

# Intellectual Estuaries:

## Connecting Learning and Creativity in Programs of Advanced Academics

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The emergence of ability testing in the United States during the early 20th century sparked interest in identifying students for placement in advanced academic programs (for a review see Kaufman et al., in press). Early on, administrators used IQ scores almost exclusively as the criterion for placing students in advanced academic programs. However, not long after Lewis Terman first used intelligence tests to identify “gifted” schoolchildren, psychologists and educators in the United States appealed for broader conceptions of learning that specifically included creativity (e.g., Guilford, 1950; Marland, 1972). These calls for broadened conceptions of learning were fortified by researchers (e.g., Torrance, 1959a, 1959b, 1959c; Yamamoto, 1964) who demonstrated empirical links between creativity and academic achievement.

Unfortunately, the prototypical K–12 curriculum often fails to include creative thinking as an explicit curricular goal. The situation is somewhat better in the curriculum and instruction of advanced academic programs where creativity typically is identified as an important ability to be cultivated. However, even when nurturing creativity is identified as a curricular goal, it often

Academic learning and creativity should be overlapping goals that can be simultaneously pursued in programs of advanced academics. However, efforts aimed at nurturing creativity and academic learning sometimes are represented as two related but separate paths; this separation is unnecessary and can undermine the development of creative and academic potential. The idea that programs of advanced academics have “two paths” (one for creativity and one for academic learning) needs to be replaced with a new metaphor, and appropriate pedagogical strategies need to be developed to support that new metaphor. In order to facilitate this process, educators will need to broaden their traditional conceptions of learning and creativity to include interpretive perspectives on learning and creativity. A new metaphor, *intellectual estuary*, illustrates the notion that streams of creative and academic interpretations can converge and thrive when educators in programs of advanced academic simultaneously support learning and creativity. Possible pedagogical strategies that utilize intellectual estuaries include exploratory talk and Socratic seminars.

## Summary

is represented as separate from academic learning goals. For instance, Renzulli (1999, 2005) defined two types of giftedness: “schoolhouse giftedness” and “creative-productive giftedness.” Similarly, Callahan and Miller (2005), following Tannenbaum (1986), described an “academic” and “innovative” path in their child-responsive model of giftedness. Notably, Callahan and Miller also pointed out that the distinction between academics and creativity should be viewed as a “fluid guideline,” as there sometimes is overlap in particular students.

In the present article, we endeavor to re-voice the long-standing but often overlooked position that curricular and instructional efforts aimed at cultivating creativity and academic learning can, and should, travel along the same path (rather than be split into two separate paths). Moreover, we argue that failing to recognize this union can undermine the development of creative and academic potential. To this end, we highlight the long-recognized link between creativity and learning, and we discuss potential reasons for the split between academics and creativity. We then propose a new metaphor that may be helpful in helping educators consider the merging of creativity and learning in programs of advanced academics. We close by highlighting several promising pedagogical strategies, programs, and considerations that alignment with our metaphor.

## (Re)establishing the Link

Calls for educators to recognize the link between creativity and academic learning are nothing new. For instance, J. P. Guilford (in his 1950 presidential address to the American Psychological Association) stressed the need for research focused on discovering and nurturing the “creative promise in our children” (p. 445). The urgency of his message was underscored by his recognition of the social importance of creativity, the neglect of creativity as an area of general research, and learning theorists’ failure to account for creative insights in their conceptualizations of learning. He called for the inclusion of “a creative act [as] an

instance of learning . . . a comprehensive learning theory must take into account both insight and creative activity” (p. 446).

Guilford was not alone in stressing the importance of linking creativity with learning; from his earliest writings, E. P. Torrance (1959a) devoted a large portion of his professional life to exploring and increasing awareness of this link. He also voiced his concern that the impoverished imaginations of many students resulted from the “concerted efforts” of teachers and parents to eliminate creative and imaginative thinking at too early an age. Upon reflecting on nearly half a century of work in this area, Torrance (1995) expressed his frustration that his work on the benefits of approaching learning with a creative mind largely had been ignored by the educational community.

Of course, there are numerous examples of creative teachers, creative curricula, and efforts aimed at supporting creativity and learning in the U.S. and throughout the world (see, for example, Kaufman & Sternberg, 2006; Piirto, 2004, 2007; Tan, 2007). We also recognize that curricular programs that represent creativity and academic learning as important, yet separate, paths (cf., Callahan & Miller, 2005) are far better than curricular programs that fail to allow any path for creativity. Still, we would like to see educators working toward merging these two paths into one. For this to happen, educators need to challenge the commonly held conception that creativity and learning are two separate enterprises.

### *Conceptions That Split Learning and Creativity*

Acquisition models of learning represent a common and persistent view of learning (Sfard, 1998). These models compare human learning and memory to computer models for storage and retrieval of information. In this view, learning is portrayed as a process of accumulating prepackaged knowledge, which has been transmitted by teachers or some other external storehouse of information (e.g., textbooks, CD-ROMs, informational Web sites). In the acquisition model, the teacher’s role is to help students acquire and retrieve as much ready-made knowledge as possible.

There are various explanations for the popularity and sustainability of the accumulation view of learning (e.g., Egan & Gajdamaschko, 2003; Hatano, 1993). According to Egan and Gajdamaschko, education conceptualized as the “accumulation of coded knowledge” may have been a response to the invention of writing that resulted in the storage of significant amounts of important knowledge in “coded form.” Because the “educated mind” was thought to be one that had accumulated a “great deal of the most important knowledge” (Egan & Gajdamaschko, 2003, p. 84), the educator’s task was to teach as much of this stored knowledge as possible. Hatano has offered the American empiricist tradition as a different reason for the popularity of the accumulative view of learning; still, he recognizes the same result: “the core educational process is the transmission of ready-made knowledge from the outside to the individual mind, which is like a blank slate” (p. 154).

Not surprisingly, the accumulation view of learning has found its way into models of advanced academics. In such models, exceptional students are thought to have the ability to accumulate more (larger amounts of) knowledge than average students and generally at a more rapid pace than their same-age peers. In addition, this representation of learning suggests that knowledge is assimilated, without alteration, by the learner. These assumptions can be seen in the language used to describe the process of learning, such as students “*absorbing* [italics added] new understandings of the world and how it works” (Callahan & Miller, 2005, p. 3). Such descriptions can result in exceptional learners being conceptualized as voracious copy machines, as opposed to interpretive beings.

We do not take issue with the claim that advanced students may have the capacity to attain more information at a faster pace than average students. In fact, there is compelling evidence in support of this claim (e.g., Steiner & Carr, 2003). However, in our view, there is more to learning than the accumulation and accurate reproduction of information. As Beghetto and Plucker (2006) have discussed, there are multiple examples of students being able to produce accurate responses with no meaningful

understanding of why the responses are accurate. Consider, for instance, the frequent phenomena of students who memorize an algorithm for solving a certain type of math problem and can (when prompted) efficiently apply it to generate accurate solutions, yet have no meaningful understanding of the mathematical concepts underlying the algorithm or when to apply it. This lack of a personally meaningful understanding is why, according to Shepard (2001), “students often lose track of the problem they are trying to solve or give silly answers, such as ‘3 buses with remainder 3’ are needed to take the class to the zoo” (p. 1079).

We expect that most educators would agree that the ability to recall answers and information without understanding what those answers mean, how they are produced, and when and why they should be employed can hardly be called learning. When academic learning is represented as a set of “facts” to be accumulated (Greene, 1995), it can have the effect of reifying the learning experience, “making our experience resistant to reevaluation and change rather than open to imagination” (p. 127). Such a view stands in direct contrast to what it means to be an “active learner . . . one awakened to pursue meaning” (Greene, 1995, p. 132). Indeed, meaningful learning also requires students to develop a personal and accurate understanding of the knowledge they are accumulating.

Current accountability movements in public education, marked by increased use of high-stakes testing, can contribute to teachers feeling pressured to quickly cover content. Teachers may feel that they simply do not have the time (or resources) to allow their students to adequately explore, interpret, and meaningfully engage in all of the topics that they teach. We recognize this tension; however, we still believe that teachers can strike a balance between covering required content and encouraging students to explore, interpret, and make personal meaning of what they are learning. For teachers to move to this more balanced approach, educators must shift away from viewing learning as merely accumulation and develop a more interpretative view of learning.

### *Learning as Interpretation and Transformation*

Bakhtin's (1981) concept of ideological becoming serves as a compelling framework for considering the interpretative and transformative nature of learning. This concept refers to how we develop our system of ideas (Freedman & Ball, 2004). Central to ideological becoming is Bakhtin's distinction between *authoritative discourse* and *internally persuasive discourse*. Authoritative discourse can be thought of as knowledge that is prepackaged and already vetted by some external authority. Conversely, internally persuasive discourse is what "each person thinks for him- or herself, what ultimately is persuasive to the individual" (Freedman & Ball, 2004, p. 8). Internally persuasive discourse does not suggest some form of radical subjectivity in which the isolated individual mind constructs its own reality; rather, it occurs in the context of active social interaction whereby new understandings and creative insights are awakened and generated:

. . . the internally persuasive word is half-ours and half-someone else's. Its creativity and productiveness consists precisely in the fact that such a word awakens new and independent words, that it organizes masses of our words from within, and does not remain in an isolated and static condition . . . it is further, that is, freely, developed, applied to new material, new conditions. . . . (Bakhtin, 1981, pp. 345–346)

According to this perspective, individuals develop their own system of ideas through contact with multiple voices and through the struggle of transforming external ideas into their own personally persuasive words and understandings. As Cazden (2001) explained,

when we transform the authoritative discourse of others into our own words, it may start to lose its authority and become more open. We can test it, consider it in dialog—

private or public—with other ideas, and “reaccentuate” it  
... in our own way. (p. 76)

Meaning making, even if the ideas started out as prepackaged information, transmitted by some external authority, is a process of interpretation and transformation.

### *Learning as Constructing*

Interpretive and transformative views of learning typically fall under the broad heading of *constructivism*. Constructivism sometimes connotes unguided learning experiences (i.e., teachers stepping aside and letting students freely discover new understandings without any direction or guidance). Most learning theorists, particularly those who endorse social-constructivist perspectives, recognize that having students engage in such unguided, independent explorations is a costly overreaction to accumulative models of learning and “has often led to the acquisition of immature concepts and [to the] neglect of important school skills” (Kozulin, 2003, p. 16). Rather, contemporary views of constructivism (particularly social-constructivist perspectives—see Kozulin, Gindis, Agseyev, & Miller, 2003) recognize that meaning making is mediated by skilled others (e.g., teachers, parents, more advanced peers) and sociocultural tools (e.g., books, the Internet, language, symbol systems).

Thus, the concept of constructivism is meant to signal that, although external supports and guidance are necessary for learning, much internal work remains on the part of individual learners as they make sense of new experiences, new information, and instructional interactions. As Cazden (2001) explained, what students “internalize, or appropriate, from other people still requires significant mental work on the part of the learner. That mental work is what ‘constructivism’ refers to” (p. 77). Moreover, learning from a constructivist perspective (as opposed to an accumulative perspective) opens the door for recognizing that meaning making is not simply a cold process of memorizing and reciting, but rather is one imbued with and reliant upon imagination.



### *The Role of Imagination in Learning*

Philosophers (e.g., Dewey) and classic learning theorists (e.g., Vygotsky) recognized the role of imagination in meaning making and, at the same time, appreciated that this connection was often obscured by overly narrow conceptions of intellectual functioning and development. For instance, Dewey (1934/2005) argued that a persistent and pernicious false belief is that imagination is a cognitive process limited only to aesthetic experiences. This false belief “obscures the larger fact that all conscious experience has of necessity some degree of imaginative quality” (Dewey, 1934/2005, p. 283). Moreover, according to Dewey, imagination serves as the gateway through which meaning is made out of new experiences. Similarly, Vygotsky (1967/2004) argued that imagination plays a central role in conceptual development and “is the basis of all creative activity” (p. 3); Vygotsky also observed that the imagination often is viewed as lacking “any serious practical significance” (p. 3) and thereby dismissed or discounted.

By highlighting the interpretative and imaginative aspects of learning, we hope that the conceptual bridge between creativity and academic learning can be firmly reestablished in programs of advanced academics. Although we believe that broader conceptions of learning will help to establish this conceptual bridge, we also believe that this goal cannot be accomplished without recognizing how traditional conceptualizations of creativity have served to preclude the conceptual connection between creativity and academic learning.

### *Creativity as Product vs. Process*

Most recent definitions inspired by some of the earliest scientific conceptions of creativity (Guilford, 1950) define creativity as the ability to produce products that are novel (i.e., original, unexpected) and appropriate (i.e., useful, often high quality) as defined by a particular sociocultural context (Plucker, Beghetto, & Dow, 2004; Sternberg, Lubart, Kaufman, & Pretz, 2005).

Typically, creativity scholars classify creativity into two levels of magnitude, *little-c* (everyday, ubiquitous creativity) and *Big-C* (revolutionary, eminent creativity).

Little-c creativity refers to more ubiquitous examples of creative expression (e.g., developing a prize-winning BBQ rub-recipe or making up a story to entertain a small child). Little-c creative expression is thought to be widely distributed (Kaufman & Baer, 2006; Runco & Richards, 1998; Sternberg, Grigorenko, & Singer, 2004) and therefore accessible by nearly everyone and expressed in just about any everyday activity (e.g., a fourth grader's historical diorama, a professional jeweler's arrangement of precious stones in a ring, a physics professor's demonstration of momentum).

Big-C creativity, on the other hand, focuses on eminent, unambiguous, and enduring examples of creative expression (e.g., Shakespeare's *Hamlet*, Langston Hughes's poetry, Salk's work on the polio vaccine). Big-C creativity represents a level of achievement that only a select few will ever attain. A perfectly solid little-c composer may love music and write pretty melodies, but could spend 10 lifetimes writing songs without creating something of truly lasting importance.

Most theories of creativity focus on Big-C. In the propulsion model of creative contributions (Sternberg, 1999; Sternberg, Kaufman, & Pretz, 2002), the creativity of a product is categorized depending on how it propels or transforms the existing paradigm. Csikszentmihalyi's (1999) systems model looks at the interaction between domain, field, and person. In Csikszentmihalyi's theory, the domain, field, and person work interactively. The field (e.g., artists, critics, professors of art) determines whether some product (e.g., Picasso's *Guernica*) is creative in a given domain (such as art). Simonton's (2004) recent work on scientific creativity highlights genius, chance, logic, and zeitgeist. Theories, such as the investment theory of creativity (Sternberg & Lubart, 1995, 1996), the componential model of creativity (Amabile, 1996), and the amusement park theoretical model (Baer & Kaufman, 2005; Kaufman & Baer, 2004), do not focus specifically on Big-C but still include Big-C as a goal to be reached.

Although Big-C and little-c creativity focus on different levels of creative magnitude, both are similar in that they share a product-oriented focus. Specifically, both Big-C and little-c conceptions of creativity focus on externally judged creative products (albeit at qualitatively different levels of impact). For instance, T. S. Eliot's "The Love Song of J. Alfred Prufrock" is considered to be creative because of its unique stream of consciousness style and enduring impact. A local slam poet who might otherwise be considered quite ordinary when compared to T. S. Eliot can still be considered creative at the little-c level because of her original and adaptive approach to poetry. Although the products differ in creative magnitude, in both cases creativity is determined by the creative products. Ideally, these products are also both judged by appropriate experts, as described by Amabile (1996) in her work on the consensual assessment technique. Academics and historians may be the more frequent judges of Big-C creativity, whereas experts at the little-c level may include not only scholars but teachers, fellow creators, or advanced students.

In many domains, a product-focused approach to creativity is perfectly fine, if not beneficial. Artists are considered creative based on their art, just as scientists are judged by their scientific contributions. This type of evaluation certainly seems fair; a writer with unlimited potential who never finishes a novel will not qualify as creative by most definitions. Indeed, the very ingredients so essential to the creative process, such as motivation, personality, knowledge, thinking styles, intelligence, and environment (e.g., Sternberg & Lubart, 1995, 1996) typically serve the creative product as well.

One reason for the prevalence of a focus on product is the importance levied on assessment. When professors go up for tenure, actors are nominated for awards, or scientists are awarded grants there must be some basis for evaluation. Some version of Amabile's (1996) product assessment is therefore needed in most domains. As much as the process of rehearsing a play or planning a study may reflect creativity, it can be argued that there needs to be follow-through and a finalized product in order to be truly assessed as a creative act.

However, we believe that there are levels of creativity that exist beyond the traditional little-c and Big-C conceptions. Cramond (2005) noted that some creativity scholars have proposed models of creativity that go beyond the little-c versus Big-C distinction. For instance, Taylor (1959) proposed five hierarchical levels of creativity. These levels (as discussed by Cramond, 2005) include: *expressive creativity* (e.g., spontaneous artwork of children); *productive creativity* (e.g., artistic and scientific expressions of creativity); *inventive creativity* (e.g., creative use of materials, methods, and techniques); *innovative creativity* (e.g., using conceptual skills to create modifications that lead to some form of improvement); and *emergenative creativity* (entirely new principles, paradigms, or assumptions that result in new schools of thought and movements in a domain).

Even with these additional levels of creative expression, there still is a danger in focusing solely on observable, external manifestations of creativity. As Runco (2005) has argued, the “extremely product-orientated” conceptualizations of creativity may result in educators and researchers failing to acknowledge the creative potential of individuals who have not “impressed some qualified audience” (p. 616). This product-oriented focus confounds productivity with creativity (Runco, 2004).

The most problematic aspect of this narrow product-oriented focus is that it obscures the interpretive process from which both little-c and Big-C creativity develops. This interpretative process—what we have called *mini-c* creativity—involves novel and personally meaningful interpretations of experiences, actions, and events (Beghetto & Kaufman, 2007). This definition follows Runco’s (1996, 2004) conception of “personal creativity” as well as recent developmental conceptions of creativity (Beghetto & Plucker, 2006; Cohen, 1989; Niu & Sternberg, 2006; Sawyer et al., 2003).

Both mini-c creativity and “personal creativity” (Runco, 1996) share a focus on the creative interpretations made by individuals. As such, mini-c creative expressions need not be recognized as novel or even meaningful to others in order to still be

considered creative. For instance, Vygotsky (1967/2004) recognized nearly half a century ago:

any human act that gives rise to something new is referred to as a creative act, regardless of whether what is created is a physical object *or some mental or emotional construct that lives within the person who created it and is known only to him* [italics added]. (p. 7)

Thus, personal and mini-c conceptions of creativity help to broaden traditional conceptions of creativity by recognizing that intrapersonal insights and interpretations are, in fact, creative acts.

Although mini-c creativity and personal creativity both focus on the intrapersonal expressions of creativity, these constructs differ on epistemological and ontological grounds. The personal creativity (Runco, 1996) construct is closer to and more clearly inspired by Piagetian (or individual constructivist) views of knowledge creation. In this view, the focus is on the development of new knowledge and insights being mediated by internal mental structures (e.g., knowledge schemes) and operations (e.g., assimilation, disequilibrium, and accommodation). In addition, Piagetian (individual constructivist) accounts of knowledge creation represent a dualistic ontology. For instance, the internal mental processes and structures are viewed as influenced by, but separate from, the external world. In this view, the development of knowledge and creative insights represents “a cognitive activity in which subjectivity applies its forms to data from a distinct and separate objective world” (Packer & Goicoechea, 2000, p. 234).

Conversely, mini-c creativity takes more of a Vygotskian (or sociocultural) view of knowledge creation. This view highlights the transactional relationship between the individual and social world and dissolves the dualistic barrier between the development of internal mental processes and engagement in activities, cultural practices, and interactions of the social world (Arievitch, 2008). Ontologically, the individual and social world

are not viewed as separate, but rather as “internally related to one another, mutually constituting . . . where people shape the social world, and in doing so are themselves transformed” (Packer & Goicoechea, 2000, p. 234).

Engagement in the social world transforms the identity development of the individual creator (funding his or her mini-c insights and interpretations). These mini-c insights and interpretations can develop into little-c or Big-C contributions that, in turn, transform the social-historical-cultural context. For instance, consider Louis Armstrong’s interpretation of the jazz musician as soloist—an act that began as mini-c, yet eventually resulted in the transformation of the identity of the jazz musician and the nature of jazz music itself.

This more transactional account of the creative person and the social world highlights the developmental nature of creativity (cf., Cohen, 1989) and positions mini-c creativity as the genesis of all later forms of creative expression. Indeed, as Moran and John-Steiner (2003) have explained, creative externalization (creative products) emerges from the creative process of internalization (i.e., interpretation and transformation) of cultural tools and social experiences. Thus, whatever the creative product (be it an idea, painting, or performance) or the magnitude of that product (be it little-c or Big-C), it all starts with the imaginative and personal interpretations of mini-c.

Additional examples may help illustrate the potential for mini-c insights to develop into transformative innovations. Consider, for instance, the development of the revolutionary, and now ubiquitous, fastening product: *Velcro*. This Big-C contribution emerged from George de Mestral imagining how he might manufacture a fastening system based on his novel and personally meaningful (mini-c) interpretation of the natural fastening system of thistles that would attach to his clothing as he strolled through the Swiss Alps.

Similarly, Freeman Dyson (the theoretical physicist) had a novel and personally meaningful interpretation of Richard Feynman’s diagrams of particle physics and Julian Schwinger’s mathematical theory of interacting particles. From this personal

interpretation he was able to creatively combine them into a theory of quantum electrodynamics:

Feynman's pictures and Schwinger's equations began sorting themselves out in my head with clarity they had never had before. For the first time I was able to put them all together. For an hour or two I arranged and rearranged the pieces. Then I knew how they all fitted . . . Feynman and Schwinger were just looking at the same set of ideas from two different sides. Putting the methods together, you would have a theory of quantum electrodynamics that combined the mathematical precision of Schwinger with the practical flexibility of Feynman. . . . It was my tremendous luck that I was the only person who had had the chance to talk at length to both Schwinger and Feynman and really understand what both of them were doing. . . . (Dyson, as cited in Gratzler, 2002, p. 105)

Similar to what we have argued with respect to knowledge development, interpretation and transformation of experiences within an academic domain are, from a mini-c perspective, central to the development of little-c and Big-C creativity. Thus, we argue that programs of advanced academics should recognize the importance of supporting and encouraging students' mini-c interpretations with the added goal of helping students develop their creative identity as they move from mini-c (unique and meaningful interpretations) to the expression of little-c and possibly even Big-C ideas, insights, and understandings of an academic domain.

How can educators in programs of advanced academics support this movement? One way is described in Beghetto's (2007) concept of *ideational code-switching*. Ideational code-switching describes how individuals move between their intrapersonal creative interpretations (mini-c) and interpersonal expressions of creativity (little-c). Similar to linguistic code-switching (in which multilingual speakers are able to switch to a more understandable form of language when they recognize that what they

are saying is not being understood), ideational code-switching highlights the need for students to receive cues from their social environment when their mini-c ideas and interpretations are not being understood.

Educators in programs of advanced academics can help encourage this switching between mini-c and little-c by: (a) taking the time to hear and attempt to understand learners' mini-c interpretations; (b) cueing learners when their contributions are not making sense given the domain constraints, conventions, and standards of the particular academic task or activity; and (c) providing multiple opportunities for learners to practice moving between mini-c and little-c creativity. In sum, ideational code-switching, like other suggestions for supporting creativity (Beghetto, 2005; Piirto, 2004; Sternberg & Grigorenko, 2004), underscores the importance of educators recognizing the value of mini-c interpretations while at the same time ensuring that learners become aware of the socially negotiated conventions, standards, and existing knowledge of a particular academic domain.

## **Bridging Parallel Paths: Connecting Creativity and Learning**

We have argued that meaningful student learning and creative expression in a particular academic domain is facilitated in part by students' own interpretations of that academic domain. To the extent that our argument has merit, educators in programs of advanced academics can work toward simultaneously supporting academic learning and creativity by finding ways to encourage and support students' interpretations of a given academic domain. To facilitate this, educators need a new metaphor to describe the nature of such programs of advanced academics as well as the pedagogical strategies aligned with that metaphor.



*Intellectual Estuaries: A New Metaphor  
for Programs of Advanced Academics*

The traditional “two paths” metaphor that describes one path leading to accelerated domain learning and one that leads to creativity enhancement is no longer tenable if we recognize that personally meaningful learning and creativity are linked by students’ ongoing interpretations and identity development in an academic domain. Thus, rather than viewing creativity and learning as two unconnected streams, we propose the metaphor of an *intellectual estuary*. An intellectual estuary describes an area of great and diverse intellectual identities in which separate streams of ideas flow in and meet with the vastness of ideas found in a given academic discipline. Viewing programs of advanced academics as intellectual estuaries is more in alignment with the interpretive and dialogic nature of learning and creativity. In this view, the streams of students’ creative and academic potential meet with supports and opportunities that will help cultivate both capacities.

Thus, students’ own unique and personally meaningful interpretations of academic content are encouraged and juxtaposed with the perspectives of other students and the conventions, norms, and standards of a particular academic domain. Such an approach should help educators in programs of advanced academics to move away from what Greenleaf and Katz (2004) described as the all-too-typical form of classroom discourse in which classrooms represent a “singularity of viewpoints, transmission, and recitation rather than meaning making” (p. 174).

Allowing students the opportunity to voice their interpretations and simultaneously confront multiple perspectives and interpretations creates the conditions under which classroom learning becomes internally persuasive and generative both of creativity and new understandings. Enacting the metaphor of an intellectual estuary requires that educators in programs of advanced academics create multiple opportunities for students to engage in the kinds of discourse that support internally persuasive understandings and new insights. Classroom discus-

sions represent one such opportunity for doing so. However, simply creating more opportunities for classroom discussions is not enough; it is *how* those discussions are held that is of great importance. The prototypical classroom discussion format of *Initiate, Respond, and Evaluate* (Cazden, 2001) where the teacher *initiates* the discussion by asking her students for an example of a hypothesis, students *respond* by providing examples, and the teacher *evaluates* each response as correct or incorrect is not sufficient. A different type of pedagogical strategy for classroom discussions is necessary if educators are serious about supporting new understandings and creative insights. Fortunately, there are several promising instructional strategies designed to provide students (of varying age levels in various subject areas) with an opportunity to encounter multiple perspectives. These strategies include “position-driven” science and mathematics (Hatano & Inagaki, 1991; O’Connor, 2001), Socratic seminars (Adler, 1982), and exploratory talk (Barnes & Todd, 1978; Mercer, 1995).

Educators interested in developing intellectual estuaries in their programs of advanced academics can also draw from a wide range of promising curricular programs that cut across various academic content areas and grade levels. The Center for Gifted Education at The College of William and Mary has developed a variety of problem-based science learning units for learners in grades K–8. Problem-based learning offers educators an important and viable strategy for linking the development of student creativity and academic learning across many content areas (Plucker & Beghetto, 2003).

With respect to curriculum design, the *Parallel Curriculum* (Tomlinson et al., 2002) offers a model for developing K–12 curriculum and instruction; this model has the added goal of helping students “think about how creativity is manifest in the [academic] discipline, when, why, and about what that helps them understand their own creativity” (p. 38). Educators and curriculum developers can also find key insights from Piirto’s (2007) five precepts for designing (and delivering) curriculum that will engage the academic and creative talent of students in programs of advanced academics. Taken together, these strate-

gies, curricula, and considerations offer educators a wide range of resources for cultivating intellectual estuaries across all grade levels and academic subject areas. To provide a more concrete example of how such strategies might be used to cultivate intellectual estuaries, we describe two examples. The first highlights the use of exploratory talk (Barnes & Todd, 1978; Mercer, 1995); the second illustrates the use of Socratic seminars (Adler, 1982; Polite & Adams, 1997).

### *Examples of Strategies for Supporting Intellectual Estuaries*

*Example 1: Exploratory Talk.* Exploratory talk as a pedagogical strategy involves teaching students how to engage in a form of shared or collaborative inquiry in which students explore and challenge ideas while at the same time they adhere to a set of social ground rules. Examples of these social ground rules include: (a) Students will be asked to make their reasoning explicit; (b) challenges and alternatives to perspectives and ideas will be presented and negotiated; and (c) general agreement will be strived for prior to making group decisions or taking action (Wegerif, 2005). Several studies (Mercer, Wegerif, & Dawes, 1999; Rojas-Drummond, Perez, Velez, Gomez, & Mendoza, 2003; Wegerif, Mercer, & Dawes, 1999) have demonstrated that teaching students to use exploratory talk has resulted in improved academic learning and creative reasoning.

According to Wegerif (2005), a key indicator that students have adopted an exploratory orientation is that students “are able to change their minds in response to good arguments” (p. 226). An example of this can be seen in several segments of Kamii’s (2000) video footage of second graders working on double-column subtraction problems. In one particular segment of the footage, the students are working through a problem in which they are asked to subtract 17 from 26. Students offer a variety of answers, which their teacher writes on the board, including: 18, 11, and 9.

As students share their answers, other students variously exclaim, "Disagree!" or "Agree!" The teacher then asks students to explain their answers. At one point a student named Gary, who believed the answer to be 9, explains that he arrived at his solution by first removing the 6 and 7 from 26 and 17. He then explains to "take off 10" from 20 and "that would be 10." Next, he explains, "take off 7 more" and "that would be 3." He then concludes by explaining, "add the 6 back on and that would be 9." After the teacher repeats Gary's method to the class, another student exclaims, "I disagree with myself!" The teacher recognizes this and asks, "What was your answer?" The student explains, "It *was* 18." Several other students provide varying explanations of how they arrived at 9.

Another student, named Steven, explains how he arrived at 11: "20 and 10 is 10 and 6 take away 7 is 1 and 10 and 1 is 11." Yet another student exclaims, "Disagree." The teacher then explains that Steven has a different answer and repeats his reasoning to the entire class. Multiple students now exclaim, "Disagree! I can prove it's 9!" Two students explain why they think it is 9. After hearing these explanations, Steven, the student who originally thought the answer was 11, seems to recognize his mistaken reasoning and explains, "I disagree with myself." The teacher then double checks with Steven, asking whether he is sure that he disagrees with his initial understanding of the problem, prior to moving on to the next problem.

This brief excerpt of classroom dialogue illustrates three important aspects of exploratory talk and a classroom environment representative of an intellectual estuary. First, there are social ground rules at play in this second-grade classroom. Indeed, in alignment to what Wegerif (2005) has described, students are expected to: (a) provide reasons for their claims by explaining how they arrived at their answers to the subtraction problem; (b) make challenges explicit, negotiate by stating whether they agree with a particular answer and then explain why they agree or disagree; and (c) as a group, seek to reach agreement on the answer before moving on to the next problem.

Second, this excerpt illustrates what Wegerif (2005) has described as a key indicator of an exploratory orientation (i.e., students change their minds in response to good arguments). This is evidenced by two separate students stating, “I disagree with myself!” after hearing the explanations of other students. Finally, this excerpt highlights how creating opportunities for students to come into contact with multiple perspectives helps not only create a new and internally persuasive academic understanding of double column subtraction but is also supportive of new, creative insights. Indeed, students came up with several creative (i.e., unique and accurate) ways of solving the problem.

*Example 2: Socratic Seminars.* Socratic seminars, typically used with older students (middle, secondary, postsecondary), represent another promising approach for creating intellectual estuaries in programs of advanced academics. Socratic seminars, a pedagogical strategy attributed to Adler’s (1982) *The Paideia Proposal*, teach students how to engage in academic discussions on a wide range of topics, in which multiple perspectives and interpretations are encouraged and ideas and understandings are critically scrutinized in light of differing perspectives and textual evidence (Polite & Adams, 1997; Wortham, 2006). The Junior Great Books program offers a series of K–12 books and curricula in support of Socratic seminars. Piirto (2007) has observed qualitative differences in the quality and nature of dialogue in students who have participated in Junior Great Books programs.

Socratic seminars represent a pedagogical strategy that is in alignment with the idea of intellectual estuaries; multiple perspectives and personal interpretations are brought together in an effort to develop new individual insights and deeper understanding of some curricular topic.

In the following excerpt, adapted from Wortham (2006, pp. 114–115), urban ninth-grade students in a combined history and language arts class that uses Socratic Seminars are discussing Pericles’ claim that Athenian soldiers had confidence in battle even though they were facing a Spartan opponent that had far greater military training. This excerpt illustrates how two stu-

dents, Jasmine and Martha, supported each other in developing their understanding of the conflict between Athens and Sparta by making connections between their own personally meaningful and unique (i.e., mini-c) interpretations of their experience and the curricular topic being discussed:

**MARTHA:** Yeah, wait. You're comparing, you're comparing Sparta to Athens. Now, they telling me, just because they get, they have confidence, all this . . .

**MAURICE:** A lot of work.

**MARTHA:** Yeah, going into a war, they going to face people whose experience in war, I mean, think, eat, feel nothing but military training—

**TEACHER (Mr. S):** What you're doing is calling Pericles a liar here.

\* \* \*

**TEACHER (Mr. S):** Okay, we've got four hands at once. I don't know who's first.

**UNIDENTIFIED FEMALE STUDENT:** Jasmine.

**TEACHER (Mr. S):** Jasmine? Okay.

**JASMINE:** Now, Martha.

**FEMALE STUDENTS:** (Laughter)

**JASMINE:** If you was about to fight William, he's bigger, he's taller than you, don't you think he'll beat you up?

**MARTHA:** Cause he got the—

**JASMINE:** Wait, wait a minute. Don't you think he can beat you? Yes or no?

**MARTHA:** But not [10 unintelligible syllables]

**JASMINE:** I'm sure that he could beat you. He's got more training than you.

**MARTHA:** But then I just have to keep fighting, right?

**UNIDENTIFIED FEMALE STUDENT:** That's what they're doing.

**MARTHA:** They just keep fighting, but they would never beat Sparta.

As illustrated in this brief excerpt, allowing students to make their own personally relevant and unique interpretations of the topic being discussed, with the added guideline that they need to connect that interpretation to the text, encourages students to develop personally meaningful analogies to support more robust understanding of the academic content. Importantly, Wortham (2006) illustrated that the use of student-participant examples in academic discussions can also influence the development of students' social identities (in sometimes unexpected, unflattering, and potentially hurtful ways). For instance, Wortham has demonstrated in his book-length analysis of classroom discussions how two students, Maurice and Tyisha, became increasingly identified through "participant examples" as social outcasts. Thus, as Wortham has argued, educators planning to use such techniques need to be aware that "personalization in the classroom offers both risks and rewards" (p. 288). Therefore, they have a responsibility to ensure that they actively monitor and interrupt any negative identifications that may result from personalizing the curriculum.

## Concluding Thoughts

In this article we have argued that supporting academic learning and creativity are not separate paths, but rather overlapping goals that can and should be simultaneously pursued in programs of advanced academics. For this to happen, educators need to recognize and support the interpretative nature of learning and creativity. This recognition is facilitated by broadening traditional conceptions of learning and creativity to include interpretive perspectives on learning and creativity.

The metaphor for programs of advanced academics as having "two paths" (one for creativity and one for academic learning) needs to be replaced with a new metaphor and appropriate pedagogical strategies in support of that metaphor. We proposed the metaphor of an intellectual estuary (in which multiple streams of creative and academic interpretations come together and thrive)

and then briefly discussed how various instructional strategies and curricular models might be used to enact that metaphor. It is our hope that the ideas presented in this paper will generate additional conversations and debate regarding how programs of advanced academics might simultaneously support student learning and creativity.

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