SEEING POSSIBILITIES: ENVISIONING GIFTED EDUCATION

by

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Abstract

This thesis investigates how seeing contributes to understanding, communicating, and conceptualizing ideas around giftedness and gifted education. Drawing on the work of Arnheim (1969), Greene (1998), Johnson (2007), and McGilchrist (2009), I explore seeing as an act of inquiry, a form of visual thinking that includes looking, visualizing, understanding, and imagining. Based on my experiences in gifted education, I employ seeing as a research methodology as I interrogate the visual aspect of texts from the field of gifted education and my own personal narratives; based on my experiences as a visual thinker, I use seeing as a visual practice of working through and communicating ideas. In this way, I use both words and images within this thesis to explore and convey ideas around concepts of giftedness, equity in gifted education, identification practices, and the role of the visual in developing novel ideas and insights. I conclude that in order to see more possibilities for gifted education, the field of gifted education must embrace a greater role for visual thinking.
Preface

This thesis is original, unpublished, independent work by the author, R. Burd.

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Chapter 1: Seeing

Our capacity to see the world in which we live shapes the ways we think about that world.

(Eisner, 1993a, p. 66)

Introduction

The search for possibilities has guided my MA studies from the beginning. When I applied to the Centre for Cross-Faculty Inquiry in Education, I was a teacher in an elementary gifted program. I was concerned by what I saw in my classroom: “Students who just want the right answer, who prefer the confines of a checklist to the possibilities of a blank page” (Burd, 2009, unpaginated). My objective then was to “expand the space of the possible” (Davis, Sumara & Luce-Kapler, 2000, p. 20) for my students, and for myself as a teacher. During my studies, my own art and writing practice evolved through my coursework in a/r/tography, embodied cognition, writing and philosophy, and I saw how the visual and physical acts of painting and sketchnoting contributed to my own insights. Seeing, thinking and understanding became inextricably entwined, and my sense of the possible expanded. Moving into the role of gifted education consultant in our large, urban school district, a major part of my job was articulating ideas and issues around advanced ability and the needs of gifted learners to my district colleagues, classroom and resource teachers, administrators, parents and students. Visual aids, from presentation slides and pie charts to sketches and hand gestures helped me communicate, and helped others grasp, potential strengths and areas for growth, and possibilities for taking learning further.

Now I am back in the classroom, trying to walk my consultant talk of meeting the diverse learning needs of students through a differentiated, inquiry-based program, and we are all

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1 This is the term that Rohde (2013) uses for his form of visual notetaking.
struggling. Many of my students, whether they are gifted or not, don’t care about exploring the possibilities of where they can take their learning – they still just want the right answer, still prefer a checklist to more open-ended inquiry. As for me, figuring out where each student needs to go next is a daunting challenge. I am happy to leave my consultant role behind – I don’t care about the ‘gifted’ label, and was increasingly uncomfortable marking out the boundary between ‘gifted’ or ‘not’ and so categorizing a child’s potential. But I do care deeply about understanding and meeting the needs of my students, especially those advanced learners for whom, I know, “the expectations of [their] grade and age group” (BC Ministry of Education, 2009, p. 32) are not a stretch, and simply exceeding those expectations is not enough. The challenge is seeing possibilities – for my students and for myself – that will stretch us further. But in order to see possibilities, we need to first understand where we are, and who we are, as learners. I believe the visual can help.

This thesis is about seeing. It is about the shifts in perception that allow us to see possibilities. At its heart are questions about meaning-making: In what ways does the visual contribute to understanding? How do observations lead to insights? How do visual practices – like sketching, painting, doodling, diagramming – relate to the thinking process? These questions matter to me, and it appears that I am not alone in thinking that the visual is important. Researchers and theorists since Arnheim (1969) have argued that visual perception is foundational to thinking and meaning-making (Eisner, 1993a, 1993b; Johnson, 2007; McGilchrist, 2009; G. Sullivan, 2010). In the past fifteen years, a flood of data has spurred the rapid expansion of information visualization and infographics (Lima, 2011); graphic novels have become mainstream (MacDonald, 2013; Medley, 2015); graphic facilitation and visual recording have become standard business tools (Brown, 2011; Roam, 2009; Rohde, 2013). Researchers from the sciences and social sciences have championed a role for the visual in academic writing in response to what they see as an increasingly visually oriented culture (Chaplin, 2006; Gooding, 

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2 By the visual, I mean things that are valued for their visual properties, such as colour, form and line. See “Understandings.”
In education, visual thinking, visible learning, visual methodologies are all part of the lexicon. But where is the visual in gifted education?

Gifted education as a field is fractured and contested (Ambrose, VanTassel-Baska, Coleman & Cross 2010; Dai et al., 2011), and it may be because of this that it feels to me that there is an underlying insecurity in the tone of much of the research, as though the reputation of the field itself is at stake with each new study presented. Much of the discussion about the state of the research centres on the replicability, reliability or generalizability of studies as proof of their scientific rigour, so that while the lack of the practitioner voice in research may be bemoaned (Coleman et al., 2007), it is the scientific method that is expected, and teacher-researchers are cautioned to be more data-driven and rigorously experimental in their investigations (Friedman-Nimz et al., 2005). Journals within the field are heavily biased toward the quantitative (Coleman et al., 2007; Friedman-Nimz et al., 2005; Dai et al., 2011), with articles that are dense with statistical analysis, and largely empty of visual content other than tables or graphs of data. Almost 20 years ago, Eisner stated with confidence, “The dominance of quantification and correlation and experimental research methods has given way to what might be regarded as more interpretative approaches to the study of educational practice” (Suppe, Eisner, Stanley, & Greene 1998, p. 34), yet as far as I can see, quantification and correlation are still seen as the standards for research in gifted education today. I am a gifted education practitioner. I am a teacher-researcher. I am also a visual thinker, a sketcher, a synthesizer. I do not see myself reflected in gifted education journals. This suggests to me that an important way of thinking and understanding is missing. How is giftedness understood, and misunderstood, when the visual is absent or sidelined? How can the visual spark insights for students, teachers and researchers and extend their understandings? How can visual practices extend the thinking process, and help advanced learners, their teachers and gifted education researchers take their thinking further?

3 See the section “Looking at Gifted Education Research.”
This thesis is about the visual. It is an investigation of how the visual contributes to understanding, communicating, and conceptualizing ideas around giftedness. My study begins by considering my own positionality, and what ‘seeing’ means to me. In Chapter 2, I look at theories of giftedness, giftedness in a local context, and gifted education research; in Chapter 3, I explore the kinds of attention that shape the search for giftedness. Chapter 4 focuses on visualization, and how diagrams and visual metaphors communicate information and promote understanding. I focus more acutely on the process of visual understanding in Chapter 5, exploring first what others perceive as the contribution of visual thinking to innovations in science and thought. Then, in a reflective and visual turn, I deconstruct my own process of visual thinking as I developed a reconceptualization of a century old, yet persistent visual representation of the distribution of intelligence – the bell curve. My questions about the role of the visual in gifted education are rooted in my own experience as a teacher, a learner and a researcher, and my data are the records of those experiences, from written journal entries to sketchnotes, diagrams, illustrations and paintings. That data will not submit to statistical analysis, yet I believe it can provide the grounding for conceptual investigations into gifted education. In imagining possibilities of gifted education, I believe the visual can help.

A note about formatting

Stylish academics do not write “outside the box” merely for the sake of showing off their intellectual audacity and skill. Their aim is to communicate ideas and arguments to readers in the most effective and enaging way possible – even when doing so means defying disciplinary norms.

(Sword, 2012, p. 169)

This document transgresses one of the structural guidelines for a thesis set forward by the Faculty of Graduate and Postdoctoral Studies, UBC: captioning and listing as a ‘figure’ or ‘illustration’ any visual that is included in the thesis. Here is my rationale for this transgression:

Rohde (2012) pioneered the term ‘sketchnotes’ to describe his style of visual note-taking.
The foundational premise of this thesis is that the visual is integral to constructing and communicating ideas. To put forward such a thesis, and yet constrain the role of the visual in order to meet conventions would be counter intuitive (Sadokierski, 2010). Traditionally, images are used in a thesis to illustrate a point otherwise articulated in words, and are captioned as ‘figures’ or ‘illustrations’ (Chaplin, 2006). Words and visual devices are kept separate, with the written word predominant and the visual in a supporting role (Chaplin, 2006; Marshall, 2007; Sadokierski, 2010). Within this thesis, visuals – including diagrams, visual notes, and original artwork – are an equal and constituent part of the dialogue, and as such are integrated seamlessly within the document.

The majority of the visuals integrated throughout this text are my original work. These are not captioned in any way. Images that I reference from other sources have been listed and captioned as figures.
Positioning: Seeing myself
November 2012

1969 I am a ten-year-old girl with long dark hair and skinny tortoiseshell glasses. When I read fiction, mostly historical, I fall into books so deeply that I feel myself climbing back out of stories when I am called to dinner: as my eyes raise up from the page, I can feel my body recalibrating to 1969 from whichever century I was inhabiting. At school, I am in an enriched class and my grade 5 teacher feeds my curiosity with a curriculum that ranges from Greek and Roman history to Early English rounds and maypole dances. We play Romans and Etruscans at lunch, or Horses, depending on the day, and whether the boys are playing.

1999 I have a ten-year-old daughter with long blonde hair who devours books, mostly fantasy, especially the medieval/fantasy hybrid of Tamora Pierce and others who weave magic, and horses, through their stories of young heroines. Always a book in her hand, walking to school, making a snack, even brushing her teeth – she is always reading, totally absorbed by another world that gives her more excitement, more enjoyment, more companionship than her regular school day. At recess and lunch she reads, or walks and talks with the supervision aide patrolling the playground, and she comes home each day full of the aphorisms and poetry her teacher has shared in her grade four/five split class, but rarely speaks of her classmates. My daughter is not unhappy, yet I ache for her and her isolation.

Acceleration is not standard practice within our board, and there are a very limited number of pull-out enrichment programs offered to elementary school students each year. At this point, my daughter has never been to a Challenge Centre program, nor has the school recommended her for the district full-time gifted class.

2012 My brother calls to update me on my nine-year-old niece. After hearing about M’s Medusa ‘Trick or Treat’ Halloween costume, which she planned in exacting detail in September, and her Rubik’s Cube ‘school’ Halloween costume, which he has had to help execute in order to meet her

5 Throughout this thesis, excerpts from my personal journals appear in italics
standards, he tells me about their current struggle to understand her learning needs. In spite of protestations from the school principal, for whom my niece’s mediocre report cards are proof of her average intelligence, my brother and sister-in-law have met with a psychologist to have M assessed. After cautioning them that many highly able students thrive in the regular system, when the psychologist reports back after completing my niece’s assessment, she advises them that M needs the challenge of higher level critical thinking, and that they had better apply for her to attend a full-time gifted program.

My interest in gifted education is personal, and conflicted. I attended a gifted program in elementary school, and advocated for my daughter and my niece to be considered for programs during their elementary school years. Yet while I am thankful for the safe places these programs gave me, my daughter, and my niece to be ourselves, I am not convinced that these programs truly extended our capabilities, or gave us the skills or awareness to stretch ourselves further. I taught in our district’s full-time gifted program, taking over from the teacher who had taught my daughter, and went on to become our district’s gifted education consultant and an executive member of my teacher union’s provincial specialist association for gifted education. Yet I am not convinced now that pull-out programs or full-time programs are desirable or defensible. I have tested hundreds of students, screened thousands of applications for programs, and spoken with countless teachers, parents and administrators. Yet I find the term ‘gifted’ objectionable, the identification of giftedness problematic, and the designation ‘Gifted’ useless.

And yet, I believe whole-heartedly in the intent of gifted education. Like James Borland (2009), I could support gifted education without gifted children. As he describes it, the underlying principle of gifted education is applicable to all education:

All students are equal in their right to and need for an appropriate education…. Educators must, to be effective and ethical, provide educational experiences that reflect the inescapable fact of individual differences in how and how well school students learn at a given time in a given subject. (p. 1)
I also believe, as Borland does, that high-ability or high-achieving students suffer when curriculum and instruction are not differentiated, and that it is a mistake to think that these students will succeed on their own, and wrong to think that meeting their needs is elitist.

And yet, I am also conscious of the students whose abilities we do not see, whose learning at any given time is hampered by the complex interaction of social, emotional, cultural, and socio-political factors. I believe our perception of ability is biased towards highly verbal, extroverted students who are full of facts and dying to share them with whoever will listen. In my current school, located on traditional Musqueam territory, within a highly transient community of predominately English Language Learners, I believe that the abilities of the quiet, the introverted, the non-verbal, the marginalized, and the newcomers are too often invisible.

And yet, and yet....

Fractured, porous, and contested – these words have been used to describe the field of gifted education (Ambrose et al., 2010), but they could just as easily describe my own attitudes and beliefs. There is tension within this multiplicity of views. They pull at and rub against each other, they shift and overlap, they will not be reconciled.

**Understandings: Seeing the visual**

By **visual**, I follow the Concise Oxford Dictionary: “of, concerned with or used in seeing... from Latin *visus* ‘sight’, from *videre* ‘see’” (1995, p. 1567).

By the **visual**, I mean those things that are valued for their visual properties, such as colour, form and line. Here I follow Heath (2000) and her understanding of the literate eye and its neurodynamic “interplay between visual images and symbolic interpretation for thinking and expressing meaning” (p. 122).
By **visuals**, I mean a variety of created visual forms, often two-dimensional – blurring images (resonant with imagination), representations (re-presenting a likeness of a thing), graphics (design as in: graph, a diagram; Greek graphē, writing), and gestures (an embodied expression of thought or feeling).

By **visualization**, I mean the act of making some thing (tangible or intangible) visible to one’s eye, or mind’s eye. Here I align with Gooding’s (2004) understanding of visualization as “making and manipulating images that convey novel phenomena, ideas and meanings” (p. 278), but insist that the notion of ‘making’ allows for the *emergence* of an image (tangible or intangible) through a physical or mental act.

By **visual thinking**, I mean thinking that involves visual perceptions: thinking in images, manipulating images mentally, and holistic rather than sequential thinking (Kalbfleisch & Gillmarten, 2013). I look to Eisner (1993b) who speaks of visual *learning* in a parallel way: it is our “capacity to construe meaning from the visual forms around us. It also pertains to our capacity to *create* visual forms that will carry the meanings we intend forward” (p. 81).

I have wrestled with proposing a continuum for the visual/visuals/visualization that pushes the pragmatic to one end, and the aesthetic to the other, yet I resist this dichotomy. Such a polarity too easily generalizes to include other equally contentious dichotomies, such as representational:abstract; scientific:artistic. Yet I acknowledge that in my use of *the visual*, I privilege an aesthetic sensibility, hence my judgement that *the visual* is not readily visible in gifted education.

**Seeing as a research methodology**

How to see? Where to see from? What limits to vision? What to see for?

(Haraway, 2002, p. 681)

I have been living this inquiry now for years. I have been reading and thinking, painting and writing and drawing, talking and listening. My questions have started and stuttered, they have
circled and turned and returned in an ongoing, discursive, recursive dialogue. Through all of this, I have been looking. And I have been stopped.

How to see?
Where to see from?
What limits to vision?
What to see for?

I have not known how to proceed. I kept looking, but I could not recognize my methodology.

May 14, 2015

I look in the mirror and a middle-aged white woman stares back at me.

“So? Nothing?” I watch her lips repeating my words.

“You, lady, are no help. I am trying to be recursive and reflexive here.” She shrugs, and looks away. She has no theory to offer, no methodology to suggest.

“What are you looking at? The door?” I groan. “OK. OK. I’ll go and look again. Be right back.”

Down the hall, my books, papers, and sketchbooks are scattered across the bed. My paintings are stacked against the wall, a square wooden board, untouched, still wrapped in plastic, propped beside them. A large piece of white paper is taped to a piece of plywood leaning against the bookshelf. The paper is scrawled with notes and quotes; there are index cards grouped by colour taped to different quadrants.

My thesis.

“OK. It’s still there. Hasn’t moved.” She doesn’t laugh. (I don’t think she has much of a sense of humour. She looks tired.)

“I could go with hermeneutics. Gadamer. You like Gadamer. Or phenomenology. We’ve talked those over – I could work with one of them. But I’m just not sure....” She sighs. So do I.

“I want this to be me writing. I don’t want to borrow or appropriate or misappropriate. I cringe when I read bell hooks⁶, because it could be me she is talking about. Listen to this:

Often individuals who employ certain terms freely – terms like “theory” or “feminism” – are not necessarily practitioners whose habits of being and living most embody the

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⁶ hooks, 1994, p. 62
action…. Indeed the privileged act of naming often affords those in power access to modes of communication and enables them to project an interpretation, a definition, a description of their work and actions, that may not be accurate, that may obscure what is really taking place.

“I know you agree with me on this, I see you nodding. I am a middle-aged, middle-class, middle-school-teaching, heterosexual white woman – what theory do I embody?” she doesn’t answer.

“I was revisiting a/r/tography, and rereading Stephanie Springgay7. She describes her own identity as ‘…leaky, porous, performed, and partial…’ and that she struggles with labels. She struggles with labels? She sounds so sure of herself! I struggle with labels! I am a teacher who doubts her own practice, an art-maker who hesitates to proclaim herself an ‘artist’, a researcher/student in the academy who is struggling to find an academic voice that rings true. I am ‘partial’, I am ‘almost’.” She returns my tirade with a calm gaze.

“I just need somewhere to begin.” (Did she raise her eyebrow? I’m sure she raised her eyebrow.)

“You’re right – I have begun. I’ve been at this for almost six years... It just keeps changing, shifting. Everything keeps changing.” I watch as she thinks this over.

“Yes, that’s life. So?”

“Just do it? That’s your answer? Umberto Eco8 was a bit more eloquent: “You must write a thesis you are able to write.” Now that’s easy!” She starts to protest, but I cut her off:

“I was joking. You take things so literally. Any other bright ideas?” She looks thoughtful.

“Look for something about looking? And being stuck, not knowing how to proceed? You are right – that describes my current situation. I’ll see what comes up.”

Some time later...

“OK – Antoinette Oberg, Paying Attention and Not Knowing9. You’ll like this. As a graduate supervisor, Oberg noticed that students often got stuck when faced with prescriptive requirements around method or literature reviews. Sound familiar?” We nod in sync with each other.

“So Oberg listened thoughtfully, paying close attention to how the students described their

7 Springgay, 2004, p. 71
8 Eco, 2015, p. 8
9 Oberg, 2003
struggles ....” I watch her face carefully, and I can see that she is thinking, searching to make a connection.

“Yes, that does sound like watchful listening, just like Lorna Williams\textsuperscript{10} describes. Oberg watched and listened as the students talked about their work, and noticed patterns in their inquiry that were present elsewhere in their lives. That became the methodology.” We looked at each other and smiled.

“So all I have to do is keep looking and drawing... and maybe talking to myself.” She laughs out loud, and so do I.

How, then, to see?

In the realm of educational research, qualitative researchers call for learning about phenomena by giving them sustained attention. What is the nature of the researcher’s attention? How do we learn to attend with keen eyes and fine sensibilities? (A. Sullivan, 2000, p. 211)

What is the nature of my attention? How do I understand seeing?

I map out the word and the meanings and connections that resonate with me:

\textsuperscript{10} Sanford, Williams, Hopper and McGregor, 2012: “Watchful listening, an openness to listening beyond our own personal thoughts and assumptions, always being aware and conscious of our surroundings as we focus on the task at hand” (p. 24)
Seeing is not merely recognition, attaching a label to an object (Eisner, 2009). Seeing goes beyond simply taking in information to thinking about what is seen. Seeing is a fully embodied cognitive process that encompasses “[a]ctive exploration, selection, grasping of essentials, simplification, abstraction, analysis and synthesis, completion, correction, comparison, problem solving…combining, separating, putting in context” (Arnheim, 1969, p. 13). Seeing entails the activation of curiosity and the engagement of wonder. Seeing is an act of inquiry: in looking, visualizing, understanding, and imagining, seeing opens up possibilities.

Seeing is looking. It is noticing, observing, attending. Seeing means learning “how to select and focus” (Eisner, 1993b, p. 84), attending to “the complexities of surface detail and also...to what lies beneath those surfaces” (A. Sullivan, 2000, p. 221). I understand seeing as a compassionate, empathic act (McGilchrist, 2009; New, 2005). It is being mindful, attentive, tender; it is being present and savouring what is seen (Eisner, 2009; Greene, 2001).

Seeing is visualizing. It is constructing, testing, contesting. It is “our ability to map interactions, experiences and cognitive operations across concepts to form images” (Heath, 2000, p. 124). It involves “making and manipulating images that convey novel phenomena, ideas and meanings” (Gooding, 2004, p. 278). It involves creating metaphors “not just as a reflection of what has been...but the means whereby the truly new...may come about” (McGilchrist, 2009, p. 179).

Seeing is understanding. Seeing is the “intensive back-and-forth conversation” of Gadamer’s (2006) hermeneutics (p. 71). “Visual perception is, at its heart, a form of thinking” (Johnson, 2007, p. 228). Concepts ‘take shape’ because the very perception of shape marks the beginnings of concept formation (Arnheim, 1969). I share with Johnson his view that art is “a way of worldmaking” (p. 210), and his alignment with Dewey in comprehending aesthetics as not just about art and beauty, but rather about “how human beings experience and make meaning” (p. 212).
Where, then, to see from?

I see from a biological, ecological, phenomenological, social, cultural body – a complex, interactive, lived body-mind “from which [the/my] world and experience flows” (Johnson, 2007, p. 275). I see from a “complex, contradictory, structuring and restructuring body” and its situated, partial perspective (Haraway, 2002, p. 683). I see from the fractured, porous, contested space of gifted education. I see from the transdisciplinary space of a consultant-gatekeeper/teacher-researcher/visual thinker.

What, then, limits vision?

“Vision is always from a specific point of view, filtered by a specific consciousness” (A. Sullivan, 2000, p. 221). My vision is limited by my expectations and experiences, my privileges, my presuppositions, and my prejudices. “Who gets blinkered? Who wears blinkers?” (Haraway, 2002, p. 682). My vision is limited by the role I inhabit, and the stance that I take. My vision is limited by my positionality, the orientation of my body, and my movement through the world. My vision is limited by the nature of my attention, and by the direction of my gaze.

What, then, to see for?

Seeing is imagining. I see to imagine that things could be otherwise. I see to theorize, reaching back to that word’s roots in ancient Greece, where “theory” meant “‘viewing’, a ‘sight’, a ‘spectacle’” (Smith, 2008, p. 261). I see not to simply confirm my expectations, but rather to surprise myself (Gadamer, 1992). I see to problematize, to make the familiar strange, and the strange familiar. I see to understand anew, to search out openings, and to expand possibilities.
Chapter 2: Looking at Giftedness

There are populations of children who are invisible to our school systems, children with enormous capacity to invent, innovate, achieve, and create. (Kalbfleisch, 2008, p. 159)
A chronology of significant theories of giftedness and intelligence

There is no consensus about the definition of giftedness (National Association for Gifted Children, 2010). The following chronology highlights some of the major constructs that have been proposed over the years.

The field of gifted education in North America can be traced to the work of Terman in the early twentieth century and his development of the Stanford-Binet Intelligence Scale as a measure of giftedness (Borland, 1997; Subotnik, Olszewski-Kubilius, & Worrell, 2011). Conceptions of giftedness within the field of education research have changed substantially since Terman and Hollingworth studied American students in the 1920s (Plucker & Callahan, 2014). And yet it is this early research that gave rise to traditional and enduring notions of giftedness, conceived as a static personal trait correlated with high IQ as measured through intelligence testing (Matthews & Dai, 2014; Plucker & Callahan, 2014; Porath, 2006; Reis & Renzulli, 2010). For the next 50 years, concepts of giftedness moved towards more ‘multi-dimensional constructs’ that incorporated creativity and a shifting view of intelligence, but remained focused on identifying and developing individual ability with scant attention to the environmental factors that might inhibit it (Plucker & Callahan, 2014; Reis & Renzulli, 2010).

Three widely adopted models of giftedness or intelligence were developed during the 1970s and 1980s and expanded the idea of giftedness and where to find it (Plucker & Callahan, 2014). Renzulli’s (2005) three-ring conception of giftedness conceived of giftedness as the intersection of above-average ability, task commitment, and creativity; Gardner’s (2012) Theory of Multiple Intelligences recognized a range of human abilities in eight intelligences from logical-mathematical to naturalistic; and Sternberg’s (2001) Triarchic Theory of Successful Intelligence suggested that intelligence was a combination of three aspects: the analytic, the creative, and the practical. These three models represented a trend away from Terman’s essentialist view of intelligence as a fixed, innate trait toward a more functional view of intelligence as a “dynamic, functional state” (Matthews & Dai, 2014, p. 336). A fourth
model developed in 1985 by Gagné can be seen to bridge the divide between those who saw
giftedness as innate intellectual ability and those who equated giftedness with advanced
distinction between gifts and talents that accounted for discrepancy between potential and
actual achievement: giftedness was defined as “the possession and use of untrained and
spontaneously expressed natural abilities” (p. 120) that placed an individual in the top 10 per
cent of age peers in at least one ability domain (a fixed trait); and talent was described as
“outstanding mastery of systematically developed abilities (or skills) and knowledge in at least
one field of human activity” (p. 120), again measured as performance within the top 10 per
cent of age peers (a functional state). Each of these models or theories of giftedness (Renzulli,
Sternberg, Gagné) broadened the concept of giftedness beyond IQ to encompass a
“multidimensional construct of giftedness that incorporates a variety of traits, skills, and
abilities which are manifested in multiple ways” (Reis & Renzulli, 2010, p. 308).

Issues around identification gave rise to two contrasting models of giftedness in the 1980s
and 1990s that address a pivotal question: Is giftedness defined by achievement or character?
For Matthews and Foster (2005), the key to giftedness is found in achievement. Matthews
and Foster described as a paradigm shift the move from “a belief-based ‘mystery’ model to a
‘mastery model’ of giftedness and talent development” (p. 64), where giftedness was no
longer conceived as “somewhat mysteriously defined attributes and learning needs” (p. 64)
but rather as subject-specific mastery achieved within Vygotsky’s (1978) zone of proximal
development. In their proposal, Matthews and Foster moved the focus of identification from
labeling the gifted child (identified early on through tests and checklists) to matching
advanced learning needs (determined by ongoing, dynamic assessment) with appropriate
educational challenge. In contrast, responding to what they perceived as an increasing focus
on gifted production at the expense of gifted children, in 1991 the Columbus Group put
forward a definition of giftedness that described asynchronous development as an inherent
affective attribute of gifted children (Silverman, 1997). Drawing heavily on Dabrowski’s
‘overexcitabilities’ (as cited in Silverman, 1997), the model of asynchronous development
related giftedness to innate characteristics, positing that gifted children were literally “out-of-sync both internally and externally” (Silverman, 1997, p.39), as their “advanced cognitive abilities and heightened intensity combine[d] to create inner experiences and awareness that are qualitatively different from the norm” (Silverman, 1997, p. 39). Subsequent integrated models suggested that defining giftedness through achievement or character attributes alone is an oversimplification, yet the notion that high achievement or quirky behaviours are legitimate identifiers of giftedness is a persistent and prevalent belief in school culture today.11

Coinciding with the rise of complexity theory, other models from the 1990s on sought to understand the factors that support the ‘emergence’ of giftedness (Dai, 2009). Barab and Plucker (2002) proposed an ‘integrated’ model of giftedness based on their observations of the reciprocal nature of learning. In their model, abilities and talents do not reside in the individual but rather in the “person-in-situation” (p. 174) – intelligence is seen to be “distributed across and situated in the transaction among subject, available tools, and the community context” (p. 171). Ziegler’s (2005) Actiotope Model of Giftedness similarly articulates a systemic development of excellence through ongoing and adaptive interactions between the individual and their environment, but identifies two determinants as critical factors in the achievement of excellence– an ‘action repertoire’ which encompasses possible actions, and a ‘subjective action space’ which is influenced by perceived limitations such as an underestimation of competency. Researchers like Subotnik (Subotnik et al., 2011) and (Ericsson, Nandogopal, & Roring, 2005) refined the idea of giftedness as eminence or expertise, popularized by Gladwell (2008) as the ‘10,000 hour rule’. From the expert-performance perspective, giftedness is developed through years of daily deliberate practice shaped by reflexive cognitive and physiological adaptations, and nurtured through access to increasingly advanced resources, superior training, and mentoring (Ericsson et al., 2005; Subotnik et al., 2011).

11 See next section: How giftedness is seen in a local context
If there is no universal definition of giftedness, a common idea runs through many of the models and concepts outlined above: Giftedness is a construct that depends on seeing ‘something’ in a child or student that sets them apart, “it is something that we discover in students” (Borland, 1997, p. 9). While this can lead to a troubling dichotomy that reduces human diversity to two distinct groups, the gifted and the rest, it also points to the narrow scope of vision constraining the search for possibilities. Where is the visual in these concepts and models? Most of the above models of giftedness address artistic talent as a domain-specific aptitude to be nurtured, and most incorporate creativity, especially divergent thinking, either as an innate trait of a gifted child or as a skill to be developed. However, the contribution of visual-spatial ability and visual thinking to the identification and development of giftedness is rarely considered. In Chapter 3, I will take a closer look at the extent to which visual-spatial ability factors into concepts and identification of giftedness, and the implications of neglecting the visual.

How giftedness is seen in a local context

Since 2006, the following definition of giftedness has been used in the BC Ministry of Education’s manual for special education:

A student is considered gifted when she/he possesses demonstrated or potential abilities that give evidence of exceptionally high capability with respect to intellect, creativity, or the skills associated with specific disciplines. Students who are gifted often demonstrate outstanding abilities in more than one area. They may demonstrate extraordinary intensity of focus in their particular areas of talent or interest. However, they may also have accompanying disabilities and should not be expected to have strengths in all areas of intellectual functioning. (BC Ministry of Education 2013, p. 53)

Deconstructing this text, it is possible to see the influence of concepts and models outlined in the previous section. ‘Demonstrated...abilities’ relates to talent/expertise models; ‘potential abilities’ suggests innate, possibly latent gifts; ‘high capability with respect to intellect’ sounds
like the traditional view of intelligence as proposed by Terman (1922); creativity connects to Renzulli (2006) and Sternberg (2001); ‘skills associated with specific disciplines’ could come from Renzulli (2006), Sternberg (2001), Gagné (2004), Matthews and Foster (2005), Subotnik (2011) or Ericsson (2005); ‘extraordinary intensity of focus’ may relate to motivation and/or task commitment or asynchronicity; and asynchronicity could also account for a disparity between abilities. While it may seem almost too generalized to be useful, this definition is based on well researched, widely held ideas about giftedness. The manual goes on to suggest that identification and assessment should rely on a range of information, from teacher observations and student and parent interviews to formal assessments, and that no single criterion should be used to include or exclude a student from gifted education services. These too are widely supported views within gifted education.

The school district that I work for uses the same definition of giftedness and the same criteria for identification. On paper. In reality, our practice looks quite different:

In my large, urban school district, ‘gifted’ often means ‘qualifies for a ‘P’ designation’\(^\text{12}\), and ‘consultation’ translates as ‘Come have a look and tell us whether this student is gifted’ – in other words “Take a look at this student and tell us if he/she qualifies for a ‘P’ designation.” My colleague, an experienced Case Manager, puts it more succinctly as she passes over a file: “Tell me if you see any ‘P-ness’ in here.” (Author’s personal journal, June 18, 2013)

It is common knowledge among teachers and administrators in our district that a student needs a psycho-educational assessment or a ‘C’ level test score to be gifted (Friedman-Nimz, O’Brien, & Frey, 2005; Sherlock & Skelton, 2015). If the school or parents have either, the Gifted Educational Consultant should be called to look at the score to see if it is in the gifted range. It is also common knowledge that gifted kids are odd or quirky, so whether or not the school has gathered any other supporting evidence, the Gifted Education Consultant should be called to look at any funny-looking kids (FLKs, in staffroom jargon) to tell you if they are

\(^{12}\) A ‘P’ designation refers to the code assigned to gifted students by the BC Ministry of Education (2009b).
gifted. And it is common practice to regard the observations of others outside the school, any private assessments, or parent-identified gifted students (PIGs), with suspicion.

“Our capacity to see the world in which we live shapes the ways we think about that world” (Eisner, 1993a, p. 66). We need a way to see the world that allows for possibilities – for students and teachers, for schools and families. I believe the visual can help.

They are beginning to see us: Giftedness and equity

February 2014
Two powerful experiences in the past ten days: an email shared by a teaching colleague, and an address by National Chief Shawn Atleo as part of a district Professional Development day¹³. The email, written by a parent and shared with her permission, outlined the transformational effect of a student’s placement in a gifted program. As the parent recounted, her child – a complex child with gifted traits, sensory disorder, attention deficits, and oppositional/defiant behaviour – had been viewed in a regular classroom primarily as a behaviour problem, with few options for enrichment, and little likelihood of being accepted in our district gifted program. In another jurisdiction, information from the child’s psycho-educational assessment was sufficient for entry into a gifted class, where, by the parent’s account, the child was thriving: engaged intellectually in projects and curriculum, engaged socially with like-minded peers, and publicly acknowledged for leadership and diligence.

The parent’s purpose in writing was two-fold. She wanted both to share her child’s current success with the teachers and administrators who had worked with her child, and also to make a plea for other children whose complex profiles might be a barrier to inclusion in our

¹³ Public Education and Urban Aboriginal People: Reconciliation and Collaboration, Vancouver School Board, February 21, 2014
district gifted program. Her email was timely – we are in the process of reviewing candidates for our gifted program, and some of these candidates are equally complex.

Shawn Atleo’s address began by stressing the cultural importance of acknowledging each other, ‘seeing’ each other: that traditional aboriginal greetings or opening remarks make connections through lineage as a reminder of how we are related; that these greetings equally remind us to be ‘mindful’ of those whose territory we are visiting, and whose laws apply. He described the ‘power of ceremony’ in the opening invocation or prayer chant as a universal that seeks to connect spirit, heart and mind. He continued with an anecdote about being in the House of Commons, with his grandmother at his side in June, 2008, when Stephen Harper apologized on behalf of Canadians for the Indian Residential Schools system. As Harper spoke, his grandmother turned to Shawn and said “They are beginning to see us, grandson.”

It is not difficult to understand why gifted education is seen as elitist. Its many definitions are predominately exclusionary, focusing on selective traits and measured statistical rarity (aptitudes and achievements described in percentiles), and these definitions lead to exclusionary identification practices. The inevitable result is seeing students as either ‘gifted’ or ‘not’.

‘They are beginning to see us’. For the mother of a child with both gifted abilities and learning disabilities, and a First Nations grandmother, the experience of being seen was powerful. Being seen, being recognized, being acknowledged is critical to any construct of equity. Within gifted education, being seen – being identified – is central to any discussion. An ongoing topic of conversation and debate within the field is the issue of which students are not being seen.

There is widespread agreement among researchers and policy-makers that the many students who experience racial, gender or cultural discrimination, poverty, or physical or learning disabilities have been under-identified and under-served by gifted education programming (Levy & Palley, 2010; Matthews & Foster, 2005; NAGC, 2010; Plucker & Callahan, 2014; Reis & Renzulli, 2010; VanTassel Baska, Feng & de Brux, 2007). In my own experience, I have
witnessed how teachers and parents more frequently nominated boys, native English speakers, extroverts, high achievers, and West-siders, for screening and programs in my district. A commonly suggested remedy for this inequality has been to focus on developing more equitable identification practices that take into account barriers to attainment such as language, culture, and underachievement (Matthews & Foster, 2005; Plucker & Callahan, 2014; VanTassel Baska et al., 2007). This is the direction I chose during my tenure as gifted consultant, and while I met my goal of expanding our gifted screening, literally and figuratively ‘seeing’ more students, I don’t know how much of a difference it really made. I am not sure that my expanded screening could have made a difference, because I believe now that what really needed to change, was not simply the instrument or process of identification, but the very construct of giftedness and concept of identification. I take up the problematization of giftedness and identification from James Borland, whose work over the past two decades, while advocating for appropriate challenges for high-ability or high-achieving students, has questioned the validity and morality of labeling some students ‘gifted’, and by extension, some students ‘not’ (Borland, 1997, 2005, 2009; Shaughnessy, Moore & Borland, 2014). His work resonates with me deeply, because it is in his project of gifted education without gifted programs or gifted students, that I can see possibilities for all students.

Borland (2005) sees the concept of the gifted child as “logically, pragmatically, and...morally untenable” (p. 1). He characterizes the construct as a concept dreamed up in the 20th century in response to sociocultural and socio-political forces, and argues convincingly that the rise of the mental testing movement can be seen as a response to the increasing diversity of the school population resulting from both waves of immigration and the enforcement of compulsory education laws in post-World War I America. Drawing on Foucault’s (1995) technologies of power, Borland contends that mental testing can be understood as a form of

\[\text{14 My experiences, and issues, with testing and identification will be expanded in Chapter 3.}\]
“hierarchical observation” (p. 5), and as an instrument of “normalizing judgement”\(^\text{15}\) (p. 5) in which "students whose IQs fell below a certain score become ‘the subnormal’...whereas students whose IQs exceeded a certain threshold...became, in the original terminology, the ‘supernormal’...the ‘gifted’" (p. 6). Within this framework, the ‘normal’ and the ‘gifted’ are both seen as invented constructs of an inequitable society.

That some students have advanced learning needs is not at issue – as Borland notes, “human variation is multifaceted, multidimensional”(p. 6). The problem that he sees is that ‘technologies of power’, such as quantitative psychometric measures of IQ and verbal and mathematical achievement or qualitative assessments of ability and/or creativity, persist as ways of categorizing and labelling children, and perpetuating inequity.

How then to proceed? How to see? Is it possible to have, as Borland (2005) suggests, gifted education without gifted children or gifted programs? Can gifted education become more democratic in seeing, and extending, the abilities of students? Van Tassel Baska (2007) calls for a new paradigm of identification that includes non-traditional measures (such as the observation of students engaged in learning) that is able to see the different ways students display their abilities. In recognition of the plasticity of development and the “problematic consequences of labelling” (Matthews, 2009, p. 94), Matthews proposes labelling advanced learning opportunities rather than students. Eisner (1993a) advocates for the role that the visual can play in recognizing the extraordinary diversity of human intellectual capacity. He states:

> Our capacity to see is crucial.... As we broaden the forms with which children interact, we expand the avenues through which more and more children can succeed. Indeed, educational equity is significantly rooted in the kinds of learning opportunities that children with different aptitudes are afforded. (p. 66)

Borland (1997) puts it another way:

\[^\text{15}\] I return to this idea in Chapter 4 as I explore the reconceptualization of the bell curve.
I think our primary task is either to construct the most educationally rewarding and equitable concept of giftedness we can or to find a way to move beyond the construct altogether to a vision of human development and learning that embraces the indescribable diversity of human consciousness and activity in a way that places limits on no child (or adult). (p.18)

Here, finally, is a project I can embrace without reservation: to move beyond the construct of giftedness to a new vision. I have been uncomfortable being the surveyor who marks the boundary between ‘gifted’ or ‘not’, and have been perplexed by a system that sees labels as an answer: here is a way of moving past those labels. I don’t want to mine a file, looking for scores, like glimpses of gold, to categorize a child’s potential: here is a vision of learning that encompasses limitless human potential, that creates possibilities for all learners. It starts by seeing each learner, their abilities, and possibilities. Our capacity to see is crucial.

Looking at gifted education research

Where is the visual in gifted education research? Not here:
There were lots of visuals: tables, graphs, and a sprinkling of concept maps. But with one exception, there was nothing that stood out visually to me. A survey of recent articles in gifted education journals confirmed my suspicion that, other than data-heavy tables and graphs, there was almost no other visual content in gifted education research articles. I knew that I had come across very little of visual interest in my research, but wanted to check against a more random sampling. I reviewed 64 articles from High Ability Studies, Gifted Child Quarterly, and Journal for the Education of the Gifted, approximately 20 from each source, and all published between 2012 and 2014. The use of tables to organize data was most prevalent (51 of the articles included tables), followed by figures (graphs were used in 14 of the articles and concept maps were used in 12). Ten articles included other kinds of figures such as statistical path models or examples of research materials such as survey questions or math problems. Twelve articles had no visual content whatsoever. From those 64 articles, one single image stood out for its attempt at visual impact:

![Figure 1 Metaphorical concept map](image)

The absence of the visual in gifted education research journal articles may seem inconsequential to most researchers, as there is nothing out of the ordinary about it. A quick survey of recent issues of Educational Researcher demonstrated a similar bias, and even an article entitled ‘Image as Insight’ (Marshall, 2007) in the journal Studies in Art Education.
followed a standard conservative academic journal format and did not include any accompanying images. In academic journals, where the target audience is predominately other researchers and academics, the visual is not apparent. Despite all the advances in data visualization in the past fifteen years (Davies, 2011; Lima, 2011), the graphs and tables used to communicate results in most articles offer no visual clues for interpretation to the viewer, and depend on an insider’s knowledge of statistics to be fully understood. It would appear that within gifted education research, data and design have not yet met.

Concept maps seem to be one area where more attention is paid to the visual. Many concept maps are simple schematics laid out with basic geometric shapes and arrows or lines indicating relationships, such as the maps below, used to document development of graduate student knowledge:

![Concept Maps](image)

*Figure 2 Concept maps (Diket & Abel, 2001, p. 27, copyright ©2001, SAGE Publications, by permission)*

Another map from the same article attempts a more visual turn, using fish instead of ovals, although any metaphorical meaning is not ascribed:

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16 By way of contrast, the graphics that Hattie (2015) uses to report effect sizes and other data from his meta-analysis of educational interventions are immediately understandable to a layperson, like the average teacher.
Concept maps appear the most visually developed when they are used to illustrate theoretical or programmatic models such as Renzulli’s (2005) three-ring conception of giftedness or the Amphitheatre Model for Talent Development (McCluskey, Treffinger, Baker, & Lamoureux, 2013):

**Figure 4** has been removed due to copyright restrictions. It was a diagram of the three-ring conception of giftedness by J. Renzulli. Original source: Renzulli, J. (2005) The three-ring conception of giftedness: A developmental model for promoting creative productivity. In R. Sternberg & J. Davidson (Eds.), *Conceptions of Giftedness* (pp. 246-279).

**Figure 5** has been removed due to copyright restrictions. It was a diagram of the amphitheatre model for talent development by K. McCluskey et al. Original source: McCluskey, K., Treffinger, D., Baker, P., & Lamoureux, K. (2013) The amphitheater model for talent development: Recognizing and nurturing the gifts of our lost prizes. *International Journal for Talent Development and Creativity*, 1(1), 99–112.

Much like the concept map in Figure 1, in which cog wheels were a visual metaphor for interconnecting perspectives, these concept mappings make an attempt at visual cohesiveness and impact: the use of centrally located circular forms (three overlapping circles in Renzulli’s model, a central circle in the amphitheatre) is suggestive of holistic focus; the
houndstooth background pattern of Renzulli’s is distinctive\(^\text{17}\); the tiers of the amphitheatre model are suggestive of increasingly higher levels of enrichment. This suggests to me that gifted education researchers are aware of the efficacy of using a well-thought out or distinctive visual to communicate ideas, especially if a portion of the intended audience for those ideas will be teachers, administrators and others outside academia.

Of all the concept maps I came across, one stood out for its visual impact:

![Figure 6 Metaphorical concept map (Ambrose, Van Tassel-Baska, Coleman & Cross, p. 458, copyright ©2010, SAGE Publications, by permission)](image)

An actual mapping of a concept, Ambrose and his colleagues propose a metaphorical understanding of the lay of the land in describing the nature and relationship of four analytic levels in gifted education. The field of gifted education is presented as a continent “with theoretical valleys, philosophical mountain peaks, and farmland of varying fertility” (Ambrose et al., 2010, p. 457), tilled by practitioners, surveyed by researchers, and explored by theorists

\(^\text{17}\) Although it certainly adds to the visual impact of the image, and makes it memorable, the significance of the houndstooth pattern in Renzulli’s graphic eludes me.
and philosophers. The metaphor plays out in a number of ways. First, it literally grounds the researchers’ investigation by situating philosophy, theory, research and practice in terms of the scope of their specific viewpoints, and their relationship to each other. For example, lack of philosophical content in practice-based research can be seen via this metaphor as an issue of distance and focus. Second, it provides a way to understand the structure and dynamics of the field: fragmentation is seen as the feudalism of interest-based camps, porosity refers to the openness of borders, and the contestation of different views or practices becomes a skirmish between tribes. Finally, the metaphor serves a metacognitive purpose by adding a filter of analysis to the researchers’ overview of the field, continually lifting the discussion from description back to the level of analysis. Although the metaphor has its limitations, I can respond to it. I am a practitioner in the field; I am a surveyor, measuring with my tools; I bring a philosopher’s view to my investigation. But mostly, I see myself as an explorer coming to the continent of gifted education from the distant unexplored interdisciplinary territory of the visual, bringing with me my own way of looking at the field.

Visual research methods are scarce in gifted education research. Qualitative methods may have enjoyed acceptance in other areas of educational research for years (Eisner, 1993b), but overviews of gifted education research suggest that quantitative methods still dominate the field (Coleman, Guo, & Dabbs, 2007; Dai, Swanson, & Cheng, 2011; Friedman-Nimz et al., 2005; Leech, Collins, Jiao, & Onwuegbuzie, 2011), and that many researchers are unclear about the use and value of qualitative procedures in gifted education research (Coleman et al., 2007). The lack of clarity around procedure and quality was demonstrated in the review carried out by Coleman and his colleagues that found that only a third of the studies they reviewed were actually consistent with the qualitative paradigm. Dai and his colleagues (2011) are among those researchers who recognize the benefits of qualitative research, identifying how the valuable ‘up-close look’ at students and their school and home situations afforded by qualitative methods contributes to a deep understanding not attainable by other methods. Yet they note that within their survey of ten years of empirical studies on giftedness and gifted education that only 25% of the studies were qualitative in nature. In the qualitative studies discussed, interviews and case studies were by far the most common methods used to
collect data, used in 75% – 85% of the studies (Coleman et al., 2007; Dai et al., 2011); the only arts-based method identified was narrative inquiry. The visual is noticeably absent.

I am a gifted education practitioner. I am a teacher-researcher. I am also a visual thinker, and I do not see myself reflected in gifted education journals. The concerns for quantification and correlation are not my concerns; the language of statistical analysis is not my language. I might consider myself an explorer bringing with me a new way of seeing, but when I read these research journals, I just feel like an outsider looking in.

As outlined in this chapter, giftedness can be seen as a socially constructed concept that has changed over time in response to changes in society and culture, and an ever-evolving understanding of the psychological and physiological process of learning. And yet, a whole way of thinking is being ignored when the visual is left out of research on giftedness and gifted education. How is giftedness understood, and misunderstood, when the visual is absent or sidelined? As will be explored in the following chapter, the neglect of visual-spatial ability can traced in part to sociocultural perceptions of academic and intellectual achievement that privilege verbal, mathematical, and logical reasoning and devalue visual and spatial abilities (Andersen, 2014; Liben, 2009; National Research Council, 2006; Smith, 2008). And, as will be seen, the result of this neglect is that the gifted abilities of many students remain invisible.
Chapter 3: Looking for giftedness

Attention changes what kind of a thing comes into being for us: in that way it changes the world.

(McGilchrist, 2009, p.28)

Kinds of attention

I had been reading graphic artist Lynda Barry’s Syllabus (2014).
Five words from a page filled with words and images caught my attention, and triggered a connection, a recollection. I rewatched an animated video of McGilchrist talking about the divided brain (RSA, 2011) then tracked down his book so I could read for myself what he said about attention:

The brain has to attend to the world in two completely different ways, and in so doing brings two different worlds into being. In the one, we experience – the live, complex, embodied, world of individual, always unique beings, forever in flux, a net of interdependencies, forming and reforming wholes, a world with which we are deeply connected. In the other we ‘experience’ our experience in a special way: a ‘re-presented’ version of it, containing now static, separable, bounded, but essentially fragmented entities, grouped into classes, on which predictions can be based. This kind of attention isolates, fixes and makes each thing explicit...
(McGilchrist, 2009, p. 31)

Sitting with a book in my hand, feeling its weight, the texture of the paper, connecting the words on paper to an experience; hearing the tick of the clock, muffled noises from the street, the living room there in my peripheral vision, all the while looking at the whole of Barry’s
densely illustrated two-page spread: this is ‘live, complex, embodied’ attention. Focusing on the page, decoding each word, examining each image – this is the kind of attention that “isolates, fixes and makes each thing explicit” (McGilchrist, 2009, p. 31).

McGilchrist (2009) sees these two different kinds of attention – an embodied, global and flexible attention and a focused, narrow and fixed attention – as the active work of the two hemispheres of the brain. The division of the brain that McGilchrist describes is not the neuromyth left side/right side polarization popularized in the 1960s and 70s, which wrongly characterized the left as the side containing reason and language, and the right as the side of emotion and visual imagery (Kalbfleisch & Gillmarten, 2013). As McGilchrist points out, both sides are now known to be involved in these functions (RSA, 2011). But there is recent research that suggests that the two cerebral hemispheres differ in their response to cognitive novelty and cognitive routines (Kalbfleisch & Gillmarten, 2013; Kounios & Beeman, 2014; McGilchrist, 2009, 2011). The right hemisphere engages in coarser semantic coding (Kounios & Beeman, 2014); it sees the whole before it is deconstructed in an attempt to know it (McGilchrist, 2009, 2011). The right hemisphere attends to the peripheral field of vision: it is therefore more “vigilant for whatever it is that exists ‘out there’” (McGilchrist, 2009, p. 40). The left hemisphere operates locally; its bias is toward finer semantic coding (Kounios & Beeman, 2014) and the identification of parts (McGilchrist, 2009, 2011): therefore it “actively narrows its attentional focus” (McGilchrist, 2009, p. 41). These differences between the two hemispheres and their modes of attention lead to a critical conception of how the world is ‘known’ through our senses, and how insights arise.

Insight can be described as a burst of understanding that yields a novel idea or interpretation (Kounios & Beeman, 2014). Cognitive neuroscientific studies of insight suggest that the right hemisphere contributes relatively more to insight than analysis, and that the reverse is true of the left hemisphere (Kounios & Beeman, 2014)\textsuperscript{18}. This makes sense in light of McGilchrist’s

\textsuperscript{18} See Chapter 5 for a more detailed discussion of insight.
(2009) description of how the right hemisphere engages with novelty. Anything novel must first be present to the right hemisphere before it can be focused upon by the left: the right hemisphere alone “can direct attention to what comes to us from the edges of our awareness” (p.40), while the left hemisphere “is remarkably entrapped by its vision” (p. 162), and sees what it expects to see. In short, the right hemisphere’s embodied, global and flexible attention is able to perceive the new; the left’s focused, narrow and fixed attention grasps the known. “We need both types of attention,” McGilchrist (2011) acknowledges, “But their relation is not symmetrical…the right hemisphere is aware of, and understands, more than the left; but the left is more able to articulate and use what it knows” (p. 1068).

**Paying attention to giftedness**

With McGilchrist (2009, 2011) in mind, I will return to some of the significant theories of giftedness and Intelligence that I outlined in Chapter 2, and take a closer look at the kinds of thinking that are embraced or ignored in current concepts of giftedness and in the identification process.

Visual-spatial abilities – such as thinking in images, the mental manipulation of images, and holistic rather than sequential thinking – have long been overlooked in the search for giftedness (Kalbfleisch & Gillmarten, 2013). Researchers have established that visual-spatial skills are important to creative production in STEM (Science, Technology, Engineering and Math) occupations (Andersen, 2014; Kalbfleisch & Gillmarten, 2013; Liben, 2009; Lubinski, 2010); in understanding complex mathematics (Boaler, 2015; Kalbfleisch, 2008b; O’Boyle, 2008; Prescott, Gavrilescu, Cunnington, O’Boyle, & Egan, 2010); and in developing scientific theories (Andersen, 2014; Gooding, 2004, 2010; Lubinski, 2010; Smith, 2008). And yet, as Lohman (2011) points out in a discussion of results from his own cognitive skills assessment, the CogAT 7:
Students who show a nonverbal strength are often not well served by our educational system.... Few programs have any systematic options for the development of visual spatial abilities. Those that do are often more concerned with fostering creativity than with developing visual thinking and reasoning abilities. (unpaginated)

If visual-spatial abilities are so important, why have they been overlooked?

As noted earlier, the neglect of visual-spatial ability can traced in part to societal perceptions that place a high value on the verbal, mathematical, and logical reasoning skills associated with academic success, and devalue visual and spatial abilities (Andersen, 2014; Liben, 2009; National Research Council, 2006; Smith, 2008). While the 1971 Marland Report expanded the definition of giftedness beyond intellectual and academic ability to encompass creativity, visual and performing arts, and psychomotor ability (Flint, 2014) – areas where the importance of visual-spatial abilities would seem uncontestable – the recognition of visual-spatial abilities in gifted screening and programming was still not assured.

A surge of interest in creativity in the 1970s gave momentum to a shift of focus in gifted education from academic content to thinking skills (Borland, 1997). Creativity was embraced as a component of giftedness, as seen in the models proposed by Renzulli (2005) and Sternberg (2001), in the development of assessments such as the Torrance Tests of Creative Thinking (TTCT; Torrance, 1974) and in programs like Future Problem Solving, also developed by Torrance in 1974 (Treffinger, Solomon, & Woythal, 2012). The qualities of fluency, flexibility, originality, and elaboration – the four components of creative thinking that Torrance identified – can be seen to align with the global, insightful, flexible vision of the right hemisphere. Yet while creative thinking remains a goal for gifted education, visual thinking is nowhere to be found. It is possible that something else was lost with the rightful debunking of the neuromyth of right-hemispheric dominance in visual-spatial abilities (Kalbfleisch, 2008a; Kalbfleisch & Gillmarten, 2013; McGilchrist, 2009; Prater, 2002). It would appear that many researchers subsequently approached new theories around hemispheric asymmetry cautiously (Kalbfleisch & Gillmarten, 2013), and chose to focus on analytic rather than visual-spatial skills in their research (Kalbfleisch & Gillmarten, 2013; Kounios & Beeman, 2014;
Smith, 2008). McGilchrist (2009, 2011) might see in this a familiar pattern: could it be that the devaluing of visual-spatial abilities has to do with the left hemisphere’s reason asserting itself over the right hemisphere’s insights?

Visual-spatial abilities are included in intelligence tests (Liben, 2009), and visual-spatial intelligence is incorporated in Gardner’s Multiple Intelligences (Gardner, 2006; Liben, 2009), yet visual-spatial abilities are not measured by most academic achievement tests (Andersen, 2014; Lohman & Gambrell, 2011), and rarely included in criteria for gifted programs (Andersen, 2014; Liben, 2009). Even non-verbal assessments that appear to test visual-spatial skills in the end capture more information about fluid reasoning, or divergent thinking, than visual thinking (Lohman & Gambrell, 2011). This is telling. As Liben (2009) notes, “We assess what we value and we value what we assess” (p. 71). Visual-spatial thinking is “underrecognized, undervalued, underappreciated, and therefore, underinstructed” (National Research Council, 2006, p. 15). The result is that the gifted abilities of many students remain unseen by those who are looking for giftedness.

Paying attention to identification

We see, but we do not see: we use our eyes, but our gaze is glancing, frivolously considering its object. We see the signs, but not their meanings. We are not blinded, but we have blinders....

(Horowitz, 2013, p. 9)

In her book, On Looking, Horowitz (2013) describes 11 walks that she takes in her familiar neighbourhood with different ‘experts’ – ten people and one dog who, as Horowitz says, “have distinctive, individual, expert ways of seeing all the unattended, perceived ordinary elements that I was missing”19 (p. 3). Each of these guides focused Horowitz’s attention on specific features and details that mattered to them, and that Horowitz had previously

19 Horowitz uses ‘seeing’ in both the literal and figurative sense, as several of her guides were consciously following senses other than sight, like hearing and smell.
overlooked: the geologist noted rocks and stonework, the naturalist pointed out plants and bugs, the typographer remarked on lettering. With one notable exception\textsuperscript{20}, the expert eyes saw with the kind of focused attention that I call noticing or observing, and it is based in recognition, responding to the familiar or known. The expert eyes knew what to look for.

The problem with paying attention, Horowitz (2013) observes, is that “no one tells you how to do that” (p.9). Focused looking can actually be taught, and it does not always rely on subject-specific expertise. A study of nursing students found that their clinical diagnostic skills were improved following participation in an art museum experience (Pellico, Friedlaender, & Fennie, 2009). After a 90 minute session where students looked intently at artworks, and learned from a docent and an educator how to “discriminate, compare, and contrast artistic intentions...how to decode objects’ meanings and extract information by direct observation” (Pellico et al., 2009, p. 650), participants subsequently made significantly more, and more detailed, observations, and offered more alternative diagnoses than the control group when examining patient photographs in a clinical setting. The nursing students who attended the museum experience and the control group had the same amount of clinical knowledge when it came to making observations of patients, they knew equally well what to look for; where the museum-going nurses differed from the control group was that they simply understood better, after only 90 minutes of noticing, observing and talking, how to look.

Knowing what to look for, and how to look, matters.

\textsuperscript{20} The exception? Artist Maira Kalman whose gaze appeared unrestricted in its enthusiasm — “She did not see a space as defined by an edge, but as an infinitely explorable openness” (p. 87).
The problem as McGilchrist (2009) sees it, is that when focus narrows, the left hemisphere’s view of the world asserts itself to the exclusion of the right. This affects “what kind of thing comes into being for us” (p.28). The left hemisphere wants to make things certain – it responds to familiarity, and it processes information according to known categories or procedures: “When we say we understand something, what we mean is that we have likened it to something else that we think we know” (McGilchrist, 2011, p. 1069). McGilchrist’s (2011) concern is that this leads to a narrowed view of the world: “We close down perception to a certainty, instead of opening up to possibility” (p. 1069). This reminds me of my checklist-oriented students, who gobbled up facts like empty calorie snacks, yet were resistant to more open-ended inquiry. In looking at student thinking, it would appear that the left hemisphere’s cognitive process is supported in its mission by various affective thinking processes or dispositions that also lead to narrowed options. Closed-mindedness, intolerance of ambiguity, certainty orientation, and a need for cognitive closure have been found to contribute to a dogmatic ‘premature settling’ of beliefs in high-ability students (Cross & Cross, 2012); fixed-
mindsets have been shown to predispose students to avoid greater or novel challenges for fear of failure (Dweck, 1986; Mueller & Dweck, 1998), and a high preference for certainty has been positively correlated with performance avoidance, and negatively related with mastery goals and deep processing of content (Harlow, DeBacker, & Crowson, 2011). What are the implications for the identification process? In the next section, I will consider how a narrow focus shapes how schools look for giftedness in students, and promotes an orientation towards certainty in teachers and administrators.

October 7, 2012

I open the big brown envelope, and a pile of forms slip onto my desk. A resource teacher (RT) has sent in four requests for ‘P’ designations21. Reason given: scored in the gifted range on a test of cognitive skills. Required documents are duly attached:

![Request for Designation]

I drive to the school to look at the complete student files. The new secretary has put them in order just for my visit: papers sorted, collated, colour-coded. From documentation

21 A ‘P’ designation refers to the code assigned to gifted students by the BC Ministry of Education (2009b).
Presented, how can I differentiate between ‘high achieving’ and ‘gifted’ students? Both may have glowing report cards (or maybe not in the case of the ‘gifted’ student); both may have been referred to our Challenge Centre programs (referrals might be based on student need, but might also be based on a teacher’s desire to reward a good student). In the case of these four students, the ‘P’ designation, which anoints these students as ‘Gifted’, appears to hinge on a single score from a single test.

Everyone here has done their job: the resource teacher has collected the requisite documents, the secretary has organized the paperwork, the School Based Team has signed off on the forms and submitted them to Central Screening. FYI, it turns out that I am Central Screening for all ‘P’ designation referrals. Central Screening is the committee that makes decisions about who does and does not qualify for a ‘P’. Central Screening is a committee of one: me.

Central Screening notes the following:

- Observations and/or checklists from teacher(s)
- Observations and/or checklists from parents
- Samples or portfolio of student work

In the incident described in the above journal entry, a single number, a test score, is noticed, and sets a bureaucratic machine in motion, beginning the process of formal designation. Meetings are scheduled, reports are compiled, forms are completed, and information is organized. Documentation is emphasized; observations are largely absent. There are no checklists or portfolios included. There is little description of the students involved, no record of their interests or passions, no samples of work or insightful comments offered as evidence of their advanced thinking. There is no mention of ‘how’ these students are seen as gifted. There is no discussion of their advanced learning needs. To me, this narrow view of
giftedness, with its emphasis on paperwork and procedure over observation of student talent or need can be seen as evidence of a system focused on bureaucratic accountability\textsuperscript{22} over pedagogy:

\[
\text{Test score} = \text{giftedness} \rightarrow \text{designation} \rightarrow \text{documentation} = \text{paper trail} = \text{audit ready}
\]

If procedure has been followed, the School-Based Team has done its job. But this scenario can also be seen as a system failure: by putting the emphasis on the designation process, it seems that well-meaning people have been looking in the wrong place, and have focused on the wrong thing.

It’s puzzling to me. In order for these students to have a test score from a cognitive assessment, someone must have noticed something about them since all students must be referred by their school to our district screening. Sometimes the referrals are generated by an interest in applying to our full-time elementary gifted programs. More recently, referrals came from an expanded screening opportunity that I put in place to help identify learning strengths in a wider range of students, including our English-language learners and twice-exceptional students\textsuperscript{23}. In either case, someone saw something in a student, and put them forward for assessment. What was the ‘something’? Did the student have an extensive vocabulary? Were they full of facts and information? These are the students who most often stand out as gifted to teachers and parents. Maybe they were quick to finish their work, or to master new skills or concepts. Or perhaps they loved solving puzzles or wrestling with complex ideas. If pedagogy, not accountability, is the focus, any one of these observations is more insightful than a single test score. An observation can be acted on – a student with an advanced vocabulary can be given more challenging books to read, or can make word maps that trace the words back to their roots. A student who quickly masters skills may be ready for

\textsuperscript{22} The BCTF characterizes bureaucratic accountability as enforcing “policies and procedures by ensuring that actions and decisions are documented and recorded” (BCTF, 2006, unpaginated).
\textsuperscript{23} Twice-exceptional is a term often used to describe students who have both gifted abilities and learning disabilities.
more advanced skills, or could be encouraged to apply their skills in increasingly complex or creative tasks. None of this requires a designation. In contrast to the accountability progression illustrated earlier, where test scores trigger an obligation to bureaucratic process, a pedagogical sequence stemming from observation of a student might look like this:

Observation → Advanced learning need → Focused programming → Continued challenge + Academic development

The obligation here is to meet the learning needs of a student. This responsiveness to a specific learning need is what Matthews and Foster (2005) have in mind when they describe a ‘mastery perspective’: “it is essentially about matching exceptional learning needs with educational provisions” (p. 66). And it starts by making an observation and noticing that need.

If observations are a recommended component of the identification process, why are observations missing from the referrals above? Why does it seem that so many teachers defer to a test score when it comes to identification of advanced learning needs? It may be an historical holdover of an intelligence-based superiority that sees an IQ score as “the gold standard for identifying giftedness” (Foreman & Gubbins, 2014, p. 7). It may reflect a privileging of the quantitative over the qualitative, as mirrored in so much gifted education research. I think it is possible that there is something else going on. In their study of teacher nominations to gifted programs, Renzulli, Siegle, Reis, Gavin, and Sytsma Reed (2009) found that uncertainty about their own ability to appropriately identify students was a significant factor in under-identifying students and/or their abilities. Eisner (1993b) suggests that those who lack competence in a domain “are often profoundly confused about what to look for” (p.83). “We see, but we do not see...” Horowitz (2013, p. 9) says, acknowledging her own deficiency in paying attention. The problem that she recognizes is that “no one tells you how to do that” (p. 9). Studies of the aesthetic development of museum goers (Housen, as cited in Yenawine, 1997), suggest that a lack of visual literacy skills leads viewers to distrust their own judgement. Could it be that similar feelings of inadequacy, confusion and lack of knowledge regarding giftedness are leading teachers to distrust their own observations of gifted
behaviours? If that’s the case, then learning how to look could help. But I am not sure that this is the whole picture yet.

Teacher rating scales are presented as helpful tools to support teachers in knowing how to look for giftedness. Two current models, the Gifted Rating Scale (GRS; Pfeiffer & Jarosewich, 2007) and the updated Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS; Renzulli et al., 2009) ask teachers to compare students to age peers with respect to attributes or actions associated with giftedness. Statements such as ‘Solves problems quickly’, ‘Demonstrates advanced reasoning skills’ (GRS online tutorial) or ‘enjoys challenging math puzzles, games, and logic problems’, ‘is able to express fine shades of meaning by using a large stock of synonyms’ (SRBCSS, unpaginated) direct a teacher’s attention to an observable quality or habit. While the GRS statements are more ambiguous – What kind of problems are being solved? What is meant by advanced reasoning? – the SRBCSS questions are focused, leaving little room for misinterpretation or uncertainty. The statements are directing the teacher’s gaze, they are suggesting where to look: ‘Have I observed this student playing math games and puzzles? Does she enjoy that activity more than others? Hmmm. Have I paid attention to that student’s choice of words? Is he more precise than his classmates? Does he know and use more synonyms? Huh.’ Knowing what to look at and where to look is a form of expertise – and access to this expertise is what I think teachers and administrators were wanting when they called me, in my consultant role, to ‘take a look’ at a child. Rating scales might help them develop this expertise for themselves.

Looking is, however, less straightforward than it seems. It’s not just getting the grain-size right. The philosopher Mark Johnson (2007) states, “What we emphasize and, conversely, what we ignore will make all the difference in what ‘things’ mean to us” (p. 269). Consider the use of a teacher rating scale in gifted identification with Johnson in mind. A teacher with little experience or education in working with gifted students may feel insecure about their own

24 As Eisner (1993b) notes: “Propositional language functions as a pointer or instrument that directs our attention to qualities other than itself” (p. 83).
observations, as Eisner (1993b) and Renzulli et al. (2009) noted. A rating scale might help alleviate that uncertainty because each statement, in effect, suggests ‘Look at this – this is important.’ But the use of a rating scale doesn’t necessarily contribute to the teacher’s expertise. The purpose of rating scales is to screen students for further identification and participation in gifted programs (Renzulli, 2009; Pfeiffer & Jarosewich, 2007). These ‘instruments’ are developed to be reliable, objective and practical measures; they are rigorously designed and tested, and their merits are discussed in academic articles full of statistical analysis. Teacher observations, as captured in a rating scale, are part of a collection of data: the observations are rated, weighted, and collated into scores that are then compared with other scores in order to identify giftedness in the observed student. Any single observation, which on its own might offer insight to the teacher regarding a child’s thinking or capability, has no validity within this scientific framework. The conversion of an observation to a score further emphasizes the quantitative nature of this scientific approach. An educator who is familiar with experimental methods might not think twice about this. For others though, it is possible that in the translation of an observation statement to a number, a line has been marked between the subjective and the objective, with the latter culturally weighted as more ‘valid’. But there could also be something else going on when an observation is converted to a score. Borland (2005) referred to Foucault and his technologies of power in his critique of the conception of giftedness. The now quantified observation can be interpreted as a normalized judgement. For some theorists, this is suggestive of the dominance of scientific thinking within education – “thought processes that produce grids, identities, positions, categories, linear progressions, and causalities” (Ellsworth, 2004, p. 120). Think again to Johnson (2007): “What we emphasize and, conversely, what we ignore will make all the difference in what ‘things’ mean to us” (p. 269). If the rating scale is seen to emphasize scores, and ignore observations, what might the rating scale ‘mean’ to the participating teacher? I see a powerful bureaucratic machine gearing up, and if I were the teacher, I would get out of the way.
I do not distrust numbers. I am not against testing. I have seen for myself how charting their math drill progress on a graph can give students a sense of accomplishment. Numbers matter. I have also seen how results – yes, scores – from ability testing can spark insightful conversations about possibilities for students. My intention here is to point out that, when it comes to looking for giftedness, many teachers are unsure where to look or what to look for, and that the processes we put in place to support identification are too often subsumed by bureaucratic purpose to be enlightening and empowering for the teachers involved.

To return to where this chapter started, this last section addressed a narrow form of attention that is often engaged in the identification of giftedness. A narrow focus is not necessarily a bad thing – what I hope I have made clear is that directed observation can lead to important insights about students, and more equitable ways of identifying student strengths. But at this point, I would like to consider how McGilchrist’s (2009) concept of focused attention might offer insights into the fixedness of ideas about giftedness.

McGilchrist (2009) suggests that the right hemisphere is open to ‘whatever is’, that it can apprehend anything new, across domains – new experiences, new information, new skills – and that it can also more readily revise assumptions and information. “The right hemisphere is, in other words, more capable of a frame shift” (p. 40). However, McGilchrist notes, once the ‘new’ becomes familiar, it becomes the concern of the left hemisphere, which ‘recognizes’ experience: the left filters, sorts, and categorizes experiences and information, and suppresses what is not currently relevant; the left constructs the world by putting pieces together, and relies on what it already knows about the world to do so. The left “positively prefers what it knows” (p. 40), and while this may make the left hemisphere more efficient when things are routine and predictable, this same pull to the familiar may also result in it being too quick to recur to what is already known. The left hemisphere, in other words, is more fixed in its outlook – it tries to apprehend the new by reconciling it within already known structures and frameworks. And when the left hemisphere is in charge, “We close
down perception to a certainty, instead of opening up to possibility” (McGilchrist, 2011, p. 1069).

It’s like the problem of a square peg and a round hole: you try to jam the peg into the hole because experience tells you that is what you should do with pegs and pegboards. This leads me to wonder if this idea can be extended: is it possible that engaging in a narrowly focused task actually predisposes a participant to a fixed way of thinking? Could it be that a narrowly focused task triggers a default to the known? A theory of embodied cognition might support this notion, as it proposes that meaning is shaped in part by our ability to manipulate objects and move our bodies in space, and by our experience of those actions and interactions (Johnson, 2007)\(^\text{25}\). If, then, I am trying to promote a broader notion of what giftedness looks like, but I supply teachers and administrators with forms and scales that require narrowly focused knowledge (and finely tuned hand-eye coordination), should I really be surprised when they defer to what they already know about giftedness? Instead of furthering a narrow focus on certainties, how can I encourage teachers, parents, and students themselves to open up to possibility?

\(^\text{25}\) Johnson’s (2007) explication of embodied cognition outlines how the physicality of being in the world shapes an embodied and metaphorical knowledge structure: thinking is ‘rooted’ in bodily experience; “there is no ontological rupture between perceiving, feeling, and thinking” (p. 122).
Chapter 4: Visualizing

Shifting how we think about language and how we use it necessarily alters how we know what we know.

(hooks, 1994, p. 174)

The visual is part of my language. I can scarcely talk without a piece of chalk, or marker in my hand. Ask my colleagues and they will tell you that they leave a seat for me near the whiteboard, knowing that I will jump up during our meetings to illustrate a point. I draw diagrams, record key words, connect ideas, sketch out plans, and illustrate analogies. In the past few years, my own note-taking has taken a graphic turn: strings of boldly lettered words swoop across the page, shifting in size, intensity and colour; sketches and diagrams work out concepts and ideas, interweaving the verbal and the visual. What I have come to appreciate in the course of my MA studies is that this way of working is more than a process of representing thoughts and ideas. This is not re-presentation. This practice actually constitutes
a way of thinking: the visualization of words and ideas is my way of actively creating connections and constructing concepts; it is my way of making sense. The visual forms and informs how I know what I know.

My own ideas about the importance of visual thinking have been shaped by the work of notable arts education researchers Eisner and Greene and their unwavering belief in the fundamental importance of aesthetics in, and of, education (Eisner, 1993a, 1993b, n.d.; Greene, 2001; Stanley, Greene, Eisner, & Suppes, 1998). I have been influenced in my thinking by Johnson (2007), who underlines that the recognition of the centrality of aesthetics to meaning-making is an ongoing project:

We need a Dewey for the 21st century. That is, we need a philosophy that sees aesthetics as not just about art, beauty, and taste but rather as how human beings experience and make meaning. (p. 212, italics in the original)

This research from the arts and philosophy has been supported by readings in psychology, neuroscience, and math and science education that elaborate the role of visual perception in the development of mental models, concepts, and abstract thought (Andersen, 2014; Arnheim, 1969, 1973; Butcher, 2006; Gooding, 2004, 2006; McGilchrist, 2009, 2011; McNeil, 2015; Smith, 2008; Thomas, 1999). Moreover, I have been greatly influenced by the proliferation of visual ways of communicating ideas and information in popular media. From the humble doodle (Brown, 2011) to sophisticated data visualization (Lima, 2011), the increasing use of infographics, graphic facilitation, and visual recording speaks to the impact of visual modes of communication in contemporary culture (Ali-Khan & Siry, 2014; Davies, 2011; Gooding, 2004; Lima, 2011; Sibbet, 2008). Visual thinking is being championed as the future of problem-solving:

Using our innate ability to see – both with our eyes and our mind’s eye – gives us entirely new ways to discover hidden ideas, develop those ideas intuitively, and then share those ideas with other people in a way they are simply going to ‘get.’ (Roam, 2014, unpaginated, italics in the original)
For all this new-found attention, researchers who have studied innovators in both the arts and the sciences describe how the visual has constituted part of the creative thinking process for scientists, philosophers and writers stretching back from Einstein and Picasso to DaVinci and Galileo to ancient history (Andersen, 2014; Card, Mackinlay, & Schneiderman, 1999; Gooding, 2004; Grandin, 2009; Larkin & Simon, 1987; Marshall, 2007; Miller, 2000; Smith, 2008). As Smith (2008) puts it, “Humans are highly visual creatures” (p. 260).

I understand aesthetic vision as a vision of possibilities for the future. I believe that visual thinking enables us to grasp possibilities in the here and now. I am convinced that visualization enables us to see our thinking, and to move it forward. I am concerned that a whole way of thinking is being ignored when the visual is left out of research on giftedness and gifted education. In the last chapter I explored how focused attention can constrain thinking. My interest in this chapter is considering some of the ways that visual thinking works to open up possibilities. Here I will look at some instances where I used visualizations to communicate information, extend thinking, and shift perceptions for my students and my colleagues.

**Visualizing information: The power of diagrams**

Trees, circle diagrams, graphs and charts organized knowledge itself, providing frameworks for visualizing relationships that led to paradigmatic leaps in many disciplines.

Christianson, 2012, p. 12

When asked to write on the curriculum of the future for a special issue of the *Cambridge Journal of Education*, Heath (2000) focused on visual literacy, and looked to research in neurobiology and child development for support. Her article, ‘Seeing our Way into Learning,’ made a case for a critical role for visual literacies in fostering collaborative learning environments. Heath’s assertion that the visual can enhance the comprehension of
theoretical concepts aligns with theorists like Eisner (1993a, 1993b) who sees the ability to abstract as a key value inherent in visual learning. Other researchers looking at visual thinking emphasize the utility of visual representations in “conceptualising and representing complex data” (Buckley & Waring, 2013, p. 150), and in aiding students and teachers in remembering, understanding and analyzing relationships and their component parts (Davies, 2011). Humans respond to patterns quickly and automatically (Gooding, 2004). When information is organized into visual forms – diagrams, sketches, charts, graphs – it is more readily comprehensible and memorable (Christianson, 2012). When it comes to understanding, the visual can help.

In my work as a district consultant, I frequently made presentations about advanced learning needs to teachers and administrators. A huge impediment to this work was a commonly held misperception that highly able students were doing alright on their own, and that programs to meet their advanced learning needs were nice rather than necessary. Other student needs were regarded as more urgent, and from a social justice standpoint, more important. Gifted education programs were seen by many colleagues as elitist and inequitable, a notion summed up in the phrase ‘giving gifts to the gifted’. My presentations would not have any impact if I could not shift those perceptions. Conscious of the complex nature of our diverse school district, I looked for a way to communicate the inherent injustice of not meeting those advanced learning needs. It wasn’t enough to tell my colleagues that advanced learning needs mattered: I needed them to ‘get it’. I adapted a visual from An Introduction to Gifted Education (Neumeister & Burney, 2011) to make my point:
When I showed this slide, nodding heads and audible exclamations told me that my colleagues understood. The pie chart captures the predicament of an advanced learner in a simple diagram – you don’t need to read the numbers to know that the gifted student, who is as deserving as any other child, is not getting a year’s growth for a year of schooling (Hattie, 2015).

When it came time to explain a new way of looking at gifted education programming in our district, I again relied on diagrams to help make information clear and understandable:
These tiers of programming were further elaborated in a more detailed handout:

26 These diagrams are included to highlight the consistency in graphic design from one presentation to another. The text is not meant to be legible, as the content is not relevant to the discussion.
The visuals above became the basis for many conversations and discussions, as I oriented those who were new to gifted education, and reoriented those who were encountering a change in processes and framework. Although it meant frequent tussles with an administrative assistant who had her own entrenched style for gifted education newsletters and forms, I was deliberate in bringing a design sensibility and consistency to the presentations and paperwork I produced. Through these diagrams, I strove to share information in a way that would be easily understood, in order to communicate “in the most effective and engaging way possible” (Sword, 2012, p. 169).

My intention in using these diagrams in these pages is the same as it was for using them in my presentations: to communicate ideas and processes. But my purpose here is different – what I will explore here is how these diagrams work, and why that matters.

Consider the basic elements of the above diagrams, the circle and the triangle:

This is elementary school geometry, familiar, recognizable. But these shapes also embody metaphors. The circle suggests wholeness, equality, and the triangle embodies hierarchy in its pyramidal form. These implicit metaphors then extend further: when the circle becomes a pie chart, it is easy to see at a glance that the whole of the pie is not being portioned out equally – someone is not getting their fair share. Now compare the triangular Response to Intervention (RtI) diagram with the tiered-service model presented in our district handout, a four-tiered booklet:
Both visuals are explicit in outlining a progression of steps from one tier to the next, and both are suggestive of the increasing complexity of each tier by allotting more physical space to each subsequent level. But the triangle additionally suggests a hierarchy of service. The tiers start from a broad base and move towards the acute apex of the triangle. The hierarchy of the triangle, combined with the increasing service options in each tier, implies that there are fewer services for all at the lowest level, and more services for fewer students at the top: it is encoding tiers of service that apply to fewer students and more acute needs.

I am not so presumptuous as to suggest that the two diagrams I used – the pie chart and the RtI triangle – have lead to “paradigmatic leaps” (Christianson, 2012, p. 12) in understanding for those with whom I have shared them. I do believe, though, that they have made a difference. But I am emboldened by my understanding of perception and embodied cognition (Johnson, 2007; McGilchrist, 2009), visual thinking and visual literacy (Arnheim, 1969; Chaplin, 2006; Dondis, 1973; Sadokierski, 2010) to suggest that these visuals resonate with viewers in a way that words on their own do not. This resonance is embodied, metaphorical, and implicit, and it is these qualities that give diagrams their power.

It is, I think, a lack of that resonance that struck me in my survey of gifted education journals in Chapter 2. Few of the visuals I encountered in those academic articles exerted any visual power; tables and graphs simply relayed data in conventional formats – few resonated in the
same way as the diagrams described above. Why is that? If the purpose of academic writing is to “communicate ideas and arguments to readers in the most effective and engaging way possible” (Sword, 2012, p. 169; italics added), why are effective visualizations ignored? It would appear that current academic conventions for data visualization constrain the impact of visuals, and so the rectangle rules in graphs and tables. If the rectangle resonates metaphorically, it is with stability, even immovability. Ellsworth (2004) sees a culturally coded grid to which experiences are pinned while Dondis (1973) sees a square – honest, workmanlike and dull.

**Visualization, metaphor, and metacognition**

When I taught in our district gifted program, I often began the year by having students complete simple, informal surveys about learning preferences and learning styles. They filled out Multiple Intelligence profiles, and Left brain/Right brain self-assessments, checklists and rating scales. I may cringe now at the naivety of these questionnaires, but I was conscious even then of their lack of scientific credibility, and cautioned my students accordingly about the validity of the results. All the same, I found these to be useful tools for encouraging metacognition – getting students to think about their own thinking. The profile of a head, copied from who knows where, was a persistent motif throughout these investigations: I used it as a visual frame for reflective writing, note-taking, and as the template for students to construct their own metaphors of thinking. Again, I am now all too aware of how this use of a head profile could be seen as problematic: it positions the head as a disembodied site of thinking and reflection, and reinforces the constraints of a mind/body dichotomy. At the time, however, the profile was my innocent visual cue for my students to ‘get inside’ their thinking. I also used profiles as visual reminders to both my students and myself to keep in mind the range of learning styles and strengths in our learning community: large profiles dedicated to each of the eight multiple intelligences hung prominently around the classroom, each inscribed with the names of those (including me) who found that particular intelligence to match with a self-assessed learning strength.
I was concerned that my fact-filled students were too literal in their perceptions and interpretations, and was always looking for strategies to help them see patterns and make deeper connections. I became interested in the role of metaphor in meaning-making, researched common metaphors for thinking, and developed a few of my own metaphors to share with my students. Once again I used the head profile as a visual cue for thinking in my visualizations of metaphors. Thinking as driving in a busy city was one of the metaphors that seemed to really click:
THE BILLIONS OF NEURONS IN OUR BRAINS

LOOK LIKE A HIGHWAY MAP.
BUT THINKING IS LESS LIKE LOOKING AT A MAP.

AND MORE LIKE DRIVING IN A BUSY CITY.
JUST LIKE TRAFFIC, YOUR THINKING

SOMETIMES GETS STOPPED.

YOU MAY WANT TO FIND ANOTHER ROUTE,

OR WAIT FOR THE FLOW TO START AGAIN.
This metaphor was particularly useful when talking to students about being ‘stuck’ in some way with a problem. Gifted students often have few social-emotional resources for dealing with setbacks (Mueller & Dweck, 1998). They can harbour the false impression that being smart means they should know the answer, find the work easy, do it quickly, and make no mistakes (Mueller & Dweck, 1998). I often had to remind students and parents that those attributes didn’t describe ‘being smart’; they described being under-challenged. However, the mind-set those attributes illustrate was resistant to change. Being able to externalize the problem through a visual metaphor seemed to help. It allowed the student to step back from the problem and see it differently. Consider the metaphor that thinking is like driving through a busy city. The metaphor of being a driver in city traffic acknowledged that getting stuck is a common occurrence – slowdowns and stoppages are to be expected. Second, the metaphor offered a viewpoint from which to look for alternatives – what are the options when faced with a roadblock of some kind? A driver may choose to turn around, take a different route, take a break, or stay in the car and practice some relaxation techniques. The discussion of the metaphor could also open up whole conversations about journeying, modes of transportation, navigation and way-finding, maps and GPS, planning and serendipity, and the people who support or thwart travel – ‘co-pilots’ and passengers, traffic cops and fellow drivers, pedestrians, cyclists, and construction crews.

How do metaphors work, and how might they connect with visualization and metacognition? Metacognition refers to the awareness and regulation of our thinking processes, with metacognitive knowledge and control representing the two main aspects of this process. Research suggests that expert problem solvers tend to be hyper-conscious of their own thinking (Gallagher, 1997), and the use of metaphors has been shown to help students and teachers better understand their own thinking (Chapman, 1997; Early, 1992; Munby & Russell, 1990). Metaphors open up new worlds or encourage reframing of existing ones in new ways (Lipari, 2014). In their groundbreaking work, Philosophy and the Flesh, Lakoff and Johnson (1999) put forward the theory that metaphors are developed in and through the body, grounding thinking, and supplying “the logic, the imagery, and the qualitative feel of sensorimotor experience to abstract concepts” (p 128). With their theory in mind, the metaphor of the driver in traffic works
because my students and I had experienced the situation of being stuck in traffic, and could transfer all our bodily knowledge of that situation to understanding a different situation. Lakoff and Johnson (1999) make clear the embodied nature of metaphor, that this meaning-making involves all bodily sensations. The process of visualization draws on this full range of bodily knowledge. Visual literacy is bound up in metaphoric understandings. As Heath (2000) describes it, “The visual...enables understanding of metaphor – our ability to map interactions, experiences and cognitive operations across concepts to form images” (p. 124). Poet Jan Zwicky (2010) acknowledges the often highly visual nature of metaphor, describing it as “a seeing of one thing in terms of another...a kind of re-cognition” by which images or ideas are “pulled into revealing alignment with one another” (p. 9). Metaphors work because they bring together the familiar and the novel. The visualization of the metaphor works because it doesn’t just capitalize on the visual nature of metaphor, it manifests it, and makes the metaphor immediately available to be experienced by the viewer. There is a recursive transaction at play here: metaphors promote meaning-making through bodily resonances, and the visual opens up metaphoric possibility.
Discovering, making, and communicating meaning is our full-time job. 
(Johnson, 2007, p. 17)

In the previous chapter, I looked at how visualizations work – how diagrams and visual metaphors convey information, and promote understanding. In this chapter, my interest is digging deeper into the process of understanding, and exploring how physical and mental visualizations generated through the process of visual thinking contribute to comprehension and novel ideas. I start by looking at the perspectives of two researchers, Arnheim (1969) and Gooding (2004, 2006, 2010), who come to their understanding of the process of visual thinking from the arts (Arnheim) and science (Gooding). I then consider how these ideas around visual thinking align with the neuroscience findings of McGilchrist (2009) and Kounios and Beeman (2014) regarding attention and insight. Following from that discussion, I examine my own visual thinking process through a verbal/visual essay.

In his classic book, Visual Thinking, Arnheim (1969) describes the mental operations he understands to be involved in the cognitive process of perception: “Active exploration, selection, grasping of essentials, simplification, abstraction, analysis and synthesis, completion, correction, comparison, problem solving...combining, separating, putting in context” (p. 13). He goes on to the refute the “false dichotomy between perceiving and thinking” (Johnson, 2007, p. 226) that is embedded in much of Western thought:

I see no way of withholding the name of “thinking” from what goes on in perception. No thought processes seem to exist that cannot be found to operate, at least in principle, in perception. Visual perception is visual thinking. (Arnheim, 1969, p. 24)

Visual perception is visual thinking. At the time, Arnheim’s (1969) idea was a radical jolt that challenged the dominant view that understood perception as a physical act of data transfer from
the senses, with no active role in concept development (G. Sullivan, 2010). Since then, however, Arnheim’s idea has been taken up by a wide range of researchers and theorists (Eisner, 1993b; Johnson, 2007; McGilchrist, 2009; G. Sullivan, 2010). And yet, some thirty years after Arnheim’s iconic book appeared, Gooding (2004) wrote, “We still lack an understanding of how visual thinking works”. Around that same time, Johnson (2007) posed a parallel, and equally perplexing, question: “How is novelty possible? As far as I can see, nobody has yet been able to explain how new experience emerges” (p. 13). Here then, is the project of this chapter. I do not presume to answer what Johnson terms “one of the most difficult problems in all philosophy, psychology, and science” (p. 13), but I intend to explore these questions further with the help of neuroscience and art.

As noted earlier in this thesis, visual thinking has been recognized as a significant contributor to success in STEM occupations (Andersen, 2014; Kalbfleisch & Gillmarten, 2013; Liben, 2009; Lubinski, 2010) and progress in scientific thinking (Gooding, 2006, 2010; Smith, 2008; Thomas, 1999). Given that even an elementary science fair understanding of the scientific method acknowledges the role of careful observation in experimentation and the importance of diagrams in recording data, I find Gooding’s pronouncement that visual thinking is not yet understood surprising, coming from a scientist. But Gooding’s research into scientific visual thinking (2004, 2006, 2010) makes for illuminating reading. He does not proclaim the superiority of “scientific ways of knowing” (2004, p. 279) as they are commonly understood: as the “rational process of reasoning about facts according to logical or statistical models of human inference” (p. 279). Rather, Gooding makes a claim for the role of visual intuition in scientific discovery. In his research, he examines how scientists use sketches, photographs, models and words to both develop and communicate new knowledge, and characterizes this process as:

a dialectical play of simple and complex images, as scientists move from interpreting novel or unfamiliar information through hypotheses expressing its possible meanings, to arguments that situate the information as evidence for an agreed explanation. (Gooding, 2004, p. 280)

Gooding (2004) describes how this ‘dialectical play’ of wrestling with the interpretation and communication of novel phenomena nurtures emergent meaning: “Increased complexity and
information density make it more difficult to think with in a consistent and general manner, leading to a new cycle of abstraction” (p. 281). This is an unruly process – and the elegant scientific argument that is presented in the end belies the messiness of thinking and intuitive thought that led to the development of that argument. As Gooding notes, the nonlinear visual thinking behind the argument is rarely visible in the end, as most scientists “edit out everything that success has shown to be unnecessary to establishing a result” (p. 281) in writing up their work. And although a key feature of scientific visualization is “the plasticity and the integrative power of multiple images” (Gooding, 2009, p. 16), what scientists commit to paper appears certain, stable, and singular.

In the ‘writing up’, the unruly process of thinking is articulated through words joined into sentences stretching across a page, and the mess of active, visual thinking is tidied away. Language is not always linear, as Arnheim (1969) acknowledges, but intellectual thinking, such as the articulation in words of a scientific argument, is linear in its construction:

> Intellectual thinking...strings perceptual concepts in linear succession. Caught in a four-dimensional world of sequence and spatial simultaneity, the mind operates, on one hand, intuitively by apprehending the products of freely interacting field forces; on the other hand, it cuts one-dimensional paths through the spatial landscape intellectually. (p. 246)

McGilchrist (2009) connects this one-dimensional linearity to hemispheric attention: “It is via denotative language and linear, sequential analysis that we pin things down and making them clear and precise equates with seeing the truth, as far as the left hemisphere is concerned” (p. 135). With McGilchrist in mind, it seems that what Arnheim recognizes as intellectual, linear thinking is the focused logic of the left hemisphere, contrasted with the intuitive, holistic view of the right.

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28 Arnheim (1969) offers conversation, operatic quartets and concrete poetry as examples of ‘unlinear’ verbal sequences (p. 246).
I began this section by listing the mental operations Arnheim (1969) ascribes to visual thinking—a list that is interestingly similar to the critical and creative thinking skills enumerated in the new BC Core Competencies (B.C. Ministry of Education, 2013). Consider some of those thinking skills—analysis and synthesis, comparison, combining, separating—in looking at the following statements from Gooding (2010) and McGilchrist (2009):

Gooding: The ability to create and manipulate visual representations is a cognitive skill acquired as a scientist becomes an accomplished participant in...a particular domain. Innovations, in particular, require the ability to introduce novel ways of seeing and thinking into an existing framework of concepts, categories, and models. Innovations may be provoked by anomalies in observational data...and by the need to integrate information that originates from disparate sources. (2010, p. 16)

McGilchrist: What is offered by the right hemisphere to the left hemisphere is offered back again and taken up into a synthesis involving both hemispheres. This must be true of the processes of creativity.... There is a progress from an intuitive apprehension of whatever it may be, via a more formal process of enrichment through conscious, detailed analytic understanding, to a new, enhanced intuitive understanding of this whole, now transformed by the process it has undergone. (2009, p. 206)

Summarizing the views put forward by Arnheim, Gooding, and McGilchrist, using vision to think requires intuition and analysis, attention to specific data and an apprehension of the whole, the integration of information from disparate sources and the synthesis of dialectical interaction, and it is the play between these that leads to innovation.

“It is by logic that we prove, but by intuition that we discover” (Poincaré, as cited by Arnheim, 1969, p. 274). By popular accounts, Poincaré was a firm believer in the role of intuition in mathematical discovery (Resonance Publishing, 2016; Mastin, 2010), and he cultivated his flashes of insight by scheduling time in his day for subconscious processing29 (Mastin, 2010). Johnson (2007) describes meaning-making as a full-time job, but states that it is not usually

29 Poincaré’s regime is described as “2 hours of work in the morning, and two hours in the early evening, with the intervening time left for his subconscious to carry on working on the problem in the hope of a flash of inspiration” (Mastin, 2010, para. 3)
conscious or intentional: “Mostly, meaning emerges for us beneath the level of our conscious awareness. Meaning is happening without our knowing it” (p. 17). Interestingly, recent research in neuroscience also makes a strong case for the role of the subconscious. Kounios and Beeman (2014) found that “insight, though abrupt, is preceded by unconscious processing, primarily in the right hemisphere” (p. 69). Furthermore, the chance of achieving insight could be increased by broadening attention, and deliberately moving focus away from the problem at hand. Insight is described scientifically as a burst of understanding that comes from the reorganization of mental representations into a “nonobvious or nondominant interpretation” (Kounios & Beeman, 2014, p. 74). In other words, a flash of insight is the surprise of a new idea produced by the interplay and synthesis of existing, yet disparate ideas and concepts. This parallels the productive processes of innovation and creativity described earlier. Another finding from Kounios and Beeman’s (2014) study is that there are critical differences between the kinds of attention that contribute to insights. This might sound familiar. Outwardly directed attention, associated with the left hemisphere, focuses processing on dominant features, “those most closely related to the dominant interpretation or the current context” (p. 77) and contributes more to analytic thinking. Inwardly directed attention, which is associated with the right hemisphere, “heightens sensitivity to weakly activated remote associations and long-shot solutions” (p. 81), and contributes more to insight solving. Further, inwardly focused attention allows for thinking about things that are not present, and this psychological distance engages abstract thinking, which, in turn, encourages “a person to think more insightfully and creatively” (Kounios & Beeman, 2014, p. 82). Aligning these ideas with McGilchrist (2009), outwardly directed attention focuses on some thing, and is pulled to the current context or what it knows: this is the fixed, narrow attention of the left hemisphere. It is the right hemisphere, with its broad global gaze pulling to the edges of awareness, and its inwardly focused attention searching for remote associations, that attends to possibility.

What do I mean when I say that I am a visual thinker? How exactly do I use vision to think? The discussions above have focused on the mechanics of visual thinking, and have highlighted the dynamic interplay of the known and the new, the analytic and the intuitive in developing novel
ideas and fostering insight. What follows now is my attempt to share the interplay of actions and images that led to my reconceptualization of the normal distribution curve. This is my unruly process, the dynamic interaction of reading and sketchnoting and painting and thinking that led me to develop a new way of representing giftedness. But I did not start out with that purpose in mind. I started by thinking about painting and change.

November 4, 2010
Where to begin? The weave of the fabric is coarse under my hands as I smooth out the canvas, dragging my fingers over thickly laid paint, skimming across the slick surface of glued down paper. No music today. I can hear myself breathing, hear the rasp of my skin catching against the rough surface. My eyes scan, looking for my opening. A yellow line curves down from the top edge, branching across the centre of the canvas, curling around circles, cutting across smears of pink and green. OK. Start with yellow, but darker...I take a palette knife and smear the yellow across the palette. Dip the tip into blue, and push the creamy colours together. I cut into the red, my knife on an angle, and pull that paint into the mix. Turning my wrist, I push and pull the paint across the palette, the knife gliding through the thick mixture, then scraping across plastic as I scoop the colours towards me. Yellow streaked with blue turns to green, then brown as red mixes in.

Now some white. Mmmm. More yellow. I scrape the palette knife off on the side of the tray and, turning back to the canvas, hold the mixture against the yellow line. Too brown. Too dark. Another squeeze of yellow, a squirt of white. The mixture lightens, brightens, as I push and pull the palette knife through the paint. Good. Wipe the knife against the edge of the palette, and set it on the newspaper. Now a paintbrush – the thick green
one? No – thinner, round. Yes. I slide it out of the canvas pocket with my right hand, dip the brush in water, pick up the palette in my left hand, and turn back to the canvas.

In the journal excerpt above I described a phenomenology of painting. It narrates my haptic and visual sensations during a painting session – the movement of my eyes, my hands, my arms, the intake of breath – in a stream of words that are themselves punctuated with my own voice-over, “Mmmm. More yellow….Too brown. Too dark.” I later performed a hermeneutic investigation of those painting sessions, citing philosophers, poets and artists as I tried to make sense of the process from outside the experience, interrogating the “not-fully-conscious self who creates” (Burd, 2010, p. 3). What was I thinking?

*What was I thinking?* That canvas started a train of thoughts, a sequence of events. Yet those phrases are too linear – they edit out the unruly process of thinking and understanding as it played out over these past years. It is only in retrospect that there is a line that can be traced – as Gooding (2004) suggests, finished work tidies up the path of discovery.

*What was I thinking about?* I can trace my thinking back through some journal entries – linear successions of words on paper documenting…Documenting what? My verbal thoughts? My interior monologue? The edited written version of what I was thinking?
Nov. 9, 2010

*In looking at our canvases – mine so soothing, encircling, soft; yours so bold and vibrant – I knew I wanted the shock of your orange. O*,

*I have not felt so brave. I have been tiptoeing into the painting – circling, smoothing, scraping – fixing it with an image, a word. Then the smear of gesso across, welling up from the corner: hiding/covering/negating the underneath. And then on top of that my splurge of colour: vibrant pink at first, poured, then scraped across, extended, a glaze of colour. Then the yellow, red: worked, smeared, pulled in fiery flares across the canvas, across my earlier tendrils of yellow. What release! But it is N* who gives me the gift of orange – his pudgy hands mixing my colours together.

I took two things away from this art-making session, each equally important in their own way. The spill of paint, and the eruption of orange on my canvas were transformative – that was when I first understood the intensity and physicality of emotion that accompanies change. That orange fuelled me for months. But the repetitive circles lying underneath that flare of colour were instructive – they spoke to me of my need to smooth things over, to clean things up, to complete the circle, to tie up loose ends, to make things whole. The circling brushstrokes, my smoothing, circling hands repeated a comforting pattern that was ingrained in my muscle memory and imprinted on my mind’s eye. Circles had resonated with me for years.*
April 12, 2011

In the shower today, preparing myself for a morning of writing, these two disparate tasks\(^{30}\) wove through my internal dialogue as ideas about lines and markers, the forward motion of time and the encircling, looping nature of memory intertwined. It seems to me that the lines of analysis we trace through data, the journey we trace with a finger on a map, the lines of poetry and prose written and read from left to right, the line of blue pen writing on paper – all speak to a forward movement, yet each also loops back through evidence and editing and events and experience. Researcher and recorder, artist and sister, teacher and _____ (whatever the word is that is the opposite of the noun ‘elder’), I am conscious of the intensely personal narrative that I draw from, and draw forth. I am wary of my own tracing, unsure of my line, aware of the multiple lines that could be, should be drawn, and that my own is but one of a multiplicity, a single line of possibility. How can I speak for others from my own place?

From February 1982 to April 1985, the artist David Hockney was captivated by the artistic possibilities of photocollage. Beginning with Polaroid prints assembled in composite grids, Hockney explored the ‘Cubist effects’ of layered images, multiple viewpoints, and the static rendering of movement through space made possible when the ‘one-eyed’ single photograph was replaced by ‘joiners’ that captured the sensation of a moving glance. His 1982 portrait, My Mother, Bolton Abbey, Yorkshire Nov. 82, is typical of this work\(^{31}\). Multiple borderless 35mm prints are pieced together, overlapped, conjoined, to render the central image of his mother resting against a flat tombstone. The ruins of the abbey, and its grounds, similarly pieced

\(^{30}\) In an earlier part of this journal entry, I described being torn between my academic writing and the task of writing my sister’s eulogy.

\(^{31}\) **Figure 7 Photocollage** has been removed due to copyright restrictions. It was a photocollage comprised of multiple overlapping photographs of David Hockney’s mother seated on the grounds of Bolton Abbey. Original source: Hockney, D. (Artist) (1982) My Mother, Bolton Abbey, Yorkshire Nov. 82 #4 (photocollage). In Tate Gallery, L., Tuchman, M., Barron, S., Weschler, L., Los Angeles County Museum of Art, & Metropolitan Museum of Art (New York, N.Y.). (1988). *David hockney : A retrospective*, p 215. Los Angeles, Calif: Los Angeles County Museum of Art; London : Thames and Hudson.
together and in focus, background the subject. In the foreground, the grass and a few scattered autumn leaves fill the space between his mother’s sensible black shoes and the tips of the artist’s brogues, seen just breaking the irregular frame of the photo collage’s lower edge.

Circling back and around. Looping, connecting multiple lines. In the midst of all else that was going on when I was writing that journal entry, that Hockney photo came to mind – it had stuck with me for years after seeing it in an exhibition, and I searched through my books so that I could include it in this entry – because it captured visually the idea of multiplicities: multiple viewpoints, multiple perspectives, multiple possibilities. Now I jump ahead to Arnheim (1969), a book found on my late father’s bookshelf just this fall. Arnheim (1969), who I should have known all along, argues that when it comes to thinking, language is “overrated” (p. 242). He draws parallels between the sequential nature of intellectual thinking and the linearity of verbal language used to convey that thinking, and contrasts those linear relations with the gestalt of perception. Heath (2000) suggests a more fluid relationship between the verbal and the visual: “The line between word and image is getting harder to draw; the visual through colour, line and form enables understanding of metaphor – our ability to map interactions, experiences and cognitive operations across concepts to form images” (p. 124). My task was to capture my reflections and ideas in words, but my mind was awash with memories. Is this why the Hockney photo collage, first encountered almost 30 years ago, struck a chord? There is something about the layering and overlapping of those multiple images to create a whole that resonated with me profoundly. I can read it now as an affirmation of non-linear thinking, as an embracing of the messy and multiple moments that constitute my reality. The messy layering of images matches my own creative process: images and ideas are secreted away, are layered, composted; later they resurface in whole or in part, and are called into relation with each other. And so David Hockney’s photo collage comes to mind as I piece together in words my own relationships with my sister, my work, and the world. All of these things – the layering and overlapping of images, the encircling, looping nature of memory – have fuelled my explorations in mixed media layered painting. And this practice in turn has sparked and shaped my thinking.
Where/how did these ideas and images and colours come together? Using vision to think involves a tension between the old and the new, the familiar and the strange; it is an integration of information from disparate sources, a synthesis of dialectical interactions. Circles and spheres; Leonardo DaVinci’s Vitruvian man, and my daughter with outstretched hands; my collaged silhouettes of my daughter standing, and of men digging my uncle’s grave in Hope Bay, Antarctica; the yellow of a stencilled globe, a spherical flower, my phrenological head poster; the turquoise that washes across my collages and is gouged off a wooden plate; Florence Nightingale’s polar area diagram and my overlay of Antarctica; mapping, measurement, memories, metaphors.

Eisner (1993a) said:

“There has been a sharp and unfortunate separation drawn between perception and cognition. In the traditional classical view, perception provided the mind with the contents it needed in order for thinking to occur. Increasingly, we have come to recognize that perception itself is a cognitive event: The eye is part of the mind. (p. 66)

“The eye is part of the mind.” My store of images and ideas, mappings and metaphors, the pull of my gaze to recognize that pattern, to notice that colour, to latch onto that shape: it was a fully embodied engagement of eye/mind that led me to a new understanding. As Heath (2000) notes, “The visual and the verbal reinforce one another in the sustained and adaptive learning necessary to increase learning from the theories of others and to build strength in one’s own theories” (p. 124). My inwardly focused attention, reaching into my store of memories, drawing forth things that are not present, engaged abstract thinking. It was the not-fully-conscious self, the circling hands, the repetitive motions, the unfocused gaze that lead to insight. This is how I came to a new way of conceptualizing the bell curve.

The ungainly canvas that came from my first exploratory project of collaborative painting, layered with those recurring circles and that orange flare of disruption, enfolding hours of studio conversations with my painting partner about collaboration and democracy, change and uncertainty, the challenges of mothering, and mothering ourselves and each other through
challenges – that canvas was transformational for me. Much later, I transformed it in my mixed media exploration of the bell curve.
PSYCHOPROFILE

COGNITION

STRENGTHS

PASSIONS

Quantitative measurement

Stemming

Task Complexity

 Trait Complexity

Holistic profiles

Florence Nightingale

Rox Combs
March 2013

I have been mapping out a bell curve, superimposing it on a circle in an attempt to visualize those percentages as part of a whole.

My first attempt used a radius line divided proportionally:

and I used these proportions on my first canvas. But in thinking it through, I realized that in using these measurements for my radii, I was actually skewing the area of each section. In reality, the proportions would shift to reflect the overall area, and a much more complex calculation would be required to determine the proportions.

Hmmmm.
\[ r_{68\%} = \sqrt{\frac{81 + 570 + 2767}{3.14}} \]
May 28, 2013

Educators use a range of measures in attempting to capture student potential: cognitive assessments, achievement tests, report cards, checklists, questionnaires, interviews. But it’s the numbers that carry weight: there is a sense in education that “things are not being done properly unless they are tabulated, measurable and measured....” (R. Smith, 2008, p. 642). Test results yield percentages and percentiles, rankings and cut-off scores, and in a system dependent on categories and designations, these numbers are often regarded as the definitive summary of student ability. What do we really see when we look at these numbers? Thinking outside the box/seeing outside the box – can we see what is right in front of us, without the restrictions imposed by ‘widely held’ societal/educational expectations at the bell curve that commonly describes the distribution of ability. The idea that 2-5% of our student population is gifted originates here:

Could it be that this illustration helps shape our perception of the very data represented? Within the bell curve’s scientific, objective display of data is the making of a metaphor: gifted and low-functioning students are seen as exceptions, pushed to the edges, marginalized by the dominance of the norm. The everyday experience of exceptional children is rendered not normal, and they themselves are outliers. The conflation of genius with ‘misfit’ or ‘crazy one’\(^{31}\) may not originate here, but it is subtly reinforced in this illustration of the extremes of ability.

\(^{31}\) This is a reference to Apple’s iconic Think Different ad campaign.
'there is nothing natural, or NORMAL about the normal curve.'

It suggests that human difference can be measured in terms of deviations from a statistical construction of

and that the mean provides a point of reference for determining who is NORMAL and who is NOT

WHAT if we could see things differently? What if we recognized that it IS NORMAL to be DIFFERENT?

And what if we embraced those differences?

What if we could tug on that line that measures out difference and encircled all the amazing human

ability within?
What if instead of measuring difference, we could see endless, vibrant human possibility?
Chapter 6: Imagining

The role of imagination is not to resolve, nor to point the way, nor to improve. It is to awaken, to disclose the ordinarily unseen, unheard and unexpected.

(Greene, 1995, p. xiii)

Sept 30 2012

In my role as the gifted education consultant for a large, metropolitan school board, I field calls daily from parents, teachers, and administrators concerning potentially gifted students: “I’ve got this child/student who is amazing/bored/challenging/under-challenged…”

Parent phone calls often document underachieving, unengaged children.

Teacher phone calls sometimes describe that same bored child from a different perspective: “The parents think he/she might be gifted, but we don’t see it….” Other times, the teacher recounts a phenomenon: “We’ve got a kid who has just blown the roof off the KTEA32….”

Administrators call because they have had conversations with both parent and teacher, and are trying to synthesize the different views of the child each describes.

My job is to provide support to each of these adults, and to the child. I try to bring together the information gathered from various sources, and from that, make decisions about designations, appropriate programming, and teacher/student support. But my tools are inadequate for this task. I am charged with capturing the potential/capacity of a child by sifting through piles of paper and bureaucratic forms:

Psycho-educational assessments

KTEAs

Woodcock Johnsons

Report Cards

Checklists

Anecdotal reports

Referrals to programs

32 KTEA: Kaufman Test of Educational Achievement
PRIS forms

Referrals to screening

Numbers

Values

Words

These do not/cannot fully capture the child they describe.

We know this. We know these numbers/values/words are markers; that our finger on a score or word is like a pinpoint on a map. The confusion comes because we are working with different maps.

A parent traces a passion for reading and an obsession with physics and astronomy.

A teacher points out achievement scores and marks that only occasionally stray from the average range.

An administrator draws a finger across a PRIS form with boxes to check and papers to attach.

Where are we with this child? What do we know? What can we say? What can we see?

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33 PRIS: Pre Referral Intervention Strategies
What can we see? As I established in the introduction to this thesis, the project of seeing possibilities for giftedness has been constrained by a limited view of giftedness: this thesis contends that an important way of thinking is missing from research, identification, and programming for gifted students when visual thinking is absent or sidelined. I have responded from the transdisciplinary space of a consultant-gatekeeper/teacher-researcher/visual thinker, and have brought those multiple views to my exploration of how and what the visual contributes to the conceptualization and communication of ideas around giftedness. Here I review the new understandings that emerged from that exploration, and consider future implications. Lastly, I will discuss how the format of this thesis itself makes an argument for the role of visual thinking in the conceptualization and communication of ideas around giftedness.

**Looking at giftedness: ‘Being seen’ is critical to an equitable construct of giftedness**

Giftedness can best be understood as a socially constructed concept that has changed over time in response to changes in society and culture, and an ever-evolving understanding of the psychological and physiological process of learning. The construct of giftedness has evolved
over the past hundred years from a fixed personal trait measured by IQ tests to a variety of multidimensional constructs that acknowledge a wider range of ability domains. Central to most constructs is the idea that giftedness is something that can be discovered in students, and can be identified through assessments such as cognitive and achievement testing or teacher rating scales, which focus predominately on selective traits and measures of statistical rarity. However, the contribution of visual-spatial ability and visual thinking to the identification and development of giftedness is rarely considered. It appears that the visual is invisible in gifted education.

The question of equity can be described as concern for who and what is seen: who is seen as ‘gifted’ or ‘not’; which abilities are recognized, and which abilities remain invisible. Coming to this discussion from my own experience and unease with identification practices, I adopt the project put forward by Borland (2005) of developing gifted education without gifted programs or gifted students. Seeing giftedness entails seeing individual learners and their abilities, and recognizing in those abilities the possibilities they encompass.

**Looking for giftedness: The search for giftedness has been constrained by narrowly focused attention**

The two hemispheres of the brain support two different types of attention: an embodied, global, flexible attention on the right and a focused, narrow and fixed attention on the left (McGilchrist, 2009). The right hemisphere gives rise to insight as it consciously and unconsciously reorganizes mental representations into new interpretations: the left hemisphere “close[s] down perception to a certainty, instead of opening up to possibility” (McGilchrist, 2011, p. 1069). While creative thinking encompasses the flexible thinking ascribed to the right hemisphere, few assessments, including measures of creativity, incorporate visual-spatial abilities. The narrow focus of the left hemisphere is pulled toward the known, a predilection for certainty that is mirrored in the close-mindedness and intolerance of ambiguity found in some gifted students (Cross & Cross, 2012). In examining the identification/documentation process, I put forward the hypothesis that this same pull to certainty
predisposes teachers and administrators to a fixed and limited view of giftedness when participating in narrowly defined identification tasks.

**Visualization:** *The representation of ideas in diagrams and visual metaphors promotes understanding*

The visualization of information and concepts constitutes a way of thinking, a way of making sense. Research from the arts and philosophy, psychology and neuroscience, math and science education confirm that visual perception contributes to the development of mental models, concepts, and abstract thought. Visual representations support the conceptualization and representation of complex data, and enhance memory, comprehension and analysis of complex relationships, and yet academic journals in general and gifted education journals in particular appear to ignore the power of effective visualizations. Visual metaphors are often incorporated in effective visual representations, and the embodied nature of metaphors contributes to their potency. Drawing on my own practice as a consultant, I examined how my knowledge of visual literacy helped me create diagrams that successfully communicated ideas and engaged my audience; and how as a teacher, I harnessed the power of visual metaphors to promote self-awareness and metacognition in my students. Visual literacy promotes the comprehension of metaphor, and metaphor in turn promotes meaning-making: in this recursive transaction, the visual opens up metaphoric possibility.

**Using vision to think:** *Visual thinking plays a significant role in the development of novel ideas and the emergence of insight*

A deeply embedded view in Western thought perpetuates a false dichotomy between mind and body, perceiving and thinking (Johnson, 2007). Diverse theories from the arts, sciences, philosophy and neuroscience support a more integrative view, and regard visual thinking/visual perception as a significant factor in nurturing innovative ideas and insightful interpretations. Innovations, insights and creativity can be seen to arise from the reorganization of the known, and the synthesis of the new, in a dynamic interchange of the intuitive and the analytic. Visual thinking is a fully embodied project. Both cerebral hemispheres are involved in that interplay,
but the right hemisphere’s involvement is critical to insightful and creative thinking. By bringing attention inward to remote associations or other things/ideas outside the current context, or taking its global gaze outward to the periphery of awareness, the right hemisphere supports abstraction and insight.

My own experience of visual thinking involves that same tension between the old and the new, the familiar and the strange; it integrates information from disparate sources, and synthesizes it in a dialectical interaction. This is an embodied act of perception: visual perception is visual thinking. It draws on my store of images and ideas, mappings and metaphors; it relies on my gaze recognizing pattern, noticing colour, latching onto shape. Using vision to think, it is my not-fully-conscious self, my circling hands, my repetitive motions, my unfocused gaze that lead to insight.

Seeing possibilities

My conception of the future makes me envisage a greater role for the imagination, a greater reliance on metaphorical thinking, and a greater openness to [the] visions of human possibility.

(Greene, 1998, p. 35)

Seeing possibilities for gifted education depends on opening up to possibility. As this thesis suggests, narrowly focused attention closes down perception to certainties, and it is broader or unfocused attention that opens up to possibility. Seeing possibilities for gifted education requires a shift in focus from giftedness to education, from labelling students to labelling opportunities. Seeing possibilities for students depends on seeing what they are capable of when given a challenge that is appropriate to their developmental stage and their interests; it depends on focusing on student ability not to categorize and limit options, but to guide next steps towards an ever-expansive horizon.
Seeing possibilities for gifted education depends on fostering insights. As this thesis proposes, innovations and insights arise from the edge of awareness, the reorganization of the known, and the synthesis of the new. Fostering innovative and insightful thinking in students, educators, and parents requires shifting focus from consuming information to interpreting information, from regurgitating facts to developing metaphors for understanding.

Seeing possibilities for gifted education depends on making space for visual thinking. As I hope this thesis demonstrates, the visual has a contribution to make to the communication and conceptualization of ideas around giftedness. Visual thinking opens up possibilities: broadened attention expands awareness, metaphorical thinking extends understanding, visualizations lead to insight. This is the thesis I had to write, and this is how I had to write it. Words are not sufficient for the task. The visual is part of my language, and the visualization of words and ideas is my way of actively creating connections and constructing concepts; it is my way of making sense. My conception of the future makes me envision a greater role for visual thinking in the ongoing search for endless vibrant human possibility.
References


