Integrative Transdisciplinarity: Explorations and Experiments in Creative Scholarship

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Throughout the world there has been a sustained criticism of current educational systems, which are viewed as unsustainable because inappropriate for an age of complexity. In this article I reflect on the development of what I call Integrative Transdisciplinarity, an approach to inquiry for individual scholars. Integrative Transdisciplinarity is grounded in systems and complexity thinking and frames inquiry as a creative process. I discuss the theoretical foundations of this approach with references to some of the ways in which it has been applied in a transdisciplinary doctoral program for almost 20 years.

Keywords: Complexity, complex thought, graduate education, creativity, integrative transdisciplinarity, systems theory.

1 Introduction

In this article I reflect on the development of what I call Integrative Transdisciplinarity and discuss the experience of preparing students for serious transdisciplinary research based on over 20 years experience teaching courses in transdisciplinarity and in an explicitly transdisciplinary doctoral program. I first taught a graduate course on Transdisciplinarity in 1998, at the California Institute of Integral Studies, with my dear friend and colleague Sean Kelly. We had been introduced by Edgar Morin, and we were both fascinated and inspired by his wide-ranging work and in particular his concept of complex thought. We both had diverse disciplinary backgrounds and wanted to introduce our graduate students to ways of doing creative research that stepped beyond disciplinary boundaries and hyper-specialization.

In the late 1990s transdisciplinarity was still a fairly mysterious concept that did not have much traction in academia. Our assigned readings for the course included works by Edgar Morin, Basarab Nicolescu, Julie Thompson-Klein, and Ian Barbour, among others. Students enjoyed the class but in the end struggled to understand how to apply the material to their doctoral research. Since those days, the field of transdisciplinarity has boomed, and there are now different schools and multiple approaches to transdisciplinarity (Augsburg, 2014; Martin, 2017; Pohl, 2010). Teaching in a transdisciplinary doctoral program (Montuori, 2010) has given me the opportunity to work with students and find out what the challenges and opportunities are, and what happens when the rubber hits the road, when they actually have to do transdisciplinary research, but also more broadly when they learn how to become scholars

and scholar practitioners. In this sense, the agenda is to articulate and develop creative transdisciplinary scholarship. I see Integrative Transdisciplinarity as a broader reframing of academic inquiry that is grounded in systems/complexity principles, and taps into the joy of inquiry that springs from the natural curiosity and creativity that drew many people to research in the first place, but that is often driven out of students and inquirers from school days all the way to university.

University education has been extensively criticized for many years now, and for any number of reasons. The traditional disciplinary approach that was at the heart of the industrial age reflected an attempt to apply the larger scientific worldview of modernity and hierarchical, authoritarian principles of social organization going back much further in history, to education in much the same way that Frederick Taylor attempted to apply to management. This approach is no longer sufficient in an age of complexity and has indeed become very counterproductive (Aronowitz, 2001; Bocchi & Ceruti, 2004; Bocchi et al., 2014; Laszlo, 1972; Morin, 2008c; Morin & Kern, 1999; Taylor, 2009; Wilshire, 1990). As Banathy argued, *We enter the twenty-first century with schooling designed in the nineteenth* (Banathy, 2001). Nicolescu has argued that in the context of a globalized world there is an urgent need for a much more integral, transdisciplinary view of education (Nicolescu, 2012). Morin has offered 7 lessons towards a new education for a complex world (Morin, 2001). With an assembly line approach, schools all over the world have historically emphasized the importance of what I have called the reproductive approach to education (Montuori, 2011c), a way to create docile students and eventually docile workers and bureaucrats that could function in a fundamentally authoritarian setting, reproducing the power structure and organization of the larger system. This reproductive approach is no longer sustainable in an age of complexity and rapid change.

The process and content of current education are therefore not sustainable because rooted in the Industrial Age, but also in a an earlier, hierarchical, authoritarian form of organization. They also do not provide the need resilience for this historical moment, a time of transition when one age is dying and a new one has not yet emerged. Students are learn how to obey and follow instructions but not how to respond to the unexpected, the unforeseen, and as a result are unprepared for the many shocks that occur from pandemics to wars to economic struggles.

The unsustainability extends to educational institutions. As an example, in the United States university departments are increasingly reliant adjunct faculty who in turn are being exploited in an effort to lower operating costs. As a result, teaching at the university level is becoming unsustainable for many. Siloed education preparing hyper-specialized students is no longer appropriate for work or for life, and there is an emerging interest in breaking down disciplinary barriers, the role of generalists, polymaths, and transdisciplinary education (Burke, 2020; Epstein, 2019; Martin & Mikkelsen, 2019; McGregor & Volckmann, 2011; Tett, 2015).

Roots and words
I have always been drawn to scholars in the systems/cybernetic tradition, like Edgar Morin, Gregory and Mary Catherine Bateson, Gianluca Bocchi, Mauro Ceruti, Magoroh Maruyama, Basarab Nicolescu, Joanna Macy, Anthony Wilden, Riane Eisler, and others who emphasize the need to approach topics in a fundamentally different way. I was particularly interested in the scholars who focused on the epistemological dimension, emphasizing the importance of reflecting on knowledge, the construction of knowledge, and viewing topics from a multiplicity of perspectives. I believe this is partly related to the fact that I grew up as a third culture kid (Pollock & Van Reken, 2001). My father was Italian, my mother Dutch, and I always lived in a third country—Lebanon, Greece, England, and then on my own in the USA and the People's Republic of China. I couldn't help but notice how different cultures had different ways of making sense of the world, different ways of thinking and expressing ideas, as well as different kinds of ideas and practices. I saw that this diversity of perspectives could be a source of conflicts and confusion, but that it could also be very generative, and a way to step outside of blinkered 'single vision.'

Systems, Complexity, and Context
Anybody with a background in systems theories, anyone approaching an issue systemically, will almost by necessity have to cross disciplines. Studying any system in context will likely require stepping out of

disciplinary boundaries and comfort zones. Some of the founding systems/cybernetics thinkers, such as von Bertalanffy (Von Bertalanffy, 1976), as well as the participants of the Macy Conferences and the Alpbach symposium, saw the emerging systems/cybernetic approaches as a way to create a way of thinking and a language that could allow researchers to move across disciplines (Bateson, 2004; Koestler & Smythies, 1969). Edgar Morin has most notably followed this original inspiration and developed his epistemology of complexity (not to be confused with complexity theory, associated with the Santa Fe Institute) to present a different way of engaging scholarship that draws on the fundamental insights of systems, cybernetic and information theories as well as philosophy (Heath-Carpentier, 2022; Morin, 2008a, 2008b). Compared to the 1950s and 1960s when the Macy and Alpbach conferences were held with their call for unification and breaking down of silos, there is now a vast amount of research being generated in a dizzyingly expanding number of journals. The pressures of academia to publish contribute to this situation, with many faculty knowing they have to publish to survive. There is much more focus on generating specialized knowledge than on contextualizing, interpreting and integrating (Morin, 2008c). In the field of creativity research, for instance, Glaveanu has bemoaned the fact that enormous amounts of new research are being generated, but in the end little of it is discussed or integrated, developed into new theoretical frameworks (Vlad Petre Glăveanu, 2014).

Integrative Transdisciplinarity was developed to prepare scholars to engage in this work of contextualizing, interpreting, integrating, and providing new perspectives. It is a form of what Boyer would call *scholarship of integration.* Cronin makes the important point that the use of the term transdisciplinary *scholarship* rather than transdisciplinary *research* points to the broader implications of transdisciplinarity and makes it clear it is not one of any number of research *methods*: it is a form and practice of scholarship, a broader context and approach top inquiry which incorporates any specific research methods a scholar might use (Boyer et al., 2015; Cronin, 2014). Scholarship of integration draws on existing empirical and theoretical research, contextualizes and connects, interprets, and integrates knowledge that is often buried in specialized journals in multiple disciplines to address a particular topic. I will often use creativity as an example throughout this article because creativity is itself central to Integrative Transdisciplinarity, and because creativity research now is moving in a more complex and systemic direction from its original individual-centered view (Glaveanu et al., 2020; Montuori, 2020). This offers an opportunity to compare and contrast the two approaches.

Integrative Transdisciplinarity

Integrative Trandisciplinarity begins with an issue of interest. This is followed by a rich description of the topic, usually in the form of a narrative, the articulation of questions and connections that arise from that narrative which establishes what questions and connections need to be addressed and explored, and then the integration of pertinent knowledge that may be found in a plurality of disciplines to provide a way to develop the inquiry. I call this an inquiry-based rather than discipline-driven approach (Montuori, 2005a). The term Integrative here refers to the integration of knowledge across disciplines, the integration of the inquirer, of theory and practice, of scholar and practitioner, of inquiry and self-inquiry, and, as Gregory Bateson put it, rigor and imagination (Bateson, 2002). Fundamentally, it is to provide scholars with a complex, generative frame for their work, restoring the joy of inquiry which is all too often lost in some of the more traditional ways of framing scholarship. I refer to it as aspirational because it makes considerable demands on scholars, it is still in its infancy, and is an attempt to open up scholarship to the aspects of inquiry that may initially have brought students to their academic work, the passion, the reflection, the conversations, the exploration and are often not accounted for in the ways that scholarship is articulated.

Integrative Transdisciplinarity has 5 major interconnected dimensions which serve as heuristics and scholarly practices to orient researchers. They are:

a) A view of the world as interconnected, interdependent, and creative which therefore should be researched using perspectives which acknowledge and incorporate that reality, namely *systems theory and complex thought.*

b) Framing *inquiry as a creative process,* and drawing on the extensive research on creativity to inform scholarship.

c) *Inquiry-based* rather than discipline-centered, meaning the inquiry begins with a "thick" description of the topic in the form of a narrative, questions are then developed from that narrative, and pertinent knowledge is then sought across a range of relevant research in various disciplines.

d) *Meta-paradigmatic,* or recognizing that there are a multiplicity of ways of approaching a topic, and there may already be one or more theoretical frameworks in use in the literature on one's chosen topic. Also essential is understanding the fundamental assumptions underlying the different theoretical positions and the fundamental assumptions of one's own approach to inquiry and to a specific topic.

e) *Integrating the inquirer* means developing the ability to reflect on one's own choices and assumptions as a scholar, the development of integrative complexity and epistemic cognition, metacognition, cultivating one's creativity, as well as situating oneself socially and psychologically (the sociology and psychology of knowledge), and reflecting on the way they influence one's research. This dimension also addresses the self-creation of individuals a scholars.

These dimensions are closely interrelated and interconnected. As an example, the way one understands and approaches creativity is informed by systems principles (a complex view of creativity as a networked phenomenon). The integration of the inquirer leads to reflection on one's own creative process and one's self-creation as a scholar. The meta-paradigmatic dimension involves the ability to differentiate and integrate multiple perspectives (integrative complexity) and also weave together existing research to create new perspectives and theories. We begin our review of the five dimensions with systems and complexity.

2   Systems/Complexity

The movement towards a more complex understanding of the world has been building in the west and found throughout the 20th century.

The demand for "seeing things whole" and seeing the world as an interconnected, inter-dependent field or continuum is . . . a healthy reaction to the loss of meaning entailed by over compartmentalized research and piecemeal analysis, bringing in particularized "facts" but failing in relevance to anything of human concern (Laszlo, 1972, p.6).

Fundamental to Integrative Transdisciplinarity is a view of the world as a complex, interconnected, interdependent, and in many ways unpredictable phenomenon. This also means viewing knowledge and knowledge production as interconnected, interdependent, and creative. This view reflects some of the key findings of the new science and its understanding of the nature of the universe and human existence (Bocchi & Ceruti, 2002; Capra & Luisi, 2014; Peat, 2002; Swimme & Tucker, 2011). Zen master Albert Low (Low, 2002) explains that

The old view was based upon clear and distinct ideas and was ushered in by Descartes, among other thinkers. It gave birth to the belief that concepts could be clearly and uniformly defined, that the world could be considered a closed system and understood in the same way that a machine could be understood. Underlying the old view was a single, unified point of view; a viewpoint originally attributed to God but subsequently adopted as the objective eye of science. The new view, on the other hand, will be based upon ambiguity, upon alternate realities, as well as upon multiple points of view of observers who cannot be abstracted from what they are observing (p.5).

The systems view of the world creates a different fundamental starting point for inquiry, one based on complexity rather than simplification. Rather than assume that to understand a phenomenon one has to take it apart to its simplest components, a complexity approach views any phenomenon in context and in terms of its connections, stressing that in order to understand the whole we must understand the parts, but in order to understand the parts we must understand the whole (Heath-Carpentier, 2022).

The systems/complexity view can be a challenge for students who are not used to reflecting on the underlying philosophical assumptions and paradigms of the material they're working with. They are also invited to reflect on the fact that there are different ways of understanding the world, different worldviews, different theoretical lenses, and different assumptions, that their own view is informed by an underlying paradigm, and that this has implications for research. One of the key aspects of this work is to see how these complex historical developments, new theories, and new approaches apply directly to the work that the students will be doing in their doctoral studies. More specifically they are invited to look at the underlying paradigms of thinking, research, and disciplinary organization, comparing the paradigm of simplification of modernity to the emerging paradigm of complexity (Heath-Carpentier, 2022). Students have to understand, reflect on, and also see the implications of a systems/complex view of the world for their own work and learn to apply it to their research. The development of complex thought—understood as a fundamental epistemology, rather than the more limited use of systems model to map and model the world—is at the heart of Integrative Transdisciplinarity.

In order to become familiar with the roots of the systems view of the world, students begin with a review of the foundations of classical science and social science. It is clear that in the 20th century there were great changes, in science, philosophy, the arts, and the social sciences, all pointing towards an emerging worldview (Peat, 2002). The orderly, deterministic, mechanistic physics that social science had modeled itself on was challenged by what Erwin Schrödinger, in a letter to Einstein, called "die verdammte quantumspringerei," or that damned quantum jumping. But what is most relevant for the students is the way that the paradigm of simplification, or analysis, was—by definition—not able to addresses the complexity of the world.

With Modernity and the Cartesian/Newtonian paradigm, the world was understood through the metaphor of the machine (Capra & Luisi, 2014). To understand a machine, it was taken apart to its constituent elements. This action of *simplification*—taking a machine apart—has its corollary in human thought in the process of *analysis*. In popular parlance, to *analyze* something means to give it sustained thought and the term has also become a synonym for inquiry. In social science the *unit of analysis* refers to the focus of our study. Of course this assumes that the "unit" will be "analyzed" or taken apart. As an example, the study of the psychology of creativity focused on the individual person as the unit of analysis, and searched for the personality traits, motivation, and cognitive processes associated with creative persons compared to persons deemed less creative.

Analysis involves a process of separation and reduction, separating out the constituent elements of the phenomenon being studied. Reductionism is the assumption that scientific explanation of complex phenomena occurs through of process of simplification to its component, more basic phenomena. The whole is explained from the knowledge of its parts. Reductionism, fundamental to the paradigm of simplification, seeks to reduce to the most basic elements of study. As a result, in this view sociology can be reduced to psychology, to chemistry and ultimately everything can be reduced to physics. In this view the universe and human beings can be reduced to nothing but particles. Love can be reduced to *nothing but* the operation of hormones. At the Alpbach symposium that focused on going *Beyond Reductionism,* the psychologist Viktor Frankl had already pointed out that the result of this "nothing butness" of reductionism is nihilism (Frankl, 1969). This is clearly not a satisfactory view of the world.

Barabasi states the problem succinctly (Barabasi, 2003):

> Reductionism was the driving force behind much of the twentieth century's scientific research. To comprehend nature, it tells us, we must first decipher its components. The assumption is that once we understand the parts, it will be easy to grasp the whole. Divide and conquer; the devil is in the details. Therefore for decades we have been forced to see the world through its constituents. We have been trained to study atoms and superstrings to understand the universe; molecules to comprehend life; individual genes to understand complex human behavior; prophets to see the origins of fads and religions. (p. 6)

The machine universe was orderly and deterministic, governed by scientific laws, and anything that appeared disorderly was simply considered a function of human ignorance. These assumptions were foundational in much of social science research, which aimed to emulate the successes of physics.

A way of understanding the world that was new for western science emerged in the 20th century with General System Theory, Cybernetics, Information Theory, and later Chaos and Complexity theories (Peat, 2002). One unifying thread in these approaches was the search for a way to go beyond reductionism, beyond analysis, beyond the paradigm of simplification. It became clear that as Morin (Morin, 2008b) put it, "(T)he modern pathology of mind is in the hyper-simplification that makes us blind to the complexity of reality" (p. 6). The paradigm of simplification was extremely successful in certain domains. It led to the Industrial Revolution, great advances in science, medicine, and other areas. But it also had its limitations, as Morin points out, and in the 21st century, complexity is perhaps the greatest challenge facing humanity.

There is a parallel between the dominant way of thinking in science and the way knowledge was organized institutionally. Thinking dominated by analysis leads to increasing focus on smaller and smaller aspects of a subject. We can see the parallel in university departments with the ever increasing specialization into disciplines, then sub-disciplines, and even more specific sub-sub-disciplines. A key problem is that there often is little or no communication between disciplines and sub-disciplines, and as a result there is a fragmentation that makes it harder for new findings to be integrated and applied. Larger questions are increasingly side-lined and forgotten, connections are ignored, and specialization can lead to a blinkered view where the part becomes the whole. One popular example is health, where there is a strong movement to augment the specialization of western medicine with more holistic approach that take into account the patient in their context, with factors such as diet, stress, psychological health, and so on (Martins, 2018).

Terms such VUCA (Volatile, Uncertain, Complex, and Ambiguous) and Postnormal are used to describe the unstable and perplexing new global condition (Montuori, 2011a; Sardar, 2010). It is increasingly evident that the planet itself has become interconnected, interdependent, and unpredictable. A shift is required to a way of thinking that can account for complexity and uncertainty rather than eliminate it. It has become necessary to recognize the importance of learning to live with uncertainty. The goals of certainty and omniscience are a chimera.

Transdisciplinarity is widely associated with the need to address "wicked problems," problems so complex (because they are interdependent, interconnected, and dynamic) that they cannot be addressed exclusively from one disciplinary perspective (Brown et al., 2010). A transdisciplinary approach is needed in huge urban projects and many environmental issues (Byrne et al., 2017; del Cerro Santamaría, 2020; Moore & Mitchell, 2015). The full extent of many environmental problems may require addressing ecological, economic, political, technological, and a host of other issues that may include, for instance, the historical sub-cultures associated with various professions such as mining or logging or heavy industry. It is possible to study aspects of these environmental issues from a disciplinary perspective, even though environmental studies itself has always drawn on multiple disciplines. But in order to address these complex issues in a thoughtful and wise manner that does not leave out key issues and stakeholders, a systemic approach is needed that does justice to the complexity of the issue and includes second-order integration of the inquirer into the inquiry, another dimension of Integrative Transdisciplinarity (Moore & Mitchell, 2015).

Integrative Transdisciplinarity, with its systemic foundation, is appropriate for scholars wishing to draw on existing empirical as well as theoretical research and develop new ways of framing, seeing, and understanding topics. A transdisciplinary approach can also be used to revisit subjects which have already been studied extensively but not systemically. Creativity research in the 20th century was predominantly found in psychology. I call psychology the Dominant Disciplinary Discourse of creativity, because it was the discipline where most of the relevant research could be found (Montuori, 2005a). Until the 1990s, this research focused almost entirely on individuals. The study of creativity was broken down into three main areas—creative person, process, and product, or "PPP" (Runco, 2007). This already established that the "who" of creativity was always by definition an individual—the person—and not a group, a relationship, or anything else. As a result there was no research on creative teams, relationships, collaborations, or how environments fostered or hindered creativity (Montuori & Purser, 1995). A systems approach to creativity draws the researcher's attention to contexts, relationships, and the social dimensions of creativity. As we shall see, this approach also changes the understanding of the individual who is now contextualized and viewed as an open system in constant interaction with its environment. Previously the individual was viewed as a closed system and the environment considered epiphenomenal. The closed system view

of the creative individual was part and parcel of a whole romantic mythology of innate genius, genius without learning, and genius overcoming all obstacles (Montuori & Purser, 1995). Only the individual mattered. If the other people did anything at all, they merely got in the way of the genius with their mediocrity (Montuori & Purser, 1999b). In the discussion of the Creativity dimension we will also see how the decontextualizing strategy of simplification can also lead to very problematic and simply mistaken views of a topic.

It should be pointed out that the focus on the individual is connected to the strategy of simplification but this in turn can be traced to the broader focus on individualism in the United States (Montuori & Purser, 1999a). Whether in social science research or in the dominant culture, it was all about the individual, and a form of methodological individualism. The United States is after all the country of the "self-made man," the lone cowboy, the lone private investigator, the country of John Wayne and Clint Eastwood (Stewart & Bennett, 1991). The resonance between the focus on the individual in research—on the methodological individualism—and the culture in which the researchers are situated is very interesting and relevant, particularly when we note that in France, Italy or Japan, creativity research has historically been much more focused on teams and collaboration (Montuori & Purser, 1999a). Part of the challenge of complexity is to dig deeper and find the traces of powerful influences that are due to historical and cultural factors not often considered in academia—particularly when a topic is studied in a very individual-centered way– but nevertheless exert their influence in the ecology of ideas.

Analysis and Synthesis

If the paradigm of simplification focuses on the role of analysis—breaking down into the simplest constituent elements–the paradigm of complexity thrives on synthesis, connecting and contextualizing. We recall also Arthur Koestler's definition of bisociation, central to the creative process, the simultaneous mental association of an idea or object in two fields ordinarily not regarded as related (Koestler, 1990). Morin (Morin, 2008b) writes that

> If the paradigm of simplification relies on disjunction and reduction, the paradigm of complexity relies on distinction and conjunction – 'to distinguish without disjoining, to associate without identifying or reducing.' Complex thinking seeks to account for experience in a unified manner and, accordingly, conjoin concepts by overcoming disciplinary isolation. Complex thinking, however, does not lead to know-it all thinking. To take complexity seriously means that one realizes the irreducible ambiguity and uncertainty of the world, which presents inquirers with the ongoing need to complexify their thinking. (p. 6).

"Complex thinking," Morin's integration of systems theory, cybernetics, and other related as approaches as well as their philosophical predecessors from Heraclitus to Hegel (Morin, 2011), is very much at the heart of Integrative Transdisciplinarity. Unlike Complexity Theory, it is an *epistemology of complexity* (Heath-Carpentier, 2022). The principles of reduction and disjunction operate in the organization of thinking and also in the organizations of institutions. We have seen that there is a process of taking complex phenomena apart and then separating the individual elements. The individual elements are then treated as if they are *separate* from the others and can be understood in isolation. We see this in the way university disciplines are separated, with little or no communication between them. In fact, Bruce Wilshire has shown the rites of disciplinary purification that occur in American universities, a process of decontaminating junior faculty from the influence of other disciplines (Wilshire, 1990).

Fundamental concepts that take the form of binary oppositions in western culture, such as Objective and Subjective, Reason and Emotion, Male and Female have been framed as separate and in opposition to each other—a hierarchical opposition, with the first term always the superior in the discourse of academia, whereas the hierarchy is inverted in Romanticism and later in the New Age (Code, 1991; Montuori, 2006; Wilden, 1980). From a systems/complexity perspective, this clear separation (in service of Aristotle's logic and Descartes' goal of clear and distinct ideas) is replaced with distinction, thereby retaining awareness of the connection and interaction and of a much more complex relationship. As an example, it is only fairly recently with the work of Antonio Damasio and others that there has been a recognition of the way

emotions and thought are profoundly interconnected rather than separate. In fact, when Damasio started out in the 70s emotions were not even considered a proper field of inquiry, and certainly clearly separate from reason. This once again raises questions about the way in which culture (and gender) affect the fundamental assumptions researchers make (Damasio, 1998). As a result, as Morin states,

> We need a kind of thinking that relinks that which is disjointed and compartmentalized, that respects diversity as it recognizes unity, and that tries to discern interdependencies. We need a radical thinking (which gets to the root of problems), a multidimensional thinking, and an organizational or systemic thinking... (Morin& Kern, 1999, p. 130).

Challenging reductionism, emergence occurs when a system displays properties that the parts do not have on their own but are the result of their interaction (Johnson, 2001). This view rejects the position that "the really real," if you will, is at lower and lower levels (particles, hormones) and the "higher" levels can be reduced to them. In this view, love—falling in love–might be viewed as an emergent of the interaction of any number of aspects of a human being, including hormones, but also any number of other psychological and sociological factors, to name a few, and a good dose of mystery too, since there appears to be a lot we don't truly understand about love. The point is that instead of reducing every phenomenon to its components, this view recognizes the way that interactions among components, and their organization, can lead to increasingly complex phenomena (Johnson, 2001; Morin, 2008a).

Love is not, as a result, trivialized as "nothing but" (hormones, genetic programs, reproduction, etc.) but viewed in its full complexity, including the vast variety of offered by the experience itself which as is known can range from the wondrous to the devastating (Morin, 1997). In this view, a love poem is not just a bunch of ink scribbles triggered by hormonal changes. A transdisciplinary approach may include—if pertinent to the question being researched—a range of "levels" all of which are significant in their own way. It is therefore multi-dimensional rather than reductionist.

The Fear of Totalizing Narratives
So much research is generated in so many often non-communicating disciplines and sub-disciplines, that knowledge has become scattered and fragmented. As a result there is a need to connect and weave together existing research to create new wholes, new frameworks, perspectives, theories and ways of researching. In recent years, particularly with postmodernism, there has been a rejection of grand synthetic efforts that are viewed as attempts at creating totalizing theories or metanarratives. But weaving existing research together does not need to be with a view to creating totalizing theories of everything. It can rather be done in an effort to address existing issues, topics, and problems, "wicked" or otherwise, and a reassessment of complex phenomena such as creativity about which there already exists a substantial research literature.

Synthesis involves weaving together empirical research and/or ideas and theories to create new ways of understanding phenomena. Unlike analysis, it is a process that has a creative dimension through the process of making connections, often between ideas or data have not been connected before, Koestler's bisociation. Key questions are what is being connected, how and why, and the choices are up to the inquirer to create something new and interesting through novel combinations. This is a second order process which will be addressed both in the discussion of the Integrative Transdisciplinarity dimensions of Creativity and the Integration of the Inquirer

Limitations of the Paradigm of Simplification
The paradigm of simplification and its disciplinary isolation has clear limits. In his book on genius, the noted psychologist Hans Eysenck (Eysenck, 1995) wrote that

> Creativity, particularly at the highest level, is closely related to gender; almost without exception, genius is found only in males (for whatever reason!) (p. 127).

I will focus only on one major aspect of this is highly problematic statement, namely the throwaway last sentence, "for whatever reason." Let us step back and look at this from the perspective of complexity. In order to be referred to as a genius, historically one had to participate in certain specific domains such

as the fine arts and physics, which popularly conjure up names like Van Gogh, Picasso, Einstein and Hawking. Women were for the longest time excluded from the domains in which recognition of "genius" was possible (Eisler et al., 2016). If one is prevented from receiving the appropriate education in the fine arts or science, and if, even with that education, one is not viewed as a fully legitimate participant in the enterprise, but rather as a handy note-taker or coffee-maker, one is unlikely ever to come into the running for the label of genius. That this should not be taken into consideration by Eysenck can be traced —if we want to side-step for now an accusation of sexism– to the fact that as psychologist, he studied what psychologists of creativity study (hence *discipline-driven* rather than inquiry-driven). Broadly the topics of the psychology of creativity have included personality, motivation, conscious and unconscious processes, more recently aspects of neuroscience, and so on. But the social environment was never seriously studied or taken into consideration by psychologists. It should be noted that Eysenck's book is simply called *Genius*: *The Natural History of Creativity* (Eysenck, 1995). There is no recognition of the disciplinary limitations of the psychological study of creativity, and the limitations they place on the author's assessment of the topic. In sociology and Women's Studies there is, of course research on what Germaine Greer has called *The Obstacle Course* for women's creativity (Greer, 2001), but in psychology it was not considered, because this was just not what psychologists study. This creates a form of disciplinary blinkers, in which vital dimensions of a phenomenon can be completely ignored but apodictic statements are made nevertheless. With a systems approach any phenomenon has to be studied in its context and relationally, leading to a radically different view of the issue.

3   Creativity

Creativity has historically largely been excluded from the way the scientific method has been formulated, understood, and taught, and more broadly in the way inquiry and research have been characterized. Popper (2002) explicitly stated that the creative dimension of scientific discovery was not a proper subject for scientific or philosophical attention. It was simply too unpredictable, contingent, and subjective and did not involve a logical method. What mattered for Popper was what could be subjected to logical analysis, namely the testing of the idea. The reality of the "how"—often messy, contingent, imaginative, exciting, serendipitous, and so on–has always been relegated to auto-biographies and biographies. What has been presented in its place is a "reconstructed logic" that removed any hint of creativity and focused on logic, methodical steps, objectivity, and a largely implicit assumption that what happened *had* to happen because of the logical unfolding of knowledge and the correct method was followed. Indeed 'methodology' often serves as a handy cover story for the realities of inquiry (Devereux, 1968; Feyerabend, 1993). Science focused on the rational and the universal in a dispassionate way, whereas creativity meant flirting if not actually getting intimate with the irrational, the intuitive, particular and aleatory. And it was always associated with somewhat unseemly passion.

This sad split has had an effect on educational systems. Ken Robinson's popular *Do Schools Kill Creativity* brought to popular attention the way in which schools around the planet not only do not address creativity but in fact "kill" the creative spirit in students (Robinson, 2017). The reality is that in the educational system that emerged at least since the Industrial Revolution in the West, schools were never meant to foster creativity. Creativity was considered undesirable, disruptive, fundamentally threatening of the authority to the teacher, and more broadly of the status quo. In education the absence of creativity can be found all the way to the doctoral degree. In the United States, the doctoral dissertation is broadly defined as an original contribution to one's field (Montuori & Donnelly, 2013). One would think that if the doctoral dissertation is supposed to be "original" then surely that implies that doctoral research should be a creative process. But doctoral programs, from the natural sciences to the social sciences and humanities, generally spend very little time if any exploring what "original" means, beyond a warning about the evils of plagiarism, and they certainly do not frame research as a creative process.

On average 50% of the students who start doctoral programs in the United States don't finish them (Lovitts, 2008). Besides inevitable personal and economic setbacks, a key reason was a lack of creativity.

Doctoral students struggled to make the transition from being good course-takers to becoming scholars and*independent researchers,* meaning they were unable to come up with a suitable research topic, and unable to work without the kinds of explicit directions telling them what to do such as the ones they had received in earlier educational experiences (Lovitts, 2005). After twenty years or more of following the teacher's guidelines and not being allowed to cultivate their creativity in an academic context, these students were—perhaps not surprisingly– unable to suddenly turn on their creativity.

Lovitts spelled out the obstacles very clearly (Lovitts, 2005):

> graduate students must make a crucial shift from the familiar realm of course-taker (a consumer of knowledge that is 'carefully doled out in the form of courses or modules, course outlines and reading lists, lecture topics and assessment tasks' in tightly bounded and controlled environments (Delamont et al., 2000, p. 1)) to that of independent scholar/researcher (a producer of knowledge that often results from uncertain processes that take place in unstructured contexts) (p.138).

Lovitts (2005) found that successful scholars

> must acquire a high degree of the related self-discipline and self-control, ability to delay gratification, resilience in the face of frustration, independence of judgment, tolerate ambiguity, autonomy, have a willingness to take risks, and a high level of self-initiated, task-oriented striving for excellence. (p. 147)

What becomes very clear reading Lovitts's research is that the current educational system does not lead to students who are resilient enough to make the journey of doctoral studies. This also shows the importance of creativity and the ability to improvise, to respond to *the unforeseen,* which is the etymological root of the word improvisation (Montuori, 2003). Current educational systems do not cultivate the capacities listed by Lovitts, capacities which are very much associated more generally with creativity. In fact they actively inhibit creativity.

In the American educational system, with its neoliberal assumptions about efficiency and what constitutes good pedagogy, instructors evaluate students, but are also in turn evaluated by students (Aronowitz, 2001). As a result, getting good course evaluations– "pleasing the customer" –becomes a major issue for a successful academic career, and grade inflation is endemic (Boretz, 2004; Hunt, 2008). The neo-liberal, consumer approach to education fails students, faculty, and education in general because it emphasizes exactly the opposite of what Lovitts's research shows students need. There is an insistence on making every step of a student's work crystal clear, spelling every process out in great detail, and an over-emphasis on the role of methods to the point of fetishization. This gives students the illusion that they are being prepared to become independent researchers and ready to embark on their dissertation. But once the course work is over, and the dissertation writing phase begins, the student is fundamentally alone writing their dissertation, with no classes to attend, no hand-holding from instructors, and little guidance. And that's where Lovitts' research shows many students crash and burn. They only know how to follow instructions, but they are unable to creatively improvise, rally from setbacks, use their creativity to solve problems large and small and are generally not able to navigate the complexity and existential challenges the dissertation process involves. Forced by the educational system to focus on following instructions students lose their capacity to take initiative, to be self-motivated, to creatively explore, to be resilient in the face of setbacks. Education becomes a mechanical chore, with the focus on passing the test and getting an A, and the joy of inquiry is lost.

Creativity in this context is not just being able to come up with a great idea for a topic, although that is clearly an important aspect of doctoral research. It is a much more systemic process that involves the ability to face frustration, be disciplined, persistent, able to engage in self-directed work, face setbacks, confusion, overwhelm, ambiguity, and disappointment. In order for creativity to go from a good idea to a reality—a completed dissertation, for example—it is necessary to develop resilience and what Duckworth has called grit, or a passion and perseverance for long-term goals (Duckworth, 2016). As Barron's research has shown, creativity also requires an ability to rally from setbacks, and as anyone who has written and chaired

dissertations knows, there can be plenty of setbacks in the process. Reflecting on creativity in this academic context also points to the need for a reassessment of creativity as a systemic process (Csikszentmihalyi, 2015; Montuori, 2011d), which we will address below.

In Integrative Transdisciplinarity creativity is central. I have called creativity in the context of scholarship Creative Inquiry, and contrasted it with Reproductive Learning and Narcissistic Learning (Montuori, 2006; Montuori & Donnelly, 2013). This differentiation emerged because of the need to articulate an alternative to Reproductive Learning. I also saw that the alternative was often framed in opposition to Reproductive Learning, thereby throwing out the baby of scholarship and imagination with the water of industrial, assembly-line, authoritarian, rote learning, so I thought it important to articulate clearly what I wanted students to avoid. Reproductive Learning is the kind of passive rote education that is too often the case in the industrial model of education (Montuori, 2011c). It *reproduces* the content, process, social structures, power relations, and individual roles that conform to what are perceived to be societal needs and norms, mostly derived from the need of industrial countries to train workers at various levels of expertise. It is an educational approach centered on testing and assessment. The acquisition of existing information and conceptual frameworks is central, as suggested in Freire's term "banking" education (Freire, 2000). Learners and their values, experience, affect, personal history, creativity, and identity are not included in the educational process. Creativity, and therefore the original generation and application of information and conceptual frameworks, is not valued. Reproductive Learning therefore becomes a vehicle to reproduce prescribed societal roles, values, hierarchies and systems of control (Giroux, 2007, 2010; Kincheloe, 1993). The teacher has the answers to all the questions. The teacher is the authority and knowledge travels top down.

What I call Narcissistic Learning emerged for a number of reasons. At the university level, and particularly in graduate school, students who are used to being clear about the authority of texts and teachers to provide the right answer, see that experts disagree about many things, from theories of personality to interpretations of quantum physics to the meaning of the French revolution. Many students struggle to make sense of the multiplicity of perspectives (Salner, 1986). At that point, they may come to believe one view is just as valid as another, and that includes their own view, insight, or "theory." They fail to understand how a multiplicity of perspectives is possible and do not see the scholarship and theory that underlies these perspectives. They view it all as opinion. 'It's a free country, I'm entitled to my opinion.'

Narcissistic learning also shows up in attempts, whether by individuals or institutions, to intentionally develop an alternative to Reproductive Learning. The problem, seen in many attempts at developing "alternative education" in the 1960s, is when it frames itself in opposition to Reproductive Learning. Reproductive Learning privileges analysis, reductionism, disjunction, abstraction and simplicity. Narcissistic Learning privileges everything that Reproductive Learning rejects, such as the students' feelings, imagination, playfulness, and subjectivity, but also academic rigor, immersion in the literature, and other traditional aspects of scholarship as well as the more stultifying. This reflects a mistaken idea of creativity that can be traced to popular interpretations of the Romantics and in the 1960s and 70s to trivializing interpretations of Humanistic Psychology which reject "thinking" in favor of "feeling," and despite good intentions unfortunately just end up with bad thinking (Montuori, 2011b).

Creative Inquiry strives to illuminate the complexity of the world by fostering the development of transdisciplinary complex thought (Montuori, 2005a; Morin, 2008b, 2008c). It stresses the importance of connecting and contextualizing, and the inquirer is recognized as an embodied and embedded participant rather than spectator to life and knowledge. Inquiry, learning, knowing and knowledge themselves are viewed as systemic, relational, processual, contextual and creative processes. Creative Inquiry does not privilege either the external or the internal authority, but rather is always engaged in a creative process, a creative hermeneutic where there is a constant dialogue between text and context, part and whole, "objective" and "subjective."

From the extensive research on the psychology of creativity we also learn about the psychological characteristics associated with creativity, and that these characteristics (or traits) can be cultivated. I can only give a hint of the relevant research here for reasons of space, drawing mostly on the pioneering work of Frank Barron (Barron, 1953, 1963, 1995).

Key characteristics include:

Independence of Judgment, or thinking for ourselves and not automatically accepting consensus views;

Tolerance of Ambiguity, or not experiencing discomfort with ambiguous phenomena and feeling the need to immediately have an answer—whether somebody else's or our own snap decision;

Openness to Experience, a sense of curiosity, acceptance of novel and unusual experience, and general open-mindedness;

Preference for Complexity, or being attracted to complex phenomena rather than wanting to stick with the simple, symmetrical, and orderly.

The creative process includes making connections between ideas and phenomena that have not previously been connected, challenging the assumptions underlying the way an issue has been addressed, using theories and methods from one discipline in a different one.

Creativity can be cultivated in students. One opportunity is offered by the fact that in the process of teaching transdisciplinarity to students who may all be researching very different topics, it is of course impossible to use examples that will draw directly on each student's research topic. It is not unusual to find students who will switch off if they hear an example that is not directly related to their interests. This can be turned to an advantage by framing the broad range of examples as an exercise whereby students have to make an effort to see the underlying principles in every example and how they can be applied to their own research rather than the focus on the specific subject matter. Students are therefore encouraged to find the underlying principles of a way of thinking or approaching a problem that can then be transferred to their own topic.

Researching creativity
The way creativity was studied traditionally reflected the paradigm of simplification. I summarize it here:

Who: The "person," and in particular the genius, was always an individual, with little or no attention placed on the environment (social political economic, etc.) or relationships and collaborations.
How: The lightbulb, the moment of insight.
Where: Art & Science, definitely not everyday, mundane activities.
What: Major artworks, breakthrough scientific theories.

In this view, creativity is a rare phenomenon possessed by a gifted few that happens in a flash. As a result, schoolchildren were made to read the work of "great men" rather than also developing their own creativity. Doctoral programs generally do not address creativity or creativity research and its relevance to scholarship. Implicitly they give the message that it's best to just get on with one's work, because creativity is something only a few have. Many students express that they don't get flashes of insight like a genius and don't conform to the popular image of the creative person and therefore can't be creative. All these limiting assumptions can be excavated, questioned, and alternatives allowed to emerge which free students from this straitjacket.

This view of creativity perpetuates what Dweck calls a fixed mindset (Dweck, 2007): you either are creative or you're not. This view is still quite pervasive, and certainly does not inspire students to believe in their own capacities. This is the dominant view for students who are inclined to engage in Reproductive Learning. Students who fall more on the Narcissistic Learning side of the spectrum tend to assume they are creative, even very creative, but tend to ignore the fact that deep scholarship is required to ground their views and make them of interest to the larger scholarly community.

The new view of creativity reflects Dweck's growth mindset, meaning that students can develop their creativity as part of their scholarship. Students can expand their conception of creativity and begin to reflect on the aspects of their life that they might not have considered as involving creativity. One related example is how much of what women have done in the home has not historically been considered creative, whereas now there is an increasing recognition of the importance relational and everyday creativity and what Eisler calls caring economics (Eisler, 2007; Eisler et al., 2016). In the new view, the who, how, where and what of creativity are quite different (Montuori, 2011a).

Who: Individuals, but also relationships, groups, organizations. Any system being researched, whether an individual, and dyad, a group, an organization, a community, and so on–is studied in its context. The emerging new paradigm of creativity research incorporates the social dimension: it is relational and contextual. Everyone *can* be creative, but creativity does not appear ex *nihilo*: it also requires skill-building, immersion in the field, and so on. The question becomes, *what* are we creating, and is it desirable, ethical, valuable, life-affirming, etc.

How: A systemic process that begins with preparation, skill-building, and after the insight also involves sticking with the idea and having the grit to complete the project. It is not limited to the moment of insight. This is demonstrated in one of the oldest and most popular models of the creative process, by Wallas (Wallas, 1926). The stages are: Preparation, Incubation, Illumination, Verification. These are intended heuristically rather than as a description of a clearly defined process.

Where: Everywhere, or distributed—in all aspects of life, including the most mundane (V.P. Glăveanu, 2014), and in all aspects of inquiry. Many aspects of research that students find tedious, like writing literature reviews, can be reframed as an aspect of the scholarship of creative Inquiry (Montuori, 2005b).

What: Everyday– not just events or products of great significance, but ways of creatively resolving small problems or framing issues in a new way.

Creativity research is bursting with research that is relevant to academic inquiry (Lovitts, 2005). Not only that, but the exploration of creativity can itself be an interesting entry point for a reflection on transdisciplinarity and how it can inform creativity research.

4   Meta-paradigmatic

As I mentioned earlier in the discussion of Narcissistic learning, in college students can be exposed to a multiplicity of theories and viewpoints, and this can lead to a view that one theory is as good as another, and ultimately it's all "relative" or a matter of "opinion." Perry's research on the cognitive development of university students revealed what Salner usefully summarized as three different epistemological "positions," Dualism, Multiplicity, and Contextual (Salner, 1986). To some extent, these positions map on to what I have called Reproductive, Narcissistic, and Creative Inquiry, with the contextual position having characteristics found in creative individuals and complex thinking. In dualism, like in Reproductive learning, students look to the teacher as the authority on what is right and wrong, and believe there is only one right way and one correct answer. In multiplicity, as in Narcissistic learning, students find that experts disagree, their authority is questioned, and "anything goes," in the sense that they can make up their own theories and perspectives, drawing on their subjective experience and opinion. They fail to ground their work in scholarship and thus cannot participate in the larger academic community. The contextual view studies every phenomenon in its context, including an awareness of the academic context and community the student participates in engages in an ongoing dialectic between subjective/objective, reason/emotion, and realizes the need to commit to a view and a course of action they can stand behind (Kuhn et al., 2011; Salner, 1986).

Unfortunately, in the years since the No Child Left Behind policy in the United States and the increased focus on Reproductive Learning in schools, even up to and including the university level, students find it harder to step into the contextual position. When the focus has been so much on "getting it right," where right means finding the one right way and the one right answer, it is harder for students to develop what Maruyama calls a "polyocular" view, one that engages multiple perspectives in understanding a phenomenon and making decisions (Maruyama, 2004). Creative Inquiry requires the cognitive capacity for *integrative complexity,* or the ability to *differentiate* between perspectives and *integrate* them for purposes of meaning-making and action (Suedfeld et al., 1992). Integrative Complexity has strong parallels Morin's complex thought, with Perry's contextual view and Barron's research on creativity. It involves the ability to avoid black and white thinking, or the necessity to immediately label and categorize phenomena, to be comfortable with ambiguity and a multiplicity of perspectives, yet be able to make decisions and chart a

course of action that draws from the integration of multiple perspectives (Kuhn et al., 2011; Suedfeld et al., 1992; Tetlock, 1986). This clearly reminds us of the characteristics Lovitts found in successful doctoral students discussed earlier.

Students can be guided to become aware of different cognitive positions and how they influence inquiry. This is an invitation to engage in reflection on their own thinking and develop metacognitive skills (Heath-Carpentier, 2022). Transdisciplinarity by definition involves stepping outside the confines of existing disciplines. One of the challenges of doing this is confronting entirely new worlds, new traditions, new approaches, new journals, new scholars and a potentially vast number of publications. Traditionally one of the main criticisms of interdisciplinary research has been that interdisciplinary researchers are dilettantes. They don't have the in-depth, specialized knowledge considered necessary to do serious research. The "gentleman scholar" of old or the "armchair theorist" is the image of the "dabbler" who is not a professional, not up to date on all the research, and is often viewed as eccentric and speculative at best. There is an aspect of the criticism that can be valid, but it is also the case that "amateur" and "dilettante" can be framed differently. The terms both refer to doing something for the love of it, but without the real commitment that is necessary to "serious" or "professional." In fact the professionalization of inquiry has been the subject of serious and increasing critique, as have the resulting joylessness and fragmentation that has resulted from hyper-specialization (Wilshire, 1990). The point, I believe, is to reintroduced love (an amateur being someone who loves to do something) joy and pleasure in inquiry (the dilettante being someone who does something for pleasure).

Nevertheless, the warnings are well taken. One challenge for the transdisciplinary scholar is to learn to work with existing research that is pertinent to the topic at hand but lives in multiple disciplines. This is not an abstruse academic issue. With the emergence of the internet citizens have at their fingertips enormous amounts of information that even 30 years ago would have required extensive trips to the library and specialized access. It is not surprising that access to this wealth of information without either subject knowledge of any sense of how to make sense of the information as an interconnected whole has led to all sorts of "post-truth" epistemological chaos, with bizarre conspiracy theories, misinformation, confusion, and misunderstandings—one only has to think of the many different stories that emerged with the pandemic. The pandemic found citizens reading about a range of related topics and disciplines, from public health policy to immunology to economics, in which the majority of them had no background at all, at a time when even the experts were struggling to keep up with findings, events, and how to translate all that into policies. There is a set of research skills that requires the ability to assess information, understand the underlying theoretical perspectives and paradigms, and integrate that information in a larger context. For the transdisciplinarity researcher this is an essential task, since the knowledge base will not be drawn exclusively within one discipline.

This is why it is important for researchers in Integrative Transdisciplinarity to develop a "radical" background in the philosophy of social science. By radical I mean going to the roots of the various perspectives, their underlying philosophical assumptions. In that way they can familiarize themselves with various ongoing debates such as atomism versus holism and objectivity versus subjectivity, because these are some of the fundamental dimensions of inquiry. I have found Brian Fay's *Contemporary philosophy of social science: A multicultural approach* particularly useful for this purpose (Fay, 1996). It covers some of the fundamental ways in which knowledge has been constructed in the west using a dialectical approach that stresses distinction, not separation, between historically opposed views such as atomism and holism and realism and constructionism.

An awareness of these fundamental categories gives a better sense of the underlying dimensions of any particular paradigm and theoretical framework. For instance, in the case of creativity, a review of the literature shows that in the 20th century, psychologists approached the topic atomistically, whereas sociologists and anthropologists where holistic. For psychologists, the individual was the fundamental unit of analysis whereas for sociologists and anthropologists it was society as a whole, leading to different understandings of creativity, and specifically different kinds of interventions to foster creativity. An awareness of these different perspectives on creativity also gives insights into the way knowledge is *constructed.*

Developing a transdisciplinary knowledge base is a complex process. We encourage students to use handbooks, encyclopedias, and overviews as part of their research so that when they engage with material in disciplines they may be unfamiliar with they can also contextualize it in their understanding of the larger issues of the discipline they are drawing from and the ways the topic has been approached. The effort is to continually contextualize and not just cherry pick fragments of information. Fortunately there are now more and more handbooks and other volumes that provide researchers with thorough overviews of a field or topic, and point readers to further research. The development of a knowledge base for a transdisciplinary scholar is an ongoing process and one that I have addressed elsewhere (Montuori, 2005b, 2013). There is still much work to be done, but it points to one of the fundamental skills of the transdisciplinary scholar, which is the ability to navigate the overwhelming quantity of research, and find pertinent knowledge, develop the ability to discriminate, always connect the part to the whole, explore the underlying assumptions of any work, and connect relevant research with a view to creative integration.

Transdisciplinary writing

Transdisciplinary has some particular challenges. We can safely assume that if an author is drawing on multiple disciplines, readers with a mono-disciplinary background may not be familiar with all the concepts and ideas. Perhaps even worse, they may *think* they know what certain terms and ideas mean because they may know the way they are used in their own discipline, which may define and use them in quite in a different ways. Maruyama calls this "sub-understanding," or the conviction that we fully understand what someone is saying when in fact we do not because they are grounded in a fundamentally different set of assumptions, as well as terminology that may mean different things in different disciplines (Maruyama, 2004). The challenge for Integrative Transdisciplinarity is writing clearly, and making sure basic concepts and terms are defined and explained succinctly. This should not be misunderstood to be 'dumbing down.' On the contrary. It makes extra demands on the author to be able to articulate complex ideas and avoid the tendency to use jargon which can easily obfuscate. The challenge for students here is to become thoroughly familiar with core concepts.

Inquiry-based

How does one begin a transdisciplinary inquiry? In a disciplinary context, a doctoral student or researcher working in the psychology of creativity has an entire history to draw on, with exemplars, multiple research agendas, the specific research agendas of faculty or colleagues, and segmentation into various emphases, such as personality, motivation, and more recently the sociocultural approach. There is a community of researchers with a history, a language, questions they are pursuing, interests, methods, journals, and so on. Being able to participate in that community has great advantages. As we can see comparing reviews of the field over the years in Annual Review of Psychology, there are changes in the topics that are of interest in any particular time. In Barron and Harrington's 1981 review of psychology (Barron & Harrington, 1981), intelligence and its relationship to creativity showed up as a major research topic. This is now no longer a "hot topic." In the 21st century, the neuroscience of creativity and the sociocultural approach are generating a lot of interest (Hennessey & Amabile, 2010; Runco, 2004). While it is by no means necessary for students in a disciplinary program to embrace one of the current approaches and agendas, researchers coming into the field cannot help but be drawn into the disciplinary culture, with its specific viewpoints, discussions, and ways of discussing, thinking, and talking about creativity .

How and where does research begin in Integrative Transdisciplinarity? Research often emerges when individuals have a burning question that is not being addressed in the literature, or at least not in a manner that is satisfactory to them. In my own case, I encountered the creativity literature because I had spent a number of years as a professional musician in London, and wondered if the creativity research had anything to say about the volatility of creative groups. To my surprise I found there was hardly any research about creative groups at all. The focus was exclusively on the individual, and I found many people in the United States felt group or social creativity was an oxymoron. This seemed rather odd since music, theater, cinema, and many other artistic , scientific and business endeavors relied on creative groups. My question therefore shifted from "what does the literature tell me about creative groups" to "why has this topic not been researched at all, and what does that tell us about how the topic is being framed, the

underlying assumptions and the way the topic is created by the community of scholars," which led to my still ongoing exploration.

I encourage my students to develop a thorough narrative describing the phenomenon or experience they want to research and a set of questions that emerged out of that narrative. This is what I mean by *inquiry-based*. Rather than starting with the existing topics, frameworks, and languages, found in a discipline, we start with a phenomenon or experience and describe it, preferably in the form of a narrative, and then explore what questions and connections arise (Panico & Dieleman, 2014). Then the search begins for what Morin calls *pertinent* knowledge (Morin, 2001). In any transdisciplinary context, my experience is that students will always be tempted to list a number of disciplines they will be exploring. This is the easy answer, but not helpful in terms of actual research. What does it mean that "I will be drawing on Psychology, Sociology, Cultural Anthropology, Cultural Studies..." and so on? Will the student develop expertise in every one of these disciplines? Surely not. What exactly will they be looking for? Nevertheless naming the disciplines seems to be such an automatic initial response that it has been one of the hardest things to disabuse students of in the beginning of their journey. To be clear, the issue is not naming disciplines that may have relevant discussions, but naming them without a strong sense of the initial questions the researcher hopes to address. A related issue is that doctoral students can lose track of their core topic and drift into exploring fascinating but marginal research. The right balance needs to be struck, and the topic needs to remain front and center throughout.

The aim of writing a narrative is to have something akin to a phenomenological description, with no interpretation, no explicit frame, just as close as possible to a statement of the facts, as they appear to the inquirer. The aim is not objectivity in the traditional sense, but rather a description of what the inquirer perceives and believes is of interest. That description serves as a starting point. Using an iterative process it will be enriched as the research on the questions brings more information and in turn more questions.

As the narrative is revisited it also helps inquirers understand what originally motivated them to begin the inquiry, and what their assumptions were when they began the process. In other words, it allows for a process of ongoing self-reflection, and also a way for the inquirer to see if they have gone off track, pulled in by a particularly fascinating issue that was not central to the original inquiry, but seduced the inquirer into new territory that is not entirely relevant. It could also be the case that the new developments are in fact are more fruitful direction, so this is where the research process requires self-reflection, judgment, and the ability to make contextually appropriate decisions. This, of course is one of the big challenges of transdisciplinary inquiry, the possibility of tumbling down endless rabbit holes. Endless drift is already a temptation in the research process, but it is certainly the case in transdisciplinary research because inquirers may be continually exposed to research, issues, methods, and theories they were completely unaware of.

Integrating the Inquirer

One of the main criticisms of reproductive education is that the learner simply became a container for knowledge that was to be regurgitated on demand. The response came in the 20th century with many attempts to create whole person education that also addressed imagination, the student's history and identity, feelings, and students' creativity. All these aspects of humanity were left out of accounts of the scientific method and of education, but it's become clear to many that they do play a role in inquiry, in education, and in the scientific method, and rather than attempt to eliminate them an effort should be made to integrate them into a more complex understanding and process of learning and education (Hart, 2009; Montuori, 2006; Morin et al., 2003).

A traditional academic article is written in the third person, detached, objective, just the facts. We know nothing about the author, and that is as it should be in this frame. Knowledge was supposed to be in no way dependent on the subjectivity and unique characteristics, of the author, whether psychological, sociological, or cultural. The article is also presented in the form of what is known as the context of justification, the final phase of the research when findings are presented. We know little if anything about the context of discovery, or how the hypothesis was developed, the creative process that led the scientist to this particular work and this conclusion. That aspect is a black box. A brief scan of academic journals will show that there is now quite a range of permissible styles. Some journals still require the very formal

writing found in a scientific report, but increasingly there are also journals that are open to first person narrative and reflection.

Integrative Transdisciplinarity stresses the importance of integrating the inquirer into the inquiry. Drawing on second order cybernetics, humanistic psychology, and feminist scholarship, this means that in the process of inquiry the role and experience of the inquirer is highlighted and becomes itself a subject of inquiry. Every inquiry also becomes self-inquiry. Integrating the inquirer requires the development of metacognition and epistemic cognition (Kuhn et al., 2011), or

One important aspect of this dimension is to recognize the creative aspect of perception, and to remind students that what they take for the way things are—"this article is boring"—is also a reflection of the way they have perceived the article, what they have foregrounded and backgrounded, what they may have skipped over, how they contextualized the reading, and so on. This is a starting point into the realization that the inquirer is always already integrated into the inquiry, constructing their own understanding of the subject.

Human beings are all situated in a complex, multi-dimensional context. The sociology of knowledge began by focusing on the social context in which knowledge emerges (McCarthy, 1996). Who is the author, what is their class, race, and gender, and to what extent do they play a role in the author's understanding of a phenomenon? This approach has sadly often been used in a deterministic and dismissive way, suggesting for instance that a "bourgeois" scholar can only have bourgeois things to say (Morin, 1991). But it can also be used self-reflectively by a scholar as a way to consider the inevitable limitations of one's native approach, and as an opportunity to expand one's viewpoint. Cross-cultural research has shown that there are certain cultural approaches to thought and to research, with scholars from the United States and Northern Europe showing a distinct cognitive preference for analysis versus more holistic approaches other parts of the world, notably East Asia, as well as Indigenous scholarship (Nisbett et al., 2001).

The psychology of knowledge leads to questions about the way an individual's psychology plays a role in the process of inquiry, both in terms of their creativity and their cognitive preferences, defense mechanisms, their quest for certainty, the need to be right, to engage in academic discourse through the metaphor of war, and so on (Devereux, 1968; Maslow, 1969). This offers a potentially very rich opportunity for inquiry into one's own limitations, blocks, fears, inner and outer conflicts, and needs. This is an aspect of scholarship that has largely been buried because it can be quite uncomfortable. One way students can be brought to an awareness of cognitive preferences is through the use of Jungian typology and the popular Myers-Briggs inventory. This can be used to make students aware of potential blind spots. Students who score high on Intuition, for instance can easily make connections between ideas, see the big picture, but might struggle with details and articulating their ideas in a systematic way so that others may be able to understand them. This is a simple and relatively inoffensive entry point to allow students to reflect on their own process, become aware of possible stumbling blocks, and orient towards addressing some of their obstacles to success and areas to pay attention to.

I am by no means suggesting that every work of Integrative Transdisciplinarity should require the author to make all the author's psychology and sociology explicit. It would also course be impossible to publish in many if not most prestigious journals if one had to include such lengthy reflections. It is, on the other hand, an opportunity for the author to frame inquiry as including self-inquiry, and to reflect on one's practice—indeed to make this reflection itself a scholarly practice. This self-reflection is central to Integrative Transdisciplinarity, and sharing the context of discovery with the reader is an important contribution to creating greater transparency.

It is not uncommon for scholars immersed in their work, which in academia involves everything from teaching to administrative roles and more, to simply "get on with it," as it were, and not spend time asking fundamental questions such as why they are focusing on a particular topic, what their motivation is, how they are making their choices, what habits they have developed, what their assumptions are, and so on. It is not hard for the academic dealing with the stress of work to lose sight of these larger questions. These are questions we invite students to explore, and at the doctoral level the choice of dissertation can be an excellent if stressful time to ask these basic questions. We remember that Lovitts found many students who drop out of doctoral studies do so because they struggle finding a suitable topic. In my experience, there

is often a "delayering" process that happens to students who are systematically engaged by their faculty to reflect on their topic. An initial topic may be what the student believes they should research. After extensive dialogue they may come to realize there is another topic that has much more resonance for them. And it is not unusual to find a last step where the student after some soul searching remarks that what they really would like to do is X, but they just don't think it's possible, it wouldn't be allowed, and so on. Chairing dissertations for almost 30 years, I have found that the journey is often just as much existential as it is academic. As a result much closer attention needs to be paid to the psychological challenges students face, ranging from impostor syndrome to feelings of inadequacy, direction in life, and doubts about their identity as a "scholar." The journey can be an opportunity for personal growth, rather than simply an academic mountain to climb (Montuori, 2006).

Epistemological Humility
A key factor for successful Integrative Transdisciplinarity is what I refer to as epistemological humility. In a traditional disciplinary context, a scholar can develop deep expertise in a topic. That expertise can also lead to a certain arrogance. One is the "knower," the "expert," and one has one's "positions" which must be "defended" from the impositions of others. The scholarship of Integrative Transdisciplinarity does not involve the kind of deep expertise in every single topic one covers. For instance, if one is studying the social dimensions of creativity one may engage feminist scholarship and its history of research in, among other things, the way women have been excluded from participation in certain fields. One leading researcher of women's creativity, Ravenna Helson (Helson, 1990), stated that

> the understanding of creativity in women requires attention to the social world, to individual differences in motivation and early object relations, and to changes in society and the individual over time. In fact, we believe that the study of creativity in general needs all of these directions of attention (p. 57).

The challenge here is that one cannot be an expert in all of these fields. Interdisciplinary scholars have suffered the slings and arrows of critics who focus on the fact that they are not "truly" experts in one of the topics they're discussing and are therefore in no position to legitimately discuss it. This starting point would make any effort at integration of knowledge that draws on multiple disciplines a priori futile and amateurish.

Nevertheless, it is becoming increasingly clear that works of synthesis that account for the complexity of a phenomenon are necessary, even vital. My example of Eysenck's statement shows how it is possible to be a disciplinary expert in a topic and yet make statements that can be deeply misguided. In this case it is not the lack of specialized knowledge that is the issue, but the inability to see the context and complexity of the phenomenon spills over disciplinary boundaries. A single disciplinary specialization can create blinkers.

Epistemological humility requires letting go of the ideal of omniscience, or the *performance* of omniscience (Ceruti, 2015). There is a shift in identity from being the "knower" to being the "inquirer," and preferably, in my view, the "creative inquirer." This means remaining open to ongoing learning and exploration, recognizing that one can make mistakes and faulty interpretations, that perspectives other than one's own may have value, and that self-reflection and challenging one's own assumptions is an essential aspect of scholarship.

The interpersonal dimension is important here, because the arrogance that is sometimes associated with expertise is directly related to one's sense of identity and the need to feel "superior," to be "right." This requires a degree of self-reflection, openness, a willingness to develop a scholarly identity that is more complex, and an openness to other perspectives as well as to the possibility that one may be wrong and others maybe right (Porter et al., 2021). Integrative Transdisciplinarity invites us to frame interactions as mind-jazz, to use the cultural historian William Irwin Thompson term. These are collective creative explorations and improvisations on a theme rather than a battle for who is right and the best debater (Thompson, 1989, 2016). This is not a rejection of debate and critique, but rather a way to expand, contextualize, and let creativity blossom in dialogue. Many academics know (and many conference organizers have acknowledged) that the most enjoyable and nourishing aspects of a conference are the

evenings spent talking over dinner and drinks, exchanging ideas, and meeting new colleagues, rather than the formal presentations. There is an informal dimension to inquiry, one that touches in with the passion for inquiry that motivated scholars in the first place that needs to brought to the fore and included in the broader understanding of what it means to be a scholar. We must not underestimate the ability to play with ideas, to explore them, to "entertain" them and follow where they take us in a very exploratory way. Being critical, finding problems too soon can be deadly, since emerging ideas can be fleeting and fragile. Premature criticism can cut off the generative potential of a rich dialogue which may take us in directions one didn't expect, and can turn out to be fruitful and enriching. This mind-jazz, this improvisation with ideas, is a key component to the joy of inquiry and of Integrative Transdisciplinarity.

5 Conclusion

Transdisciplinarity is a new frontier that can potentially revolutionize education for a global age (Morin, 2008c; Nicolescu, 2012). The industrial educational model is not sustainable in the 21st century, and has in fact become counterproductive. A transdisciplinary approach, grounded in principles of systems theory and complex thought, and informed by creativity, can point the way towards new academic horizons. Integrative Transdisciplinarity is one example of an attempt to work with graduate students in a way that begins to embody those principles in scholarly research.

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