

“The Word I Would Use is *Aesthetic*”: Reading David Hawkins

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David Hawkins, who died early this year at the age of 88, was, next to Jerome Bruner, the most influential of the many academic figures who involved themselves in school reform in the 1960s. A philosopher of science and at a young age the historian of the Manhattan Project, he first became visible as a school reformer as director of Elementary Science Study in Cambridge, Massachusetts. His wife, Frances Pockman Hawkins (1969, 1997), is a well-known early childhood teacher and writer in her own right. In many projects ranging from Africa to Italy and the U.S., David and Frances Hawkins helped shape a small but vital renaissance in school reform committed to first-rate yet inexpensive science materials and children's active intellectual exploration.

The Hawkinses founded the Mountain View Center for Environmental Education at the University of Colorado, and were partners in an ambitious and respectful (and, in the US context at least, rare) kind of advisory work aimed at helping teachers develop children's thinking and imaginative exploration. The Center published *Outlook*, our nomination for the most literate (as well as eclectic) journal in the entire history of education. The fruit of his early thinking was a collection of brilliant essays *The Informed Vision* (Hawkins, 1974), some of which are already classics. Now we have *The Roots of Literacy* (Hawkins, 2000).

Hawkins himself was too modest to claim to be the Dewey of the revival of intellectual progressivism of the 1960s and 1970s, but the comparison is instructive. A famous essay in *The Informed Vision*, entitled 'I, Thou, and It' views curriculum as a set of on-going, three-way transactions between teacher, child and subject matter, a deceptively simple formulation that keeps getting kidnapped and recycled by new generations of scholars. The same essay also pushed progressive tradition in deeper directions – toward an even more demanding vision of teaching, as well as an even more intellectually ambitious notion of curriculum, to say nothing of a new level of curiosity about and respect for children's thinking. Both homage and revisionism, 'I, Thou and It' might be said to be Hawkins' version of Dewey's *The Child and the Curriculum*.

Dewey lost the chance for day-to-day contact with a real school when he left Chicago for Teachers College in 1904; some of the essays in *The Roots of Literacy* are the kind of writing Dewey might have produced had he been lucky enough to stay in close touch with classrooms and the problems of teaching practice. They are, at times, theoretical, even, in a few cases, teeth-cracking in their difficulty, but they are different from Hawkins' brilliant and more abstract earlier work; they reflect the thinking of a philosopher who has been hanging around and working with children and teachers for a very long time.

Hawkins' framing of the grand enterprise of teaching remains firmly rooted in a high romantic intellectual progressive tradition that values direct experience as the matrix of vital culture and worthwhile learning. Several early essays restate this old idea in relation to aims and methods in interesting ways. He talks of being able to make yourself 'at home in the world' as one goal of education. Like many other 1960s academic reformers, Hawkins had more respect for the relevance of the university disciplines to children than an earlier generation of progressives; he adopts the old elite college slogan, 'liberal learning', as a democratic aspiration for all children. The liberally educated mind has necessary skills, but is free to frame its own purposes, to think critically and to play; it is capable of hard disciplined work, but also of leisure and imaginative playfulness. Hawkins aims to expand our ideas about classrooms to include play, the aesthetic, active inquiry and children's choices within an educational environment designed for learning.

He respects skill and in particular the skill needed for literacy, but wants adults to view literacy within the bigger educational context of how children gain life-long habits of choosing purposes and pleasures and framing solutions to problems in the interests of their own learning. A rich classroom environment, he argues, is a seedbed for habits of curiosity, inquiry and delight that grow children into life-long learners and devoted readers. Children can and should experience first-hand some of the many very satisfying reasons to read by learning in a classroom where reading serves their own vital purposes. And for children without much cultural capital, youngsters whose homes lack books and adults with leisure to indulge and nourish the impulse to explore intriguing objects, Hawkins suggests that classrooms stocked for science and mathematical inquiry may provide the best routes into literacy. Hawkins' expansive view of literacy and its roots in personal exploration and the pleasures of the mind offer a refreshing contrast to the solemnity of current reform.

The aesthetic has moved closer to the center of Hawkins' vision; its pursuit stands next to, and seems almost indistinguishable from, science itself. Hawkins connects aesthetic experience to interest and engagement, arguing that classrooms that are aesthetically dreary places are ones where children are bored, either because they are kept at workbooks all day and have no chance for authentic exploration or because they are allowed to do exactly as they want and, having been given no guidance, they are not learning anything. For although Hawkins sees choice, pleasure and play as central to what happens in good classrooms, he assigns the teacher an active and demanding role in observing and

guiding children's explorations. He delights in the British infant school classrooms in which children's murals, calligraphy and illustrated reports on scientific inquiries decorate walls and – when wall space gives out – hang from lines strung across the room at eye level, while found materials collected by children – shells, intriguing stones, moss and toadstools – line shelves and tables.

In 'Enlargement of the aesthetic', he argues that teaching is a high art and that all arts are a form of teaching. Echoing what Dewey (1934a) has to say about consummatory experience, Hawkins asserts that all that is routine, habitual, un-thought-through (and this is, inevitably, much of life), is unaesthetic.

By contrast the experience that is cumulative, that leads to some reduction of the tensions of disorder, some unifying grasp of perceptions or plan of procedure, has aesthetic quality, is suffused by a distinctive emotion. Aesthetic experience is in this sense synoptic, integral. (p 84)

Interestingly, however, it is precisely in his formulation of the role of the aesthetic impulse in learning that Hawkins parts company with Dewey. While Dewey (1934b) argues that exploratory behavior and reflective thought are rooted in the need to act or, more precisely, in the blockage of habitual or on-going action, and asserts that thought and action are an indivisible whole, Hawkins sees exploration as less utilitarian:

What motivates exploratory behavior, in a deep psychological sense, one cannot well say. For myself, I would like to label that motivation, however connected with others, as being provisionally of an independent category; not, as Emerson said, to eat and not for love. The word I would use is *aesthetic*. It is a mode of behavior in which the distinction between ends and means collapses; it is its own end and it is its own reinforcement. (pp 116-117)

Hawkins places mathematics and science at the center of the early childhood classroom precisely because of their aesthetic potential. A teacher who knows her subject matter and has learned to listen well can stock her classroom with concrete materials that beckon children into explorations of number, shape, pendula, inclined planes, growing things, and more – into scientific and mathematical investigations. The teacher, of course, is active as instigator and guide – play must be "closely observed and then steadied and extended by adult provisioning" (p. 29), but Hawkins is confident that the materials themselves and the intriguing beauty of the patterns that play with these materials reveals will draw children in. [1] Equally important, the materials will enable communication between the child and the teacher that would be impossible in their absence, for, as Hawkins frequently notes, children understand more than they can articulate in words alone. Demonstration can often replace some of the missing vocabulary.

In the essays 'The view from below' and 'Early roots', both originally published in *For the Learning of Mathematics* [2], Hawkins develops some interesting ideas about the development of mathematical thinking. Taking a cue from

Plato, who claimed that although the young lack the experience and understanding to deal well with the complexities of 'practical life', they can understand 'the essence of mathematical objects' perfectly adequately, Hawkins argues that even young children can and will develop sophisticated and abstract mathematical ideas in the course of normal sorts of play experiences. He illustrates his point with a story of a child who, having been told by a contemporary that the largest number is a trillion, trillion, trillion and by a whimsical physicist that it is 10^{69} , offers an interpretation: "They only mean it is the largest number they have a name for". When queried, she explains, "Well, you could always add one more". Clearly no child has personal and concrete experience of infinity – there are, after all, a finite number of all objects in the known world – yet most delightedly deduces its existence.

Both these essays echo with the aesthetic satisfaction that Hawkins finds in listening to children talk about what they see, hear and think as they play with materials that enable discovery. He is delighted by the child who, having seen that an equilateral triangle can be divided into 4 congruent triangles, infers that it can also be divided into 9, 16 or 25 parts. She has drawn this conclusion from earlier work in which she found that when you make an isosceles triangle with small similar plastic triangles, you can 'grow' it by adding the next odd number of triangles to the bottom row: $1 + 3 + 5 + 7$, etc., each sum making a square number (pp. 160-161).

Hawkins uses this story to connect the observation that discovery often comes when two known but previously separated facts are brought into proximity to the historic fact that the Greek mathematicians brought together two bodies of knowledge that had previously been separate, arithmetic and geometry, with important consequences for mathematics.

One does not know in advance which propositions, previously isolated, will combine to form new conclusions. Deduction is the end result, but not the method (p. 160)

(We notice, as well, the echoes here of Hadamard's (1945) and Poincaré's (1946) descriptions of the process of mathematical discovery.) Hawkins laments:

A long tradition has robbed schoolchildren of the richness of this Pythagorean discipline, well within their reach. (p. 161)

Here, and elsewhere, Hawkins trolls the history of discoveries in science and mathematics for curricular possibilities.

But Hawkins' stories do more than communicate his pleasure in children's thinking: they ground and illustrate points about the nature of mathematical knowledge and about the difference between the roads that adults and children travel to mathematical discovery. Borrowing from Edwina Michener (1978) a tripartite division of mathematics into theorems, ideas and examples, Hawkins argues that for the adult mathematician examples are surplus – a theorem that follows logically from other proven theorems is valid even if it does not correspond to any concrete object or observable event – but that for children mathematical thinking grows out of concrete examples. His paradigmatic case is 'Suzie',

a fourth-grader who in play with a friend discovered that when a compass is 'walked' around the circumference of a circle it arrives back at its starting place after precisely six steps. Here we catch Hawkins both listening and teaching:

I happened to be near and caught the question that hovered between them: "How come?" My intervention was honest and it worked. We walked another circle with great care and the point of the compass landed, by luck, in the hole it had started from. After drawing the lines we ended up with the hexagon dissected into equilateral triangles (see above). At one point Suzie said "This [pointing to a radial line segment] is the same as that [a hexagonal edge], so it has to be just six". (pp 165-166; *all brackets in original*)

The case is paradigmatic, he tells us, because with the assertion '*it has to be*' Suzie leaps from the merely empirical to the mathematical. Like the mathematician, she focuses on the logical thread that tells her what *must be*, rather than simply glorying in the picture she has made or the symmetry unexpectedly revealed. She reaches for reasons even though she has never studied Euclidean geometry, has never seen a two-column proof. Like the mathematician, she does mathematics, but her road into the subject matter is grounded in the concrete and particular.

Hawkins spells out the implications of all this for teaching clearly and explicitly. Because children learn most eagerly what they want to, a teacher must create a classroom environment that awakens and nurtures curiosity, a desire to figure out particular things. This is best done by stocking shelves and tables with science and mathematics materials that invite exploratory play, by observing the children as they experiment and talk and by quietly providing questions and materials that will nurture and support their curiosities.

In all such children's work, guided by thoughtful and responsive teachers, there is a spirit of play. The adult conception of play is usually a stereotypic one: enjoyable activity devoted to no single or sober or serious end, and often disparaged for that reason. I think this definition of play is in fact a good one, but the disparagement is unwarranted. Children's play, closely observed and then steadied and extended by adult provisioning, represents a powerful organizer of their growing experience and, at the same time, a synoptic expression of it; it is expression that is the precursor of all the established arts, wider in its range and never lost among those who grow creatively into the traditions that those arts represent. But it is also the matrix out of which is born the capacity for the very definition of sober and serious ends, and the capacity to reconstruct them in the course of a worthy life. It is the unifying sphere in which all the major capacities of the mind are brought together in some potentially fruitful relation. (p. 29)

But in order to steady, extend and provision, teachers must, of course, become students of subject matter; many do not and for this Hawkins blames liberal arts courses in the universities that educate and certify them (we find it somewhat refreshing to see reproaches directed, for once, outside of the

colleges of education). Too often, instructors in liberal arts departments teach their required introductory courses in a way that leads teachers (and many others) to conclude, "If this is science [mathematics, music, etc.], then it is not for me". Not only do they fail to develop prospective teachers' understandings of the most elementary concepts in their discipline, they teach in a way that kills their impulse to investigate the subject as they teach it. Thus, they fail these students twice.

Like Dewey, Hawkins is an optimist and a democrat, finding the roots of science and aesthetics in human experience, accessible to all. But Hawkins is a Westerner rather than a New Englander, freer from the Puritan strain in American culture that caused Dewey to shy away from a whole-hearted embrace of play. Although the late Dewey (1916, 1933) ended as an apostle of the aesthetic, he often had to assure himself and his readers that play, whose goals shift from minute to minute, soon develops into work in which an overarching purpose shapes activity that may extend over days or even weeks.

More familiar than Dewey with the actual enterprise and scholarship of science and mathematics (though Hawkins was by trade a philosopher and spent a significant chunk of his long and fruitful retirement studying Spinoza, his doctorate was in probability theory and he taught university courses in the history of science), Hawkins is more confident than Dewey of the intrinsic pleasure of science. He knows from deep experience that when classrooms and teachers invite and support play with the materials of science and mathematics, children will 'do' science and mathematics, will develop their curiosities and will discover their own minds and the joy of inquiry. This is not pie-in-the-sky romanticism: Hawkins sees the continuing development of teachers' subject-matter knowledge and of engaging curriculum as key to the success of this kind of education. And he sees all too clearly the cultural obstacles standing in the way of those who would reshape schools.

In view of the obvious lack of widespread recognition for the movement that Dewey sponsored and extended, one must very seriously ask today whether there is not some deep inadequacy in his synthesis and in the practice that has tried to remain faithful to it, or whether, on the other hand, our puritan traditions, reinterpreted and amplified by a narrow educational utilitarianism of costs and benefits, would have defeated even the most enlightened and effective traditions of schooling. To insist upon the educational importance of playfulness in inquiry and upon the long-term consummatory joys of self-propelled learning is almost surely to be disparaged in, or even banished from, a world dominated by moral futurism, whether secular or sacred in its measures of utility. Dewey himself saw the threat and devoted much analytical attention to challenge this presupposition that education is only a preparation - whether for life after death or for life after schooling makes little difference. (p. 95)

Still, in this era of utilitarian school reform and grim high-stakes testing, David Hawkins eloquently and explicitly awards pleasure a central place in learning.

Note

[1] A contemporary account of young children working with aesthetic materials on mathematics in artistic ways can be found in Upitis, Phillips and Higginson (1997).

[2] These two pieces are Hawkins (1980) and Hawkins (1995). He also published 'The edge of Platonism' (Hawkins, 1985) in this journal

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