

Cognition and Representation

*A Way to Pursue
The American Dream?*

BY ELLIOT W. EISNER

Reflection on the role that forms of representation play in the creation of mind has been all but neglected in framing curricular policy, Mr. Eisner notes. We need to remedy that.

IN SOME ways it's an old idea. I'm talking about the idea that the forms we use to represent what we think — literal language, visual images, number, poetry — have an impact on how we think and what we can think about. If different forms of representation performed identical cognitive functions, then there would be no need to dance, compute, or draw. Why would we want to write poetry, history, fiction, drama, or factual accounts of what we have experienced? Yet this apparently obvious idea has not been a prominent consideration in setting curricular agendas in America's schools or in shaping education policy. The articles in this special section of the *Kappan* are intended to illustrate the ways in which *forms of representation*, or what are sometimes called "symbol systems," function in our mental lives and to explore their contributions to the development of mind.

Among the various aims we consider important in education, two are especially so. We would like our children to be well informed — that is, to understand ideas that are important, useful, beautiful, and powerful. And we also want them to have the appetite and ability to think analytically and critically, to be able to speculate and imagine, to see connections among ideas, and to be able to use what they know to enhance their own lives and to contribute to their culture.

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Neither of these two goals is likely to be achieved if schools are inattentive to the variety of ways that humans have represented what they have thought, felt, and imagined. Nor will these goals be achieved if we fail to appreciate culture's role in making these processes of representation possible. After all, human products owe their existence not only to the achievements of individual minds, but to the forms of representation available in the culture — forms that enable us to make our ideas and feelings public. Put another way, we can't have a musical idea without thinking and representing what we have thought musically. We can't have a mathematical idea without mathematics. And neither is possible without a form of representation that affords our ideas the possibility of life. It is the school as a representative of culture that provides access to those forms. It is the school that fosters their skillful use among the young.

Minds, then, in a curious but profound way, are made. Their shape and capacities are influenced by what we are given an opportunity to learn when young. Given this conception of the genesis of mind, the curriculum is a mind-altering device.

Decisions that policy makers and educators make about what will be accessible to children help shape the kinds of minds they will come to own. The character of their minds, in turn, will help shape the culture in which we all live.

Brains, in contrast to minds, are biological — they are given by nature. Minds are cultural — they are the result of experience. And the kinds of experience the child secures in school are significantly influ-

enced by the decisions we make about what to teach. As I indicated, as important a consideration as this might be, reflection on the role that forms of representation play in the creation of mind has been all but neglected in framing curricular policy. We need to remedy that.

Ours is a school system that gives pride of place to the skillful use of language and number, the venerable three R's. No one can cogently argue that the three R's are unimportant. Clearly, competency in their use is of primary importance. But even high levels of skill in their use are not enough to develop the variety of mental capacities that children possess. The three R's tap too little of what the mind can do. Where do we learn what the mind can do? We learn about its potentialities not only from psychologists who study the mind but also by looking at the culture — all cultures — because culture displays the forms humans have used to give expression to what they have imagined, understood, and felt. Each product humans create embodies the forms of thinking that led to its realization, each one of them provides testimony to what humans can achieve, each one represents a silent but eloquent statement concerning the scope and possibilities of the human mind, and each one comes into being through the use of one or more forms of representation.

If culture is, as I have suggested, the most telling repository of human capacity, then I suggest that we inspect the culture to discover what might be called "cognitive artifacts" (the products of thought), that we use these products of thought to understand what we can of the forms of thinking that led to each, and that we try in the process to grasp the kind of meaning that each provides. I am saying that it is the sciences and the arts — the architecture, the music, the mathematics, and the literature found in culture — that give us the clearest sense of what humans are capable of thinking about, the heights their thinking can reach, and the kinds of meaning they are capable of creating. Understanding these achievements can, and in my view ought to, provide a basis for making decisions about what we teach.

Let's turn now to some of the core ideas you will find elaborated in the articles that follow.

First, the form of representation we use to represent what we think influences both the processes and products of thinking.

Imagine a white horse. Imagine a white

horse standing in the corner of a green field and slowly beginning to move. As the horse moves, it gradually turns from white to brilliant blue. Imagine, as it begins to move from walk to trot, from trot to gallop, large gold wings emerging from its back. Now imagine those wings moving as the blue horse rises slowly into the sky above, getting smaller and smaller and slowly disappearing into a large, soft white cloud.

Now imagine creating a poem that communicates to a reader your experience with that image, or a painting that depicts it, or a literal description that conveys it, or a set of numbers that represents it — a set of numbers? A problem emerges. Poetry, yes; painting, yes; a literal description, yes. But numbers — in this case, numbers won't do.

This example is not an argument against the representational capacities of numbers; it is an effort to demonstrate graphically that you can't represent *everything* with *anything*. What you choose to use to think with affects what you can think about. Furthermore, the ability to represent experience within the limits and possibilities of a form of representation requires that you think *within* the material with which you work. When such thinking is effective, you convert that material into a medium, something that mediates. Mediates what? It mediates your thinking. The choice of a form of representation and the selection of the material to be used both impose constraints and offer possibilities. When the material is employed skillfully, meanings are made that become candidates for interpretation by the "reader."

Reading a form that carries meaning is by no means limited to those who are spectators. Reading the form is required of the maker, of the individual who attempts to use a form of representation to say something. The maker must be able to read the work as it unfolds and, through such a reading, be able to make adjustments. It is in this monitoring process that attention to nuance becomes especially important. Through such attention, when the necessary skills are available, the process is modified to yield a product worth making. In short, the processes of thinking are engaged in the process of making, and the process of making requires the ability to see what is going on in order to make it better. When we modify what we have made as a result of such inspection, we call it "editing." The editing process is employed in all forms

representation.

What is particularly important in this process is that the "standards" the maker uses to make judgments about his or her work are often personal or idiosyncratic — that is, the standards for the work, although influenced by the culture, are often sufficiently open, especially in the arts, to allow the maker to depend on an internal locus of evaluation. Thus thinking is promoted by the character of the task.

Second, different forms of representation develop different cognitive skills. Think about what is required to write a poem or to paint a watercolor or to choreograph a dance. What must someone be able to do? What must a child learn to think about in order to become proficient? First, an idea must be framed that at the very least functions as a launching pad for one's work. Second, the idea itself must be transformed within the terms of the medium. Think again about the horse. To render the experience in dance, what we might call choreographic thinking is required. To render it in paint, another form of thinking is involved. Dance requires movement; painting, the illusion of movement. While both

require attention to composition, the terms or conditions of composing in each form are quite different. The choreographer composes through movement framed by a proscenium arch; the artist composes on canvas, a static surface intended to receive a physically static image. The ability to cope successfully with the demands of the former provides no assurance that one will be successful with the demands of the latter. Although both forms of representation are visual, each one is mediated through its own materials, and each material imposes its own demands. And because the demands of different forms of representation differ, different cognitive skills are developed to cope with them.

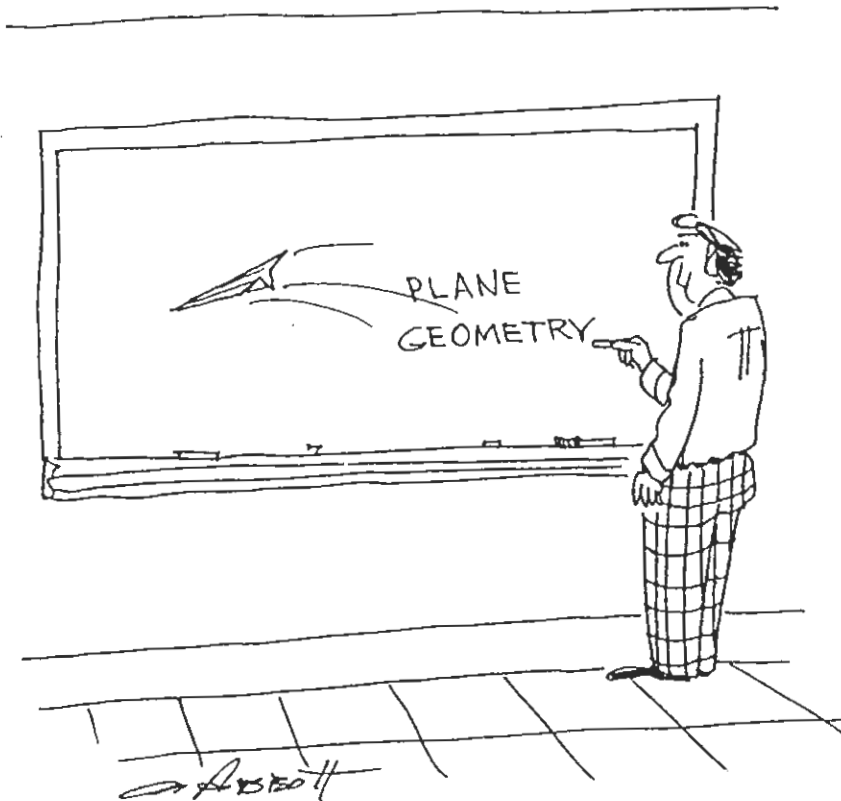
Let me offer a specific example of one of those demands in order to better appreciate the forms of cognition it engenders. I turn to watercolor painting. Watercolor painting is an unforgiving process. By this I mean that watercolor requires a directness and confidence in execution that helps one avoid costly mistakes. Unlike oil painting, in which changes can be made by overpainting a section of a canvas, watercolor painting does not accom-

modate overpainting as a happy solution for correcting unhappy decisions; colors grow muddy, and spontaneity is lost. Thus the person using watercolors must work directly and often quickly. This means becoming sensitive to a wide array of qualities, including the weight of the tip of the brush, for its weight when charged with color tells one about the amount of paint it holds. This is important to know because the amount of paint on the brush's tip will affect the kind of image that will flow from it. But that is not all. The kind of image that flows from the brush is also influenced by the wetness of the paper that receives it. The artist or student has to take that interaction into account as well.

In these assessments of the conditions of one's work, there is no rule to follow and no metric with which to measure weight or to determine wetness. The artist knows through sight and through feel. A unified body and mind must be fully engaged with the material at hand to have a basis for making such judgments.

I have described only a minuscule part of the process of watercolor painting; I have not mentioned any of the formal or expressive considerations that are at the heart of making an art form. These considerations present particularly complex cognitive demands. To regard what is euphemistically called "artwork" as "non-cognitive" is to reveal a massive misunderstanding of what such work requires. The task of the teacher is to create the conditions through which the student's thinking about these matters can become more complex, subtler, more effective. In a word, more intelligent.

Third, the selection of a form of representation influences not only what you are able to represent but also what you are able to see. Ernst Gombrich, the noted art historian, has been quoted as saying, "Artists don't paint what they can see; they see what they can paint." Gombrich's point, of course, is that people look for what they know how to find, and what they know how to find is often related to what they know how to do. When what one knows is how to measure, one looks for what one can measure. If the only tool you have is a hammer, you treat almost everything as if it were a nail. Tools are not neutral. Forms of representation are tools, and they are not neutral. If one sees a city in terms of the poetry one wants to write about it, one seeks in one's travels through the city what



has poetic potential. If one searches the city for images to record on black-and-white film, one seeks images in light and dark. Put color film in the camera, and another set of criteria emerge for searching the city's landscape. When we emphasize the use of particular forms of representation, we influence what counts as relevant.

Fourth, forms of representation can be combined to enrich the array of resources students can respond to.

alluded earlier to the fact that our schools are deeply immersed in teaching language and number. Working with each one separately, as is often done in school, has the benefit of providing focused attention to a specific task. There is virtue in such focus when trying to learn something complex. At the same time, displays that make available to students ideas couched in visual, verbal, numerical, and auditory forms increase the resources available to the student for making meaning. When resources are rich, the number of avenues for learning expands.

The kind of resource-rich environment I am talking about is much closer to the conditions of life outside of schools than those inside of them. We live our daily lives in an abundant and redundant multimedia environment in which opportunities for iterative forms of learning are common. This means that if we have difficulty learning something one way, there are often other routes that can be taken. Observing preschoolers explore their surroundings through all their sensory modalities is evidence enough of the variety of ways through which they come to understand the world. Preschool teachers and kindergarten teachers know this, and the environments they create for their students reflect their understanding of the multiple ways through which children learn. These environments also reflect their belief in the importance of providing a wide variety of forms through which their students might represent what they wish to "say."

It is unfortunate that the resource-rich environments that characterize good preschools and kindergartens are typically neutralized as young children move up into the grades. We would do better, I believe, to push the best features of kindergarten upward into the grades than to push the grades into the kindergarten. In many ways the good kindergarten displays features that could serve as a model for the rest of schooling. Kindergarten teachers can create such environments because — at least until re-

cently — kindergarten has not been regarded as "serious" education. As a result, kindergarten teachers are able to utilize the central role sensory experience plays in learning and are free to afford their students many opportunities to find and use forms of representation that stimulate, practice, and develop different cognitive skills.

For older children, imagine programs in science, history, and the arts coming together to provide students with a complete picture of scientific, historical, and artistic content. For example, the early years of the 20th century brought Einstein's special theory of relativity, innovations in visual art and music (Picasso's cubism and Stravinsky's "Firebird"), and Freud's exploration of the unconscious. What would it mean to students to be given the opportunity to explore the relationships between these developments by tuning directly to the representational forms in which they were realized — listening to Stravinsky, seeing Picasso's cubism, reading Einstein's comments on his own thought processes and Freud's descriptions of his cases? A curriculum unit designed to introduce students to such material, to ground it in time and in representational form, would multiply the number and types of "cognitive hooks" or forms of scaffolding that students could use to advance their own learning. The enrichment of the environment by the provision of a variety of forms of representation would also increase the array of cognitive abilities that students could develop.

The curriculum would become not only a mind-altering device but a mind-expanding one as well.

There is another issue that needs to be recognized. This one pertains to matters of educational equity. The forms of representation that an institution emphasizes influence who succeeds and who does not. At issue is the fit between the aptitudes of the students and the possibilities presented by the forms they are to use. When the primary game in town is the denotative use of language and the calculation of number, those whose aptitudes or whose out-of-school experience utilize such skills are likely to be successful; there is a congruence between what they bring to the school and what the school requires of them. But when the school's curricular agenda is diverse, diverse aptitudes and experience can come into play. Educational equity is provided not merely by opening the doors of the school to the child but by providing

opportunities to the child to succeed once he or she arrives. The provision of the source-rich environment I have described is an extremely important way in which genuine educational equity can be achieved.

This way of thinking about the relationship between the development of cognition and the forms of representation through which it is realized has implications for how we conceive of a successful school. In the conception implicit in what I have said, the mission of the school is decidedly not to bring everyone to the same place but rather to increase the variance in performance among students while escalating the mean for all. The reason I believe that this is an important aim for schools in a democracy is that the cultivation of cognitive diversity is a way of creating citizens who are better able to contribute uniquely to the commonweal. Look at it this way. If by some magic everyone were transformed into a brilliant violinist, the convocation of all the brilliance among all the violinists on the planet would not make possible the kind of music that equal competencies would produce if they were distributed among all the instruments. Sometimes you need woodwinds, or percussion, or brass. Schools that cultivate the differences among us while escalating the *mé* for performance in each of the forms of representation provide for the richness of the full orchestra. We do better as a culture when we are not all violinists — even brilliant ones.

Fifth, each form of representation can be used in different ways, and each way calls on the use of different skills and forms of thinking. We tend to talk about forms of representation as if each of them called on a single set of specific cognitive skills. At a general level they do. Dance, in contrast to computation or the writing of poetry, makes use of the body in motion; thinking must be realized within the capacities of a moving body. But such parameters are general parameters, and within movement itself there are a wide array of options: *how* one chooses to dance, *what* one wishes to express, and the *genre* within which one works also impose requirements that are specific to the particular task to be performed. In the field of painting, the pathos expressed in the drawings of Käthe Kollwitz depend on a marriage between mind, emotion, and body that made the power of her images possible; in a sense her aesthetic center is located in her gut.

Her work is not what one might call cerebral, though surely there are ideas in it. Other artists — for example, the abstractionist Josef Albers — were concerned with color relationships. Albers' paintings deal with what might be called visual vibration. His center is located in a different part of the body from Kollwitz's. And when we look at the work of Salvador Dali, other sources become dominant — these in the meanderings of the unconscious. My point here is that, as Richard Snow points out in his article in this section, many forms of thinking are at play in any single form of representation, even though one may dominate.

What does the foregoing mean for American education? Do the ideas we have examined have any implications for what we do in schools or for the policies we create to guide them? Do they have relevance for how we think about the meaning of education? I think they do, and I believe their implications pertain to matters of *process*, *content*, *equity*, and *culture*. I address each briefly here.

By *process* I refer back to where we began, namely with the idea that mind is a cultural achievement, that the form it takes is influenced to a significant degree by the kinds of experience an individual is afforded in the course of a lifetime. In school a major locus of experience for children and adolescents is the curriculum. It performs a major function in shaping those experiences. Decisions regarding which forms of representation will be emphasized, which will be marginalized, and which will be absent constitute decisions about the kinds of processes that will be stimulated, developed, and refined. In short, in schools we influence the forms of cognitive competency that students will develop by providing opportunities for development to occur. In education we are in the construction business.

Process is one side of the coin; *content* is the other. Competency in the use of a form of representation provides access to particular forms of experience and therefore to ways of understanding. In order to be read, a poem, an equation, a painting, a dance, a novel, or a contract each requires a distinctive form of literacy, when literacy means, as I intend it to mean, a way of conveying meaning through and recovering meaning from the form of representation in which it appears. Given this conception of literacy, a conception far

broader than its commonly held root "logos" (referring to the word), we ought to be interested in developing multiple forms of literacy. Why? Because each form of literacy has the capacity to provide unique forms of meaning, and it is in the pursuit of meaning that much of the good life is lived. Schools serve children best when their programs do not narrow the kinds of meanings children know how to pursue and capture.

Equity is a third notion that can summarize the contributions that attention to multiple forms of representation can help achieve. As already noted, the equity question is related to aptitude differences among students and to the opportunities they will find in schools to capitalize on their strengths. Equity of opportunity does not reside, as some people seem to believe, in a common program for all. It resides in school programs that make it possible for students to follow their bliss, to pursue their interests, to realize and develop what they are good at. Of course there will need to be limits set with respect to what is possible — a school cannot do everything. Nevertheless, I am talking about ambitions, desiderata, principles. We ought to try to grasp what may be beyond our reach — or what's a heaven for?

Finally, we come to *culture*. What kind of society do we want? What kind of life do we want to be able to lead? What kind of place will America become? The quality of life that America as a culture will make possible will be a function not only

of a diversity of traditions and values but also of the varying natures of the contributions that our individual differences allow. In totalitarian societies, Herbert Read reminds us, children are to be shaped by schools to fit an image defined by the state.¹ In democratic societies and in those societies seeking to create a democratic way of life, children are helped to realize their distinctive talents and, through such realization, to be in a position to contribute to the culture as a whole. The presence of multiple forms of representation in the school is one way to try to achieve that democratic ambition.

Ultimately we need to build a culture reflecting the two senses in which the term can be used. One sense of *culture* is biological; the other, anthropological. In the biological sense, a culture is a medium for growing things. In the anthropological sense, a culture is a shared way of life. Our schools should embody both. They should be media for growing things, and what they should grow are minds. They should try to achieve that noble ambition through the shared way of life they make possible, a way of life that recognizes both the differences and the commonalities among us. Understanding the relationship between cognition and representation and its relevance for policy and practice in our schools is one place to begin — and one way to pursue the American dream.

1. Herbert Read, *Education Through Art* (London: Pantheon, 1944). ■



"What do you mean, 'What is it?' It's the spontaneous, unfettered expression of a young mind not yet bound by the restraints of narrative or pictorial representation."