



Drawing and the Brain

Visualizing information is a vital early step in learning to read

KENNETH A. WESSON

When budgets call for belt-tightening, school districts prepare to fend off the “red ink monster” by looking for a sacrificial lamb. Arts education is often the first sacrifice because it is viewed as a nonacademic luxury. It’s not uncommon to hear people say, “We can no longer afford the arts,” yet recent studies have confirmed that public schools cannot afford to eliminate arts education because of the important contributions it makes in the cognitive development of the whole child.

It was reassuring to arts education advocates in July 2004 when former Education Secretary Rod Paige, one of the architects of the federal No Child Left Behind Act, sent a letter to all superintendents advocating the reinstatement (or the preservation) of arts education. Paige had learned that school districts throughout the country were abandoning the arts to devote more time to standardized test preparation.

“The arts, perhaps more than any other subject, help students to understand themselves and others, whether they lived in the

past or are living in the present,” he wrote. The letter concluded: “For both the important knowledge and skills they impart and the ways in which they help students to succeed in school and in life, the arts are an important part of a complete education.”

Arguments against arts education survive primarily because we have ignored much of the recent research on how the human mind develops when art is a consistent part of long-term instructional planning. In fact, some exciting new developments shed light on the linkages among the arts, brain development, and aca-

demie success. Researchers in educational psychology have revealed surprising evidence validating the positive effect that the arts have on young learners, ranging from increasing math and reading scores to improvements in general cognitive abilities and social development.

For example, *Champions of Change: The Impact of the Arts on Learning*—the report of a federal research project involving 25,000 secondary school students—found a significant correlation between high levels of involvement in the arts and performance on nearly every measure of standardized testing. As this and other studies have found, engagement in the arts—especially visual art such as drawing—develops skills in other areas as well:

- Art facilitates the development of spatial reasoning skills.
- Art increases a child’s ability to create abstractions and mental processes in the abstract.

- Art helps students visualize the images words represent as they learn to read.

- Art develops fine-motor skills, necessary prerequisites for writing.

- Art develops patience, sustained attention, and self-regulation (that is, control of impulsivity).

- Art serves as a bridge between one's mind and the real world.

- Art cultivates one of the multiple intelligences identified by Harvard University's Howard Gardner.

- Art develops the whole brain and the whole child.

LOOKING FOR PATTERNS

The most important role of the human brain is to create networked connections among its 100 billion neurons so we can navigate our world successfully. Everything that we “know” is represented by these connected neurons. The brain is not a passive processor of untidily gathered information. Instead, it is an immensely effective pattern-detecting device, examining new stimuli for clues that will help us connect incoming information back to stored patterns or past experiences. Whether we are children in an art classroom or stockbrokers on Wall Street, we all look for any pattern that will aid our thinking.

Neural connections and overall brain circuitry are determined, to a significant degree, by the quality, quantity, and variety of stimuli and early learning experiences. These learning experiences directly affect how the developing brain gets “wired up” initially. At the earliest stages of infancy, all children are biologically ready to learn from their interactions within a motivating environment, which is a requirement for building those neural networks.

In the human brain, a considerable amount of cortical real estate is dedicated to our eyes and hands, making them perfect vehicles for shaping the developing brain. More than 80 percent of the information en-

tering the brain comes in via the eyes. Not only is the sense of sight among the first sensory systems to go online inside the brain, but the eyes and the brain also undergo daily preparation for art well before children pick up their first crayon or take their first art class.

This development mirrors our history as a species. Pictorial representations and symbols have been part of the human experience for far longer than the printed word. Equally important, visualizing is integral to learning to read. To understand what they read, students frequently rely heavily on the “picture-making” mechanisms in the visual systems of the brain. The association cortices (areas) of the brain “make sense” of that visual information. Visual imagery is a fundamental nonverbal dimension of reading and learning that determines success in early reading comprehension.

The brain naturally seeks to (1) find patterns, (2) make sense of information and experiences, and (3) evaluate the personal and emotional significance of an event or object. (Early humans did not survive their daily challenges by fixating on trivia.) These three “brain-considerate” elements drive learning and memory and are primary contributors to academic success and cognitive development.

FRAMING PICTURES INSIDE THE MIND

Just as babies drink liquids before eating solids, children develop conceptual insight in a certain order. By understanding the sequences governing concept development, educators can carefully plan foundational learning events. The more complex brain processes should follow early sensory experiences in foundational learning. The process by which a concept becomes “known” by a learner requires several steps that are essential to concept formation and highly dependent on visual experiences and symbolic representation (see chart).

Children can call up mental pictures of

nouns more readily than other random words. Thus, young learners respond positively to opportunities to develop their abstract thinking abilities by translating their mental images into visible pictures on paper. In young minds, drawing, painting, and other art forms that produce a visual image trigger the construction of vivid images that mere words cannot activate.

Every student is naturally creative in varying degrees, and many are extremely creative, but requiring written essays is often the closest most school subjects come to permitting the creative use of a student's hands. Moreover, the number of classroom hours reserved for artistic development diminishes year by year as students advance through the grades. Although art instruction was commonplace in elementary and secondary schools a generation ago, in many communities today, art classes become available for the very first time when students enter college.

When given written assignments, students increasingly ask, “How do I get started?” For those students, it can be helpful to draw what they cannot yet write about as the very first stage in the writing process. Once students can “see” the abstract idea, they can begin to put it into words. If students (or adults, for that matter) encounter writer's block, they can simply return to their drawing and add more defining pictorial details, then resume writing.

This strategy is effective because, whether we realize it or not, we are all extremely creative at least once a day—that is, when we dream at night. Neuroscientist Robert Sylwester has said that drawing does for the brain during the day what dreaming does for the brain at night. The simple act of drawing mimics dreaming and daydreaming in several remarkable ways. Art, like dreaming, allows the brain to craft mental images of people, places, objects, and events although they are physically absent at the moment. What students cannot imagine, they cannot draw. What they cannot envision,

IF I CAN ...

Mentally visualize a concept

Discuss the image orally

Illustrate it

Process my symbol(s)

Understand various representations

Hold flexible abstract ideas in my mind

Understand what others mean verbally

THEN I'M ABLE TO ...

Discuss the images I see in my
"mind's eye."

Draw, sketch, or paint it.

Process it on a symbolic level.

Understand other representational forms.

Process flexible abstract forms.

Understand what others mean when
discussing them.

Read what others write about
a concept.

they cannot understand. And while it is possible to listen without thinking (it happens in our classrooms daily), we can neither write nor draw without actively thinking.

THE ABSORBENT MIND

Suppose we chose to walk, rather than drive, through an unfamiliar neighborhood. On foot, we would notice hundreds of details—the produce in the market window, the cat on the steps—that we would have missed if we were looking through the window of a fast-moving car. Similarly, giving students the opportunity, time, and clear directions for drawing with details heightens their awareness of the importance of the supportive relationship that finer points play in appreciating a larger idea.

Teaching students to draw in ways that help them concentrate on producing precise images fosters subsequent precision in their thinking. Teaching them to add the details to artwork lays the foundation for details in symbolic language. The two go hand-in-hand if offered in a structured educational setting. Saying "We don't have the time to teach art," in reality translates into, "We won't plan to take the time to teach precision in thinking." It is academic time that is not only remarkably well spent, but that yields long-term academic and cognitive benefits.

The purpose of formal education is to provide students with a structured learning environment that establishes the neural con-

nections and habits of mind that foster success in subsequent learning. Schools should provide well-planned opportunities for the student mind to develop as many conceptual connections as possible. Children respond positively to instruction that is prearranged around sequential skills that acknowledge their developmental stages, along with how they think and mature. However, learning situations must include instructional plans that take into consideration how the absorbent young brain naturally processes and stores information.

The basics for understanding any concept can be delivered through art. Appropriate step-by-step art instruction can begin as early as preschool and should be extended throughout higher education, since art is the only content area that takes advantage of the brain's naturally occurring inclination to look for patterns, colors, shapes, lines, depth perception, sequence, and order. Art programs grounded in educational research emphasize the orderly progression of concept development.

GOT ART?

In addition to establishing new standards for math and reading, nearly every state has also adopted standards for the arts. Several leading school districts have funded comprehensive plans to revitalize their arts programs:

- New York City has committed \$75 million a year to hire new arts teachers.

- Chicago has transformed 47 of its elementary schools to arts magnet schools.

- Baltimore has budgeted \$93 million for art.

- Los Angeles now has a \$190 million 10-year plan to revamp its arts programs.

At the state level, the Education Commission of the States has encouraged legislation guaranteeing access to arts education for all K-12 students. When he began his two-year chairmanship of ECS in July 2004, Arkansas Gov. Mike Huckabee announced an initiative called "The Arts—A Lifetime of Learning."

"Whether one looks at studies of students' ACT and SAT scores, or their math scores or their capacity for learning foreign language, a tremendous body of evidence indicates a correlation between arts and academics," Huckabee said.

"To put it simply," he said, "we need to focus on the arts in education because the arts teach kids how to learn. Through the arts, children are presented with huge amounts of new information that they process and use to participate in activities they enjoy. Through the arts, children develop creative skills which carry them toward new ideas, new experiences, and new challenges, not to mention a great deal of satisfaction. This is the intrinsic value of the arts, and it cannot be overestimated in any way."

Philosopher-educator Mortimer Adler often spoke of education's goal as freeing the mind through "the discipline of wonder." Schools clearly should be both the beacons and the incubators of wonder exploration, and art. If they are, the question "Got art?" will be answered, "Yes—from kindergarten through college."

Kenneth A. Wesson (kenawesson@aol.com), a neuroscientist, is an educational consultant and keynote speaker on the neuroscience of learning. A former college faculty member and administrator, he has served on the school board in San Jose, Calif.