Image as Insight: Visual Images in Practice-Based Research

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Art practice as research casts artmaking as inquiry—as a particularly experiential and constructivist process of learning in which imaginative synthesis and creative image making are ways of constructing knowledge. This article explores how artmaking functions as research through the creation of visual images, especially images that picture concepts, to create new insights and transform perceptions. It follows a path from mental images that mediate conceptualization in the mind to visible images in the world that shape thought in the social realm. To do this, it takes an interdisciplinary approach, exploring concepts from cognitive science, metaphor theory, and the sociocultural theory of mind, and presenting relevant examples from science and art to explain those concepts.

Although visual imagery is considered central to studio-based inquiry, theory in art practice as research has yet to explain fully how imaging works. As learning is the central tenet of research, it follows that an understanding of the ways people learn through seeing, visualizing and making visual imagery is critical to any explanation of why artmaking qualifies as research. This article addresses this omission by constructing a theory of learning through image making. The central premise of this theory is that clarity and meaning are engendered when ideas, concepts, or information is transformed into visual images, objects, or visual experiences. This transformation either organizes ideas and information in ways that make it accessible, concrete, and understandable (in diagrams and maps), or allows information to be seen differently, in a fresh, more meaningful, personal, and experiential way (as in art, symbolism, and metaphor). This transformation of concepts through imaging produces new insights and learning.

A theory is essentially a proposition constructed from a synthesis of experience, evidence, and insights of researchers and experts in the field or related fields. The theory discussed here is based on accounts of visual thinking, image making, and seeing from many sources: the cognitive sciences, theories of scientific process, visual hermeneutics, and sociocultural theories of visuality. It also has roots in my practice as a studio artist, observations of art, and work with art students.

Theories in art education are often constructed to shed light on practice (to generate awareness of what exists) and to articulate conceptual structures for practice (to make sense of it or to see it in new ways). The theory presented here focuses on the cognitive processes that take place in image making and places them within a conceptual
framework of learning. To accomplish this, it formulates an account of imaginative learning based on images as they function in art practice—as components of creative process, as mediums of cognition, and as shapers of individual and social/cultural thought. Conceptualizing art practice in this way has practical value; it can shape and facilitate art practice. It also makes the concept of artmaking as research clearer and more concrete. The theory presented here could be useful to: (a) artists who want to augment their processes of learning through artmaking; (b) art educators who teach about and through images and catalyze learning through image making; and (c) art educators and theorists who understand learning as a primary motive for image making and advocate for the concept of art practice as a form of research.

**Art Practice as Research**

The notion that art practice is research provides a fresh take on artmaking. This approach modifies conventional notions of art practice as self-expression or object making to cast it primarily as an exercise in knowledge construction: a process of coming to know. This has significant implications for art education on all levels from kindergarten through doctorate programs in art. It places studio practice in line with qualitative research procedures in other domains and justifies the inclusion of art programs in academia (Gray & Malins, 2004; Sullivan, 2005). It inspires and validates a new approach to creative process and to visual images in the classroom.

Sullivan (2004, 2005, 2006) calls this form of research *studio-based* or *practice-based* and defines it as inquiry that is centered in creative practice where the artist uses image making as the primary mode of exploration. In this definition, Sullivan delineates two fundamental elements of studio-based research: studio practice and visual images. To Sullivan, process is the factor that distinguishes studio-based research from other discipline-based arts inquiries such as those in art history, anthropology, or cultural studies where images serve as focal points of analysis. In practice-based inquiry, analysis of images is only a part of a reflective process; the creation of images is the primary mode of inquiry.

Gray and Malins (2004) describe practice-based research as a constructivist, reflective practice where the artist-practitioner shapes findings in the form of visual images to construct meaning. In defining studio practice as constructivist, these theorists depict studio process as iterative and progressive; ideas are shaped into images and the resulting images shape further thought and imagery. It is important to note here that the term *constructivist* is usually applied in learning theory to characterize learning as an interactive process (Efland, 2002; Freedman, 2003). Here Gray and Malins make a direct link between learning and image making and they highlight the explorative, experiential aspects of this type of learning. Also, when described as meaning making, creative practice
is connected to understanding—to learning that is significant, meaningful, and applicable (Bransford, Brown, & Cocking, 2000).

The kind of knowledge generated in practice-based research is also significant. Sullivan (2005) claims that studio-based research is not concerned with generating new information (as conventional research generally is) but with re-construing existing information. Its goal is to transform perception: to change the way we see or interpret things. Transforming perceptions generates insight: new understandings and new perspectives that make sense of perceptions and experience in new ways. New insights represent new knowledge and they create new knowledge. Studio-based research is well suited for this transformative role precisely because visual images are its primary medium.

**Context and Issues of Visual Images**

A fundamental question underlies our discussion of visual imagery in art practice as research: What is the nature of vision or visual experience? A summary of theories of visuality in visual studies and visual culture yields many interpretations of vision, but they all agree on one thing: Vision and visual imagery play a dominant role in shaping consciousness in the contemporary world (Elkins, 2003; Heywood & Sandywell, 1999; Jay, 1993; Levin, 1993). As Elkins states, “We live in a pictorial age, the age of pictures. Pictures represent, mediate it, make it comprehensible” (p. 130).

The study of visuality has inherited from structuralist/poststructuralist theory a propensity to treat visual imagery in terms of language; to understand vision from a cultural-linguistic perspective (Jay, 1993). This orientation is associated with Postmodernism. In it, theorists understand all vision to be filtered through experience and culture. No perception is direct or unaffected by context (Anderson, 1997; Efland, Freedman, & Stuhr, 1996; Freedman, 2003; Parsons, 1998). A corollary to this premise is the semiotic theory that all images are representations (signs and symbols) that can be read as texts (Barrett, 1997). Most visual scholars today agree that vision is a complex phenomenon that defies these reductive assumptions (Brennan, 1996; Jay, 1993; Mitchell, 1986; Stafford, 1996). Jay, for example, posits the existence of the optical unconscious or preconscious unfiltered perception. The existence of the optical unconscious suggests that the physiological explanation of visual experience needs to coexist with the cultural-linguistic perspective (Brennan, 1996). This is reaffirmed in cognitive science where nativist or veridical perception is seen to complement illusory perception, perception filtered and distorted through the sensory-cognitive prism and, therefore, shaped by culture and experience (Solso, 2003).

A pluralistic account of vision is critical to our understandings of imagery and imaging in art practice as research. It defines vision as a
complex modality that works on conscious and unconscious levels and involves \textit{reading} and direct experience. It also makes room for the theories of Gestalt psychologist Rudolf Arnheim, which are incompatible with a strict cultural-linguist interpretation (Parsons, 1998). Arnheim (1969) argues that perception precedes conception. Conception is also a visual process of discernment of forms in space. To Arnheim, seeing is thinking, \textit{visual thinking}. Vision is a step toward language, not the other way around. Arnheim's insights into visual thinking, provide the groundwork for our discussion of conceptualization in art practice. Although they leave out the cultural aspects of perception (Parsons, 1998), they do present a critical piece of the puzzle.

We return to our original question: What is visual experience? One way to penetrate the nature of vision is to compare it to language. Arnheim (1969) finds that one distinction between the two modalities lies in the way vision apprehends patterns in space or whole forms in one perceptual act. Language, on the other hand, has the capacity for precision and explanation. It is a secondary modality limited with its distance from perception and necessity to be sequential (Dorn, 1999; Gardner, 1982). Also, Arnheim believes that we think in a medium. Visual thinking is distinct from linguistic thinking because it takes place in mediums such as ink, paint, stone, plaster, and clay (for Arnheim), or in video, film, and digital images in more contemporary work. It is a complex synthesis of perception and problem solving, which occurs in the give and take between eye, mind, materials, and forms (Parsons, 1998). Visual thinking, therefore, occurs in structure, form, and materials with their particular conventions, possibilities, and limitations. In contrast, linguistic thinking takes place in the medium of words and sentences with their specific characteristics and rules (Gardner, 1983).

The embodiment of ideas in materials and in visual images is another factor that sets visual experience apart from linguistic experience. Hermeneutic aesthetics finds the fusion of idea with presentation (form and material presence) to be the factor that makes visual experience different from linguistic experience, where ideas are \textit{represented} in a disembodied way. This fusion of presence and idea is the source of art's meaning and power; it brings materials to life and it allows an instance (a single artwork) to allude to a host of unsaid interconnected ideas and to speak to each viewer in a direct, personal way (Davey, 1999). Whereas Arnheim found ideas and meaning in abstract non-objective forms (he believed subject matter to be a distraction;) (Dorn, 1999; Parsons, 1998), visual hermeneutics also embraces images that depict or represent phenomena in the visible world. In hermeneutic aesthetics, visual imagery and imaging are celebrated for their generative capacity to distill and increase reality and this power comes from the synthesis of presentation and representation (Davey, 1999). Stafford (1996).
addresses the complexity presentation brings to representation. For her, imaging is the richest modality for configuring and conveying ideas not only because of the materiality and formal qualities of the image that give it physical presence, but also in the multiple layers of meaning that defy reading, which physical presence provides.

What is the significance of these theories of cognition, language and imagery to our discussion of imagery in art practice as research? First, they put Arnheim’s theories in context and shed light on the controversy surrounding his ideas and the aesthetics associated with them. Arnheim’s emphasis on structure, distillation, and medium provided the basis for formalist aesthetics and essentialism in art. These ideas had a great influence on art and art education in the mid-20th century when the basics (the principles of design and formal elements such as line, form, color and texture) were given prime time (Hobbs, 1997). But attitudes have changed. Parsons (1998) expresses commonly held and valid criticisms of Arnheim: “Its universalist implications and individualist views of learning sit uneasily with our awareness of diversity and the importance of culture; and its prohibition of linguistic thinking in art fits poorly with our postmodern interest in context and meaning” (p. 84). It may be an uncomfortable fit, but a fit nevertheless. Although contemporary art and art education have shifted to an emphasis on plurality, diversity, and meaning in line with postmodern art and thought (Anderson & Milbrandt, 2005; Efland, Freedman, & Stuhr, 1996; Freedman, 2003; Parsons, 1998), this does not exclude an engagement with the formal qualities of art but shifts the focus to the ways these qualities participate in the making of meaning. The intimate connection between content and form was one of Arnheim’s primary themes (Freedman, 2003).

Second, the contrast of language and vision leads to an appreciation of vision as a cognitive modality with its own capacities to construct and convey knowledge and concepts. It illuminates the difference between conventional language-based research and visual research, the goal of which is not communicable knowledge in the sense of verbal communication but in the sense of “iconic or imagistic communication” (Macleod & Holdridge, 2006, p. 4). This is a critical factor for art practice as research. In conventional research, the written word and language-based processes have primacy, with pictures and visual observation acting as supporting tools. Art practice as research offers an alternative model of research where images are the principal medium, imaging the primary modality, and language a complementary tool (Macleod & Holdridge, 2006; Sullivan, 2005).

Third, the comparison between language and vision compels us to look closely and contrast linguistic experience to visual experience. Thus, it reveals the distinctiveness of visual thinking and visual experience. Visual imagery, in working on a conscious and unconscious
level, and in presenting phenomena in ways that defy reading, can evoke and articulate ideas in ways verbal language cannot. The complexity, ambiguity, and experiential qualities of visual imagery make art practice as research an especially nuanced and powerful mode of inquiry.

**Visual Imagery in Perception and Conception**

Definitions of the term *image* range from likenesses of perceived entities to internal visualizations in the mind such as apparitions and conceptions (Barry, 1997). These definitions include and delineate between perceived and mental images (images in the brain or mind) and *exteriorized* images (Ricoeur, 1991) that have been created in visible, material form by an artist, designer, or scientist. Whether interior or exterior, images can be categorized into two general types: pictorial (natural, mimetic) images that represent or record perceptions (such as naturalistic drawings and photographs), and conceptual images that embody concepts. This dichotomy is somewhat problematic as there are no pure pictorial (or perceptual) images (Elkins, 1999). Perception is a function of the brain (Arnheim, 1969; Barry, 1997; Gregory, 1997; Solso, 1994); therefore all images are mediated. Also, the line between pictorial and conceptual images is flexible and porous; images usually have both pictorial and conceptual qualities (Elkins, 1999). Furthermore, perceived or pictorial images are often the building blocks of conceptual images (Arnheim, 1969; Barry, 1997; Solso, 1994; Zeki, 1999), and the two intermix in concept-construction and in creative process. However, in order to explore creative process, it is useful to begin by making a distinction between these two general categories of visual images. Having done this, our examination focuses primarily on conceptual imagery and its function in the mind and in art.

**Arnheim: Visual Thinking and Abstract Thought**

As Ricoeur (1991) contends in his theory of imagination, all mental images are conceptual; they do not copy reality. Arnheim (1969) agrees and posits that the mind makes sense of perceptions through conceptual imaging: either as a paring down to essences or in picturing connections. In his case for abstraction, Arnheim argues that mental images are on a basic level interior extensions and refinements of the images perceived by the eye. These images are often incomplete and their partiality is not a deficit but a source of their cognitive function and power. This abstraction or distillation represents a step beyond perception to conceptualization.

Arnheim (1969) argues further that mental images can be abstract *shapes*, which are not distilled from physical exterior reality but are instead visualizations of patterns, relationships, and concepts. When Arnheim states that “concepts take shape” (p. 116), he asserts that the mind organizes concepts, which are organizations or categories of ideas in
themselves, as spatial configurations and meaning develops through the spatial arrangement of relationships. This mapping is also a step beyond perception toward conceptualization. To Arnheim, conceptualization or abstract thought is dependent on the distillations and mappings that visual thinking provides.

**Gardner: Spatial Intelligence**

Howard Gardner builds on the work of Arnheim (Gardner, 1982; Parsons, 1998). In his theory of multiple intelligences (1983), he delineates seven modalities through which the mind conceives, structures, and communicates reality. Three modalities (musical, spatial, and kinaesthetic) are related directly to the body and the senses. Visual images and visualization are commonly associated with spatial intelligence. According to Gardner, spatial intelligence is a set of capacities that “typically occur in the spatial realm” (p. 176) that can work together or independently. He elaborates,

> Spatial intelligence entails a number of loosely related capacities: the ability to recognize instances of the same element; the ability to transform or recognize a transformation of one element into another; the capacity to conjure up mental imagery and then to transform that imagery; the capacity to produce a graphic likeness of spatial information; and the like. (p. 176)

The capacities delineated by Gardner (1983) fall into four basic categories: observing, making connections, conjuring, and transforming. We will start with the first two: observation and connection making. To Gardner, these abilities and activities are directly related. Observation leads to discerning visible differences and similarities. Discerning visible similarities extends to perceiving connections that are symbolic or metaphorical. This last step requires making connections beyond the literal, which is a long-distance leap of the imagination.

A final facet of spatial intelligence grows out of the resemblances that may exist across two seemingly disparate forms, or, for that matter, across two seemingly remote domains of experience. In my view, that metaphoric ability to discern similarities across domains derives in many instances from a manifestation of spatial intelligence. (p. 176)

Gardner agrees with Arnheim that visual/spatial thinking is critical to higher-order thinking, but Gardner takes connection making from mapping to metaphor; from simple connections to complex imaginative relationships.

Understanding the concept of metaphor is critical to grasping the gravity of Gardner’s ideas. A metaphor is essentially a comparison between similar but not identical things where one entity is seen in terms of another (Black, 1981; Johnson, 1981). Metaphor has tradi-
tionally been connected to language and linguistic thought (Johnson, 1981; Ricoeur, 1981, 1991). Indeed, Lakoff and Johnson (1980) study the metaphorical workings of the mind by examining language. Rooting metaphor in language is consistent with the structuralist/poststructuralist notion that consciousness is rooted in language. As discussed earlier, the linguistic basis for all thought is contested. Ricoeur proposes a solution. He calls the mechanisms of metaphor language-like. In doing this, he removes metaphor from language and puts it in the realm of general mental processing, which includes visualization. In connecting metaphorical thinking to spatial intelligence and thereby challenging the notion that metaphor is primarily linguistic, Gardner further adds credence to the case that visual imagery is a foundation of consciousness. This is a particularly significant claim because, according to Lakoff and Johnson, the mind works metaphorically; our entire conceptual systems, our ways of understanding the world, are based on the metaphors through which we view the world.

Taking his clues from Gardner and Arnheim, West (1997) contends that visual/spatial thinking is the integrative mental modality. West argues that because visual images are the mode through which ideas are synthesized, organized, or interpreted, they present an integrative picture. Therefore, visual/spatial thinking enables us to grasp the gestalt, the big picture, and to do it, not in a linear linguistic fashion, but simultaneously and instantaneously. When this picture presents an illuminating new vision, it becomes a catalyst for insight. West makes the critical connection between visual images, imaginative synthesis, and understanding.

West (1997) also sees a connection between the integrative function of visual/spatial thinking and creativity. To West, seeing a problem in a holistic, integrated way is critical to solving it. The connection between creative thinking and spatial/visual thinking for Gardner (1983), however, also lies in the third and fourth capacities that he designates in his theory of spatial intelligence: the ability of the mind to transform given images, or conjure and transform images of its own. These abilities and the capacities to visualize and make symbolic connections are the two capacities that connect creativity and visual/spatial intelligence. In art practice, as in research in other domains that employ imagination, these are primary modes of inquiry and learning; they are the capacities at work in producing what Sullivan (2005) calls imaginative insight.

Images of Creative Scientists: Maps to Metaphors
To understand the role of visual imagery in imaginative, integrative thinking we must look at the visible manifestations of this thinking: conceptual images of art and science. As science provides the conventional model of research, we begin with concept visualization.
in theory-construction in science. Arthur I. Miller (1996, 2001) examines imaginative insight as it shaped the great breakthroughs in 20th-century physics. To Miller, imaginative insight is a product of deliberate observation, data gathering, and rational analysis (synthesis). Observation involves perception and pictorial images, while synthesis requires mappings. Mapping is a way we make sense of the reality behind our percepts and how we find invisible, conceptual structures (Arnheim, 1969; West, 1997). This process is materialized and made visible in maps.

Elkins (1999) classifies maps as schemata. Merging notation (readable signs) with geometric configuration, the category of schemata covers a wide range of images with varying degrees of notation, pictorial qualities, and symbolism. On the notational end of the scale are the graphic images cartographers construct to show locations or graphs and diagrams scientists use to organize and understand data. These schemata generally reduce information into simple forms to display quantities and relationships but they are never purely notational.

A primarily notational map makes sense of information in a way that can generate insight based on a visual, rational process of “connecting the dots.” A truly new insight, however, often requires a conceptual leap that is not based on rationality alone. This leap occurs through metaphor and metaphorical images. The process of constructing a metaphor is partly rational (connecting the dots) but also imaginative (seeing the dots in a new way). Lakoff and Johnson (1980) call this process imaginative rationality. Often metaphorical images emerge from the notational maps scientists construct to shape information. Indeed, they often resemble maps. Elkins (1999) locates these map-like images on the pictorial/symbolic end of his scale of schemata and connects this metaphorical impulse and picturing to ancient pre-scientific ways of knowing. His examples are images of the “world egg,” mandalas, or genealogical trees. To Miller (1996, 2001) metaphorical images or schemata are critical to new understandings in science because they not only provide a coherence and embodiment to what would otherwise appear to be a random and confusing deluge of information, but they also breach the limits of logic to reveal and generate new imaginative concepts.

Charles Darwin’s image of the tree of evolution in his Sketch for an Evolutionary Tree (1870) stands out as an archetypal example of the revelatory metaphorical image in the form of map (Eldredge, 2005; Gardner, 1983). After gathering a vast array of data, Darwin mapped out his findings in the form of a tree. The tree is a map and served as the model, the organizing principle that not only made sense of the data but shaped further construction, arrangement, and understanding of all Darwin’s (and later Darwinians’) facts (Eldredge, 2005). Darwin’s tree
also has deep metaphorical roots; it is reminiscent of other symbolic tree schemata such as genealogies and trees of knowledge. As such, it represents a pan-species family tree and it resonates with wisdom about life, interconnectedness, and change.

Visual imagery also played a pivotal role in the scientific work of Johann Goethe, who, in his *Spiral Tendency of Plant Forms* (1831), employed the spiral to illustrate and further his understanding of his theory of metamorphosis in plants (Engard, 1989). Once again, an image works as a map (leaves generally grow in spiral formations on stems) and as a metaphor (spirals often symbolize the cyclical yet linear nature of growth and life). As a metaphor, this image encapsulates Goethe’s concept of dynamism in nature and was pivotal in his conception of the life force that animates all living things.

**Metaphors and Maps in Art**

The images of science discussed above illustrate and embody theories: They organize or distill massive amounts of thought and data into comprehensive, compact explanations of reality. On the other hand, art images, according to Gray and Malins (2004), are not theories because they do not present fulsome, wide-ranging visions of reality. Instead, art images manifest an individual artist’s hypotheses or interpretations of reality that resonate with others. Also, they do not explain reality as much as they evoke reality (Sullivan, 2005). Sullivan (2005), and also Macleod and Holdridge (2006), find the link between artists and theory in the process more than in the outcome. To them, artists are theorists; they question, observe, analyze, synthesize, and hypothesize as scientists do and shape thought into conceptual images, which are often metaphorical.

Bruner (1979) celebrates metaphorical images in art as compact images whose power resides in their economy: their ability to manifest complex meaning into deceptively simple forms. Bruner finds that the use of economic metaphorical images is one place where science and art overlap. His principle of economy in metaphor is similar to Ricoeur’s (1991) notion of iconic augmentation, which he defines as the “power of the image to condense, spell out, and develop reality” (p. 130). For Bruner and Ricoeur, metaphorical art images are not reductive but productive; they add to reality or create reality.

Here are two examples of productive metaphorical images in art that encapsulate worldviews and recast realities. In his painting of Isaac Newton (*Newton, 1795*), William Blake represents his insights into the famous scientist and the implications of his theories. He casts Newton as an ancient scribe, nude and muscular like a pagan god, mapping out the geometry of the universe. With this metaphor, Blake connects Newton to an ancient ideal, an icon that represents a classical vision of reality; one that is ordered and rational (Hamlyn & Phillips, 2000). The scribe
designs reality along simple geometric lines using calipers, an architectural tool of precise measurement. This image not only addresses the mechanistic, reductive and rigid vision of reality that Newton’s theories represent to Blake but also alludes to how human perception of reality (in this case scientific theory) creates reality.

Contemporary artist Sui Jianguo also connects a new reality to a time-honored worldview by casting one iconic figure in terms another. In his portrait of Chairman Mao in *Sleeping Mao* (2002), the Chinese leader is seen as the sleeping Buddha. This metaphor alludes to the “cult of Mao” in present day China. Sui’s Mao is as venerable and mythic as the ancient spiritual figure. The metaphor also provides insight into China’s new reality: The surreal post-communist world of Mao is conflated with the ethereal ancient world of Buddha and the ideology of communism is compared to religion.

In Buddhist iconography, the sleeping Buddha represents the moment in which Buddha enters Nirvana. In many depictions of this iconic scene, animals surround and mourn the Buddha as he leaves this world. In Sui’s work, Buddha/Mao sleeps and dreams amid a sea of multicolored plastic dinosaurs, cheap industrial products from China. This dream is really a nightmare. The metaphor guides us to see Mao’s nirvana (his legacy as it declines into rampant capitalism) as the production of trivial useless objects that flood and engulf the world (Kelley, 2004).

These examples from art are metaphorical images based on entities we see in the physical world and they employ pictorial representations of these entities to illustrate concepts. This is the most common way of conveying metaphorical meaning in visual art, but conceptual images such as maps work as well. As we have seen in two conceptual images from science and Elkins’ (1999) delineations of schemata, maps can also be metaphorical. An example of maps as metaphorical images in art (similar to Darwin’s *Tree of Evolution* or Goethe’s *Spiral Tendency in Plant Forms*) is found in the work of contemporary artist, Mark Lombardi. Lombardi constructs notational, schematic drawings that display the relationships between corporations, governments, and the people who work with or control them. These spatial configurations of global, political, and economic power structures reveal complex relationships. Because they are maps, the viewer grasps the concept through seeing relationships spatially. The basic diagrammatic function of a map evolves into metaphor when we read them as webs, nets, scaffolding, or multi-legged organisms. Additional metaphors emerge when we connect them to other maps, especially maps that chart movement or interaction such as choreography, weather patterns, subatomic dynamics, and processes in nature and the body. These multiple references cohere into a vision of reality in our globalized world; a world structured, animated, and controlled by invisible forces.
Complex symbolic representations of reality that combine mapping and metaphor are also found in the *dhulan* of the Yolngu people of Australia. Dhulan are stylized paintings on bark of animals floating on backgrounds of geometric patterns. Although they are not immediately recognizable as maps in the Euro-Western sense, these images represent the trails of *djalkiri*, or footprints of the ancestors and correspond to real places. They are, therefore, maps. The symbolic quality of the mapping is deepened and expanded with the images of the animals, which represent the ancestors. Their suspension in nets or patterns is a metaphor for an interconnected reality that links landscape and place to social and spiritual interconnections that transcend time. In this way, these paintings are spiritual icons that display a multi-dimensional reality and a complex belief system (Watson, 1989). With their synthesis of pictorial/symbolic images and geometric configuration, they are also good examples of metaphorical schemata delineated by Elkins (1999).

**The Social World of Art Images**

**Sources of Images in Art**

Interior mental images (as distillations and synthetic images) often play a generative role in artmaking (Arnheim, 1969; Ricoeur, 1981); artists frequently see images in their heads before they begin to make objects and images. No matter how abstract, ideal, and distilled a mental image is, however, its origins are in the exterior, material world (Arnheim, 1969; Zeki, 1999). As Arnheim suggests, perceptions are the building blocks of concepts (Arnheim, 1969; Barry, 1997; Solso, 1994; Zeki, 1999). This is why many artists have placed (and still do) a great deal of importance on observing and rendering the visual world in pictorial images, arguing that these exercises contribute to the richness and variety of images in art (and in the mind).

The sociocultural theory of mind (Valinger & van der Veer, 2000; White, 1996) offer a culturalist perspective. While acknowledging the sources of thought and image in the material world and nature, it expands the field to include the artifacts of culture. Cultural artifacts are primary sources of visual images and these artifacts can be conceptual as well as material (Cole, 1996). Conceptual artifacts include language, values, practices, rituals, stories and myths, and systems of thought and faith. These conceptual artifacts can be represented in material artifacts (objects and images). For example, a Greek scribe represents classicism and reason in Blake's image of Newton, and the Buddha embodies enlightenment or nirvana in Sui's *Sleeping Mao*.

The social construction of meaning also occurs in what Parsons (1998) calls *distributed cognition* the process in which thinking takes place in the interactions between people, images, and artifacts. It is also represented in Freedman's (1994, 2003) notion of *intergraphicality* where meaning
is constructed not in an individual image but through its associations with other images.

Sociocultural theory is linked to postmodernism, which further dissolves the border between the individual mind and culture (Butler, 2002; Efland, Freedman & Stuhr, 1996). This breakdown between interior and individual, and communal and cultural is seen in contemporary art practice. Many artists (from Picasso to contemporary artists) practice *collage*, the juxtaposing and combining of found images on a picture plane (Taylor, 2004). This practice further highlights the social sources of imagery and suggests that postmodern artists not only exteriorize images in the mind but also make meaning by recombining existing exterior images (Stafford, 1999).

**Exteriorization**

Arnheim, Gardner, and West explain how the mind synthesizes and transforms (conceptualizes) its source material (perceptions) through visual/spatial processes in the mind. Ricoeur (1991) sees a continuation of this process when an image is exteriorized or manifested in materials by an artist. To Ricoeur, exteriorization is a critical factor in creating meaning: When mental images are exteriorized as art imagery, they accrue meaning, produce new meanings and become productive. He states:

> It is precisely the exteriorization of thought in external marks which has encouraged the creation of images which not only are shadows or similarities, but also offer new models for perceiving the world. If some promotion of reality results … it is primarily because projects, human designs, have been externalized in material medium. (p. 131)

The visibility or materiality of an image also gives it a social function. Ricoeur (1991) implies that just as mental images play a constructive role in shaping, distilling, and transforming thought in the individual mind, art images do the same in the social/cultural realm. To Ricoeur, the value, power, and utility of art lies in these social cognitive functions. He celebrates this in his compelling statement: “When the image is made, it is also able to remake the world” (p. 129). Ricoeur’s assertion is predicated on the belief that reality lies in how humans perceive it. For him, changing perceptions is changing reality and art or any images (the images of theoretical science, for example) that present and catalyze new insights become powerful agents for shaping new realities on a grand scale.

This power is contingent on audiences finding meaning and making meaning through art images. From Ricoeur’s hermeneutic perspective, meaning emerges in the dialogue between the mind and the image; it is not in the image itself but in the active interpretation of the viewer.
A further hermeneutical perspective comes from Davey (1999) quoting Gadamer (1989) who likens the process of viewing to a conversation between image and viewer that builds from the initial presentation to create new realities. A postmodern view finds meaning not in an isolated image but in the context in which it is made and seen (Anderson & Milbrandt, 2005; Efland, Freedman, & Stuhr, 1996; Freedman, 2003). This context includes the mind of the beholder. Both schools of thought place the audience or viewer in the role of actively learning or making meaning through their own interpretations.

What are the implications of this for meaning making or learning in practice-based research? Audience participation in the construction of meaning casts practice-based research as a social endeavor—as learning that is personal and individual for the artist but also as learning by the audience through their interpretations. From this social, hermeneutical perspective, the artist creates the exteriorized image (through personal process of research) and the viewers continue the research (come to insights and understandings) by mining the images and connecting them to their own experience. This is the crux of practice-based research: It is a social, participatory, conversational endeavor in learning based on synthetic productive conceptual images that creates new realities. As Ricoeur (1991) asserts, this can be transformative. Imaginative insight of the artist is shared and perceptions are changed. Sullivan (2005) agrees and celebrates the social impact of art when he states that the visual arts are “a powerful cultural agency of human insight” (p. 131).

The Art of Matthew Ritchie: A Synthesis

The work of contemporary artist Matthew Ritchie brings these ideas together in a fulsome and fitting example; providing a direct link between the theories of cognitive science, metaphor theory, sociocultural theory of mind, and the postmodern focus on audience, context, and socio-cultural mediation. Ritchie exemplifies the artist as artist-theorist: He questions, analyzes, and hypothesizes about ideas and shapes his concepts into forms. These forms are big map-like abstract paintings and room-sized installations that are full three-dimensional versions of his paintings. These works are intended to give meaning and coherence to information, as Ritchie puts it, the invisible. He describes his ideas and purposes in regard to image and content,

How can we learn to see information as form? I’ve always been interested in this idea of anthropomorphizing information and have wanted to use painting to prove one of the fundamental premises of information theory, that any sufficiently complex system will acquire its own internal meaning. (Ritchie, in Goodeve, 2004 p. 39)
As abstract forms, Ritchie’s work finds its ancestry in the cognitive theories of Arnheim and Ricoeur. Ritchie (in Goodeve, 2004) even refers to his paintings as “pictures of thinking” (p. 43). He understands the cognitive function of form. “Shape or form is how we make sense and use information—how you inoculate yourself against information overload and get on top of it” (p. 43). Ritchie’s work is also very current and postmodern in its focus on the information age as a social force and powerful determinate in how we see the world. By exteriorizing his mental mappings of information, Ritchie is giving material shape to social/cultural phenomena. The sources for Ritchie’s work are public. “All the information in my work can be found in the public realm, on the internet or at any public library” (p. 42). Moreover, his artwork is intended to transform the audience’s understandings. “I am trying to create a class of objects whose main property is that they turn the viewer’s consciousness back out” (p. 42).

Although Ritchie’s forms are map-like, he believes they are not purely abstract configurations. As environments filled with dynamic lines, organic irregular shapes, and bright colors, they provide a visual metaphor of the mind and the cosmos casting them as dynamic worlds that vacillate between chaos and order. Here we see Ritchie working in the tradition of Darwin, Goethe, and Mark Lombardi: His forms have their origins in maps and they evolve into metaphor. In Proposition Player (2004), the metaphor becomes apparent when Ritchie casts the cosmos as a game of chance. He adds coherence to the metaphor of chance by superimposing on the piece the spiritual structure of Voudon, a chance-based religion, and by appropriating Voudon iconography and symbols from card games as the imagery of the game. With this mixture of map and metaphor, Proposition Player is Ritchie’s visual version of chaos theory or complexity theory; an ambitious take on reality with a scope similar to scientific theories and a scale and symbolic layering reminiscent of the dhulan of the Yolngu.

In a postmodern vein, Ritchie celebrates the various interpretations audiences bring to his work. In Proposition Player, he welcomes and amplifies this, inviting audiences to participate in the creation of the paintings and learn through experience. Viewers play a digitized visual craps game and as they play the game, they build the paintings. When the audience creates the paintings in actual space, they manifest in literal, physical visual form a collaborative, collective cognition; they create the visual image and they participate in the interpretation and construction of knowledge. In this way, they participate in Ritchie’s research in a palpable way. If this works according to Ritchie’s plan, they come to new insights and understandings.
Implications for Art Education

Art practice as research has much to contribute to theory and practice in art education. These include a new more cognitive approach to visual imagery, one that understands visual images as mediums of insight at the core of thought and learning, and as ways we synthesize and shape reality individually and as groups. This understanding of visual images contributes to art education in many critical ways.

First, it expands our concept of visual literacy. Visual literacy is not limited to the ability to decode the meaning and impact of existing visual images in art or visual culture, but also includes comprehension of how knowledge and reality are constructed and interpreted through making images. Visual images are seen as part of practice; an evolving process that includes questioning, resource gathering, analysis, hypothesis, and especially, creating. Understanding this process requires experience in creating and reflecting on one’s own visual interpretations (Elkins, 2003). It is a way we learn from ourselves. Therefore, creative art practice (making images) is as critical to visual literacy as deconstruction and analysis of existing images. This calls for specific changes in studio curriculum and instruction that promote and explicate artmaking as exploratory, experiential, and imaginative learning through image making. Curriculum should include using the vocabulary of research and employ scaffolding activities and assignments that are unambiguous exercises in which students become conscious of creative synthetic processes; gathering sources (including pictorial images) and developing conceptual images that make sense of them.

Second, it gives us a different understanding of art history, where art images are seen as part of a productive visual culture; as artifacts that synthesize and represent concepts, and evoke or produce reality by mediating the way we perceive reality. It also calls for a more concept-focused analysis of art where meanings and their manifestations in imagery are examined across time and cultures. This includes recognizing how meaning is contextual and intergraphical. For example, students compare the contemporary art of Matthew Ritchie and Mark Lombardi to the mappings of the Yolngu (as culturally constructed visions of invisible forces and realities), or the metaphorical sculptures of Sui Jianguo and William Blake’s Newton (both of which comment on ideologies or worldviews).

Third, it draws attention to the integrative nature of visual thinking and the role of visual images in research, insight, and knowledge construction in all areas of inquiry. It calls for an art integration that makes connections on a structural, foundational level; at the level of conceptual images and imaginative processes. It also prescribes a study of how art images convey and construct meaning through metaphor,
linking art to the sciences and to language arts. In calling attention to centrality of visualization in all areas of inquiry, it places art practice where it belongs at the core of the school curriculum.

In conclusion, art as research is a powerful metaphor in itself. It transforms our conceptions of research and art practice. It requires a metaphor this compelling to alter other people's perceptions as well. Therefore, art as research represents a powerful tool for advocating for the inclusion of art practice in the schools and for developing a new approach to art and learning. Like other metaphors, art as research provides a framework for its realization. It gives us the principles for forming a new and better art education.

References


