Interdisciplinary Arts 🔓

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Abstract and Keywords

This chapter offers a brief and necessarily incomplete overview of what has been written on the interdisciplinary arts within academic scholarship on the creative arts. The author identifies five major integrative aspects highlighted in the existing literature on the interdisciplinary arts: (1) the Wagnerian *Gestamtkunstwerk*, i.e., the `total work of art;' (2) the legacy of the historical avant-garde, with its focus on radical juxtaposition; (3) the continuation of post WWII arts experimentation in between and among multiple art mediums simultaneously with Happenings, intermedia and multimedia; (4) the intersections between art, science, and/or technology; and (5) interdisciplinary arts as its own emergent subject of inquiry, practice, and research. The chapter additionally includes a brief overview of the transdisciplinary arts. It concludes with the observation that considerations of current developments in interdisciplinary arts will serve to advance the understanding of interdisciplinarity in general.

Keywords: Interdisciplinary arts, Transdisciplinary arts, Gestamtkunstwerk, Historical avant-garde, Multimedia, Intermedia, Hybridity, Technology and art, Interdisciplinary arts typology, Arts integration

THE interdisciplinary arts have yet to receive their fair share of attention within the existing literature on interdisciplinarity even as interrelations between the arts have become increasingly commonplace. As David Cecchetto et al. point out, "previous research on interdisciplinarity between the arts has been strangely piecemeal, especially when one considers the abundance of recent scholarly writing devoted to the challenges and possibilities of academic interdisciplinarity" (Cecchetto et al. 2008, p. xii). To note one prominent example, Julie Thompson Klein's seminal 1990 study *Interdisciplinarity* includes bibliographies for the social sciences, the humanities, and the sciences—but none for the arts. The tendency among scholars whose expertise lies outside the arts to conflate the study of art history or the study of musicology with the study of interdisciplinary arts has perhaps contributed to this relative lack of attention—again within the literature on interdisciplinarity, which has traditionally focused more on the social sciences, and, to a somewhat lesser extent, the sciences and the humanities.

Complicating matters has been the lack of consensus about what the interdisciplinary arts entail, which is not surprising given ongoing debates about the arts in general. Authoritative definitions for the interdisciplinary arts written by interdisciplinary artists and scholars are difficult to find. As historians of multimedia Randall Packer and Ken Jordan concede, "definitions are confining" (Packer & Jordan 2001, p. xxxiii). Artists who value artistic freedom and originality have been known to resist participating in normative discourses that definitions often serve to establish. Tactics of resistance can include downright refusals but they can also entail deferrals from answering the question, "What are the interdisciplinary arts?" by highlighting the lack of canonical definitions—which happens to be the approach Eckerd College's long-standing interdisciplinary arts program takes on its website: "Look in any arts or cultural history text and you'll not likely find an entry for *Interdisciplinary Arts*" (http://www.eckerd.edu/academics/interdisciplinaryarts/about/index.php).

10.1 Interrelations

Just because definitions are scarce or not yet authoritative does not mean they do not exist. Two well-crafted definitions are worth noting here: the first within the interdisciplinary (p. 132) studies (IDS) literature, and the second, apparently influenced by it. Within the IDS literature, James W. Davis offers the following definition in his history of the well-regarded albeit eventually ill-fated interdisciplinary arts program at San Francisco State: " 'Interdisciplinary arts' … came to be defined as original, creative works that synthesized theory and practice (ideas and applications), and that also integrated two or more elements of expression (choosing from sound, images, movement, text, and spatial/temporal modes of expression)" (Davis 2009, p. 103). Alternatively, the interdisciplinary arts program at Arizona State West defined the interdisciplinary arts on its former website as a course of study: "Interdisciplinary arts means an approach to study and training in the arts, performance and creativity that focuses on how multiple artistic disciplines combine in an integrated way with an emphasis on new concepts and experiences and artistic way of working." Both definitions emphasize integration not only of art forms, disciplines, mediums, or media but also the synthesis of ideas and artistic practice in the study and production of interdisciplinary artworks. More specifically, both definitions suggest that the interdisciplinary arts involve more than the synthesis and integration of art media, mediums, and disciplines. In other words, the interdisciplinary arts are reflective of, and characterized by, their interrelations with academic disciplines, fields, and discourses within and outside the realm of art. At their core the interdisciplinary arts exemplify what has been termed as either a wide or broad form of interdisciplinarity (Newell 1998; Klein & Parncutt 2010).

Their broadness suggests additional qualities. Broad interdisciplinarity connotes inclusivity, another integral feature of the interdisciplinary arts. Inclusivity in turn implies openness to continuous change and innovation. Outwardly and continually inclusive, expanding, evolving, and innovative, the interdisciplinary arts defy attempts at not only definition but also periodization, categorization, comparisons, theorization, and typologies—in

other words, the established arsenal of concepts, methodologies, and approaches that scholars have deployed to study and understand the arts (Klein 2005, pp. 108–109). Rather than aim for the definitive, scholars interested in studying and researching the interdisciplinary arts would do well to accept from the onset that they will never have the last word on the subject.

The rest of this chapter offers a brief and necessarily incomplete overview of what has been written on the interdisciplinary arts within academic scholarship on the creative arts. The comprehensive and authoritative history of interdisciplinarity within all of the arts across cultures has yet to be written, and space limitations prohibit any attempt here. Instead, this chapter is offered as an initial overview on which subsequent research on interdisciplinarity in general, and the interdisciplinary arts in particular, can build. My outline draws from an extensive review on the existing literature on interdisciplinary arts, which has focused its attention on a few established traditions within the creative arts literature while ignoring many other important strands of interdisciplinary arts such as my own areas of specialty, performance art and feminist art. This chapter does not include a discussion of interarts research within art history and musicology, as Klein has offered such accounts elsewhere (Klein 2005; Klein & Parncutt 2010).

From my research, I have identified five major integrative aspects highlighted in the existing literature on the interdisciplinary arts: (1) the Wagnerian *Gesamtkunstwerk*, the perceived fusion between the arts, that is, the "unified" or "total work of art"; (2) the legacy of the historical avant-garde, with its focus on radical juxtaposition; (3) the continuation of post–World War II arts experimentation in between and among multiple art mediums (p. 133) simultaneously with Happenings, intermedia, and multimedia; (4) the intersections between art, science, and/or technology, particularly that which is known as electronic or digital arts since the rapid developments in computers, communications technology, biotech, and new media; and (5) interdisciplinary arts as its own emergent subject of inquiry, practice, and research that encompasses the previous four aspects as well as a rhetoric of its own.

10.2 Richard Wagner's *Gesamtkunstwerk*: The Quest for Unity and the Total Work of Art

Interdisciplinarity is often viewed as dependent on, and a response to, the concept of disciplinarity. The concept of the interdisciplinary arts is not only a reaction to the division of art mediums—it also counters the valorization of the "purity" and "autonomy" of each art medium by modern and modernist aesthetics since the late eighteenth century. Writing in 1920s, the philosopher Walter Benjamin observed that the impulse toward unifying the arts was evident as far back as the seventeenth century, while in the nineteenth century Friedrich Wilhelm Joseph Schelling and Richard Wagner traced back interrelations between the arts all the way back to Ancient Greek drama (Koss 2010). Nonetheless, as the

art historian Juliet Koss points out in her monumental study on Wagner's influence on modernism,

> within the discipline of art history … scholars regularly invoke the *Gesamtkunstwerk* as a countermodel for the "advanced art" of European modernism, conveniently erasing the concept's revolutionary origins… . Such assessments invariably oppose the *Gesamtkunstwerk* to such basic principles as artistic purity, autonomy, and medium specificity (the idea that each art work should develop and present those attributes specific to medium).

> (Koss 2010, pp. xi–xii)

Many existing theoretical considerations and historical accounts of the interdisciplinary arts begin with Wagner's oft-misunderstood concept of *Gesamtkunstwerk*, which contained elements of complete integration or fusion while still respecting each medium's autonomy. Neither the term *Gesamtkunstwerk* nor the dream of total unity, however, originates with Wagner. The term has been traced back to an 1827 text of philosopher Karl Friedrich Eusebius Trahndorff (Koss 2010). Koss points to a 1803 lecture by Schelling, in which he simultaneously exalted ancient Greek tragedy's unification of art forms while expressing a hope for future synthetic form of opera, as laying the groundwork for Wagner's later ideas (Koss 2010, p. 11). In two essays, *Art and Revolution* and *The Art-Work of the Future*, Wagner envisioned a total artwork that would unify and synthesize poetry, music, and dance in order to create an "integrated drama," "the consummate artwork of the future." Nevertheless Wagner's concept of the *Gesamtkunstwerk* was paradoxical, as it unified multiple art forms while keeping their individual distinctness and independence as they contributed to its creation. In other words, it suggests both unity and autonomy. So the term *Gesamtkunstwerk* in itself is an integrated term, containing elements of what in the literature on interdisciplinarity considers both multidisciplinarity and interdisciplinarity.

(p. 134) In Wagnerian opera, much more that art forms were unified. The theater was designed to give audiences a total immersive experience, which, as Koss points out, "often stands for an artistic environment or performance in which spectators are expertly maneuvered into dumbfounded passivity by a sinister and powerful force" (Koss 2010, p. xii). The orchestra pit was lowered to become hidden, and elaborate sets masked intricate mechanics. Wagner's ideas for his Festival Theater additionally blurred the traditional distinctions between audience and stage.

Moreover, the *Gesamtkunstwerk* attempted to go beyond the aesthetic realm to unite with nationalistic and political aims. While Wagner may have envisioned a new Athens, the philosopher Theodor Adorno would subsequently link it with anti-Semitism and German fascism of the 1930s (Adorno 2005; Koss 2010, p. 279). Wagner's antimodern and anticosmopolitan stances, which ultimately resulted in his decision to locate his Festival Theater in the small town of Bayreuth, nonetheless set the stage for revolutionary innovation

within the arts beginning with the historical avant-garde during the first three decades of the twentieth century.

10.3 The Historical Avant-Garde and Radical Juxtapositions

The close associations of interdisciplinary arts with new and experimental art developments harken back to the tradition of the historical avant-garde movements (Futurism, Dadaism, Constructivism, and Surrealism). The invention of new art forms such as collage, concrete poetry, sound poetry, performance art, montage, photomontage, assemblages, constructions, readymades, mobiles, and kinetic sculptures was grounded in artistic innovation, revolutionary aspirations, and a sense of the new. They were also foundationally integrative as the avant-garde combined established art genres and incorporated materials not previously included in, or considered as, art or art media.

For example, Georges Braque and Pablo Picasso in 1912 invented collage—the integration of paint on two-dimensional planes with nonpaint such as newspaper fragments in painting that would later extend to three dimensions with their cubist constructions and Kurt Schwitters's assemblages. The Italian Futurist composer Luigi Russolo made the case for composers to consider the noises of modern life for the renewal of music in his 1913 manifesto *The Art of Noise*. Marcel Duchamp laid the groundwork for both conceptual art and kinetic art when he created his first readymade *Bicycle Wheel* (1913) by attaching a bicycle wheel to a stool. When several years later in 1917 Duchamp signed the fictive name R. Mutt on a urinal, he challenged philosophically the limits of art by calling into question both the originality and status of the art object.

The Dadaist Hugo Ball is often credited with launching performance art when he recited noise poetry at the Café Voltaire in Switzerland in 1916. The Russian Constructivist Arseny Avraamov in 1922 composed and organized *The Symphony of Sirens*, an outdoor public event performed by thousands of musicians and workers, incorporating synthetically modern sounds such as cannon shots, foghorns, and factory sirens into his musical score. In 1924, Sergei Eisenstein created a novel way to forge continuities and overlaps within different (p. 135) strips of film with his editing technique of montage. Comte de Lautréamont's poetic line "as beautiful as a chance encounter of a sewing machine and an umbrella on an operating table" found form with Surrealism, which borrowed heavily from the ideas of Freudian psychoanalysis to unleash the powers of the unconscious through art by means of strange juxtapositions to create startling effects.

The integrative strategies and techniques of the avant-garde remain to be considered at length within the literature on interdisciplinarity. The avant-garde emphasized radical juxtaposition, particularly collage in all its manifestations, to create a sense of "shock of the new" and "startling effects" that enabled new perspectives and insights. Avant-garde composers, artists, and filmmakers provoked viewers to find common ground between two different entities with the confidence that such common ground was always possible.

Many avant-garde innovations would advance further during the rise of intermedia and multimedia as art disciplines in their own right beginning in the late 1940s.

10.4 Intermedia and Multimedia Experimentations after World War II

The period after World War II witnessed an unprecedented mixing of arts to create new art media that had their roots in the avant-garde. Already in 1916, Italian Futurists "declared film to be the supreme art because it embraced all other art forms through the use of (then) new media technology" (Packer & Jordan 2001, p. xx). They saw film as the means toward what they called *polyexpressiveness*, "towards which all the most modern artistic researches are moving" (Marinetti et al. 2001, p. 12). Among the qualities they sought for Futurist cinema was simultaneity, a quality composer John Cage explored with other artists at Black Mountain College in 1948, when he orchestrated an untitled event at Black Mountain College. Cage collaborated with the painter Robert Rauschenberg, choreographer Merce Cunningham, and poets Charles Olson and Mary Richards, among others to create a multidisciplinary work that was based on the concepts of simultaneity and action. The performance scholars Rosemary Klich and Edward Scheer have described the event as follows:

> Numerous artistic forms were employed within the event: as Cage spoke about the "relation of music to Zen Buddhism," Rauschenberg played records on a gramophone and projected slides and film on the ceiling. Merce Cunningham danced through the audience while Olson and Richards read their poetry and Jay Watt sat in the corner and played different instruments. It was significant that these events/processes/performances occurred simultaneously, and could be considered equally important, without any mode being relegated to a supportive role… . Performers were given a score which indicated time brackets only—the rest was up to them. The performances were simultaneous events unified by the theatrical frame, and by the audiences' experience.
>
> (Klich & Scheer 2012, p. 28)

Cage's experiments were considered to break down the boundaries between the arts, as well as require more active participation of audiences to make meaning of what they were experiencing as art. The painter Allen Kaprow would subsequently explore these ideas though the (p. 136) avant-garde technique of assemblage—the mixing of three-dimensional objects. Kaprow's first Happenings in 1959 expanded assemblages to room environments and involved what the critic and scholar Richard Konstelanetz would later term a "theater of mixed means" (Konstelanetz 1968). Participants (rather than audience members) would take part in a Happening event by moving around three room environments and interacting with the players (rather than actors or performers) according to Kaprow's written instructions disseminated beforehand. In his essay "Untitled Guidelines for Happenings" Kaprow asserted "that audiences should be eliminated entirely. All the

elements—people, space, the particular materials, and character of the environment, time can in this way be integrated" (Kaprow 2001, p. 313).

Kaprow's Happenings brought together elements from multiple established art forms—theater and painting—as well as emergent media of installation and assemblage to create works that at the time seemed "in between" art disciplines. In 1965 the Fluxxus artist Dick Higgins published an influential essay in which he coined the term *intermedia*, although he claimed to have borrowed the term from Samuel Taylor Coleridge. Writing a postscript to the text in 1981, Higgins noted that Coleridge used the word in 1812 "in exactly its contemporary sense—to define works which fall conceptually between media that are already known" (Higgins 1984, p. 23). Scholars have since largely dismissed his claims as exaggerated, since Coleridge only used the term *intermedium* as an adjective once in 1812, whereas Higgins succeeded in popularizing the term as an important concept for thinking about new developments in art, even as he eventually lost some of his initial enthusiasm for the term, warning that "it is more useful at the onset of a critical process than at the later stages of it" (Higgins 1984, p. 28). Nonetheless, Higgins's concept of intermedia has been used to describe both the blurring of disciplinary boundaries and artworks regarded as "in-between" established art mediums. The concept of intermedia thus introduced multidimensionality to interdisciplinarity with a sense of place (in-betweenness) and time (simultaneity).

"Intermedia" became a popular term during in the 1960s to describe the experimentations by painters, sculptors, dancers, musicians, and filmmakers associated with the Judson Church and the Fluxxus art movement who freely combined visual arts, sculpture, film, slide photography, and dance in their work. A year after Higgins published his essay in 1965, the term "multimedia" also started to be used, especially for art that involved video, film, and electronic music. The advent of video and personal computing as well as advances in communication technologies during the 1960s eventually shifted the meaning of multimedia: By the early 1980s it focused more on electronic and computer-based art. In contrast to intermedia, multimedia has emphasized the simultaneous multiplicity of art forms while also aligning itself with the technology and art movement, which has prompted Packer and Jordan (2001) to proclaim, "multimedia is emerging as the defining medium of the twenty-first century" (p. xv). While they view integration as "the foundation of multimedia," (p. xxxvi), they also list interactivity, hypermedia, immersion, and narrativity as characteristics, concluding that "the medium's only defining element is its mutability" (p. xxxviii). In a very real sense the multimedia experiments during the 1960s paved the way for the acceleration of the technology and art movement. As Packer and Jordan point out, "it was not until Bell Labs scientist Billy Klüver placed the potential of advanced engineering into the hands of artists in New York that integrated works of art and technology began to flourish" (p. xxi).

(p. 137) 10.5 Science, Technology and Art : Hybridity, Research, and Opposing Worldviews

Artists have always been interested in incorporating science and technology in art. As Klüver observed, "technology has always been closely tied in to the development of art. For Aristotle, *Technê* means both art and technology. As they became different subjects they still fed on each other" (Klüver 2001, p. 35). Leonardo da Vinci drew on his skills as an artist to further his studies in science and engineering. Nineteenth-century painters drew on scientific research on light and motion. Beginning with the Italian Futurists, avant-garde artists began to view technology as an art medium in its own right. Lásló Moholy-Nagy experimented with light and making art with telephones while at the Bauhaus, the German modernist precursor for contemporary interdisciplinary arts education. Marcel Duchamp called Alexander Calder's hanging moving objects mobiles in 1932. By the late 1950s, kinetic art was firmly established as a strand of modern art. For the most part, kinetic art explored the aesthetics of motion. In 1960 Jean Tinguely created *Homage to New York*, a machine performance in the sculpture garden of the Museum of Modern art during which a machine that he created with other artists and engineers destroyed itself. Tinguely's machine performance set the stage for postmodernist and poststructualist technological art that coincidentally critiqued the very technologies in which it participated.

One of Tinguely's collaborators, the aforementioned engineer Billy Klüver, cofounded Experiments in Art and Technology, also known as E.A.T, in 1961 to bring artists and engineers together to create new artworks (Packer & Jordan 2001, pp. xxi–xxii). By 1965 the Fluxxus composer Nam June Paik pioneered electronic and new media art by combining television, music, and live performance with the new medium of video. The 1970s saw the rise of new media art using video, television, film, and satellite technologies. With the advent of personal computing, computer-mediated communication technologies, the Internet, and the World Wide Web, the term *multimedia* became increasingly associated with electronic forms of imaging and what Jay Bolter and Richard Grusin call "remediation," the representation of an artwork in another medium (Bolter & Grusin 1999).

The developments in art, science, and technology are too vast and large in scope to be summarized here. Numerous encyclopedic compendiums have attempted to document comprehensively the developments in technology, science, and art even as their authors acknowledge the impossibility of completing the task. Margo Lovejoy's *Digital Currents: Art in the Electric Age* remains an influential pioneering survey after several editions (Lovejoy 2004; first published 1989). Among the most authoritative studies have been those published as part of the *Leonardo* journal series published by MIT Press, such as Steve Wilson's (2002) *Information Arts: Intersections of Art, Science, and Technology* and Steve Dixon's *Digital Performance* (Dixon 2007).

Despite the considerable growth in art and technology scholarship, little emphasis has been placed on interdisciplinarity. Lovejoy (2004), Wilson (2002), and Frank Popper

(2007) each note that artists working with science and technology must reconcile with opposing worldviews—that of science and what Wilson (2002) calls "critical theory," that is, the cultural critique of science and technology. Wilson asserts that artists have responded to that opposition three ways: "(1) continue a modernist practice of art linked with adjustments for (p. 138) the contemporary era; (2) develop a unique postmodernist art built around deconstruction at its core; (3) develop a practice focused on elaborating the possibilities of new technology." Wilson adds, "In reality, the work of artists interweaves these approaches" (p. 26).

Two of the three responses Wilson (2002) identifies can be regarded as integrative. The second response, creating art that contains either a reflection on or critique of technology, maintains two opposing views simultaneously without necessarily offering any common ground. Wilson asserts that for artists who pursue deconstruction as art practice, "theory, writing, and art production become intertwined in intimate ways" (p. 27). The third response requires that artists "participate in research activity rather than remain distant commentators, even while maintaining reservations about the meaning and future of the scientific explosion" (p. 28). Wilson furthermore suggests that the third response offers artists the following opportunities:

> Free from the demands of the market and the socialization of particular disciplines, artists can explore and extend principles and technologies in unanticipated ways. They can pursue "unprofitable" lines of inquiry or research outside of disciplinary priorities. They can integrate disciplines and create events that expose the cultural implications, costs, and possibilities of the new knowledge and technologies.
>
> (Wilson 2002, p. 28)

Additional integrative techniques can be noted. First and foremost is that of hybridization, a methodological concept borrowed from biology and agriculture. It implies seamless, if not organic, integration of two or more different form or materials. In 1972 James W. Davis identified seven different types of hybrid elements in art (Davis 1972). The result of hybridization, *hybridity*, as a concept has been increasingly used since the 1990s extensively to describe not only technological art but also contemporary art in general (Drucker 2005). Simon Shaw-Miller goes so far as to assert "that hybridity … is perhaps the general condition of the arts" (Shaw-Miller 2002, p. 32), a sentiment shared by James W. Davis in his book *Hybrid Culture: Mix-Art* (2007).

Within the constellation of possible intersections between technology and art, the technology itself can be considered as integrative. Immersive art is often used to describe the use of technology and art to create immersive environments such as those produced by virtual reality. Such artworks mix "real-world realities" with those that are mediated (Benford & Giannachi 2011). Network or communications arts are based on the use of communication technologies or computer-mediated communication such as the Internet. Transgenic arts describe the artist creation of new life forms by new combinations of DNA, such as Eduardo Kac's transgenic bunny, Alba, that glowed green under florescent

light. The more technological or scientific the art, the greater the possibility of collaborations between artists, scientists, and engineers that can be best categorized as research. Paradoxically, while the interrelations between science, technology, and art are increasingly research based, the theorization of interdisciplinary arts continues to be more associated with arts and humanities scholarship.

10.6 Recent Interdisciplinary Arts Research

By now it should be evident that current notions of the interdisciplinary arts have been to no small extent cobbled together from the past, particularly from overlapping accounts of (p. 139) the *Gesamtkunstwerk*, the historical avant-garde, intermedia, multimedia, and technological arts. New ideas about the interdisciplinary arts are drawing heavily from metaphor. As Klein (1990) points out, metaphors are indispensible tools for both thinking about and doing interdisciplinarity. For example, hybridity remains a central yet still undertheorized integrative metaphorical concept in more recent interdisciplinary arts. First used to describe integrations between art, science, and technology, it has emerged as a fundamental term for understanding contemporary art in general. Its discursive journey from the sciences to the arts as a concept also illustrates Mieke Bal's theory of traveling concepts, which Bal has espoused as fundamental for interdisciplinarity within the humanities (Bal 2002).

10.6.1 Collision as an Emergent Interdisciplinary Arts Metaphor

Collision has emerged as another significant metaphorical interdisciplinary arts concept. In 2005 a group of graduate students organized an inaugural conference investigating the interdisciplinary arts titled *Collision* at the University of Victoria, which was followed by another symposium on the topic the following year. In 2008 a volume of essays from the two meetings was published, and in its introduction the editors explain their choice of metaphor. Noting that the most common image of collision comes not from physics but from popular media—the image of cars colliding—the editors describe the interdisciplinary arts in terms resonant of Wagner: "In this book the productive struggle between two or more art forms or disciplines is described as a radical exteriority, suggesting continual movement while resisting any final unity or acceptance of one form's dominance over another" (Cecchetto et al. 2008, pp. xi–xii).

Distancing the interdisciplinary arts from the interarts model, "where one art form borrows or adopts characteristics from another," the editors embrace instead "Roland Barthes' [*sic*] disruptive notion of interdisciplinarity as an act that results in mutation when 'the solidarity of the old disciplines breaks down-perhaps even violently' (Barthes 1984, p. 56)" (Cecchetto et al. 2008, p. xiii). For these scholars, "this rupturing of boundaries points to the sense in which the term 'collision,' while maintaining its suggestion of forceful impact between two or more distinct masses moving in different directions, also conveys a potentially productive learning from differences" (p. xiii). Elsewhere in the volume, the contributor Tanya Augsburg (2008) cites another passage about interdisciplinar-

ity from Barthes that emphasizes creative innovation: "In order to do interdisciplinary work, it is not enough to take a 'subject' (a theme) and to arrange two or three sciences around it. Interdisciplinary study consists in creating a new object, which belongs to no one" (Barthes 1981, p. 72).

10.6.2 An Interdisciplinary Arts Typology

The *Collision* editors cite Shaw-Miller (2002), who has made an attempt at developing a typology for the interdisciplinary arts based on the philosopher Jerrold Levinson's prior distinctions. Levinson (1984) borrows the concept of hybrid to distinguish three types of "hybrid art forms": (1) juxtaposition, (2) synthesis, and (3) transformation. Shaw-Miller (p. 140) superimposes interdisciplinary typology on Levinson's categories: juxtaposition as multidisciplinary, synthesis as interdisciplinary, and transformation as cross-disciplinary. Examples of multidisciplinary juxtaposition would include Cages's untitled 1952 event at Black Mountain College as well as Philip Glass and Robert Wilson's collaborative opera *Einstein on the Beach* (1976). Synthetic interdisciplinary work would be more evident with Wagner's *Gesamtkunstwerk* as well as collage. Cross-disciplinary transformation is "characterized by an instable relationship between its constituent elements," where "one art form crosses over into the territory of the other(s) as in kinetic sculpture," which Levinson defines as "ordinary sculpture modified in the direction of dance" (Levinson 1984, p. 33). For Shaw-Miller, whether the art is juxtapositional, synthetic, or transformational, "the combining of music and the visual arts draws attention to points of similarity, difference, and contrast" (Shaw-Miller 2002, p. 27). Arguably his attempt at typology does not go far enough, given the recent interest in conceptualizing the transdisciplinary arts.

10.7 Toward Transdisciplinary Arts

The existing scholarship on transdisciplinary arts has yet to catch up to its burgeoning practice. Recently established transdisciplinary arts programs such as the transdisciplinary media arts and technology graduate program at University of California, Santa Barbara, and the MA/MFA trandisciplinary new media program at the Paris College of Art emphasize the intersections between science, art, technology, and new media. The Paris College of Art appears to draw from definitions of transdisciplinarity as a collaborative practice in its program description:

> Designed for those who are interested in exploring the wide-ranging creative field of New Media that goes beyond traditionally defined art and design disciplines, this program employs methods of transdisciplinary practice through collaborative teamwork. Through a shared creative process, students will re-frame their current understanding of different tools, technologies, theories and methods, developing hybrid systems and solutions that go beyond any one discipline.
>
> (https://www.paris.edu/departments/in_program/19/66)

The above description points to the transdisciplinary arts as art that is collaborative while transcending disciplinary boundaries altogether. In 2005 Ami Davis described transdisciplinary arts by distinguishing them from the interdisciplinary arts:

> In interdisciplinary pursuits, disciplines collaborate. Scientists and artists, commonly regarded as ideologically opposed practitioners, can intersect and contemplate their common relationships. However, these interacting disciplines ultimately retain their identities as isolated from each other. Transdisciplinary projects have also an agenda to explore common practices among disciplines, but with a more holistic approach. By transcending conventional notions of what appropriate activities within a discipline are, participants attempt to bridge disciplines in innovative ways…. In transdisciplinary projects, the traditionally assumed binary nature of art and science is exposed, and not taken for granted.
>
> (A. Davis, 2005)

For Ami Davis (2005), the overriding metaphor for transdisciplinary arts is transvergence. In 2012 for the Second Annual Conference on Transdisciplinary Imaging the metaphorical (p. 141) theme was interference as a strategy for art. The proceedings from this conference were published in 2014 as a volume of *Leonardo Electronic Almanac* titled *Interference Strategies*, coedited by Lanfranco Aceti and Paul Thomas. According to Aceti, interference "is a word that assembles a multitude of meanings interpreted according to one's perspective and ideological constructs as a meddling, disturbance, and an alteration of modalities of interaction between two parties…. Interfering artworks … by their own nature challenge a system" (Aceti 2014, p. 10). For Thomas (2014), "the theme of `interference strategies for art' reflects a literal merging of sources, an interplay between factors, and acts as a metaphor for the interaction of art and science, the essence of transdisciplinary study" (p. 13). Interference is explored as "a key tactic for the contemporary image in disrupting and critiquing the continual flood of constructed imagery," and as "an active process of negotiating between different forces" (p.14). The contributor Anna Munster points out that as a concept, interference has been conceived within physics "as a phenomenon and then technique for generating a diverse range of scientific imaging from the mid-twentieth century onward" (Munster 2014, p. 155). It is an ethical tactic for interfering with static and authoritative contemporary scientific imaging.

10.8 Conclusion

Interdisciplinary arts are thriving, although the scholarship on the interdisciplinary arts has yet to catch up with practice. Views of the interdisciplinary arts have shifted from Wagnerian ideals of a unified total artwork to theoretical considerations of certain current artistic practices. Presently the literature reflects a fascination with latest technological developments, as it borrows heavily from the scholarship on science, technology, and art. As it currently exists, the literature is not only incomplete but also mostly devoid of considerations of interdisciplinary art that foregrounds social, global, and environmental awareness and activism. Consequently, it is out of sync with much of the thriving interdis-

ciplinary developments evident in theater, film, music, performance art, dance, feminist art, disability arts, contemporary art, social practice art, and more. Nonetheless, it is an important discourse to review and consider, as advances in understanding what are the interdisciplinary arts propel the understanding of all the arts forward. It also serves to advance the understanding of interdisciplinarity in general, and possibilities for integrative techniques in particular.

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