This chapter presents a philosophical reflection on ecological mindfulness as it relates to curriculum integration, mathematics education, and experiential education. The chapter's title refers to a collection of poems that are full of "particulars"—the meticulous details of memory and reverie—and that show how lives are always lived in the face of these stubborn particulars. To understand what is present in an ecologically sane, integrated way is to somehow see the particular thing in place, located in a patterned nest of interdependencies without which it would not be what it is. Differently put, understanding "the whole" involves paying attention to the particular in its wholeness. All too often, curriculum integration means the combination of the literal surface features of activities from different subject areas, such as presenting first-graders with basic addition problems surrounded by line drawings of teddy bears to be colored. Such efforts seek to make curricular fragments whole, not by sticking with them and delving into their particular mysteries, but by surrounding them with other equally isolated, unexamined fragments. A truly integrated approach to mathematics education requires the simultaneous realizations that each child's learning is embedded in a web of relationships and possibilities, and that the patterned doings of mathematics are not simply isolated facts but reflect the mathematicity of language and of an array of nature's rhythms. (Contains 15 references.) (SV)
Chapter 15

"THE STUBBORN PARTICULARS OF GRACE"

David W. Jardine

David Jardine has a background in philosophy and religious studies and currently teaches Early Childhood Education at the University of Calgary, Alberta.

He brings this background and a fine poetic sensitivity to the experiences of children and teachers in trying to make sense of mathematics in the world. David takes us from the surfaces of things into the depths of reality and meaning. He invites us to attend to particulars of practice as persistent symbols of unity. He seeks to have us see the everyday business of teaching as a whole. In doing so, he holds up a mirror to practice which is lyrically beautiful, critical, and hopeful.
Prelude

Poet Bronwen Wallace entitled her third collection of poems *The Stubborn Particulars of Grace* (1987). Reference to this title comes up in a poem called “Particulars” which is full of the meticulous details of memory and reverie (“those Sundays at my grandmother’s table”) and which shows the way that our lives are always lived right here, in the face of these stubborn particulars. Wallace’s work gains its deep resonances, its sense of wholeness, not through nebulous talk of grand things, but because it consistently “argue[s] the stubborn argument of the particular, right now, in the midst of things, *this* and *this*” (p. 111).

This stubborn argument of the particular is reminiscent of a fragment of William Carlos Williams’s “Spring and All” (1991, p. 224):

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So much depends upon
the red wheel
barrow
glazed with rain
water
beside the white
chickens.
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Here, an ordinarily insignificant object is portrayed with such spacious clarity that the insight becomes unavoidable: somehow, *everything* depends upon this red wheelbarrow. Somehow, from out of a mindfulness to *this* and *this*, the particular object, in its very particularity, becomes like a sacred place where the whole Earth comes to nestle in relations of deep interdependency.

This is one of the secrets of ecological mindfulness. To understand what is right in front of us in an ecologically sane, integrated way is to somehow see this particular thing in place, located in a patterned nest of interdependencies without which it would not be what it is. Differently put, understanding “the whole” involves paying attention to *this* in its wholeness. This rootedness in the particular is what helps prevent ecology from becoming woozy and amorphous—a disembodied idea that misses the particularities in the flit of *this* ruby-crowned kinglet pair in the lower pine branches and how their movement is so fitting here, in the coming arch of spring in the Rocky Mountain foothills.

Math Facts on a Teddy Bear’s Tummy

During practicum supervision in a Grade 1 classroom over the past year, I witnessed again a common sight. The children are in the middle of a bear theme. In order to integrate with this theme and in order to make the work “more fun for the kids” (as one teacher put it), mathematics addition facts are printed on the stomach of a cut-out line drawing of a teddy bear.

Such activities—where the mathematics questions are answered and the bears are coloured in and posted on the wall of the classroom—are certainly carried out with the best of intentions. Blaming teachers for engaging their children in such trite activities in the name of curriculum integration belies the fact that we are all “witnessing the inevitable outcome of a logic [of fragmentation, severance and dis-integration] that is already centuries old and that is being played out in our own lifetime” (Berman, 1983, p. 23). More strongly put, we are all, however unwittingly, living out this logic. Teachers, children, administrators, University academics—we have all, in our own ways, been victimized by the uprootedness and “unsettling” (Berry, 1986) caused by this logic. Such classroom activities should, therefore, not be taken up as occasions for blame, but as interpretive opportunities that give us all ways to address how we might make our pedagogical conduct more integrated and whole.

What we see occurring with these math facts on a teddy bear’s tummy is what could be called an “urban sprawl” version of integration. To integrate one subject area with another, one begins with the clear, unambiguous, univocal, literal surface features of a particular activity (for example, “5+3= _” as a so-called “math fact”)
and moves laterally, adding more and more (clear, unambiguous, univocal, literal surface feature) activities from different subject areas. We can hear in teacher's talk such as "I wanted to make the math stuff more fun for the children by linking it up to things they were already doing," the understandable desire to rescue $5+3=\_\_$ from its flatness and isolation. Understood and presented merely as a math fact, it is rather severe, so we find ways to remedy this malady by dressing it up through combining it with cut-out line drawings of teddy bears (which the children supposedly find cute and interesting).

The problem, however, is that such integration, if one could call it that, works precisely because it operates with the thinnest veneer of each area. Curricular integration becomes akin to formulations of post-modernism which well describe the mood of so many elementary schools: a hyperactive play of surfaces juxtaposed at the whim of the subject (whether teacher or child), juxtaposable with facile ease precisely because we are dealing with uprooted surfaces which offer no real resistance and demand no real work. Integration in such a post-modern milieu becomes formulated as little more than surface co-presence or co-occurrence, bereft of any fleshy, experiential immediacy.

If we begin with a surface understanding of $5+3=\_\_$, our efforts at integration can easily fall prey to the bizarre cultural-capitalist equation of the achievement of wholeness with the consumptive accumulation of "more." One makes $5+3=\_\_$ (or any other curricular fragment) whole, not by sticking with it, deepening it, opening up its "necessities and mysteries" (Berry, 1983, p. vii) but by adding more and more activities to it—surrounding and crowding it with other equally isolated, unopened particulars but, we might say, never housing it. In this way, to re-formulate Wendell Berry's (1986) critique of the motto of the Sierra Club, our interest in math facts becomes scenic. Mathematics becomes akin to a tourist attraction, something to look at but never enter into, open up, and learn to live with. And we, in turn, become akin to curricular tourists, ready to be momentarily entertained and amused. However, since we just see the thin, tarted-up, presentable surface of things, we, along with our children, become equally subject to boredom, frustration, and eventual violence. Given what is presented to us, it is little wonder that our attention is fleeting.

There is an odd logic at work here. Since, as a math fact, $5+3=\_\_$ affords only the briefest consideration, what we begin to witness is the attempt to attain integration, not simply through the accumulation of co-present surfaces, but through the acceleration of such accumulation. One need think only of the typical tempo of early-grade elementary school classrooms. What appears on the surface as vigour and enthusiasm is also readable as a type of hysteria and panic. Given that $5+3=\_\_$ is understood to be an isolated curricular fragment (i.e., it is "un-whole"), there is no time to deepen it and dwell on it, to slow it down and open it up, because there is simply so much else to get done and so little time. As Wendell Berry suggests, for this way of being in the world of the classroom, "time is always running out" (1983, p. 76). As such, we can witness in so many classrooms (and, in fact, in so much of contemporary life) an ever-accelerating "onslaught" (Arendt, 1969) of ever-new activities and the odd equation of some sort of fulfilment with becoming caught up in such frenetic consumption. Many teachers and children are thereby condemned to constantly strive to keep up, and to take on the failure to keep up as a personal, pathological problem involving lack of effort or lack of will. Talk of slowing things down, dwelling over something, and deepening our experience of it begins to sound vaguely quaint and antiquated.

An urban sprawl version of curriculum integration thus becomes convoluted with both a metaphysical and an eschatological belief. First, it is premised on the metaphysical belief that each curricular fragment (e.g., $5+3=\_\_$) is what it is independently of everything else, independently of any sustaining relations. In this view, wholeness cannot be a matter of meditating on how the whole of our course might be refracted through this fragment or this, since it is precisely such refraction that is denied by this metaphysical assumption of severance and fragmentation. Second, and following from this metaphysical assumption, an urban sprawl version of curriculum integration suggests that wholeness and integrity is always yet-to-arrive. Education thus gets caught up in a type of eschatological anticipation—"an occult yearning for the future" (Berry, 1986).
when integrity and health and wholeness might finally be achieved through the final accumulation of all the pieces of the picture.

**Placing “5+3=8” Back into all its Relations**

In a recent Early Childhood Education methods course, we considered the following examples of Grade One children’s math-facts work:

1) 5+3=8
2) 5+3=8
3) 5+3=8

It was proposed that we had found these three samples in the files of three different children who have just entered our classroom. The following questions were posed: What do we now know about these children, these samples? What do they mean? What do they show? As expected, the answer, for the most part, was “very little.” One student ventured that “these children know how to add.”

Through a combination of considerations of Jean Piaget’s notion of operations (1952), working ourselves with manipulative materials, and, especially, frequent visits to a wonderful, Grades 1-4, multi-aged classroom, what slowly became visible underneath the surface-presentation of “these children know how to add” was a roiling nest of multiple operations, multiple voices: “threads interweaving and criss-crossing” (Wittgenstein, 1968, p. 32). Rather than reading each 5+3=8 pathologically, as an isolated fact, we slowly became able to read each as a sign pointing beyond its isolation to a whole world of implicate relations, a whole “chaos of possibilities” (Hillman, 1987).

One child holds five and counts on. A second counts them all out, showing us not only his own ways of working in mathematics, but showing us also that the child who can hold five is holding not just a math fact but a crystallized and stabilized nest of operations that this second child still needs to concretely re-embody and re-enact. Differently put, “5” is itself a doing full of underworlds of relations and connections and threads (for example, the accomplishment and stability of 1-to-1 correspondence and ordinal numerical sequences, the infinite iterations of relations of 4+1, 3+2, 12-7, the square root of 25, and so on), some of which this child who holds five understands, some not, but all of which surrounds and houses and makes understandable and locatable his work, his efforts, and his experiences. This child’s work lives in these implicate relations and is deeply meaningful and sustainable only within them (and this in spite of the fact that some of these relations are, from the point of view of the child’s own experiences, beyond him at this juncture: this is a profound and difficult ecological point—our lives and actions are sustained in part by what is beyond us, beyond what we know, experience, or construct). Another child “just knows” the answer but cannot articulate the operations she performs. Another gets caught up in such articulations and takes on the task of filling out all the permutations of operations embedded in the question at hand, verging, for a moment, near calculus and the formulation of functionally defined sets.

What occurred here was a wonderful but also rather disorienting phenomenon for many student-teachers in this class. They began to see that being stuck in the present tense with the three surface
samples and then rushing to accumulate more and more in order to understand "the whole child" (or in order to "cover the whole curriculum"), was somehow potentially misguided and unhealthy, for it skitters over the deeply experiential ecology of just this. Underneath the surface of each stubborn particular was an almost overwhelming richness, diversity—hitherto unnoticed communities of relations. But more than this, once opened up, we could begin to see how each stubborn particular—this child's work and this child's work—becomes reflected and refracted through all the other stubborn particulars, giving all the others shape and place and sense. Differently put, once this 5+3= 8 becomes interpretable, it is no longer an isolated given which simply is what it is independently of everything else, like the unread work samples found in the children’s files. It becomes readable as a multivocal sign which portends a whole nest of sustaining relations that are always already wholly at work and without which this stubborn particular would not be what it is. Each stubborn particular thus becomes placed within a nest of possibilities that house and sustain it. It becomes, in this deeply ecological sense, whole, through the slow, meticulous, disciplined working out of its relations.

Here we have a wonderful inversion of the metaphysical assumption of the urban sprawl version of curriculum integration. Each curricular fragment is what it is only in relation to the whole, a whole now readable in and through the stubborn particulars of our lives.

It is important to add that this does not mean that every child should be relentlessly inundated with relations, possibilities, and articulations at every turn. This would simply turn our interpretive efforts into another version of urban sprawl which acts irrespective of where we are and what particular relations are at work “here and here.” This is the profound sense in which the particular is stubborn: there is no way that we can replace the exquisiteness of this particular (child’s work, for example). This work—this 5+3= 8—occurs at an irreplaceable intersection between the world of mathematics, this child’s life and breath and attention and experience, the life and relations of the classroom, the hopes and actions and experience of the teacher, the working out of our curriculum and our culture in and through the institutions of schooling, and so on.

Differently put, this work—the delicacies of this child’s slow counting out of 5—is the centre of the whole of these relations. It is, in its own way, “a sacred place where the whole of the Earth comes to rest in relations of deep interdependency.”

However (and this cannot be overemphasized, given our culture’s tendency to inflate “child-centredness” to ecologically disastrous proportions), this work is, at the very same time, peripheral to (yet still housing of) the work of this next child and this. This stubborn paradox is at the core of curriculum integration. On the one hand, “the universe is a fabric of interdependent events in which none is the fundamental entity” (Nhat Hahn, 1986, p. 70): curriculum integration is not child-centred or teacher-centred or subject-matter-centred, but rather gives up the fundamentalism that underwrites such centration in favour of a world of relations. And yet, at the same time:

The centre is [also] everywhere. Each and every thing becomes the centre of all things and, in that sense, becomes an absolute centre. This is the absolute uniqueness of things, their [stubborn] reality. (Nishitani, 1982, p. 146)

The arrival of each new child in one’s class, the arrival of each new piece of work is thus potentially fecund. Each stubborn particular carries the potential of re-opening and thus revitalizing what I have heretofore understood the whole web of delicacies surrounding 5+3= ___ to mean. This particular child always counts by twos and seems stuck there in a loop. She disassembles 5 and 3, re-sorts them, and adds them two by two by two by two by setting out pairs of small wooden blocks in rows in front of her. This child brings a uniqueness and individuality and irreplaceability to this activity. But her actions are not just that. Her work cannot simply be accumulatively added to the whole of what we have heretofore understood 5+3= 8 to mean. Rather, because of her work, that whole now “wavers and trembles” (Caputo, 1987, p. 7). This fecund new case refracts and cascades through each particular relation that we took to be a given, giving each one a renewed and transformed sense of its relations and place in the whole. Without the arrival of such fecund new cases, and the portent of transformation and renewal that they bring, mathematics would
become simply a given set of memorizable (but not especially memorable) facts and rules and would lose its sense of potency and possibility. It would thus lose its integrity as a living system.

What we have come upon here is a discipline of mathematics which is both open and closed, which has its own patterns and structures and operations, its own arrays of possibilities and potentialities, but which somehow is renewed and made whole by the arrival of the young. If we pay attention to the stubborn particularity of this 5+3= 8, this arrival need not be caught up in an onslaught of accumulation and acceleration. Our attention to this 5+3= 8 is slowed and held in place by the wisdoms and disciplines and sustaining relations of this place called mathematics. Conceived as a living system (one hopes that this is a warrantable image for our curriculum), mathematics is not a fixed state (whether already achieved or yet-to-arrive). It is, so to speak, a way which must be taken up to be a living whole. There is thus a way to mathematics. Learning its ways means entering into these ways, making these ways give up their secrets—making these ways telling again, making them more generous and open and connected to the lives we are living out. Understanding mathematics thus becomes a type of ecological intimacy which always already contains images of children and the passing on of the wisdoms of the world to the young. Consider this passage as describing the world of mathematics and all its sustaining interdependencies:

Some people are beginning to try to understand where they are, and what it would mean to live carefully and wisely and delicately in a place, in such a way that you can live there adequately and comfortably. Also, your children and grandchildren and generations a thousand years in the future would still be able to live there. That’s living in terms of the whole. (Snyder, 1980, p. 86)

Living in terms of the whole requires somehow making the world of mathematics livable. As such, it is not enough to simply delve into its indigenous operations and patterns; nor is it enough to simply abandon children to their own devices and, so to speak, let them have their way with mathematics and not teach the difficult lessons of how to pay attention to where they are and what mysteries this place offers.

It is here that we encounter a paradox: making the world of mathematics livable requires going beyond mathematics itself into the deep, patterned relations of the world which house and sustain the possibility of pursuing mathematics at all: patterns of experience and breath and bone and blood. It is in this deeper, fleshier discipline of repeated patterns of operations and structures and doings, that mathematics becomes integrated. It becomes whole.

Interpretive Descent and the Mathematicity of the World

The patterned doings of mathematics are themselves not simply isolated facts. Rather, we find in the patterns and structures of mathematics “an anciently perceived likeness between all creatures and the earth of which they are made” (Berry, 1983, p. 76). Consider how the following passages describe the patterned doings of the human body (pulse, breath), the patterns of our Earthly lives (daily and seasonal cycles and rhythms), and the structure of language itself. Consider how these passages show that each of these refracts through all the others:

The rhythm of a song or a poem rises, no doubt, in reference to the pulse and breath of the poet. But that is too specialized an accounting; it rises also in reference to daily and seasonal—and surely even longer—rhythms in the life of the poet and in the life that surrounds him. The rhythm of a poem resonates with these larger rhythms that surround it; it fills its environment with sympathetic vibrations. Rhyme, which is a function of rhythm, may suggest this sort of resonance; it marks the coincidences of smaller structures with larger ones, as when the day, the month and the year all end at the same moment. Song, then, is a force opposed to speciality and isolation. It is the testimony of the singer’s inescapable relation to the earth, to the human community, and also to tradition. (Berry, 1983, p. 93)

Or, even more mysterious:

Rhyme leads one no doubt to hear in language a very ancient cosmology. Rhyme is not only an echo from word to word. Arrangement for arrangement, the order of language evokes and mimes a
cosmic order. In realizing itself, rhyme is tuned in to [this cosmology]. Rhyme and meter are praise. An indirect theology. (Meschonnic, 1988, p. 93)

Given this, we can see how curriculum integration cannot involve concertedly adding on language alongside mathematics or vice versa. Rather, it requires delving into the mathematicity of language itself—its patterns and structures and rhythms and tones and operations and grammars. And, once we crack the literalist surface of mathematics that might render it an isolated discipline, a cascade of implications ensues: the rhythm of mathematics, mathematicity of language, the language of music and rhythm, the interlocked music, patterns, and rhythms of the world, and, in the end, the profound mathematicity of the shifts and flutters in a bear’s gait as it breaks from a walk into a run. Differently put, deep in the underworlds of 5+3=_, we find a strong and sustainable integration of mathematics into a bear theme. Or, better, we find the integration of bears and 5+3= into a whole which embraces them both, each in their own way and refracts each through the other—structure, pattern, rhythm, operation.

This is an exhilarating movement—a type of meditational and imaginal descent into the crawling underworld of the particularities of our lives. Every thing—even just this red wheelbarrow, or that child’s holding five tight in her fist for fear of losing it—abounds with connections, dependencies, relations. Every thing, every word, every curricular fragment is a potential opening into the whole—“this and this” (Wallace, 1987, p. 111). More strongly put, only through a deliberate and disciplined attention to the stubborn particulars is the whole anything more than simply a floating, and, in the end, unsustainable idea.

However, there is also a fearsomeness attached to the realization that the world is not a flat, clean, literal surface and that our sanity and healthy wholeness cannot be had by skittering across such surfaces, however safe and secure they might appear at first glance. There is a fearsomeness attached to the realizations that the world is interpretable, alive with implications and complicities that are always already at work in the intimacies of our everyday experiences, and that we cannot always control and predict what relations we might stumble on in the dark, no matter how well-laid our (lesson) plans might be.

But none of this goes quite far enough. The mathematicity in the gait of a bear as it breaks from a walk into a run is, in the end, a topic which still simply floats. We could just as easily have mapped out the parabolic curve of its shoulders or counted its toes or graphed its offspring or lifespan in relation to other animals. The sort of interpretive descent that curriculum integration requires of us is far more fearsome and more experientially immediate than this allows.

In dwelling upon the mathematical changes in the gait of a bear as it moves from a walk to a run, I cannot avoid coming to reflect on my own living involvement in such Earthly rhythms, an “anciently perceived likeness” (Berry, 1983, p. 76) that embraces us both and makes the life of each complicit in the other. In walking up this hill and feeling the fluttering mathematical patterns of breath and pulse and steps, I come to better understand this creature and its mathematical being in place, housed by flesh and humus, housed by a mysterious immediacy. And, in understanding this creature in this way, I come to understand myself and my own living involvement in the ecological conditions under which this creature lives and which I live with it, pulling hard at this same air as it curves up the steep valley sides. It is the fleshy mysteries of my own life and my own wholeness and integrity that this bear and its steps pace out. And, it is mathematicsthe very mathematics which I now teach my childwhich has underwritten technological images of severance, fragmentation, commodification, and mastery that have ravaged this place, this bear’s life and, thereby, mine along with it. To teach mathematics in an integrated way, therefore, requires more than simply dwelling in its indigenous intricacies and patterns. I must help children (and myself) place mathematics back into the embrace of the Earth (into the embrace of its kin, like the symmetries of these pine branches). Such embrace will make it more generous and forgiving and livable than it has become in the severities of our curriculum guides and the severities and violences of our unsustainable beliefs in its dominion as a “Father Tongue” (LeGuin, 1987) which silences all others.
It will help make it (and ourselves, and our children, and this bear, which paces out a life beyond our dominion) whole.

**Concluding Remarks**

It is impossible to divorce the question of what we do from the question of where we are—or, rather, where we think we are. That no sane creature befouls its own nest is accepted as generally true. What we conceive to be our nest, and where we think it is, are therefore questions of the greatest importance. (Berry, 1986, p. 51)

Just as it is my own wholeness and integrity that this bear and its steps pace out, so too it is my own wholeness and integrity that are foretold in whatever actions I do here, with these children in the classroom. In another Grade One classroom, children are completing subtraction equations on a white sheet of paper. When they are done, the rectangles, each with one equation, are cut out, curled up, pasted on Santa's beard, and posted for parents to see during the Christmas Concert and classroom visits that surround it.

If we meditate for a moment on this activity, there is a sense in which it is, frankly put, insane. This is not to say that some children might not enjoy it. It is to say that fostering such enjoyment abandons children to a flickering, hallucinatory vision of the Earth, of mathematics, of the events surrounding Christmas that is, in the end, an ecological and spiritual disaster that no amount of acceleration and accumulation can outrun. Such activities suggest that we no longer know where we are. Such activities, too, are disturbingly suggestive of where we might think we are.

In this chapter, I have been suggesting that curriculum integration requires a concerted, thoughtful resistance to such skittering hallucinations. To prevent the woozy visions often associated with such matters, curriculum integration and the wholeness it portends must not sidestep a disciplined, mindful attention to the stubborn particulars of grace. But there is another suggestion here: these examples of math facts on a Teddy Bear's tummy and Christmas subtraction equations bear witness to a terrible logic that my teachers and children are suffering on our behalf. This is one of the agonies of ecological mindfulness: my own life is implicated in these very examples—this and this—as is my son's. This difficult knowledge, more than anything, is at the heart of curriculum integration and the ecologies of experiential education.

**References**


