

Nurturing the Art of Seeing and Gift of Vision in Preservice Elementary Science Teachers

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Abstract

If schools are to help all students flourish and thrive, it is essential that teachers have experiences that help them to see the students they teach in their fullest possibilities, beyond the reduced images that result from looking through the lens of technical observation schemes. With this study, inspired by the early artist-scientists, I introduced drawing while observing as a pedagogical practice to develop the “art of seeing and gift of vision” (Carini, 1979) among elementary preservice teachers [EPST]. EPST (22 females and 2 males) were enrolled in a science methods course that was part of a licensure in elementary education. EPST made hand drawings of a bean seed they sprouted and observed over an 8-week period. Data sources include EPST observation journals, class discussions, and reflective field notes I made while teaching. Analytic coding revealed 6 broad categories: Observing, connecting, caring, seeing; seeing growth, development and potential; seeing dynamism and vitality; seeing, feeling, caring and connecting; seeing in a new light; and seeing actualization and “wondrous transformation.”

Keywords: *elementary preservice teachers, drawing-while-observing, seeing, artist-scientists*

I am a teacher educator. To prepare preservice teachers to teach science in the elementary grades, I involve them as explorers of scientific phenomena so that they have experiences to draw on when planning curricula to support children’s science learning. This work rests on two assumptions: 1. That teachers have the latitude to build curriculum based on their insights into children’s learning needs and 2. Designing settings that enable all learners to flourish to their fullest potential is the larger purpose (Perrone, 1991,

1998) of what schools are for and what teaching is. This vision is made possible by teachers’ capacities for seeing— the ability to transcend the impoverished and distorted images produced by looking through the reductionist lens of modern science, to see students “how they are actually given” (Husserl, 2001, p. 168), in their wholeness and fullest possibility, as persons of unique brilliance, beauty, and promise, and potential for extraordinary growth. In an era of American schooling that promotes teaching blindness,

wherein teachers implement externally prescribed curricula rather than create experiences informed by their informed observations of children's self-directed interactions with subject matter, as Dewey (1938) called for, it is essential that teacher preparation provide experiences that nurture the "art of seeing and gift of vision" (Carini, 1979).

To see things "as they are actually given," rather than how "we know they must be," was the challenge of early artist-scientists Leonardo da Vinci, Robert Hooke, and Maria Sibylla Merian who sought a deeper and more experiential way of knowing than was accessible through the constraints of tradition. Open to seeing and receiving their chosen subject matters in their wholeness, these artist-scientists observed from a stance of genuine curiosity with pencil in hand, thus connecting eye, hand, mind, and body. Inspired by the beauty of the images these artist-scientists produced and the possibilities uncovered for imagining what could be, I introduced drawing while observing into a science methods course that I teach for elementary preservice teachers.

"The Art of Seeing" And "The Gift of Vision"

In *The Art of Seeing and the Visibility of the Person*, Pat Carini¹ (1979), an archivist of children's works, pointed to a dilemma – observing does not equate with seeing, "Having the capacity for sight, for seeing, we are all potentially observers" (p. 10). Yet, without practice in seeing, even the most well-intentioned observer relapses into "a kind of blindness, in which things in the world are perceived only as objects-of-use; that is, in terms of personal need" (p. 11). Viewing through this

¹ Carini served as director of The Prospect Archive of Children's Work and Center for Education and Research, located in North Bennington, VT. The Center closed in 2010. <https://cdi.uvm.edu/prospect/about>

lens, a position that Schachtel (1959) terms "profane vision" (Carini, 1979, p. 11), "both viewer and viewed are impoverished, detachment replaces interest, and the world loses its power for calling forth meaning" (p. 11). In Freirean terms, both observer and observed are "dehumanized," blind to seeing their connection and shared humanity (Freire, 1998).

Edmund Husserl (2001), the father of phenomenology, emphasized that in an age in which natural phenomena are described and explained solely in terms of logical analysis, "We find ourselves describing things as 'we know they must be' rather than how they are actually given" (p. 168). What is needed, wrote Husserl, are "clear, undistorted descriptions of the way things appear," warning, "We can absolutely not rest content with 'mere words', i.e. with a merely symbolic understanding of words, meanings inspired only by remote, confused, inauthentic intuitions- if by any intuitions at all- are not enough." And, in his famous battle-cry, Husserl declared, "We must go back to the 'things themselves'" (p. 168).

Observers practiced in the art of seeing and who have developed the "gift of vision" (Carini, 1979, p. 11) observe with genuine intellectual curiosity, assuming a stance of receptivity and openness; and by so doing, encounter things observed (objects or beings), not in some reduced form, but as they really are, in their wholeness and their "fullest possibilities" (p. 11).

To see an object in its totality, in all of its dimensions, requires first and foremost that the observer brings a genuine interest in seeing the object as it really is, beyond preformed notions of it. This involves moving from a position and stance of subject-object detachment to a relationship of openness and receptivity and requires looking

without holding theoretical presuppositions, to see to the things themselves. It requires that the observer make “repeated and varied approaches” to it, not to manipulate or control, but to explore, as it is only by doing so that the object can reveal itself and be seen in all of its dimensions. As the object becomes visible to the observer, the observer “extends to the object the totality of its being” (Carini, 1979, p. 17). Educator and education philosopher David Hawkins (2002/1967) had a similar image in mind, “A human being is a localized physical body, but you can’t see [them] as a *person* unless you see [them] in [their] working relationships with the world around him” (p. 53).

In the modern era, seeing in this way is challenging. While observers are no longer hostage to the authoritarian dogma of earlier epochs, the techniques of the modern scientific tradition have a tight grasp on those aspects and attributes of an object that can be observed and the form in which those attributes are described. As Carini (1979) commented, the technical refinement of modern observational techniques necessitated by their purpose of manipulation and control are “peculiarly anti-pathetic to observing” (p. 12). Yet, despite these constraints, and

for all of the possibility of slipping into the comfort and familiarity of profane vision, the uniquely human gift of vision maintains always the power to break through, so that what has been “labeled and filed away” suddenly appears in a new light, full and complete. (p.12)

In a passage that begins with the words, “I contemplate a tree,” philosopher Martin Buber (1970) conveys the transformation of seeing and knowing and feelings of mutuality, in connection and complete unity with things observed that can

emerge when observers give their whole being and complete attentiveness to seeing and encountering the thing itself.

I contemplate a tree.
I can accept it as a picture. . .
I can feel it as movement . . .
I can assign it to a species . . .

I can overcome its uniqueness and form so rigorously that I recognize it only as an expression of the law
I can dissolve it into a number . . .

Throughout all of this the tree remains my object and has its place and its time span, its kind and condition.

But it can also happen, if will and grace are joined, that as I contemplate the tree I am drawn into a relation, and the tree ceases to be an It. The power of exclusiveness has seized me.

This does not require me to forego any of the modes of contemplation. There is nothing that I must not see in order to see, and there is no knowledge that I must forget. Rather is everything, picture and movement, species and instance, law and number included and inseparably fused.

Whatever belongs to the tree is included: its form and its mechanics, its colours and its chemistry, its conversation with the elements and its conversation with the stars - all this in its entirety.

. . . .

One should not try to dilute the meaning of the relation: relation is reciprocity.

. . . What I encounter is neither the soul of a tree nor a dryad, but the tree itself. (pp. 57–59)

Andrea Kantrowitz (2022) is a contemporary artist-educator who encourages her students and readers to engage in the practice of drawing while observing as “a simple and accessible means to become more mindful and aware of our inner and outer worlds” [para 2]. Persons who draw while observing, Kantrowitz, notes, “will observe new details . . . never seen before. [They] might experience a heightened appreciation of the uniqueness of the subject of [their] drawing and a sense of wonder at their mere presence in the world” [para 3]. Drawing, she writes,

is always a negotiation between what we see and what we know. It leverages the ways we have evolved to think with our whole bodies as we interact with the environment in which we find ourselves. . . . The pencil, while in use, is an integral extension of the hand. The eye, hand, pencil, and mind are one. [Para 7]

To See Things As They Are: The Artist-Scientists

To see things as they are, to set aside assumptions and prejudices from common sense and science, to explain the world through human experience and see beyond the rational and logical-deductive accounts generated western science and “go back to the ‘things themselves’” (Husserl, 2001, p. 168) was the very challenge and way of knowing that the early artist-scientists Leonardo da Vinci, Robert Hooks and Maria Sibylla Merian, sought for themselves.

Leonardo da Vinci (April 15, 1452 – May 2, 1519)

Leonardo di Ser Piero da Vinci was an Italian polymath of the High Renaissance who was active as a painter, draughtsman, engineer, scientist, theorist, sculptor, and architect (Capra, 2007). As Capra (2007), Leonardo biographer, has commented, in all things, Leonardo inquired into nature not to dominate, but, instead, driven by passionate intellectual curiosity, to “learn from her as much as possible” (p. 260). Leonardo’s “approach to scientific knowledge was visual. It was the approach of a painter” (p. 3). While aiming to see without taken for granted assumptions Leonardo considered the eye as his “principal instrument as both a painter and a scientist” to take in the everyday world (p.3). For Leonardo, “the eye was the window of learning” (Ackerman, 1978, p. 108). Helped by the hand and artists’ tools, the eye “was the instrument that makes possible direct contact with the natural environment and the uncovering of truths that before his time had been uncovered by the authority of the printed word” (p. 108).² Drawing with the hand what the eyes observed, “Observation and documentation were fused into a single act,” serving “as art and as tools of scientific analysis” (Capra, 2007, p. 6). The images produced belong to both art and science. Working as both artist and inquirer of the world, Leonardo recognized “the intimate connection between the artistic representation of [forms observed] and the intellectual understanding of their intrinsic nature and underlying principles” (p. 3). It is also stated, “To practice his art, he needed the scientific understanding of the forms of nature; in order to analyze the forms of nature, he needed the artistic ability to draw them” (p. 7). Leonardo’s approach

² The eye, being fundamental to his work in painting as well as in descriptive science, became both an important subject of investigation as well as an essential tool, for investigation (Ackerman, 1978; Capra, 2007).

to knowing the world was to observe with passionate genuine curiosity, drawing with his hand what his eyes were seeing and experiencing. In this way, knowing and coming to know involves seeing and experiencing, with the act of drawing being a means to connect observer and world. Through the activity of drawing while observing, gaps between observer and things observed are reduced, and taken-for-granted assumptions dissolve as things observed are experienced and seen anew.

Robert Hooke (1635-1703)

As Britain's first salaried research scientist, Hooke conducted research into a range of phenomena, from physics to physiology (Chapman, 1996). In the Preface to *Micrographia*, Hooke (1665) declared to his readers that "To avoid corruptions of the past," corruptions that in his view resulted from applying "the brain and the fancy" (p. 8), he sought "to examine, and to record, the things themselves as they appear" (p.3). He would do so by applying to his observations "a sincere Hand, and a faithful Eye" (p. 3). As Chapman (1996) has stated, Hooke made "sense-knowledge . . . the very king-pin of his experimental technique" (p.9). *Micrographia*, with its sixty observations and fifty-eight engravings of the objects seen beneath the microscope, was "the first proper picture-book of science to come off the presses" (p. 17). Part of the popular fascination of *Micrographia*, Chapman suggests, "lay in the arresting new perspective that it cast on to common and familiar objects" (p. 17). Providing the Royal Society with these images, Hooke's explicit intention was to avoid "dogmatizing, and the espousal of any Hypothesis not sufficiently grounded and confirm'd by Experiments" and thereby "preserve both Philosophy and Natural History from its former Corruptions" (p. 17). Hooke declared,

not having a full sensation of the Object . . . we often take the shadow of things for the substance, small appearances for good similitudes, similitudes for definitions; and even many of those, which we think, to be the most solid definitions, are rather expressions of our own misguided apprehensions than of the true nature of the things themselves. (*Preface*, p. 7)

Aware of the unusualness of his chosen approach, his use of "Observations" and the "arts" to convey knowledge of the world, Hooke wrote:

The truth is, the Science of Nature has been already too long made only a work of the Brain and the Fancy: It is now high time that it should return to the plainness and soundness of Observations on material and obvious things. It is said of great Empires, That the best way to preserve them from decay, is to bring them back to the first Principles, and Arts, on which they did begin. (p. 8)

In short, Robert Hooke, the great experimentalist of the seventeenth-century, looked to pure observation as a means to help science know "the true nature of the things themselves" and see Nature beyond the shadows created by ideas imposed.

Maria Sibylla Merian (April 2, 1647 – January 13, 1717)

Born in Frankfurt into a family of artists and engravers, Merian became interested in insects at a young child and at just 13 years of age was raising – feeding and caring for – silkworms in her home: "Paintbrush in hand," Merian recorded each stage of their life cycles, "noting every change and movement" (Wulf, 2016, p. 2). Merian would recall these early years in the Preface to

The *Metamorphosis of the Insects of Suriname*, which as a woman with both artistic talent and financial means, she engraved and published in 1705 independently.

From my youth onwards I have been concerned with the study of insects, in which I began with silk-worms in my native city, Frankfurt am Main; then I observed the far more beautiful butterflies and moths that developed from caterpillars other than silk-worms, which led me to collect all the caterpillars I could find in order to study their metamorphosis. I therefore withdrew from society and devoted myself to these investigations; at the same time I wished to become proficient in the skill of painting in order to paint and describe them from life.

(Foreword)

Merian was keenly aware that the illustrations she was producing were both art and science. Merian recognized that her method of observing insects directly, including on a single vellum sheet detailed images of insects in their different life forms, alongside their food sources, would make them attractive to art collectors, gardeners and naturalists. Merian asserted as much in 1679 with the release of her second self-published book *Caterpillars, Their Wondrous Transformation and Peculiar Nourishment from Flowers* (Der Raupen wunderbare Verwandlung, und sonderbare Blumen-nahrung). Inscribed on the title page, Merian boldly proclaimed:

wherein by means of an entirely new invention the origin, food and development of caterpillars, worms, butterflies, moths, flies and other such little animals, including times, places and characteristics,

for naturalists, artists, and gardeners, are diligently examined, briefly described, painted from nature, engraved in copper and published independently.

Merian included a written description to bring alive the dynamism and energy she was witnessing as moths and butterflies worked to break free from the forms in which they were encased. Alongside the illustration of a chrysalis, depicted resting on a green vine, a moth just above, Merian wrote, "The chrysalis was very restless, throwing itself to and for continuously for about a quarter of an hour" (Heard, 2016, p. 83). Alongside two images of a butterfly that she painted when viewed from above and again from the side, Merian included the following observation: "If one observes this creature through the magnifying glass it looks wonderfully beautiful and is worth studying in detail, for its beauty cannot be described in words" (p. 102). Merian conveys her surprise and feelings of deception when a caterpillar that had captured her attention for its bright coloring and markings transformed into what she described as "an unsightly moth" (p. 113).

Merian recognized that her approach, observing and illustrating with the hand what her eyes saw, and stance to the world, showing insects and other creatures along with food sources and vegetation, what today we might refer to as their habitat, was both novel and important investigatory work. As Merian both anticipated and hoped, her illustrations became a resource for the scientific community. Carl Linneaus cited Merian's Work more than 130 times. The method in which she made her careful observations and detailed drawings of more than 186 insects that illustrated the entire life cycle of silkworms, butterflies and moths were significant in unsettling

the previously held idea that insects were born of mud by spontaneous generation (Wulf, 2016). Whereas Leewenhoek, an early user of the microscope, claimed to have seen large eyes alongside the body of a caterpillar, Merian declared, “Leeuwenhoek thought he saw eyes on these caterpillars, but I have been unable to find any although I have very large caterpillars...” (Heard, 2016, p. 144). At a time when other scientists were collecting and classifying plants and animals into narrow categories, “Merian looked at their place within the wider natural world” (Wulf, 2016, p. 2). Where others saw separation Merian saw connection, leading some to call her The First Ecologist (Etheridge, 2011). It is fitting that The Royal Society of London’s Philosophical Transactions, in its 1710 edition, portrayed Merian as “that great Naturalist and Artist” (p. 27).

The Inquiry

To nurture the art of seeing and cultivate the gift of vision among aspiring teachers such that they, like the early artist-scientists, may break free from “the corruptions of the past,” I introduced the practice of drawing while observing into a science methods course that I teach for elementary preservice teachers. The course was part of an evening undergraduate degree completion program for adults who were learners seeking licensure in elementary education. Participants were 24 elementary preservice science teachers EPST (22 females, 2 males).

Upon the students’ arrival to the very first class, I handed each student two small bean seeds. Our challenge, I announced, was to learn all that we could about how seeds grow and develop into fruit-producing plants by observing our seeds over the course of the semester. To learn about how seeds sprout, they were to observe a seed that

they placed on a water-moistened paper towel. The second seed they were to plant in a small container of soil. I directed students to create a seed observation journal and to make a minimum of one observation and one hand-drawn pencil drawing entry each week. Since the class met weekly, students were free to take their seeds home or leave them in the classroom. Findings are drawn from thematic coding (Saldana, 2016) of data taken from EPST observation journals and notes I made of what EPST shared during weekly class discussions. Findings center on EPST insights into the nature of development as through drawing while observing as they encountered the seed itself.

Findings

Observing, connecting, caring, seeing

Witnessing a tiny bean seed of the ordinary field variety, seemingly inert when placed in their hand, which by being supplied with what it needed to sprout, flourish into a bean-producing plant had enormous impact on these aspiring teachers. The journal entries and drawings of this group of preservice teachers, all of whom aspire to teach, indicate that the experience of drawing while observing nurtured their capacity for seeing. Within the overarching theme of “seeing,” the following subthemes emerged: seeing growth, development and potential; seeing dynamism and vitality; seeing, feeling, caring, connecting; seeing in a new light; seeing “wondrous transformation” and actualization.

Seeing Growth, Development and Potential

“I was amazed at just how rapidly it had begun to grow!”

A student who had taken her seeds home, was amazed by the rapid developments she observed

happening in the seed that she had placed on a moistened cotton square. Required to make just one journal entry per week, this student was so captivated by what she was seeing that she completed a series of drawings over the course of a day.

"I simply felt that I couldn't take my eyes off my plant."

Another student described how her fascination in observing her seed caused her to withdraw from the typical weekend activities, something that did not go unnoticed by her husband.

"This weekend I simply felt that I couldn't take my eyes off my plant. It was growing so quickly that I was afraid I would miss something if I went out. My husband wonders what has happened to me!"

"I would have been more careful, had I known what I was carrying!"

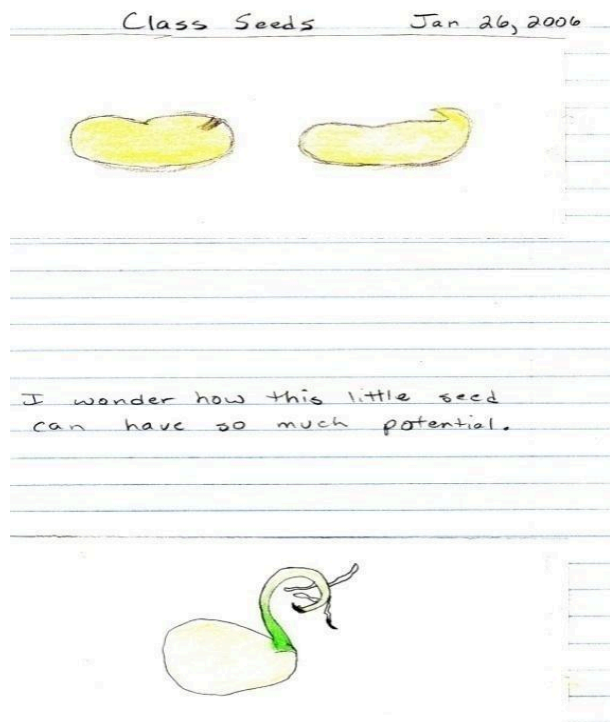
Returning to class a week later, students gasped when they observed the new growth of seeds they had left on cabinet tops and in drawers had produced a long white root. "How could it do that?" "Is that really the same seed?" asked one student. A student shrieked in delight when she found that the seed she had left in the bottom of her pocketbook had also produced a long, white root, exclaiming, "I would have been more careful, had I known what I was carrying!"

"I wonder how this little seed can have so much potential."

Two students sat quietly, marveling together at a seedling which had anchored itself to the cotton square and was "trying to stand up." Next to a drawing of a sprouting seed, perhaps imagining the plant her sprouting seed was becoming, a

student wrote, "I wonder how this little seed can have so much potential." (see Figure 1)

Figure 1



"I Wonder How This Little Seed Can Have So Much Potential."

Seeing Dynamism and Vitality

"I could not stop myself from drawing. I wanted to capture all that I was seeing"

A student who had been observing the container of soil into which she had planted a seed, explained to the class, "Just when I had given up hope of seeing anything, I noticed a bump just under the soil surface." Intrigued by the bump in the soil, the student described how she watched closely, making careful pencil drawings for a four-hour period, as the seedling emerged from the soil (see Figure 2). As she explained in class, "I could not stop myself from drawing. I wanted to capture all that I was seeing." This student then

gave an hour-to-hour account of what she observed as the seedling emerged from the soil.

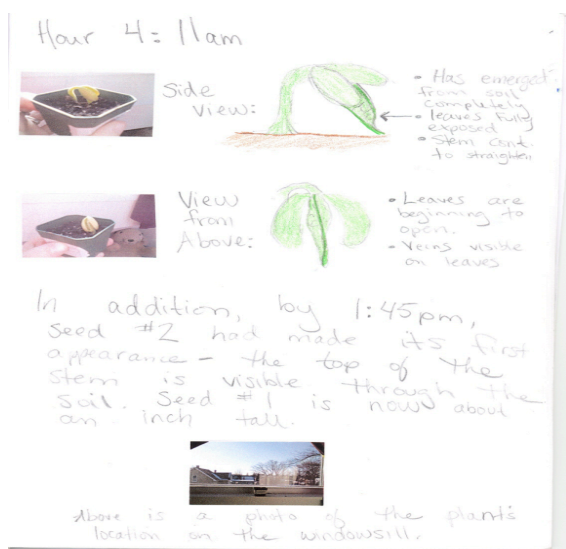
With each hour that passed the seedling grew taller. By hour two the seed was almost fully exposed from the soil. The sprout was opening, and the leaves were visible. By hour three, the stem was rising from the soil. The stem was straightening, and the sprout had opened wide. By hour 4, the seedling had emerged from the soil. The leaves were fully exposed, and the stem continued to straighten. I could actually see the veins in the tiny leaves.

"I am amazed at all the parts and details I hadn't noticed in the past."

Another student, a self-proclaimed gardener, noticed that through drawing she was now seeing structures and details of plants she had not seen before.

While observing and drawing my plant I am amazed at all the parts and details I hadn't noticed in the past (of course I've been looking at them my whole life).

Figure 2



A student observes over a four-hour time span, documenting the emergence of a seedling from the soil.

Seeing, Feeling, Caring and Connecting

"I became more involved in the growth of my plant because I looked forward to the next stage."

In subsequent weeks, a student reflected on the nature of her deepening and genuine interest in seeing "the slightest changes" in the seedling and anticipating what would follow.

I notice, as I look over my plant journal, that I became more descriptive and at the same time I became more interested in the slightest changes. I became more involved in the growth of my plant because I looked forward to the next stage.

"The measuring helped you find the facts, but the drawing really made you look at it!"

A student became aware of her growing connection to and developing feelings of "care for" an ordinary bean plant, feelings that she attributed to looking closely, writing "I really wanted to record the changes in my little friends."

I think this part - the drawing part - forces you to make a connection. How could you not! The measuring helped you find the facts, but the drawing really made you look at it! . . . As the time has gone on - my drawings have become more detailed . . . I think that I could of just not cared - but over time I really wanted to record the changes in my little friends.

"I feel as if I am really getting to know my plant."

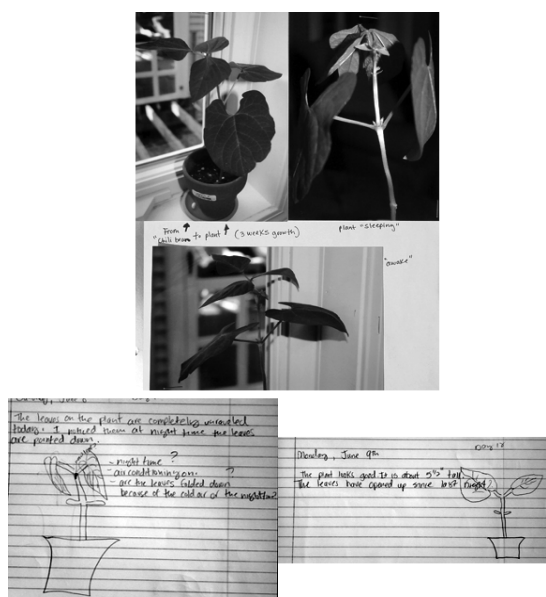
As evidenced below, each drawing of the seedling became an encounter between the seedling and the observing student. Students described not

only their sense of connection to their seedling but the accompanying feelings of joy, and peace they experienced as they noticed new developments.

Every Sunday morning, I get up early before the kids to draw my plant. When I draw my plant, I feel so peaceful. I feel as if I am really getting to know my plant. It brings me such joy.

One student observed her seedling morning and night, noticing that the plant lifted and lowered its leaves with the changing light (see Figure 3).

Figure 3



A student draws her plant, with its leaves raised, a position she later termed “awake” given that she observed this during the daytime hours, and again with its leaves lowered, a position she labeled “sleeping,” given that she observed this behavior on a repeated basis during nighttime hours. The student documented the event with pencil drawings and digital photographs.

“I have beans!”

Students felt compelled to make detailed pencil drawings of the entire bean plant, even when it was several inches tall and bearing beans. The drawings that students produced show remarkable attention to detail, attending to subtleties in colors seen, as well as indicating the specific number and location of flowers and leaves. Students expressed sheer delight when through comparing drawings they saw that where there had once been tiny flower blossoms, there were now tiny beans (see Figure 4).

Figure 4



The detail of a student’s drawing reveals that where there were once flower blossoms there are now beans.

Seeing in a New Light

“Sometimes you even tend to look at it in a completely different way than at the beginning.”

Students recognized their new appreciation for and perspective of the seedlings they were observing, and the role that looking closely played in developing that new perspective.

Drawing gives a more intimate perspective of the plant. . . .The more you look at something the more details you end up seeing. Sometimes you even tend to look at it in a completely different way than at the beginning.

“Drawing the plant made me . . . care more about its own outcome.” A student described how,

through trying to capture the details unique to the plant, she had been transported from the “outside” world into the “plant world.” With her new insider perspective came a desire to care for the plant and “its own outcome,” as opposed to some other outcome imposed from the outside. She described it this way:

Drawing the plant made me somehow care more about it and care more about its own outcome. . . . Drawing brought me into the plant world instead of just continuing on the outside as an observer.

Seeing Actualization and “Wondrous Transformation”

“It was amazing to discover that seeds contain everything needed to become a plant.”

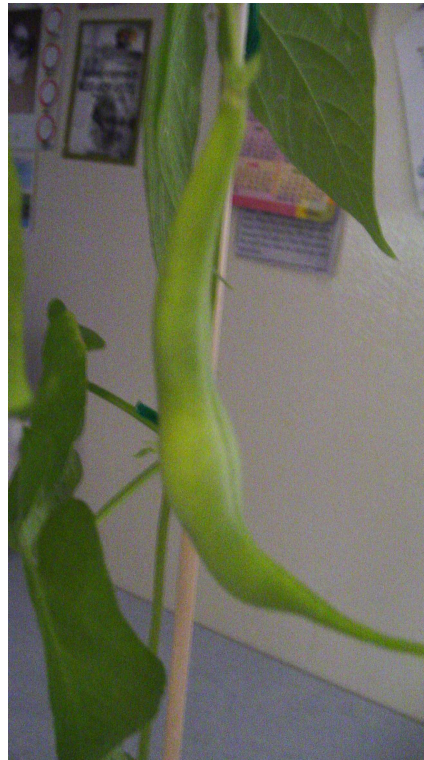
A student who had observed her plant well beyond the duration of the course shared:

As for my growing involvement with my plants, that goes without saying. I had actually named my plants . . . I have felt like a mother watching her children grow! I may have been a little compulsive in the way I took care of my plants, but it was amazing to discover that seeds contain everything needed to become a plant.

“I wanted you to see them in color because my bean looks amazing to me.”

When the class came to a close at semester’s end, a student who was so moved by the experience, slipped under my office door a photograph she had taken of her bean plant (see Figure 5). As the student explained, “I wanted you to see them in color because my bean looks amazing to me.”

Figure 5



“My Bean Looks Amazing To Me!”

Implications for Teaching and Learning

Vito Perrone, remembered for his fierce advocacy of humanistic education, reminded the audience at his retirement celebration in 1998, “Preparing the next generation of educators is the most important work that an Ed. School can do.” “Teaching,” he continued, “is . . . in every respect a profession of hope” (p. 2). The work “is always about young children, young people and development” (p. 4). In an era in which schools are increasingly technological with an abundance of schemes for observing, labeling, and classifying learners, it is essential that educator preparation programs provide multiple opportunities to practice the art of seeing and thus cultivate the gift of vision. Failure to provide these opportunities puts the next generation of teachers at risk of observing and looking at the students entrusted to their care through the distorted lens

of deficiency, seeing and describing students only in terms of measurements, labels, acronyms, and classification schemes, rather than in the light of promise and possibility. Seeing through the lens of promise and possibility locates deficiency not within the seed or student but in the soil and environmental conditions in which the seed or student is planted. As cultivators of growth and development, as opposed to measurers, educators practiced in the art of seeing who possess the gift of vision, aim to support the full flourishing of the seed, anticipating the blossoming of the unique flower it will become. Any perceived weakness or deficiencies, not by weeding the garden, but by enriching the soil. As John Dewey (1959/1902) put it:

The child is the starting point, the center, and the end. His development, his growth, is the ideal. It alone furnishes the standard... Not knowledge or information, but self-realization, is the goal. (p.95)

The observations, feelings, and language these aspiring teachers used when describing their experiences observing seeds is reflected in the comments of geneticist and noble laureate Barbara McClintock, who, when asked by her biographer (Keller, 1986), how it was that she could “see further and deeper into the mysteries of genetics than her colleagues,” responded:

One must understand how it grows, understand its parts, understand when something is going wrong with it. . . You need to know those plants well enough so that if anything changes, . . . you can look at the plant and right away you know what this damage you see is from. . . . You need to have a feeling for every individual plant. (p. 198)

Have you ever just held a bit of soil in your hand and just sniffed?

I close with the words of a teacher education student who described her own awakening and deepening understanding of the tiny seed she was observing as she used all of her senses (connecting senses to mind) to take in and grasp “all that the plant had to offer” as it transitioned from tiny bean seed to plant.

Have you ever just held a bit of soil in your hand and just sniffed? Oh, the freedom that such an aroma gives a person and the imagination that stimulates the mind as the scent permeates the brain. My fingers felt the different textures that the plant had to offer in its various stages starting with a smooth seed that turned rubbery after it swelled with water. The senses I used allowed my mind to envision ideas of seeds and plants unlike any other time in my life. The experience was invigorating, arousing...incredible. Such a feeling of freedom is lost in today’s classrooms and must be awakened.

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Author Bio

Fiona McDonnell is a teacher educator. Having studied under Eleanor Duckworth, McDonnell explores pedagogical approaches that, by engaging preservice teachers as researchers of the phenomena of learning, growth and development, support them in the "having of ideas about how, as future teachers, they might put their knowledge and expertise in the service of creating environments that nurture the full flourishing of all the young students they teach. Prior to her work in teacher education, Fiona taught secondary science in the public setting and served as principal of a comprehensive high school.