

Engaging Imagination and
Developing Creativity in Education
(2nd Edition)

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Edited by

Kieran Egan, Gillian Judson
and Krystina Madej

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PREFACE TO THE SECOND EDITION

KIERAN EGAN

Advocating greater imaginative engagement and creativity in schooling is hardly new. Jean-Jacques Rousseau argued long ago that making what we want to teach to students conform with their natural ways of learning would cause a revolution in education. And long before him, Plato had argued that children's learning, especially of subjects like mathematics, should be taught in the context of games and play, so that their imaginations would be caught up while gaining knowledge. In making his argument, he referred to the wise practice of the Egyptians, who had been using play in teaching and learning for hundreds of years before him. And in more modern times, John Dewey gave a great boost to the progressivist movement by showing how this could still be achieved in a modern industrial world. Howard Gardner is another strong modern proponent of imaginative engagement of students in learning and creativity in education generally. Kenneth Robinson's advocacy of this general insight into how to make the educational process more interesting, meaningful to students, and effective is widely celebrated.

So what's the problem? Why do people have to keep making the same arguments and find new ways to express them? Why do these advocates of imagination and creativity keep representing themselves—with good justification—as an embattled minority having to continually fight against institutionalized forms of dreary educational practices? And, more to the immediate point, what's different about this book? What are we offering that is new and can help imagination and creativity find their proper place in an educational process that has seemed determined to resist them, for one reason or another?

Teaching well is hard work. One very simple reason why there is constant advocacy of change towards more imaginative methods of teaching and learning is that engaging students' imaginations all day is even harder work for the teacher—or so it has always seemed. It is all very well for philosophers and academics to airily lecture about how wonderful education can be if only teachers are consistently more creative, but they don't have to get up every morning and make it happen in classes of

twenty-five and more students day in and day out. Which brings us to how the approaches advocated in this book can help.

All the papers in this book are more or less closely related to the Imaginative Educational Research Group (IERG) [<http://ierg.ca>] and its work. The IERG, with its thousands of associates around the world, has been intensely involved in devising techniques and programs that help teachers routinely engage students' imaginations and develop their creativity in learning. While many educational researchers and theorists have been content with advocating, often eloquently and influentially, the value of doing this, the IERG has been working out methods and techniques for making it happen in the normal contexts of everyday classrooms. Each of the papers in the second edition of this book contributes to making imaginative engagement routine and practical, and often points back to the IERG website, where you will find theoretical support and advocacy as well as practical materials, including planning frameworks, examples, and new programs to enable any teacher to take the ideas of Imaginative Education into practice.

Krystina Madej and I have been gratified by the call for this expanded and revised edition of our 2010 book, and we have been delighted to welcome to our editorial group Gillian Judson, one of the Directors of the IERG. She has been particularly helpful in soliciting new articles that contribute to the range of perspectives taken in the book. We hope you find the collection of papers useful and inspiring.

PREFACE TO THE FIRST EDITION

KIERAN EGAN

This series of essays has been collected expressly to showcase new ideas about stimulating and developing imagination and creativity in education. Clearly, many teachers already energetically engage students' imaginations and foster fascinating creative work, and there are many good programs available to teachers that can help them become more adept at attaining these desirable goals of education. But all surveys of schooling suggest that the average classroom is not in general wonderfully successful when it comes to stimulating imaginations and sparking creativity in children. Also one of the problems with many programs currently available to help achieve these aims is that they tend to see their role in either stand-alone activities or via arts subjects. What we want to emphasize through this book is that engaging imaginations and stimulating creativity is something that is properly done across the curriculum, in science and math no less than in history or language learning or the arts.

So a distinctive feature of our book and of the research group with which much of this work is connected is dedicated to showing how teachers may routinely engage students' imaginations in learning that alternate interior angles in a parallelogram are congruent or about the life cycle of eels or the way place value works in arithmetic or the industrial revolution or anything else. The Imaginative Education Research Group (www.ierg.net) is centred at Simon Fraser University in Canada, but it also has many affiliates around the world. The articles in this book aim to expose aspects of the IERG's work, and also extensions of it. We also want to provide understanding of the basic theory of imagination and creativity and their roles in learning and life. And we want to explore the many other arenas of learning in addition to the regular school classroom in which the imagination can enliven and stimulate both the work of the learner and of the teacher.

There is something about the normal conditions of public educational institutions that makes engaging imaginations seem a desirable frill, but a frill that can be attended to only after the hard work of controlling and directing the learning of twenty-five or more children. So, even though desirable, the difficulties of the primary tasks of control and basic

instruction tend to leave little time for the imagination. What we are intent on showing is that engaging the imagination is not something to be attended to after the hard work of learning is completed, but is rather something that can make the tasks of control and basic instruction more stimulating to teacher and students. The imagination, we propose, is properly seen as one the great workhorses of learning, and a central workhorse at that, not a peripheral frill. The readings in this book are designed to expose various dimensions of this perspective on the uses of the imagination in teaching and learning and on stimulating creativity in students' own work.

Many of the most important issues that we deal with in education are matters of value and meaning, and these are areas where the dominant forms of educational research are powerless to help us. The value of engaging the imagination in learning is not something that has been enlightened by empirical research, and there is always a tendency to focus attention on those things we find easier to research. This is the phenomenon of looking on the sidewalk under the bright lamppost for the keys that were actually lost in the deep grass out of the light. But imagination and creativity are crucially important elements in education, and to continue to give them less attention that they merit is to persist in the folly of futile searching for keys under the lamppost. Through their work, the educators and researchers in this book provide a light that is directed at where we have misplaced some of the important keys to effective education.

In the first part of this book, authors explore and discuss different theories of development, imagination, and creativity. In the second part authors negotiate ideas concerning imagination and apply them to both broader social issues such as responsible citizenship and gender, and to a wide array of curriculum subjects, from the arts and literacy to mathematics.

Krystina Madej and I would like to thank all of the authors for their imaginative approaches and for allowing us to use their work, Stacey Makortoff for her organization skills, and Melanie Young and Peter Kovacs for their assistance with editing.

PART I

IMAGINATION AND CREATIVITY: THEORIES AND DISCUSSIONS

THE TIES THAT BIND: HOW IMAGINATION GRASPS THE WORLD

MARK FETTES

The Tools of Imagination

In a series of books beginning with *Educational Development* (1979), the Canadian educational philosopher Kieran Egan has argued that the modern individual imagination retraces, in its unfolding from birth to adulthood, a series of transformations rooted in the cultural history of our civilization (see especially Egan, 1988; 1990; 1997). The driving force behind this process, according to Egan, is the progressive acquisition of culturally embedded strategies of imaginative engagement with the world around us. Egan calls these cultural strategies “tools,” following the Russian psychologist Vygotsky (Egan, 1997; Vygotsky, 1986). For both Vygotsky and Egan, such tools (for example, particular ways of using language) are first encountered in social use and gradually integrated into individual patterns of awareness and thought.

However, Egan’s notion of “cognitive tools” only partially overlaps with the Vygotskian notion of “psychological tools.” With his Marxist training, Vygotsky incorporated a firmly materialist conception of culture into his theory; a psychological tool for him was something particular and concrete – a gesture, a word, a drawing, a model, and so on. Egan uses the word to mean something much broader and more abstract: “binary opposites,” “association with heroes,” and “the search for general schemes” are among the key imaginative strategies he labels “cognitive tools” (e.g. in Egan, 2005). Egan’s rationale for picking out these particular themes only makes sense in the context of his general thesis that the imagination develops through five “somewhat distinct” kinds of understanding, each characterized by particular sets of tools, or “toolkits” (1997; 2005). Throughout his work, Egan describes each “toolkit” on its own terms—the imaginative toolkit of oral language/Mythic understanding, for instance, being elaborated separately from that of written language/Romantic understanding, and separately again from the toolkit of disciplined abstract thought/Philosophic understanding.

In this brief essay I explore the notion that the imagination, as Egan describes it, may also usefully be viewed in terms of somewhat distinct “foundational capacities” which remain constant *across* kinds of understanding. The purpose of these capacities, their evolutionary function, is to help us “grasp” hidden forms of order and unrealized possibilities in the world. (This ancient metaphor of “grasping”, which Brann, 1991, attributes to the Greek philosopher Zeno, still seems one of the best terms for alluding to what Egan calls the “reaching out” quality of imaginative thinking.) Foundational imaginative capacities, in this view, have developed in response to the most persistent and significant challenges of this kind faced by humans, and our cultures have learned to train and shape these capacities through a diverse range of language and behaviour.

One straightforward example would be an imaginative capacity for “grasping regularity”—that is, the ability to perceive new forms of order in the world, and indeed to impose them on a sometimes recalcitrant reality. Of course, probably all organisms need to be able to identify recurring or stable aspects of their environment, so imagination cannot be the only means of accomplishing this. But what imagination is supremely well suited for is coping with the unexpected, the rapidly changing, the unfamiliar. It is therefore plausible that, as the human imagination developed, it did so in part by inventing and assimilating cultural tools for quickly identifying regular patterns in new and unfamiliar settings. This means that, even today, we might expect to see the imagination drawn to pick up and use such tools—that this foundational capacity might be reflected in the “cognitive tools” identified by Egan in his various kinds of understanding.

What might be other candidates for foundational imaginative capacities? Although any categorization must probably be somewhat arbitrary, here I will focus on eight capacities that together seem to cover most of the tools identified by Egan (plus a few more). These include *grasping regularity*, as already outlined, and the following: *grasping detail*, that is, holding in one’s imagination the individual richness of particular cases, situations, events, that makes them unique; *grasping composition*, or developing a sense of the invisible relationships that bind such details together into a greater whole; *grasping wholes* themselves, apprehending them as coherent entities with an identity sustained through time and space; *grasping possibility*, or developing an understanding of how such wholes may vary and change; *grasping struggle*, that is, gaining a sense of what drives and what hinders change, and how this plays itself out in myriad variations; *grasping indices* that help identify and

characterize the possible limits of variation, change and struggle; and *grasping inconsistency*, or an appreciation for the ways in which the world does not always act as we imagine it will.

This is, of course, an abstract and perhaps overly cognitive way of putting things. It does not go into the emotional connections that seem so important to imagination and are properly emphasized by Egan; it leaves unexplored its aesthetic and expressive dimensions. But it does help us to see the imagination as an extension of fundamental adaptive capacities not unique to humans, and thereby to tie it more firmly to our embodied, biological, ecological identity. More immediately, it points to a way of thinking about imaginative development that is compatible with Egan's scheme, but that enriches it with new insights and possibilities.

The principal implication to be explored in this paper is that Egan's "cognitive tools" can be associated with one another not only "horizontally" (that is, within a particular kind of understanding), but also "vertically" (that is, in connection with a particular foundational imaginative capacity). This provides a useful way of probing Egan's description of each kind of understanding, asking whether each "toolkit" is truly comprehensive in the sense that it accounts for how these diverse functions of the imagination take up the affordances of oral, written or disciplinary language. (I follow Egan's recent practice, e.g. in Egan 2005, of focusing on the tools of Mythic, Romantic, and Philosophic understanding, leaving Somatic and Ironic understanding for exploration elsewhere.) In place of the catch-all term "cognitive tools," we might call these vertically linked cultural strategies "tools of imaginative engagement," or TIEs—a term that usefully echoes their contribution to "tying" together Egan's kinds of understanding.

In the space available, it is only possible to sketch what each set of TIEs may look like, without exploring the different cultural forms they may take or how they might be used in educational practice. Yet even this cursory introduction may suggest how Egan's theory may be linked to a variety of other efforts to understand and develop "imaginative education" (e.g. Blenkinsop, 2009; Jones et al., 2008; Leonard and Willis, 2008).

The TIEs of Substance

Of the eight imaginative capacities listed earlier, three might be thought of as grasping the substantive, stable nature of the world, its "thingness," three as grasping its emergent, shifting nature, its "becomingness," and two as spanning the divide. Rough as it is, this division offers a useful way of organizing the following exploration.

We might see an imaginative capacity for *grasping regularity* in what Egan describes as “the passionate drive to complete a set or to enlarge and organize, or constantly reorganize, a collection” (1997, 87)—a familiar passion in modern Western culture, and one that Egan situates firmly in the context of Romantic understanding. As he argues, collecting and organizing fits with other features of Romantic understanding—that is, horizontally, as part of the Romantic toolkit that develops as the imagination takes up the tools of popular literacy. The question that concerns us here is whether related drives exist in Mythic and Philosophic understanding, and the kinds of cultural tools or strategies they employ. Egan himself emphasizes the tensions between different kinds of understanding—their tendency to compete for imaginative space—and so we would expect these strategies, or TIEs, to be somewhat at odds with one another as well.

Thus, when Egan notes that “the Philosophic mind focuses on the connections between things, constructing theories, laws, ideologies, and metaphysical schemes to tie together the facts available to the student” (1997, 121), we may see this as a Philosophic TIE of systematization and generalization, linked vertically to the Romantic TIE of collecting and organizing. That is, both categories of activity respond to the same existential imperative, the urge to imaginatively grasp the regular, orderly nature of the world; yet they deploy different tools to that end, and thereby alter the end itself. As Egan observes, “When Philosophic understanding dominates the mind...Romantic knowledge...is often dismissed as irrelevant, pointless, a trivial pursuit. Romantic hobbies and collections lose their interest” (1997, 125). It is thus no easy matter to keep both sets of tools alive and well.

When we turn to Mythic understanding, however, we find nothing in Egan’s description of this kind of understanding that stands out as an obvious counterpart to the Romantic passion for collecting, or the systematizing zeal of the Philosophic imagination. We must therefore ask ourselves what “grasping regularity” may look like when confined to the tools of oral language. Any imaginative strategy of this kind should still find echoes in our contemporary culture, which has not entirely abandoned its Mythic roots, as well as in the cultures of non-literate peoples. Some reflection suggests the activity of naming as a plausible candidate. One does not need familiarity with the story of Rumpelstiltskin to be aware of the power that names traditionally have in oral cultures. We still see echoes of this even in the most Philosophic realms, as when new and obscure species of plant or insect, or new comets or asteroids, are named after their discoverer. We might thus tentatively identify “naming and

characterization” as a Mythic TIE for grasping regularity—enriching our picture of Mythic understanding in the process.

This produces our first set of three vertically linked TIEs. Proceeding further, we come to the capacity for *grasping detail*. At the Mythic level, this is clearly related to Egan’s discussion of images in *The Educated Mind* (1997, 60-62): that is, the use of oral language to evoke vivid, affectively engaging mental images (not only visual, but aural, olfactory, and so on) is a distinctive kind of tool for imaginative development, one deployed in different ways by different cultures. As Egan argues, it is a tool of great educational power, albeit rarely used:

When teaching about the earthworm, for instance, the instructor can augment the facts about its senses and structure by evoking for students images of what it would be like to slither and push through the soil, hesitantly exploring in one direction then another, looking for easier passages, contracting and expanding our sequence of muscles segment by segment, and sensing moisture, scents, grubs, or whatever...[I]t is not so much a matter of seeing the earthworm in terms of our senses as performing the imaginative act of recognizing earthwormness in ourselves. (1997, 61)

In the subsequent chapter on Romantic understanding, however, one looks in vain for a tool that might build on this capacity for holding vivid details in the mind. This is odd, in a way, because Egan emphasizes the “search for reality” that characterizes the Romantic imagination, as seen for instance in the need to provide a detailed life history of Superman in order to account for his extraordinary powers. In other Romantic tools, too, such as the urge to build and organize collections of things, one can see this same passion for detail: detail sought not merely to vividly evoke, but to identify unambiguously, to “pin down” in some mental map of the world. So let us remedy this omission by identifying “precise characterization” as a Romantic TIE— a means of grasping detail that calls on the resources of literate culture. To pick up on Egan’s example: understanding earthworms using this TIE would adduce such details as the weight of castings produced by a single worm (up to ten pounds a year), the density of earthworms in arable soil (from about sixty up to several hundred per square metre), the value of the Canadian earthworm market (\$10-20 million a year), and so on.

Regarded Philosophically, however, the Romantic grasp of reality is too focused on idiosyncratic particulars, too unsystematic, and hence constantly tending towards the trivial. The way the Philosophic imagination grasps details is by developing and applying standard

descriptive criteria to case after case. In the “Earthworms” Wikipedia, for instance, one can read:

Earthworms are also called megadriles (or big worms), as opposed to the microdriles (or small worms) in the families Tubificidae, Lumbriculidae, and Enchytraeidae, among others. The megadriles are characterized by having a multilayered clitellum (which is much more obvious than the single-layered one of the microdriles), a vascular system with true capillaries, and male pores behind the female pores. (accessed Jan. 23, 2009)

For most of us, who do not even have a particularly developed Romantic understanding of earthworms, this way of understanding them is not immediately accessible. But we can accept the importance of grasping detail to the Philosophic mind, and postulate a corresponding TIE that we might call “fine-grained analysis.” Again, this is not a tool to be found in Egan’s discussion of Philosophic understanding, which lays heavy emphasis on the role of theoretical generalization. Yet analytical detail provides depth and colour for theories in much the same way as images provide depth and colour for Mythic stories. Further, as we would expect, training in such analysis is a fundamental part of a good Philosophic (that is, disciplinary) education—though the means to this end are not always as imaginative as one might wish!

The next in the list is *grasping composition*, understood as a sense of the invisible relationships that bind many details together into a greater whole. This is clearly an aspect of the imagination that plays a vital role in music, literature, and the other arts. In Egan’s account of Mythic understanding, we might see it implied by his discussion of rhyme, rhythm and narrative:

Sacred stories were...recited to the tapping of a drum or strumming of a stringed instrument. Patterning sound helped to embed the tales in the mind of the hearers.... The larger trick is attaching the rhythms inherent in languages to the more general, peripatetic pattern of everyday life—hope and despair, fear and relief, oppression, resentment, and revolt, youth and age, the rising emotions of comedy and the pity and fear of tragedy, and so on. The elaboration of linguistic rhythms to match the patterns of our lives results in those larger forms we call narratives. (1997, 58-59)

There will be more to say about narrative towards the end of this chapter, but let us focus our present attention on the similarities between rhythm and pattern. Both refer to the way that elements of something hang or fit together. So we might focus our search for Romantic and

Philosophic TIEs for “grasping composition” on patterns of form and meaning that lend analogous coherence, beauty, and memorability to written or theoretical utterances. At the Romantic level, this TIE might involve both the appearance of text itself, as expressed, for instance, in the care lavished on medieval manuscripts, modern font design, and the art of calligraphy, along with the *deployment* of text to communicate meaning through form, as in concrete poetry, the art of sign making, and the huge range of devices used to represent information in visual form. At the Philosophic level, the corresponding TIE would involve patterns in how ideas and concepts are deployed to form greater wholes, which we might call arguments. In other words, grasping composition in Mythic understanding works primarily through the ear, in Romantic through the eye, and in Philosophic through what the Greeks called logic and rhetoric—the aesthetic shaping of language to reason and persuade.

What are we to call this series of TIEs? In more recent works, Egan refers to “the literate eye” as a tool of Romantic understanding (Egan, 2005). We might therefore call its Mythic equivalent “the prosodic ear” and its Philosophic counterpart “the noetic composer”—each a kind of metaphor for a range of related tools. There are, of course, forms of pattern recognition that fall outside this series of TIEs, which is specifically linked to Egan’s emphasis on the role of language in imaginative development. Nonetheless, these ways of “grasping composition” seem deeply important for the development of imaginative understanding, challenging the tendency for the mind to become enmeshed in ever-turning treadmills of words and ideas.

Perhaps it is time to pause and take stock. We have identified the three sets of “tools of imaginative engagement” summarized in Table 1. In reality, of course, each TIE is not comprised of a single cultural tool but a whole set of tools or strategies for engaging imaginatively with the world. Presumably an important feature of imaginative education would be to expose learners to a wide variety of such strategies, some of which might be more engaging than others. The judgment of the teacher therefore remains central to the use of the TIEs: what is being elaborated here is not a single method but a palette of options.

Table 1. The TIEs of Substance

<i>Tools for:</i>	<i>Mythic TIEs</i>	<i>Romantic TIEs</i>	<i>Philosophic TIEs</i>
<i>Grasping composition</i>	The prosodic ear (rhyme, rhythm, and the music of spoken language)	The literate eye (design and display of text and visual information)	The noetic composer (organization of ideas and observations into greater wholes)
<i>Grasping detail</i>	Vivid imagery (not only visual, but involving all the senses)	Precise characterization (in ways that enhance a sense of objective reality)	Fine-grained analysis (in ways that make underlying forms of order more apparent)
<i>Grasping regularity</i>	Naming and characterizing	Collecting and organizing	Systematizing and generalizing

The TIEs of Process

If the emphasis in the first group of TIEs was on grasping the coherence and stability of the world, the emphasis in the second group is on change, variation, and unpredictability.

Let us begin with tools for *grasping possibility*, or developing an imaginative understanding of how particular features of the world may vary and change. We might see this as the domain of imaginative play, in particular—that is, play often seems to involve an exploration of possibilities, of “what ifs.” So at the Mythic level we would look for the ways oral language is imaginatively used in play, and as teachers we would seek to establish settings for such play that would encourage the children to explore particular kinds of possibility. This is routinely done in many preschools and kindergartens, but as so often with the tools of Mythic understanding, the opportunities for play *related to the imaginative exploration of subject matter* seem to dwindle rapidly in regular classrooms. Games that involve making up stories, taking on roles, and generally engaging with each other in open-ended, emotionally meaningful ways, open the door to an expanded sense of what the world may hold.

A rather different kind of play appeals to the Romantic imagination. This is the kind of understanding that relishes formal games of all kinds: board and card games, strategy and chance games, solitaire and multiplayer games, and so on, along with dramatic and physical games constrained by formal rules. It is also a kind of understanding that builds

elaborate virtual fantasy worlds governed by their own laws, traditions, and languages. Occasionally some small uses of this TIE may trickle into classrooms, as when students are asked to display their knowledge of a topic by designing a board game. Yet if one compares this to the fascination of many students with sophisticated online games, or even with trading card games such as *Magic*, it's clear that schools' uses of this tool are marginal by comparison.

How, then, does the Philosophic imagination explore possibility? One thinks immediately of Einstein and his famous "thought experiments" such as the one in which he imagines himself riding on a beam of light and asking himself how he might perceive the passage of time. But one might also think of how scientists sometimes expand the boundaries of knowledge through unorthodox real experiments, of how theoreticians in all fields benefit from tossing "blue-sky" ideas around, and how companies like Google encourage their employees to spend some of their time working on off-the-wall ideas. We might think of all these as instances of a single Philosophic TIE, summed up as hypothesis, experiment, and playing around with ideas.

Yet one cannot adequately grasp possibility without a sense of the forces that constrain variation and hinder change. A somewhat unsatisfactory term for this imaginative capacity is *grasping struggle*—understanding the world as formed through the interaction of opposing forces. Again, in the tradition inherited from the Greeks, we have the term "dialectics" to express one Philosophic version of this mode of thought, but the Philosophic TIE is broader, encompassing the struggle between contradiction, paradox, and the unruliness of data, on the one hand, and the quest for proof, consistency, and elegance on the other. T.H. Huxley summed up this TIE admirably when he referred to the "great tragedy of science: the slaying of a beautiful hypothesis by an ugly fact." The starkness of the metaphor aptly captures the importance of this sense of tension in the Philosophic imagination.

Where the Philosophic TIE helps the imagination grasp struggle as a conflict between opposing ideas, the Romantic TIE develops an understanding of struggle as a conflict between human agents (or human-like agency projected onto other aspects of the world). Egan draws attention to the increasing importance of revolt and idealism to children developing Romantic understanding: that is, they are increasingly drawn to stories that explain the development of ideas, technology, and so on as a rebellion against the constraints of tradition and authority. This is one aspect of a broader source of imaginative engagement in the struggle of

opposing forces, often (though not necessarily) with one side seen as the hero, the other as the villain.

At the Mythic level, as always, the struggle is more abstract. Egan draws attention to the imaginative importance of binary opposites: “The most evident structural feature of children’s stories or self-generated narratives is that the surface content very commonly rests on such underlying binary sets as security/fear, good/bad, brave/cowardly, love/hate, happy/sad, poor/rich, health/sickness, permitted/forbidden” (p. 40). As he points out, teaching history through such opposites would make it immediately meaningful to children, even if many of the ways in which adults understand history were not developed until later. What will Romantically be taken up as stories of heroic rebels and villainous rulers, or Philosophically as struggles of opposing ideologies and historical forces, begins Mythically as the conflict between weakness and strength, fairness and unfairness, good and evil.

This binary structuring plays a second and equally important role at the Mythic level, in terms of *grasping indices*—a term that refers to the way the imagination picks out exemplary cases to represent potentially unlimited variability. As Egan observes, “Organizing one’s conceptual grasp on the physical world by initially forming binary structures—hot/cold, big/little, soft/hard, crooked/straight, sweet/sour—allows an initial orientation over a range of otherwise bewilderingly complex phenomena” (1997, 40). What is not emphasized here, however, is the extent to which each of these extremes is associated with particular experiences or images—the scalding tap/the freezing ice cube, the towering elephant/the miniature mouse, and so on. These become the imaginative indices against which new experiences and new information can be measured and seen in proportion.

An equivalent TIE is to be found in the Romantic fascination with the extremes and limits of reality, and particularly of human experience. Here is Egan again:

By discovering the real limits of the world and of human experience, we form a context that enables us to establish some security and to establish proportionate meaning within it. Knowing about the biggest and smallest people allows us, on the one hand, to wonder at their extreme sizes, but, on the other, to be reassured about our own scale. Once we have some sense of context, we can begin to develop some sense of the proportionate meaning of things. (p. 85)

The imaginative strategy, in short, is the same as for the Mythic TIE; what has changed is the kind of understanding and the cultural tools it has available.

Evidently the Philosophic imagination faces an analogous challenge. For every general scheme it comes up with, there will be limits to its explanatory power; there will be anomalies to note, special cases to explain, and neighboring areas of knowledge to which it does not apply. Here, too, the Philosophic imagination grapples with this by focusing on canonical or paradigmatic examples—cases that perfectly illustrate the general scheme in action. Once these ideal cases are established, they can be used as a measure for the “fit” of other cases to the theory, perhaps leading to the identification of particularly problematic cases that establish the limits of the general scheme. The same binary structuring is at work here as well, establishing a continuum of explanation between valid and invalid, relevant and irrelevant, true and false. Table 2 summarizes the three sets of TIEs reviewed in this section.

Table 2. The TIEs of Process

<i>Tools for:</i>	<i>Mythic TIEs</i>	<i>Romantic TIEs</i>	<i>Philosophic TIEs</i>
<i>Grasping possibility</i>	Role-playing, invention of stories, and other forms of social play	Rule-defined games of all kinds, and the building of fantasy worlds	Hypothesis, experiment, and playing around with ideas
<i>Grasping struggle</i>	Tension and conflict between opposing binary qualities or concepts	Transgression, revolt, and conflict based on human values and beliefs	Contradiction, paradox, and the unruliness of data versus proof, consistency, and
<i>Grasping limits</i>	Binary contrasts and mediating concepts	Extremes and limits of reality	Paradigmatic cases, anomalies, and the limits of general schemes

The Integrative TIEs

The diverse TIEs reviewed so far are all means of getting an imaginative handle on the complexity of the world—on the ways in which it eludes direct and simple comprehension. Even so, they do not do away with our need to understand things as in some sense complete in themselves, even if we have no way of knowing everything that entails. This human capacity for *grasping wholes* is vitally important—so important that an entire branch of psychology, Gestalt psychology, was developed to try and understand it. But our purpose here is more modest: we simply

want to know whether particular cultural tools or strategies exist to help us do this.

Egan, quoting evolutionary psychologist Merlin Donald, suggests that myth itself is one such tool—"the fundamental integrative mind tool" (1997, 35; citing Donald, 1991, 214-15). That is, particular kinds of narratives, structured upon the tensions and contrasts that most fundamentally shape human existence, enable us to hold together in our imaginations the vast range of elements in a complex reality. In particular, mythic narratives are capable of incorporating all of the Mythic TIEs we have considered so far: naming and characterizing, vivid imagery, the prosodic ear, and so on. One might even say that these imaginative components *define* mythic narratives, setting them apart from other kinds of stories or accounts. In this case, however, we might want to extend this category to include other oral genres such as songs, chants, and oratory that incorporate imaginative tools to a similar extent. A similar emphasis on the importance of speech genres for grasping wholes can be found in Bakhtin (1986).

We might therefore look for specific genres associated with Romantic and Philosophic understanding that offer analogous imaginative possibilities. In the case of the former, for instance, we might look for written genres that incorporate the TIEs of collecting and organizing, precise description, the literate eye, and so on, and that communicate a deeper message about the possibilities and limits of human agency. A quintessentially Romantic work of this kind is the Guinness Book of World Records, but so too are tales of real-life adventures, heroic biographies, historical triumphs and disasters, romances, mysteries, and family sagas, soap operas, gossip magazines, and a host of other genres. The wealth of possibilities in this area undoubtedly reflects the dominance of Romantic understanding in our culture, which has done much to eclipse the Mythic and has never awarded the Philosophic more than a marginal place.

It is scarcely surprising, therefore, that the range of imaginatively engaging Philosophic genres is underdeveloped in comparison to Romantic understanding. Theoretical statements and expositions, systematic taxonomies and methodologies, specialized monographs and case studies all certainly qualify, as perhaps do certain kinds of poetry, plays and novels in which a central purpose of the author is to work out the consequences of a general scheme or guiding principle. Such works can become definitive statements of a particular imaginative take on the world, to be pored over by scholars for decades, centuries or millennia. And it is surely their integrative quality above all, their ability to hold many

elements in some kind of coherent relationship, that endows them with this timeless appeal.

Yet all kinds of understanding are flawed. The world does not always act as we imagine it will. Thinking back to the emergence of imagination in our early human ancestors, we can suppose the failures to have been more frequent than the successes—for every productive leap into the realm of possibility, there must be a multitude of fiascos. So it does not seem altogether surprising that we developed imaginative means of *grasping inconsistency*—of accommodating ourselves to the risks that imagination poses, indeed embracing them. When the imagination trips and falls on its face, we laugh.

Egan draws attention to the importance of humour in the context of Mythic understanding; he is particularly taken with its role in developing a reflexive awareness of language, through the use of puns and other forms of word play. We might expand this TIE to include all kinds of quirks in the tools of Mythic understanding: the incongruous image, the inappropriate name, the story that reverses expectations, and so on. The enjoyment that accompanies these violations of convention is surely one of the greatest spurs to the Mythic imagination, a reminder that invention and possibility are unlimited. And just as Egan proposes (1997, 65), we can extend this insight to subsequent kinds of understanding.

The inconsistencies that engage the Romantic imagination are of a more elaborate kind, just like the stories that develop this kind of understanding. The one-liner gives way to the humorous anecdote; the incongruous detail becomes the incongruous situation; jokes develop into comedy. To the Romantic mind, Mythic humour tends to be overly simplistic, too obvious and immediate to be really funny. The best humour comes from the gradual accumulation of inconsistencies, drawing the protagonists through inexorable logic into situations of greater and greater absurdity. Examples of Romantic humour abound in popular culture, of course, but they are almost wholly exiled from schools, where any uses of humour tend to be of the Mythic kind. One wonders about the consequences for the development of subsequent understandings.

Indeed, humour is not a trait most of us associate with the Philosophic imagination. Incisively serious at best, drearily ponderous at worst, Philosophic understanding does not come across as tolerant or appreciative of inconsistency. Yet the satirical writings of Swift, for example, or Pope, or Voltaire, display unambiguously Philosophic imaginations grappling with the hypocrisies and illusions of Enlightenment rationalism. Perhaps there is a tradition there that has become marginalized in the subsequent two centuries, and that needs reviving in the context of a holistic approach

to imaginative development—a possibility that seems in keeping with Egan’s championing of irony on other grounds (1997).

Table 3. The Integrative TIEs

<i>Tools for:</i>	<i>Mythic TIEs</i>	<i>Romantic TIEs</i>	<i>Philosophic TIEs</i>
<i>Grasping wholes</i>	Oral genres focused on fundamental tensions in human existence, including fables, myths, songs and chants, oratory	Written genres focused on human agency and the diversity of experience (too many to list)	Conceptual genres focused on general schemes, including theoretical statements, arguments and expositions, taxonomies and methodologies
<i>Grasping inconsistency</i>	Jokes, puns, and incongruities	Humorous stories and situational comedy	Irony and satire

With these two final sets of TIEs, summarized in Table 3, this preliminary theoretical reworking of Egan’s notion of “cognitive tools” has come to an end. In no way exhaustive or definitive, it has nonetheless yielded a more extensive list of tools in each kind of understanding, along with an enhanced developmental sense of how each kind of understanding both builds on and competes with prior kinds. As a theoretical approach, it seems productive enough to warrant further exploration.

An important caveat about the scheme presented here, nonetheless, is that it is too neat. There is no particular reason for thinking that our imaginative grasp on the world can be corralled and explained so easily. The present exploration is only one sketch of the terrain. Other kinds of maps are surely needed.

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DIALECTIC EXPLICATION OF CREATIVITY

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Efforts to define and measure creativity by qualifying it with analytical and logical conditions have not proved to be very useful. In this paper we attempt to use a different method to crack the code of creativity, a method we call: dialectical explication. We see this type of explication as being more appropriate to cover a polysemic and fluid concept that is manifested in many fields and is driven by emotions and motivations and not only by cognitive processes. The first part of this paper reviews and criticizes several traditional approaches to study the nature of creativity, the most prominent being the psychometric and the biographical schools of research. The second part shows how an explanation based on the ability to locate different and even contradictory meanings on a flexible semantic space could help to capture the ill-defined nature of the concept. The paper includes implications of the different efforts to define creativity for the teacher and the educational system.

Introduction

When the words imagination and creativity are mentioned in public they tend to cast a kind of magic on their listeners. Their impression is especially evident when we use them as descriptors of an original and astonishing idea or product. In these instances we can wonder: “how come nobody thought about this great idea before?” or “how did this literary or artistic work manage to excite me so much?” However, while most people are able to distinguish between a creative product and a less original one, and can tell a real creator from a fake one, it seems much harder to agree on what creativity really means. We are even more perplexed when we have to measure the creative ability of certain people or select candidates on the basis of their creative potential.

What can be done to bridge the gap between our intuitive grasp of the term, the so-called folk theories about it, and the need to clarify its various meanings and communicate them to others? This need is especially acute for an educator selecting a working definition that will assist in the engagement of students in creative thinking. In this paper we will attempt

to provide a partial solution to this problem, although the versatile and elusive nature of the concept seems to defy efforts to enclose it in one comprehensive definition covering all possible instances. Our efforts to catch creativity by its many horns and bridge the gap between an intuitive and scientific understanding of the concept will be based on a new method that we call “*dialectic explication*.” The intricacies of this method and its potential advantages will be explained in the last part of this chapter.

To give the reader a preliminary idea of what we mean by dialectic explication we will say that it is based on the ability to encompass different meanings of a concept by locating them on an imaginary continuum between a number of binary opposites. Our main argument will be that since creativity tends to be a “fluid concept” (Hofstaeder 1993) the dialectic explication could be a possible method to account for that fluidity.

We will argue that as educators, we are asked from time to time to attend to the imagination and creative affordances of our students. Our job is *inter alia* to help them and ourselves, get rid of misconceptions and traditionalized understandings of these concepts. Some of these misconceptions unfortunately derive from efforts to define concepts too narrowly. We are all aware of tests that were designed to measure and capture polysemic meanings and do it by narrowing such meanings into a small number of factors or by using one simple operational definition.

A fair analysis of the traditional treatments of the terms imagination and creativity in psychology will reveal some of their contributions as well. The psychological studies that have been initiated by Guilford in 1950 have improved our ability to identify various types of creative abilities and locate them amongst other human faculties. Nevertheless, when we survey some of these efforts it will be clear that the desire to box such concepts in one concise working definition has widened the gap between lay understandings of such terms which leave many degrees of freedom and the more precise and restricted scholarly representations, particularly those suggested by the scientific community. Consequently, there is a need to redefine the concept and think about it in a fresh way.

Flaws in major trends which explore the nature of creativity

A. The psychometric approach

One course in the research on creativity taken by enthusiastic psychometricians defines the level of creativity on the basis of existing tests or by inventing new kinds of test items. These new tests reflect the

frustration of psychologists like Guilford (1950) who felt that conventional IQ tests do not succeed to cover the myriad ways to reflect on things or solve problems. For example, most IQ tests and many of the examinations that we are currently using in schools assume that there is one right solution to every problem. In contrast, most creativity tests encourage the subject to think about as many answers to a given stimulus as one can. The well-known Torrance test (with items such as “list as many unusual uses for a paper clip”) is but one popular example of such a test. However, the permission that is granted in these tests to free one’s imagination can cause difficulties in grading the answers. Another problem regards the reliability and validity of many of the tests. This means, for example, that the ability to list many original and valuable answers in the test does not necessarily predict a later success to demonstrate creative behavior at work, or engage in creative problem solving in real life situations.

Creativity tests have been used for purposes ranging from the allocation of gifted students for special programs in education to the selection of candidates for demanding and challenging jobs. However, the success of these tests in helping to screen the best candidates is at best questionable. This is despite the fact that the tasks on the tests require only the most common type of creativity, referred to by some British scholars as little “c” creativity (Craft, Jeffrey & Leibling, 2001). It seems that even this ordinary and more common type of creativity cannot be faithfully captured in a short pencil and paper assignment.

A main contribution of Guilford and the other psychometricians who followed his call to develop creativity test has been mainly in providing us with an assemblage of many measurable factors that are sub-skills of creativity. Among these factors are: the number of products that the subject can generate in a limited time (called fluency or ideation), the uniqueness of the product or response (its originality), the variance between several answers to the same question (flexibility), the ability to attach a different and new function to a familiar object (redefinition), etc. These measures have set the stage for several generations of creativity tests, which were developed by researchers like Torrance, Barron, Mednick and others for the army, and helped to select creative workers for organizations and business companies.

In education, one can trace two common applications of these tests: allocating gifted students to special programs and evaluating the possible impacts of certain projects or educational practices, especially those labeled as constructivistic or alternative. However, it seems that educators of the gifted are generally more interested in intelligence tests and in convergent thinking than in divergent or creative thinking, and the ability

to relate a specific educational treatment to improvements in creative thinking can be very limited.

Without devoting too much space to methodological issues, we can add that in most cases it would be a mistake to base an educational decision on a single score that a student got on a creativity test. The reason for the inability of the test to give an objective assessment of one's creative ability can be demonstrated by the problem of judging the degree of originality in the popular Torrance test. Should the scorer decide if the answer is really original by checking how much the subject's response deviates from a list of previous answers? Or should this be rather decided through inter-judge agreement? Both methods may not be sufficiently satisfactory. It is very easy to demonstrate that statistical rareness cannot be the only measure for one's originality, and agreement between different scorers runs the risk of arbitrariness and subjectivity. There is also the dilemma of what the scorer is supposed to do when a response looks unique but also appears bizarre and irrelevant? A decision to ignore or reject it can be controversial, since a response that seems to be irrelevant in the eyes of one judge may look like a springboard for impressive future elaborations and new discoveries by another.

These questions are of concern to educators as well. A teacher is often running the risk of ignoring a potential contribution of a student on the one hand or the opposite risk of being too quick to praise the originality of a student's response even when there's nothing creative in her thinking, on the other.

B. Learning about creativity from the biographies of great creators

A different school of research studied the lives of great discoverers scientists and artists in order to learn from their best contributions. Researchers like Barron, Simonton, Csikszentmihalyi, and their followers started an immense project of unveiling some of the secrets and processes that enabled these geniuses to come up with new ideas and inventions. (See Sternberg (1999) for a coverage of some of their findings). The line of research that has been used by these scholars included interviews and documentation of the creative process of Nobel Prize winners and other acknowledged creators who excelled in their field of specialization. This line of research proved to be productive in many ways and managed to highlight crucial qualities of the creative process, at least as it has been experienced and reported by these geniuses. It yielded new concepts describing the nature of the commitment and perseverance that one needs