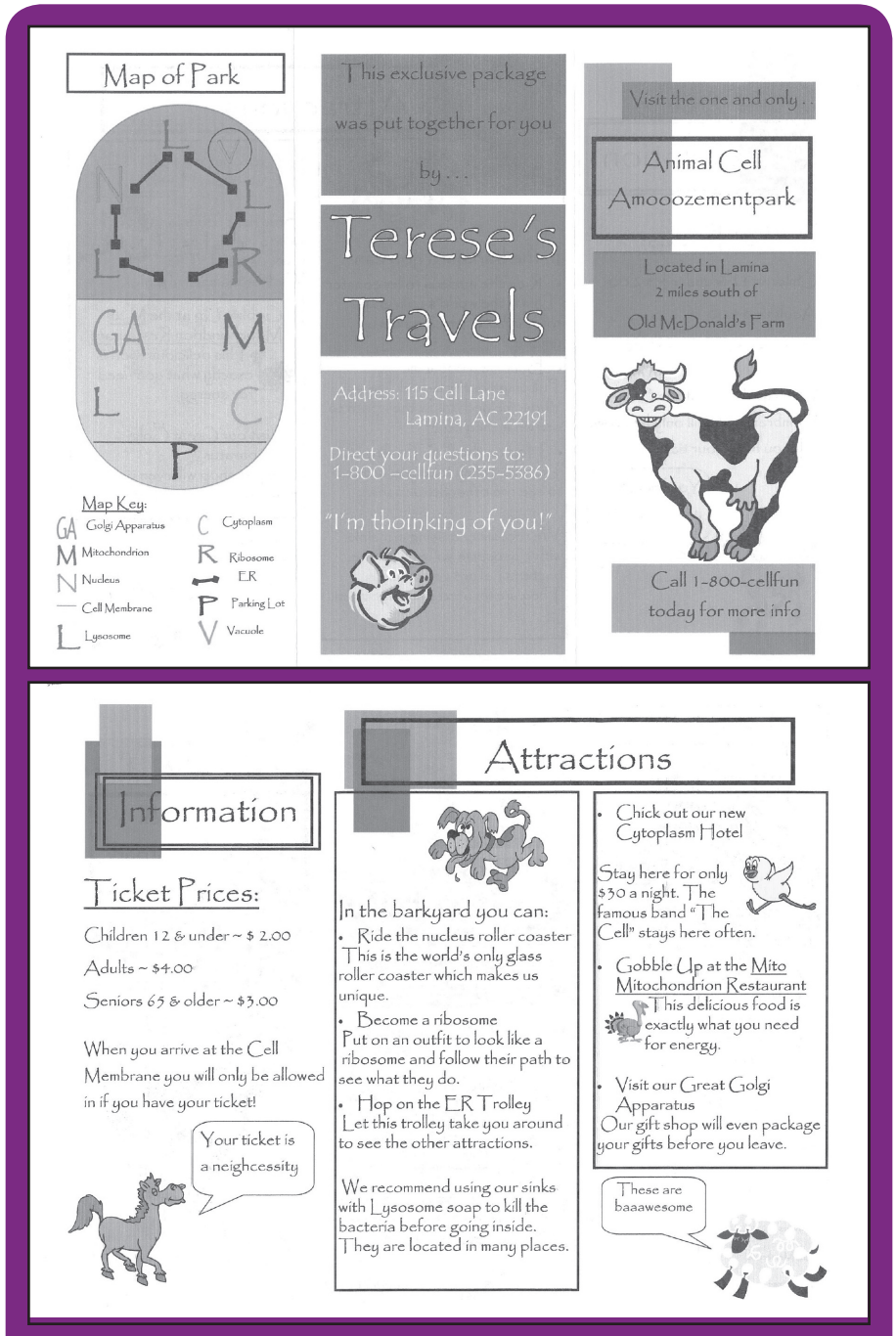

Figure 2. Front and inside pages of the brochure.

Perhaps the most telling scholarship entry was from eighth grader Dylan Shroll from Watertown, SD, who created a series of abstract paintings for his Watertown Junior High School history class to represent the Battle of Lexington and Concord in the American Revolution. According to his statement, Dylan created the paintings not because he previously had been recognized for artistic talent, but because he wanted to "challenge perceptions that assume if you do well at math, then you aren't creative, and vise-versa [*sic*]." Note that Dylan coupled his paintings (see Figures 3, 4, and 5) with short narratives explaining how the paintings related to the battle. Through the process of explaining the connection to the creative work he was doing, Dylan demonstrated an individual understanding of the events of the battle and a strong sense of the battle's significance. He achieved what Blau (2003) has referred to as learning that comes from a properly realigned relationship of teacher and student: getting the students to engage in the kind of learning work that teachers typically do to prepare to teach. When Dylan presented his works to his classmates, they, too participated in his interpretation of the historical events.

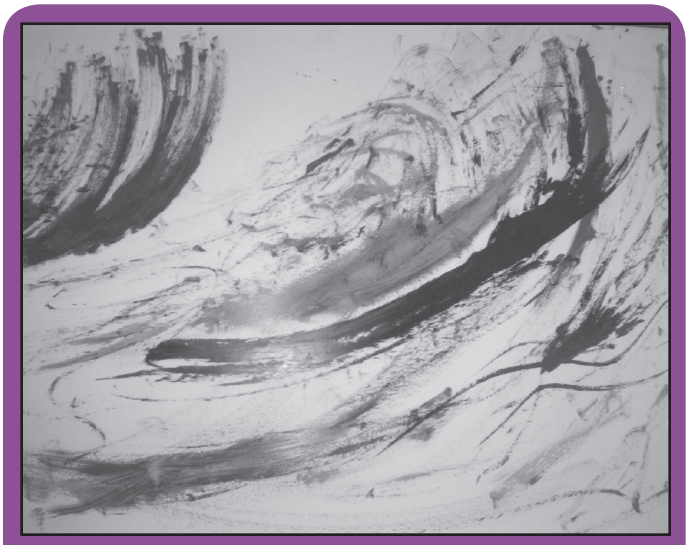

Figure 3. The Battle of Lexington and Concord. The first painting in my series represents the coming of the British across the river from Boston. They were on their way to Concord where they were hoping to disarm the colonists without violence. The blue symbolizes the long journey they had to undertake. The red symbolizes the British military that were going across the water to disarm the angry Colonists. The green represents the forests the British soldiers had to trek through to reach the town of Concord. The black represents the night the British spent walking so they could arrive at Concord before late in the evening. The yellow represents the lights of the towns Lexington and Concord.

In *The Unschooled Mind* (1991), Gardner argued for a variety of "entry points" for the "nurturing of individual understanding," implying that teachers need to consider several approaches to a subject in order to engage the variety of learners in their care. These entry points include the narrational, the logical-quantitative, the foundational, the esthetic, and the experiential (see Figure 6). If we accept Gardner's premise regarding teacher input, we can also imagine these entry points as "exit points" of student understanding, or student demonstrations of their individual understanding. Thereby, as seen with these scholarship applicants, a concept in science becomes a poem, an animal cell becomes a travel brochure, and one of the seminal battles in American history becomes a series of abstract paintings.

Using Blau's (2003) assertion that the best way for our students to understand what we understand is to compel them to do the work that we do to prepare as teachers, Dylan's explanations surrounding his paintings serve as instruction for his peers and demonstrate understanding that grows from the creative experience, rather than from the sole agency of the teacher. The notion of agency is important in two ways, not just in the student taking responsibility for his or her own knowledge production, but for the student being able to see how his or her own agentive self (Hull & Katz, 2006) impacts the environment of the classroom.

Artistic alternatives can be designed to allow students the opportunity to collaborate with their peers. Several scholarship contest entrants submitted work done in collaboration with peers, including video productions and sound files. Collaborations aren't simply confined to core classes. Artistic representations of knowledge can be expanded even within the context of arts classes. In a class of fourth, fifth, and sixth graders studying Shakespeare in a summer program in Omaha, NE, students read not merely as a traditional English class would read, but memorized lines and movement to perform scenes from *Hamlet*. Although such activity is typical of Shakespeare performance classes, these students also collaborated to paint a 30' x 12' backdrop and wrote original music, including an opening overture and music for

Figure 4. The Battle of Lexington and Concord. The second painting in my series represents the "shot heard around the world," which occurred in Lexington where a local militia was lined up on the green preventing the British military from passing. When an unknown soldier fired, the British, against orders, attacked the militia. The red represents the British soldiers. The green represents the strip where the militia stood. The brown represents the firing of the first shot.

Figure 5. The Battle of Lexington and Concord. The last painting in my series represents the small skirmishes that occurred as the British attempted to leave. It represents the bloodshed of many, and the difficult journey the British still had to face as they tried to make their way home. The gray represents the British bayonets and the colonists' muzzle-loaders. The green represents the forest. The blue represents the colonists. The footprints represent the long journey and many casualties the British faced as they attempted to leave. The red represents the blood of all the fallen soldiers on both sides. The yellow represents the sun and the heat the British endured during their long march.

eight scene changes. Students produced sketches to scale for the backdrop, then voted on the best designs, and everyone had a hand in the painting. The music was written by students working in triads, based upon their understanding of the text, and performed between scenes. The performance for parents, grandparents, and other family members showcased the children's understanding of the story of *Hamlet* through dramatic performance, as well as visual art and music, and students worked together every step of the way. According to gifted specialist Betsy Barbary (personal communication, March 17, 2007), who assisted in teaching the workshop,

> Rising to the challenge of mastering a portion of a work of Shakespeare provided an exceptional opportunity for students to stretch their minds and creative abilities. Their sense of accomplishment grew immensely as did their knowledge of the times, language, and life of Shakespeare.

Each of these examples suggests how the arts can not only *represent* understanding, but also might be used to *further* understanding and foster students' individual and collective growth through the process of developing artistic products. The importance of such opportunities in schools hardly can be overestimated. As Maxine Greene (2007) claimed,

> Encounters with the arts nurture and sometimes provoke the growth of individuals who reach out to one another as they seek clearings in their experience and try to live more ardently in the world. If the significance of the arts for growth, inventiveness, and problem solving is recognized at last, a desperate stasis may be overcome, and people may come to recognize the need for new raids on what T. S. Eliot called the "inarticulate." (p. 37)

Two approaches teachers can take in order to implement artistic modes of response in typical assignments are through specific text content and through broad concepts. For example, a language arts teacher can take a section of reading from a textbook covering sentence fragments or some other grammatical concept. The teacher typically may require students to respond to sentences by identifying them as fragments or complete sentences. Generally, students are then required to fix fragments by completing the sentences, or to generate complete sentences of their own. An artistic approach may extend upon these typical assignments by inviting students to take the textbook section on fragments and explain the concept through song, poetry, or drama. A song about sentence fragments may serve to reinforce the concept for other students for whom the song is performed. Extensions in thinking also may grow out of the exercise. Visual art that conveys the concept of completeness in sentences also may connect the concept to completeness in other contexts, which anticipates the second approach that teachers can take to incorporating artistic production in class.

Broad concepts, like *completeness* above, or *balance*, *form*, *equality*, *harmony*, *truth*, *process*, *concentration*, or any other broad concept that has a place in the school curriculum can provide the basis for artistic approaches to learning. Taking one example from the list above, *balance*, we may imagine what students could generate if given prompts using Gardner's eight identified intelligences. For example, imagine how students could represent their understanding of balance using their musical intelligence, their bodily-kinesthetic intelligence (as in dance), or their naturalistic intelligence. The concept itself is transformed through these

different treatments, and students can then explore what aspects of the concept remain in the different contexts and what aspects change. Balance in mathematics shares qualities with balance in written composition, but different processes and intellectual demands are placed upon the learner to express understanding of each.

If teachers (and other educators from outside of the school) begin to consider opportunities for students to engage in artistic responses to school curriculum, we will move toward discovering the balance between standards-based, one-size-fits-all instruction and diverse, exploratory, creative learning that Burke-Adams (2007) advocated. The creative options in response to course content can either replace traditional assessment or accompany it. Preassessment can help teachers to identify students who will benefit overtly from arts-related alternatives, although *all* students, not just gifted students, deserve opportunities to demonstrate knowledge in a variety of ways.

Five Entry Points for the Nurturing of Individual Understanding (Gardner)

Narrational—
Storytelling, chronology
Stories, films, timelines, scripts, skits, graphic novels

Experiential—
Hands-on, work tasks
Products, inventions, models, organizations

Logical-quantitative—
Numbers and deductive reasoning
Equations, statistics, problems

Esthetic—
Artistic elements and expressions
Poems, paintings, dance, music, designs

Foundational—
Conceptual framework and big questions
Position papers, hypotheses, theories, conceptual models

Gardner's entry points for instruction can translate to exit points for students demonstrating their individual understanding.

Figure 6. Gardner's entry points

In a time when assessment is often associated with standardized paper-and-pencil tests, we will serve our students well by offering them the chance to show us what they know through the arts. We can give them the chance to internalize knowledge through their own creative processes, which enhances their encounters with material we ask them to learn, enriches the classroom experience for their fellow students, and ultimately deepens our appreciation of their knowledge and their talents. GCT

References

Blau, S. D. (2003). *The literature workshop: Teaching texts and their readers*. Portsmouth, NH: Heinemann.

Burke-Adams, A. (2007). The benefits of equalizing standards and creativity: Discovering a balance in instruction. *Gifted Child Today, 30*(1), 58–63.

Eisner, E. W. (1979). *The educational imagination*. Upper Saddle River, NJ: Merrill/Prentice Hall.

Eisner, E. W. (2002). *The educational imagination* (3rd ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Gardner, H. (1991). *The unschooled mind: How children think and how schools should teach*. New York: Basic Books.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.

Greene, M. (2007). Art and imagination: Overcoming a desperate stasis. In A. C. Ornstein, E. F. Pajak, & S. B. Ornstein (Eds.), *Contemporary issues in curriculum* (4th ed., pp. 32–38). Boston: Allyn & Bacon.

Harste, J. C. (2001). Foreword. In R. Beach & J. Myers (Eds.), *Inquiry-based English instruction*. New York: Teachers College Press.

Hull, G. A., & Katz, M. (2006). Crafting an agentive self: Case studies of digital storytelling. *Research in the Teaching of English*, *41*(1), 43–81.

Roberts, J. L., & Inman, T. F. (2007). *Strategies for differentiating instruction: Best practices for the classroom.* Waco, TX: Prufrock Press.

Robinson, A., Shore, B. M., & Enersen, D. L. (2007). *Best practices in gifted education: An evidence-based guide*. Waco, TX: Prufrock Press.

Sternberg, R. J., & Lubart, T. I. (1991). Creating creative minds. *Phi Delta Kappan, 21*, 608–614.

Tomlinson, C. A. (1999). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: ASCD.

VanTassel-Baska, J., & Stambaugh, T. (2006). *Comprehensive curriculum for gifted learners* (3rd ed.). Boston: Pearson.

Wiggins, G. P., & McTighe, J. (1998). *Understanding by design*. Alexandria, VA: ASCD.