In 1990, when I began to write the first edition of my book, Understanding Those Who Create, I began it with this vignette:

It was a convention for teachers of the talented. Katherine Miller had just been hired to teach in a pullout program for fourth, fifth, and sixth grade talented students. She was glad for the opportunity, for in her undergraduate years during her student teaching experiences, she had always seemed to gravitate towards the bright students. Her new superintendent had received an announcement for the state convention for teachers of the talented, and had told Katherine that he would pay her way to go so she could learn what she was supposed to teach.

There was no written curriculum to guide her. Besides teaching the students, Katherine was to develop a curriculum. As in most states, Katherine’s state did not require her to have any special training in how to teach talented children. Katherine, her superintendent said, was bright and young, and not jaded, and the school district could afford to hire her because she had no teaching experience and would come in on the lowest rung of the salary scale.

Katherine had not been taught anything about talented children in her education courses, though she had a course in the education of other special children. Before her interview, she had gone to the state university library in a town nearby to do some reading. She had memorized the categories of the talented children that the state served. Among these were “creative” children. Katherine was not sure what creativity was, and was even less sure who “creative” children were. Were they the ones who colored outside the lines? Were they the ones who looked a little weird? She stepped into the large ballroom of the hotel where the convention was being held, took a cup of coffee, and sat down to hear the first keynote speaker.

The conference organizer introduced him as one of the experts on creativity. “Oh good,” Katherine thought. As he began to speak she settled in. He told a joke or two, and was a little mussed, his hair caught into a fashionable ponytail, his cowboy boots and jeans in
Gifted children are born with a passion for life. They are bundles of energy grasping eagerly at the world around them. As they grow, gifted children explore myriad aspects of life and living. They want to know, to partake, to participate. They actively engage life with a thirst for knowledge that seems insatiable.

How do we nurture this quest for life itself? Knowing that somewhere along the path of life, many people lose their passion for exploration, for challenge, and for pursuit, how do we nourish this propensity so that it endures for a lifetime? How do we share it so that it is not crushed?

We can sense the exhilaration of actively living life as opposed to passively existing through life. The world glistens and beckons, offering countless adventures to explore or ignore. We have the power to experience the marvels of life, moment by moment. When we fully experience a starry summer eve or a frosty winter morn, a dry autumn breeze or a thundering spring storm, we partake in the wonder of life. When we live intensely, when we feel down to our core, we kindle a flame of passion for life. Every moment presents another opportunity.

How do we encourage gifted children to live their lives to the fullest? How do we nurture this vitality so it weaves the fabric of their lives? How do we teach them to pursue their passions into new realms of understanding?

Children are born with the ability, the sensitivity, and the intensity that are characteristic of productive creativity. We need to provide the environment to nourish children physically, intellectually, and emotionally. Through nourishment, the same passion for life and living that permeates gifted children, and radiates into their lives? How do we teach them to pursue their passions into new realms of understanding?

Going for the Gold
Adults have to be creative to meet the challenge of developing children's gifts. One of our challenges is to channel gifted children's creativity into productivity. It comes naturally to these children to observe in depth, to comprehend at a complex level, and to view from multiple perspectives. This is the root of creative thinking. However, creative thinking is only the first step. Children must be encouraged to follow through. It is one thing to think of a great idea; it is quite another to follow through to productivity.

Our country is strong and our history is rich because so many of our forefathers had great ideas and followed through with a stalwart passion for life. We kindle a flame of passion for life. Every moment presents another opportunity. When we live intensely, when we feel down to our core, we kindle a flame of passion for life. Every moment presents another opportunity. When we live intensely, when we feel down to our core, we kindle a flame of passion for life. Every moment presents another opportunity.

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How do we encourage gifted children to live their lives to the fullest? How do we nurture this vitality so it weaves the fabric of their lives? How do we teach them to pursue their passions into new realms of understanding?

From the President

Nurturing Productive Creativity

Colleen Elam
HB 1, General Appropriations Act. Foundation School Program
Gifted education did well this session under HB 1, the General Appropriations bill, thanks to the support of Chairman Rob Junell, District 72, San Angelo. TAGT also acknowledges and thanks Representative Scott Hochberg, District 132, Houston, a member of the House Appropriations Committee, for his support of gifted education programs. State funding for gifted education in very few states equals that in Texas according to a recent survey compiled by the national organization of state directors of gifted programs. Funding of services for gifted and talented students is included as a line item in the Texas Education Agency Foundation School Program appropriation. This represents a significant commitment to the education of gifted and talented students.

During the 2000-2001 biennium, the following riders will provide another major source of state funding for gifted/talented and other advanced-learner programs. Information about the General Appropriations HB 1 riders was reported in the June TAGT Newsletter, along with commentary on each one.

Rider 69. Standards for Gifted and Talented Students Pilot Project
It is the intent of the Legislature that the Texas Education Agency develop an assessment system and statewide standards for gifted and talented students at all grade levels. Out of the funds appropriated in Strategy C.1.3., Improving Instruction - Operations, the Texas Education Agency shall expend $277,250 in each year of the 2000-01 biennium to begin development of such a system, and shall pilot high school exit-level standards for the performance of gifted and talented students in the areas of mathematics, science, social studies, and language arts. School district participation in the project or in the use of the standards is not mandatory. The exit-level pilot shall be completed by August, 2001.

Rider 30. Texas Advanced Placement Incentive Program
Notwithstanding appropriations otherwise made by this Act to the Foundation School Program, $2,000,000 of the appropriations made for gifted and talented education is transferred and reappropriated to the Texas Education Agency for both the pre-Advanced Placement/International Baccalaureate activities and for the Texas Advanced Placement Incentive Program for the 2000-2001 fiscal biennium. In addition, out of the funds appropriated in Strategy B.1.1., Instructional Excellence, $8,000,000 in fiscal year 2000 and $11,000,000 in fiscal year 2001 is allocated for the Advanced Placement Incentive Program. The expenditure of such funds shall not be subject to the limitations in Rider 41, Limitations: Transfer Authority.

Rider 57. Special Foundation School Program Payments
The Texas Academy of Mathematics in the Humanities is entitled to Foundation School Program (FSP) allotments for each student enrolled in the academy as if it were a school district, except that the local share applied is equal to the Beaumont ISD's local share. The same methodology shall apply to the Texas Academy of Mathematics and Science with a local share equal to Denton ISD's.

... And Some Legislative Outcomes Causing Concern

Rider 34. Mathcounts
Out of Foundation School Program Gifted and Talented Education Funds appropriated in A.3.3., Improving Educator Performance, the Commissioner shall set aside $200,000 in each year of the biennium for the MATHCOUNTS program. (The MATHCOUNTS appropriation is a set aside from the Gifted and Talented Foundation School Program. It is a commercially-sponsored and operated competition for approximately 2,500 middle school students in grades 7 and 8. Parents of middle school gifted children say the program does not challenge the mathematically gifted student. Over the next biennium, $400,000 will be siphoned off the Gifted and Talented Foundation School Program allotment for MATHCOUNTS. This is an increase over the current biennial set aside of $250,000.)

The Texas Governor's School
Regrettably, this twelve-year-old program did not receive line item funding for the 2000-2001 biennium. The Texas Governor's School appropriation for the biennium would have totaled $160,000, provided the sponsoring institution could raise matching funds.

Highlights of SB 4
Education became the dominant focus of the 140-day Texas Legislative Session when lawmakers decided to spend the bulk of the state's $6.4 billion surplus over the next two years on education. Big-ticket items covered in Senate Bill 4, (the $3.9 billion education finance bill) include the following: a $3,000 pay raise for teachers, librarians, counselors and school nurses; a $300 million allocation to expand full-day kindergarten and pre-kindergarten and to establish "second-chance" remedial programs for low-achieving ninth-graders; a provision that raises the share-the-wealth school finance level from $280,000 in property value per student to $295,000; help for fast-growing districts with facility construction costs; funding for the Governor's social promotion plan requiring students in grades 3, 5, and 8 to pass the TAAS before advancing to the next grade level; and some reduction in local property taxes by increasing the state's share of education funding. SB 4 also funds a number of programs passed in other bills. (See June issue of the TAGT Newsletter for SB 103 legislation, which when finally approved, did not include the gifted and talented section on accountability.)

Sunset Review of State Board of Education Rules for Gifted/Talented Education
House Bill 1, General Appropriations Act, 75th Texas Legislature, Rider 167, established a four-year sunset review for all state agency rules, including State Board of Education (SBOE) rules. The purpose of the sunset review is to ensure that the need for the rule still exists. Rules with effective dates on or after September 1, 1997, must be
We often assume that childhood giftedness and creativity are one and the same. I argue here, however, that this assumption is both unwarranted and misleading. In what follows, the complex relationship between giftedness and creativity in the visual arts is analyzed.

Alexandra Nechita has just burst upon the child prodigy scene. She works in oil, on large canvases, some up to 5 feet by 9 feet, and she paints quickly and compulsively, often completing several large paintings in one week. Her paintings, which now sell for up to $80,000 apiece, are clearly imbued in the Western modernist tradition—Cubism, Fauvism, Expressionism. One can see in them the styles not only of Picasso, but also of Gorky, Kandinsky, and Miró.

Alexandra attaches moralistic descriptions to her pictures that belie her childhoodness. For example, about one of her paintings which she called “Forgotten Values,” she writes:

This painting portrays people who are blinded by their fame and fortune and forget about their families... In the painting you can see a very clear shape, a hollowness inside the figure. He wants to go back to his family, and his family will not accept him because of what he has done. (Nechita, 1996, p. 8)

No adult artist would talk so literally about what a painting “stands for.” We see here the mind of a child, albeit a precocious one. But her paintings are startlingly adult.

Picasso’s childhood works are certainly precocious; one would say gifted. They do not look like the work of an adult master, however, but rather like the work of a talented child. And they look nothing like the adult Picasso.

Picasso’s early drawings are typical of what children gifted in the visual arts do, or at least they are typical of twentieth century Western gifted children. What makes Picasso’s early works typical of a gifted child artist is that they show a precocious ability to draw realistically, to capture the illusion of depth, to depict contour faithfully and in one fluid line rather than in schematic formulae. Picasso prided himself on never having drawn like a child. He described a realistic drawing of Hercules which he drew at age nine in these words: “...It wasn’t a child’s drawing. It was a real drawing, representing Hercules with his club” (Richardson, 1991, p.29).

Until recently, precocious realism was assumed to distinguish the work of all artistically gifted children, and most of the preserved juvenalia of adult artists have shown this heightened realism. Of course the juvenalia preserved was by Western artists. Thus, until recently we knew nothing about the childhood work of artists from non-Western artistic traditions.

About ten years ago, the assumption that the early sign of giftedness in art was precocious realism had to be revised when the works of the Chinese painting prodigy, Wang Yani, were discovered (Zhensun & Low, 1991). Yani has exhibited her work in major museums and, like Alexandra Nechita, her paintings have been published.

Yani does not draw or paint in a realistic style, but rather in the style of classical Chinese painting. As young as four, Yani had developed a sense of the adult art world, and could make the kind of art valued by the art “field” in her culture — i.e., the art historians, the museum curators, and so forth. Yani uses the classical Chinese wash technique and paints in the loose, spontaneous, and abbreviated style of Chinese ink paintings.

Yani and Alexandra tell us not only about the power of the domain, but also about the strong role that the field plays. The term field refers to the gatekeepers, the judges, those curators and art critics who determine whether a work is to be valued and considered new and interesting and creative (see Bordieu, 1983; Csikszentmihalyi, 1986; Csikszentmihalyi & Robinson, 1986). If Alexandra had somehow been able to develop her style in China, her works would almost certainly have been seen as odd, as distorted, as ugly, as unskillful, and as something to be discouraged. They would have looked nothing like the art that the adult field values. Because she painted in the West and in the 20th century, where modernism and Picasso are revered, her art looks adult-like and has thus been deemed prodigious. Had she produced her paintings two hundred years ago in the West, her works would surely have attracted the same negative reaction as they would probably get in China today.

The Relationship Between Giftedness and Creativity

The contrast between the works by Picasso as a child, and by these two painting prodigies, Yani and Alexandra, can illuminate the relationship between childhood giftedness and creativity. The contrast between these kinds of child prodigies can perhaps also help to clarify the developmental path to adult creativity.

Are the paintings by Alexandra and Yani valued because they are by children, or are they inherently creative works? If Alexandra and Yani continue as adults to paint in their respective styles, will they be recognized? It is possible that the answer to these questions differs for the two children because of the very different cultures in which they paint. In the case of Alexandra, it is likely that she will be written off as derivative unless she can develop an original style of her own. While we marvel at a ten year old who can be derivative of Picasso, we would be far less interested in an adult who can do this. This is because in the West, we celebrate novelty, and at the very core of our conception of creativity is the notion that the creator must do something novel, and thereby extend the boundaries of the domain.

Because she paints in China, where a different conception of creativity seems to exist, Yani may have an easier route to adult eminence than does Alexandra. In China, mastering of a tradition is val-
Come to the West, she would face the same challenge as Alexandra: as children become adult creators.

The child, just as universal creativity declines in late childhood years, must master it. There is a considerable amount of evidence that it leaves a domain forever altered (Gardner, 1993; Simonton, 1994). The assumption that creativity is part of being ordinary child, and has been argued to decline in middle to late childhood. Gifted creativity characterizes the adult who alters a domain. Picasso and Braques altered the domain of painting when they invented cubism. James Joyce altered the domain of writing with his stream of consciousness style. No gifted child can be domain creative. There are two quite different kinds of talent: (a) A first kind is personality far more than ability level alone. That can predict domain creativity, labeled here as universal creativity, gifted creativity, and domain creativity. Universal creativity characterizes the ordinary child, and has been argued to decline in middle to late childhood. Gifted creativity characterizes the adult who alters a domain. Picasso and Braques altered the domain of painting when they invented cubism. James Joyce altered the domain of writing with his stream of consciousness style. No gifted child can be domain creative. There is a considerable amount of evidence that it leaves a domain forever altered (Gardner, 1993; Simonton, 1994).

These distinctions can help to clear up some confusion about the relationship between giftedness and creativity. There are two quite common misconceptions about this issue: (a) One misconception is the assumption that creativity is part of being gifted. While gifted children are creative, they are not domain creative; and (b) A second misconception is the assumption that gifted children become domain creative as adults. Sheer ability level cannot predict domain creativity. It is personality far more than ability level alone, that can predict who becomes domain creative.

**Universal Creativity and the U-shaped Curve in Normal Children**

Drawing development in ordinary children has been argued to follow a U-shaped pattern of development (Gardner, 1980; Gardner & Winner, 1982). What is meant by this is that the level of aesthetic qualities and the level of perceived creativity is seen to decline in middle childhood, only to rise again in those who go on to become artists. The drawings and paintings of very young children (i.e., between three to six years of age) are spontaneous, appealing, and surprising, and some are similar in their grace, charm, and simplicity to works produced by contemporary Western expressionists.

It appears that something in universal creativity is lost with age. With increasing skill and technical competence comes a decline in aesthetic appeal. While the preschool child’s art is pre-conventional, the school-age child’s art is conventional. However, this loss may be necessary and natural. It is during the school years that children master the rules of various domains, so it is not surprising that these are the years when their drawings show increasing mastery of the conventions of drawing.

While I have referred to this pattern of development as U-shaped, this is not quite accurate. For the upsweep of the U occurs only in those who go on to become artists, in those who have special ability in the arts. Most children whose creativity in art declines never emerge from the literal stage.

**Gifted Creativity**

Children who are gifted in the visual arts do not draw at all like ordinary children. As an illustration, consider the drawings by a child called Peter, who is strikingly gifted in drawing (Winner, 1998). Peter first drew at age 10 months; typically children begin to draw around two. While his earliest drawings were scribbles, by two he was drawing perfect balloons in motion. By seven he was drawing in a very realistic fashion, often from observation. He chose complex things to draw — figures in motion, figures in noncanonical positions, or in three quarters view. At six, he drew a foreshortened image of a person lying down, an unusual and challenging position even for an adult to render. And he could start his drawings from odd points, like the hem of a dress, a shoulder, or a shoe.

**Characteristics of Drawings by Gifted Children**

The major features that are typically seen in drawings by young gifted children that make them stand out from those by ordinary, "preconventional" children are as follows:

- **Recognizable Shapes**: The earliest sign of giftedness in drawing is the ability to draw recognizable shapes. Children typically scribble until age three or four, gifted children draw recognizable shapes by age two.
- **Detail and Specificity**: Gifted children do not draw generic objects and people, but draw specific, rich, and detailed.
- **Depth**: These children achieve the illusion of realism not only by drawing recognizable and differentiated shapes and details, but also by rendering depth. They use all the known Western techniques to show depth: foreshortening, occlusion, size diminution, modeling to show volume, and linear perspective (Milbrough, in press).
- **Mastery of an Adult Art Style**: In the case of gifted children like Yani and Alexandra, who are not drawing realistically, creativity inheres in their ability to internalize and take off from the art of the adult art world in their culture. Both these children have an extraordinary mimetic ability, yet neither is just imitating. Rather, they have both in some real sense internalized a kind of style.
- **Posing Challenges**: Gifted children create challenges for themselves to solve. They will start a drawing from noncanonical places (the hem of a dress, in Peter’s case, the ear of a dog, as in Picasso’s case) (Richardson, 1991); they will draw figures in noncanonical orientations (in three-quarters view, or drastically foreshortened). Certainly Yani and Alexandra are creating challenges for themselves, in their complex compositions full of narrative complexity.

**Domain Creativity**

There is no necessary connection between childhood giftedness and domain creativity. Many artistically gifted children drop out of the visual arts. Only a few go on to become domain creative.

It is extremely difficult to predict adult artistry from childhood giftedness. First of all, no child, no matter how gifted in art, will become a domain creative adult artist unless he or she can go beyond what has already been done. Child prodigies have to reinvent themselves. What they have is technical mastery and facility. They have to have more than this to make the field notice them. They must develop a style that is valued by the field. If Picasso had never gone beyond his precocious realism, he would never have been noticed, for the art world had already seen extreme realism. If one’s skill is realism in an age of abstraction, one has no hope of making it. In (see Winner, page 18)
Farewell, Old Friend

Usually, my article focuses on the theme that is presented throughout Tempo, but this will be an exception. I admit to taking great liberties and apologize in advance. At the end of the summer, Jeanette Covington, director for gifted education at the Texas Education Agency, will resign her position. It is a time of great sadness for our office, as Jeanette has been with us for over 10 years, and she will be greatly missed. However, it also is a time of great joy, for we know that she has much she wants to do outside of gifted education.

For those many people who know Jeanette, several attributes have always stood out—her professionalism, her commitment, her devotion to assuring that gifted students have opportunities to reach their extraordinary potential. But what we will miss the most is her enjoyment of life, family, and friends. In times of stress, she is a steadying force, exuding patience and calm. In times of pleasure, she joins in with gusto.

Over the past several years, the responsibilities of our division have grown considerably. In 1994, our office was the “Division for Gifted Education” and dealt almost exclusively with that topic. Since that time, however, our role has changed to cover all advanced academic services. It was important that services to gifted students not be lost in the crush of those other assignments. It was critical to emphasize gifted education as the core of what we did, and naming Jeanette the director of gifted education did much to highlight our activities in that area.

It is a very exciting time for gifted education in Texas, and Jeanette has taken a strong leadership role. As coordinator of the task force that developed the system for districts gaining “recognized” and “exemplary” status, she has made an indelible mark on the field, not just in the state but throughout the country. The importance of that work will long be remembered as elevating gifted education from merely a compliance issue to one in which educators strive and are recognized for services that are the equal to the students they serve. While this role was the most visible that Jeanette took on in recent years, it should not overshadow her other many contributions. These tasks often could be overlooked—the sympathetic listener who nurtured parents and frustrated educators through difficult decisions, the tireless advocate who stood up for gifted students both within and outside the agency, the effective public speaker who motivated all of us to do a better job.

Will Jeanette be missed? You bet she will. Will it be hard to fill her shoes? It seems impossible. But Jeanette would be the first to tell you, everyone can be replaced—professionally. While there will be another advocate at her desk, we can only hope that person will have the warmth, the charm, the optimism of our Jeanette. For, more than an office colleague, she will be missed as a friend who was always there when needed, whose loyalty was unquestioned, and whose devotion was unending. Oh yes, there’ll be another strong, committed fighter for the gifted students in our state, but it may be a while before there’s a boon companion like my Dorothy Jean. Farewell, old friend.

Evelyn Levsky Hiatt is associate senior director for the Division of Advanced Academic Services at the Texas Education Agency. Past-president of both the council of State Directors of Programs for the Gifted and the Texas Association for the Gifted and Talented, Ms. Hiatt serves on the governing board of the International Baccalaureate Organization and the advisory board for Advanced Placement in the Southwest Region. She is the very proud recipient of the Lifetime Advocacy Award presented by the Texas Association for the Gifted and Talented in 1998.
The Complexity of Creativity

Creativity has numerous facets that include but reach beyond the visual and performing arts, where it is most often recognized. It is a surprisingly strong and influential element adding spark, energy, and resourcefulness to all areas of life. Even though experts do not agree concerning all aspects of creativity, they do recognize that it is powerful, and Clark (1983, 30) goes so far as to state that creativity is "the highest expression of giftedness."

Recognizing Creativity

"Creativity in young children is as common as runny noses, and, yet, it is quite rare in adults." Renzulli’s (Clark, 1989, 30) statement alerts us to the importance of recognizing creativity early in a child’s life, even before formal education begins. It has previously been demonstrated that careful observation of children in order to identify creativity is more accurate than using tests alone. Tests are often too narrow and observation offers a far broader range of abilities and motivations (Amabile, 1989); however, tests can certainly be used as supplementary information. Further studies focusing on the role of observation as a method of recognizing creative behaviors confirms the validity of this method. One study of observation led to a compilation of the most commonly recurring positive and negative traits of creativity, which vary in degree among creative people (Davis & Colangelo, 1992, 274-75).

Positive Traits

1. aware of creativeness  
2. independent  
3. risk taking  
4. energetic  
5. having a sense of humor  
6. curious  
7. attracted to complexity & dialectical thinking  
8. open-minded  
9. artistic  
10. needing privacy/alone time  
11. perceptive  
12. original/imaginative

Research confirms that the negative traits often keep teachers from nominating creative students for gifted programs (Davis & Colangelo, 1992).

Negative Traits

1. indifferent to conventions and courtesies  
2. apt to challenge rules and authority  
3. rebellious, uncooperative,  
4. capricious, careless, disorderly  
5. absent-minded, forgetful  
6. argumentative, cynical, sarcastic  
7. sloppy with details and unimportant matters  
8. egocentric, intolerant, tactless  
9. temperamental, emotional, overactive physically and mentally

Furthermore, studies point out that people who do not understand the traits mistakenly identify strange, eccentric, or unbalanced behavior as creative. Even though extremely creative people tend to be unconforming, they also tend to be strong mentally and emotionally (Amabile 1989).

Specific personality characteristics have been shown to exist in creative people, characteristics that are easily observed. These traits include:

• self-discipline about work;  
• perseverance, even when frustrated;  
• independence;  
• tolerance for unclear situations;  
• nonconformity to society's stereotypes;  
• ability to wait for rewards;  
• self-motivation to do excellent work; and  
• a willingness to take risks.  

In addition to observable behaviors and personality characteristics, it has also been suggested that biographical information be utilized when identifying an individual's creativity (Colangelo & Davis 1997, 272). For example, does the elementary child

• make or build things?  
• have wide interests?  
• have unusual hobbies?  
• have unusual talent in art, poetry, creative writing, handicrafts, music, dance, computer programming, or a science area?  
• know more about Picasso, Napoleon, Maya Angelou, or Russian cosmonauts, trains, etc., than do the teachers?  
• have/had an imaginary playmate?  
• have a background in theater?

Indeed, it has been emphasized that children or adolescents who have had an imaginary playmate or a background in theater most certainly are creative (Colangelo & Davis 1997).

Beyond Characteristics

Possessing creative characteristics alone is not enough. The creative process consists of three components, all of which are necessary to produce a product. One must have knowledge, the predisposition to create, and motivation (Amabile, 1989). Irving (Amabile, 1989, p. 57) supports Amabile’s model, stating that the theory of having a natural inclination or skill and never having to really work does not hold up in terms of success.

The so-called natural writer is just not going to get it done. At a certain level, the only thing that gets it done is doing the same thing, seven or eight hours a day, for two or three years, and getting better at it all the time.

Renzulli (1986) also recognizes that motivation, which he refers to as task commitment, is vital. His three-ring conception of giftedness includes above average ability, task commitment, and creativity. He states that research tells us that it is from the top fifteen to twenty percent of the school population identified as having these three attributes that "we can expect to identify those persons who will ultimately engage in high levels of creative productivity" (Renzulli,
1986, 228).

ENVIRONMENTAL INFLUENCES

Studies substantiate that some elements of creativity are inborn, some depend on learning and experience, and some depend on social environment. In schools, the environments teachers set up have a significant impact on creativity and intrinsic motivation. Storing knowledge through rote learning, or memorizing facts without knowing how the facts connect, and demanding absolute control of the environment have a negative impact (Amabile, 1989). In contrast, encouraging teachers who allow choices, reasonable physical movement, and questioning; who integrate broad thematic approaches, who allow multimedia approaches to assignments; who allow for quiet thinking time, and who discuss multiple perspectives and provide for individualization and differentiation of the curriculum have a positive impact on creativity (Davis, 1997).

One of the major obstacles in aiding a child to develop and retain his or her creativity is to identify those areas in which the child has talent, skills, and interests that overlap. This overlapping results in a creative intersection (Amabile, 1989, 89). However, this intersection is on a sliding scale, where one aspect may have dominance over another. The role of the parent and the teacher, therefore, is to help develop the skills needed, for example, when interest and talent emerge, so that the child can utilize his or her abilities in creative productivity.

INTELLIGENCE AND CREATIVITY

Most experts in the field agree that creativity and intelligence are connected in some way. Amabile (1989) refers to intelligence as talent in her model, and Renzulli (1986) describes it as above-average ability. Gezels and Jackson (1958, 71-76) and Torrance (1960, 71-76) also address this connection in their research of comparative studies of intellectually gifted (high IQ) and creatively gifted students, reporting that there were no differences in the measured educational achievement of the two groups of gifted students. In fact, the results of this study revealed that:

Elementary school students identified as creatively gifted (IQ 115-129 and Creativity Index of 130 or higher) but not intellectually gifted (IQ 130 or above) equal or exceed those who were identified as intellectually gifted but not creatively gifted as well as those who were identified as both creatively and intellectually gifted.

Thus, the concern expressed by Torrance (Torrance, 1962, 1979) for creatively gifted children who fall short of being identified as gifted according to the IQ criterion, seems to be justified. Their creative achievements in high school as well as their creative career achievements, the judged creativeness of their future career images, and their creative style of life achievements equal or exceed those of their classmates identified by the IQ criterion as gifted.

In addition, Davis (Colangelo & Davis, 1997, p.271) also sees this link but views it differently and reports, "There is little doubt that intelligence and creativity are different animals, but important to the present argument, they also are related...high intelligence is a requisite trait for high-level creativity." Linda Silverman (1993, p.66) recognizes creativity and intelligence as being intimately connected, and those identified as gifted as well as those identified as creative are not "two discrete groups, but rather...[both] tend to be gifted."

Whether experts in the field agree or not on how creativity is linked to intelligence, it could
Many noted researchers in the area of creativity have commented on the need for ways to effectively and fairly evaluate creative products. According to Reis and Renzulli (1991), this need is especially critical for programs serving gifted and talented students. In discussing the assessment of creative products, Reis and Renzulli review various instruments available for product and process evaluation, including Callahan's Product Evaluation Form (1980) which was specifically created to evaluate Type III Enrichment Triad activities; and Westberg's (1990) adaptation of it. This instrument, called the "Invention Evaluation Instrument," judged the creative productivity of student inventors using a factor analysis stressing three items: originality, technical excellence, and aesthetic appeal. However, statistical factor analysis is not an evaluation tool normally available to or used by classroom teachers doing Type III Enrichment Triad activities with their students. During the past school year, for example, my third through sixth grade gifted students completed a wide variety of Type III activities, including a display, a scientific illustration, an audiotaped radio program, a videotaped science news report, an invention, and a portfolio of original art, along with a computer simulated mission based on the NASA NEAR project. Each of these projects, some individually completed and others done in small groups, was based on the guidelines of an authentic national or international program that would assess the students' work in comparison with that of their peer group. Each program, however, has its own set of evaluative criteria.

In the regional judging of the Crayola Dream-Makers program, for instance, based on the theme, Millennium Traveler, the work of 14 students submitted from my campus will be evaluated by a jury of art professionals and professors at Baylor University. Their goal is to select 40 pieces from the many thousands of K-Grade 6 entries in a five state area, assessing each work on the basis of: visual appeal, originality, age appropriateness, craftsmanship, and the written Dream Statement accompanying each artwork, and its relationship to the art.

The national Craftsman/National Science Teachers Association's Young Inventors Awards Program for grades 3-8 requires each student entry to consist of an inventor's log, photograph of the student, tool, and diagram. A panel of science specialists and educators will select the inventions of 12 national finalists and 24 second and third place regional winners, all based on the following criteria: 30% functionality of the tool, 40% creativity, and 30% clarity of communication in written format.

As Kingore (1998) states, problem solving performance tasks, such as the ones above, can provide many significant learning opportunities for the gifted and talented child and actively promote higher-level thinking.

As students become producers, they are challenged and engaged, both mentally and physically. But with so many different products and programs done this year, my dilemma as facilitator and coach was how to establish a way for both students and teacher to evaluate all types of products consistently, both in individual and collaborative situations.

Obviously, we could use the criteria established in each and every competition, and we did. I still felt the need, however, to find or create a standardized evaluation that would cut across project lines and allow for a better comparison of student efforts.

In reviewing various resources on creativity, another model of creative productivity surfaced, that belonging to Besemer and Treffinger (1981), who set out to review the existing literature on the criteria by which creative products and creative ability are evaluated. First identifying over 125 proposed criteria, Besemer and Treffinger went on to develop a theory summarizing their research. This theory led to their devising an evaluative model called CPAM or the Creative Product Analysis Matrix.

In CPAM, Besemer and Treffinger grouped related attributes used for creative evaluation and found among the varying words and phrases three general categories. These they viewed as different but interrelated dimensions: (1) novelty; (2) resolution; and (3) elaboration and synthesis. Each dimension, in turn, was seen as composed of two or more distinctive attributes or sub-scales (Dacey, 1989). According to Reis and Renzulli (1991), 12 subscales were developed from the original 110 adjectives studied; Dacey cites eleven.

These subscales were further studied by Besemer and O'Quin in two separate but related efforts (1986, 1987) as a way to confirm the initial CPAM theory. The result, after elimination of ambiguous and/or overly negative adjectives, was the current model (see Figure 1) composed of three categories and eleven subcategories.

CPAM criterion ratings for creative products can be given by an evaluator on one of three possible levels for each of the 11 criteria: low, medium, or high. Besemer and Treffinger determined that it was not necessary for a product to excel (that is, be rated at the high level) on all criteria.

One of my third graders' inventions, the Burger Buddy, consisted of a modified pair of long-handled tongs that were given the addition of two spatulas, hot glued to the tongs' ends. Using the CPAM instrument, the student's Burger Buddy evaluation, done by classroom peers, teacher, and young inventor after a lesson on the criterion ratings and their meanings, might look like the chart in Figure 2.

(see PHILLIPS, page 19)
Moving Beyond the Creative Thinking Skills

Joyce Juntune

A review of gifted programs and practices points out our commitment to the teaching of creative thinking. Almost every program includes services such as Odyssey of the Mind teams, Future Problem Solving teams, and participation in Invention Conventions. Resource room and extension activities are often designed around the common creative thinking skills of fluency (the generation of many ideas), flexibility (the generation of different kinds of ideas), originality (the generation of unusual ideas), and elaboration (adding details to ideas to bring clarity) (Juntune, 1990). Many of the units teachers write for gifted students use a number of the eighteen teaching strategies for thinking and feeling developed by Frank Williams as a guide for designing the process part of the unit (Maker & Nielson, 1996). These eighteen strategies include familiar strategies such as attribute listing and analogies, as well as the less familiar strategies of examples of habit and the study of creative people and process (Williams, 1986).

While these activities and strategies are important components of a gifted program, they pull us into believing that as long as we provide creative thinking experiences to all students we are adequately meeting the needs of our creatively gifted students. There is a difference between the teaching of creative thinking skills and developing the potential of the creatively gifted.

An examination of the research and writings in the area of creativity can help us understand what it means to be a creative person, as well as suggest ways to modify our programs to serve our creatively gifted students. It is true that the teaching of creative process skills will help people become more creative in their thinking and approach to problems (Csikszentmihalyi, 1996), but skills alone do not define a creative person. Most of the literature describes creativity as a collection of personality traits and characteristics rather than a competence in creative thinking skills.

Creative people are described as individuals who are independent, have a low need for conformity, and whose ideas often appear unconventional (Barron, 1995; Getzels & Csikszentmihalyi, 1976). They have a strong internal drive (Amabile, 1983; Ghiselin, 1952; Piirto, 1998) and experience great freedom and joy through immersing themselves in a topic or problem for hours and days (Bloom, 1985; Piirto, 1998). Sometimes they totally lose track of time and are surprised to find they have missed a meal or an important appointment (Csikszentmihalyi, 1996). Torrance (1995) describes this as “having a passionate love for something” or the “ability to fall in love with something” (p. 129). He lists this as a key characteristic of a creative person.

Creative people find they are more creative when they have long periods of time for independent work and will bypass group activities for the opportunity to work alone (Barron, 1995; Ghiselin, 1952). Piirto (1998) found that the times of solitude brought an inner harmony. This seems to closely align with the strong case Amabile (1983) makes for the role of internal motivation which was mentioned earlier.

Intrinsic motivation is conducive to creativity, but extrinsic motivation is detrimental. It appears that when people are primarily motivated to do some creative activity by their own interest in and enjoyment of that activity, they may be more creative than when primarily motivated by some goal imposed on them by others (p. 15).

Another trait described by several researchers relates to the way a creative person views the world. Piirto (1998) describes it as a freshness, a sense of newness, “seeing things many times but always seeing it like a first time” (p. 52). Others refer to this trait as an openness to experience the world around one (Barron, 1995; Getzels & Csikszentmihalyi, 1976), to be curious, to ask questions, to wonder and delight in the details of each leaf or each building (Csikszentmihalyi, 1996).

Creative people are visualizers and daydreamers. They are able to use their imagination to see order where others see chaos. They see interrelated ideas where others see isolated ideas.

The creative person intertwines ideas, thoughts and actions that to most people appear segregated (Barron, 1995; Csikszentmihalyi, 1996; Piirto, 1998).

Seeing relationships that others do not also requires creative people to have courage and fortitude. Torrance (1995) calls it the “minority of one” experience (p. 121). He reminds us that creativity involves being different, stepping into uncharted waters, making honest mistakes, testing known limits, and responding to challenge. All of these take an immense amount of courage.

Csikszentmihalyi (1996) describes the personality of creative people as complex because they often exhibit a paradoxical expression of opposites. “The creative person brings together the entire range of human possibilities within themselves. Instead of an individual, we have a multitude” (p. 57). The creative person has the ability to quickly move from one extreme to the other. Creative people can be energetic and laid back, focused and listless, disciplined and playful, wholistic and detailed, all the while jumping between fantasy and reality. It is not surprising that Koestler (1988) defines creativity as “a learning process where teacher and student are located in the same individual” (p. 269).

Understanding the creative person is one piece of the task. We must also understand the process of creativity and learn to fit what we have come to embrace as creativity into a larger plan for develop-
oping our creatively gifted students. In the mid 1920's, Wallas (1926) attempted to define the mental process used by creative people. The process he defined as the Wallas Paradigm has four stages:

- **preparation** — the investigation stage, the gathering of information, the stage of indepth study;
- **incubation** — the time of arranging and rearranging ideas, letting the ideas simmer, a time of living with ambiguity;
- **illumination** — the realization of a solution, the A-HA, a time of sudden insight; and
- **verification** — a time of evaluation, deciding if the solution or insight has worth.

Czikszentmihalyi (1996) termed this fourth stage evaluation and added a fifth stage. He called the fifth stage elaboration. In this stage one adds the details to make the idea or solution interesting and understandable. Czikszentmihalyi suggests this stage is probably the hardest and requires the most energy. He likens this to the 99 percent stage from the comment attributed to Edison that creativity is one percent inspiration and 99 percent perspiration. Though the process appears linear, it is actually cyclical. A person may return to parts of the process again and again during the creation of an idea or product.

To make the creative process work internally, students need more than the ability to generate a large number of ideas. They need in-depth knowledge of the field or domain which matches their interest and talent. They also need to develop a high level of proficiency in using the tools and techniques of the domain. This lays the foundation for the preparation stage of the creative process. For creativity to occur, the mind must be stretched to its limits voluntarily (Csikszentmihalyi, 1996).

During the third verification/evaluation stage of the creative process, students need to bring together a highly tuned intuition and skilled judgment. The generation of new and unusual ideas is not the issue; but the intuition and good judgment to know which of the ideas generated are worth pursuing. Csikszentmihalyi (1996) quotes a creative scientist who credits success to such a combination, “whereas most scholars have ideas which do not pan out more than, say, 4 percent of the time, mine come through maybe 80 percent of the time” (p. 61).

One technique that is mentioned consistently throughout the literature on creativity is the importance of keeping a notebook or journal of one’s thoughts and ideas (Csikszentmihalyi, 1996; Piirto, 1998). The value of this is supported through the study of the lives of creative people across the disciplines. Note-taking allows a person to take down incomplete thoughts that can be strung together with similar thoughts at a later date.

The stream of ideas flows continuously during all our waking hours, and along this stream priceless ideas are passing.

The thing to do is to try to catch them as they go by. We should make a rough note of every idea just as soon as it occurs to us, regardless of where we are (Osborn, 1985, p. 225).

This expanded view of creativity has several implications for gifted programs. Though the descriptions of our gifted programs include the creatively gifted, in reality, most gifted programs are designed to challenge the academically able student. It is often supposed that somehow the creatively gifted are also served by exposing students to a variety of activities using higher level thinking processes. As the literature points out, the creatively gifted need the encouragement and the environment to develop the personality characteristics that will serve them as creative adults, not just the process skills.

Gifted programs must also re-examine how they find the creatively gifted students among their student population. High performance on a cognitive abilities or standardized achievement test does not translate into a student with a high creativity potential. The correlation ends at an IQ level of 120 (Csikszentmihalyi, 1996; Piirto, 1998). Gardner (1993) puts it this way:

**First, creativity is not the same as intelligence. While these two traits are correlated, an individual may be far more creative than he or she is intelligent, or far more intelligent than creative. Moreover, when talented individuals are examined, it is clear that psychometric creativity is independent**

**DISTRICT RESPONSIBILITIES TO THE CREATIVELY GIFTED**

1. A re-examination of identification procedures. The elements related to creativity must uncover students exhibiting the characteristics associated with creativity, not just students testing high on a creativity test. An expectation of a high cognitive ability score AND a high creativity score is unfair to both the highly creative student and the academically gifted student.

2. A development of program services that allow for different opportunities for the academically gifted and the highly creative. Highly creative students need chunks of time to work alone on issues and problems of high interest to them. Sometimes the highly creative student needs the time to ponder an idea while the academically gifted student needs to move on and cover a larger amount of content.

3. The finding of teachers who understand the highly creative and are able to live with their need for ambiguity, their inability to follow the straight predictable path, and their intense passion and curiosity which can derail a lesson with no warning. Teachers of the highly creative student must resist putting their creativity on the classroom stage in favor of strengthening the personality traits and characteristics embodied within the creatively gifted student.

**Figure 1**

(SEE JUNTUNE, page 17)
Creativity is as Creativity Does

My Mama always says, "Stupid is as stupid does."—Forrest Gump

At times, great wisdom emerges from the most improbable sources. The aphorisms of Forrest Gump often read like Zen koans, shrouding truth within incongruity. A koan is a short anecdote or statement that expresses some aspect of enlightenment, often in an unintelligible, paradoxical manner. For example, "The harder you try, the less you know; beware lest you lose the substance by grasping at the shadow." Forrest plays the archetypal "great fool," wise beyond understanding (Nisker, 1990). The great fool, in his innocence, wonders about the obvious, stands in awe of the ordinary, and stumbles into revolutionary discoveries.

Only the foolish would attempt to package creativity. Yet, the great fool may help us find a way to achieve it. If we paraphrase the words of Forrest Gump's mama, we touch upon a truth that can aid in the search for creativity. We find the creative spirit in creative action. Creativity is as creativity does.

Creativity is generally defined as the ability to produce or bring into being some new thing, activity, course of action, or way of thinking by using imaginative skill rather than imitation. Theorists arguing nuances of definition and researchers dissecting various origins of creativity can prove fascinating to study, yet provide little help in developing creativity within students. For the teacher, the central question remains, "Can creativity be cultivated? Through the program provided, through the leadership exhibited, through the inspiration engendered, will more creative individuals emerge?"

I believe the answer is yes. Creativity can be nurtured. The issue then becomes, how is this task accomplished? How does one cultivate the creative potential within learners? We cannot simply copy creative products. That becomes imitation, not originality. Rather, we must attempt to discern and instill the creative process—the "how one does it."

Perhaps the best place to begin to understand the "how" of creativity is the study of creative individuals. If we distill the essence of what they do, we may learn something about the nature of creativity. We can expect to find only general directions, not a well-beaten path. Creativity, by its nature, means actions and results that include the unpredictable, the unimagined, the unusual. We must be careful not to corrupt the lessons we learn.

Michael Michalko, a creativity consultant, studied a number of creative people, all of whom earned the label "genius." (Michalko, 1998). He studied a number of these individuals throughout history from science, art, and industry, seeking common patterns. Michalko first determined that the genius thinks "productively," rather than "reproductively."

Reproductive thinking operates on the basis of precedent, considering similar problems encountered in the past. While thinking through the prism of past experience provides a rich array of materials, it does not lead to originality. The old axiom applies, "If you always think the way you've always thought..."

By contrast, geniuses think "productively" when confronting a problem. They ask, "How many different ways can I look at this? How can I rethink this?" Michalko argues geniuses operate according to Darwin's theory of biological evolution. Like nature, they create many possibilities through blind trial and error and then let natural selection decide what solution survives. The critical feature is "the unpredictable generation of a rich diversity of alternatives and conjectures." (Michalko, 1998). From this variety, the best ideas survive for further development and communication.

Michalko found that in terms of productive thinking strategies, geniuses:

- look at problems in many different ways;
- make their thoughts visible;
- produce;
- make novel contributions;
- force relationships;
- think in opposites;
- think metaphorically; and
- prepare themselves for chance.

If we know, therefore, that creative geniuses function in this manner, then we can logically assume that, if we act in like manner, while we may not become geniuses, we will become more creative. Genius is as genius does.

If teachers seriously desire to have more creative students, they must first seek more creativity in themselves. They must understand the nature of the creative process and apply this knowledge to three critical areas: their instruction to students, the classroom activities in which students engage, and the products they require of students.

For the teacher, a new question emerges, "How exactly do I achieve this? Fine words—think like a genius—easy to say; not so easy to accomplish." In addition, while the key to success lies in applying the process, the ultimate measure of a program's success resides among the products—the "what one can do". In an age of quantification, scores must be assigned, points totaled, results evaluated. To know creativity is not enough. The creative teacher must also nurture creative actions to stimulate creative production.

While the nature of creativity itself prohibits the development of specific templates (the term "creativity notebook" seems an oxymoron), I do believe I can suggest five keys for unlocking greater creativity. Bear in mind they provide the techniques. Like chess rules, they are short and general. Learning them is relatively simple. However, also like chess, mastering them requires extensive work and constant effort.

Play

An excellent place to search for creativity is in the world of business, where the challenge is far from esoteric. If companies and executives do not find creative solutions to their problems, they face extinction. Several interesting individuals have directed their efforts toward this audience.
One writer from this field widely known to educators is Edward De Bono. De Bono developed the “Six Thinking Hats” strategy for business (De Bono, 1985). He created the six hats to provide a mechanism for “deliberate thinking.” Each hat focuses on a different type of thinking, allowing for clearer focus and communication among participants in a group. When deliberating, each speaker would clearly express him or herself by donning (at times literally) the appropriate hat:

- **The White Hat** wearer concentrates on objective facts and figures.
- **A Red Hat** speaker expresses the emotion generated by the discussion.
- **Black Hats** always lead the speakers to cover the negative aspects of the issue.
- To put on the **Yellow Hat**, one must seek the most optimistic and positive thinking possible.
- **Green Hats** fertilize creativity and new ideas.
- Those who wear the **Blue Hats** look at the thinking itself, organizing the process for optimum results.

De Bono’s goal was to help business managers turn their “intentions” into “performance” (De Bono, 1985). He provided business (and educators) with a clever tool for developing more focused thought. Many teachers have applied De Bono’s Hats directly to the classroom. This tool is an excellent example of bringing creative procedures to classroom operation. Students correctly using the Six Hats will think in a more complex manner and increase the potential for better thoughts.

Two important points to note. First, De Bono stresses the importance of play-acting. Play is important to the creative process. John Cleese said, “The essence of creativity is not the possession of some special talent; it is much more the ability to play.” Nietzsche said, “In every real man a child is hidden that wants to play.” Play is the central human learning structure (Gelb, 1994). In play, children learn rapidly, adjusting knowledge and skill almost without thought. Play is more fun and failure at play less devastating.

Secondly, as we play, we become that at which we play. De Bono contends, “If you go through the motions of being a thinker—for example, putting on your thinking hat—then eventually you will become a thinker. Your thinking will follow the motions. Your play-acting will become real” (De Bono, 1985). Heraclitus reminds us, “We are most nearly ourselves when we achieve the seriousness of the child at play” (Gelb, 1994). We are more creative when we play. If you would be more creative, play at it.

**DRAW**

Geniuses make their thoughts visible. The notes of Leonardo Da Vinci, exhibit a fascinating blend of word and image. Text and sketches flow together, enhancing one another. Similar patterns appear in the notes of Isaac Newton, Albert Einstein, and Vincent Van Gogh. The use of sketches, patterns, lines, and drawings in formulating notes stimulates greater creativity and strengthens recall.

Tony Buzan has developed an amazing device for producing visible thought—mind mapping (Buzan, 1993). Buzan bases his idea upon “radient thinking.” Radiant thinking refers to associative thought processes that proceed from or connect to a central point. In The Mind Map Book, Buzan elaborates on basic mind mapping techniques. The “rules” he suggests using build an organic pattern, flowing from some central thought. Lines, color, symbols, and drawings all allow for notes that better match mental patterns than do traditional, linear ones.

Teachers can use mind mapping to organize their materials and presentations. For example, I mind map a unit before I begin it. I can see the entire unit on a single sheet of paper. I can consider how the different components fit the main theme and relate to one another. I can track my progress and make adjustments more quickly. Finally, the map helps me recall the unit’s components, as well as viewing it in a more holistic manner.

Students can employ mind mapping as an organizing tool for their own knowledge. They can map materials studied in class, from textbook chapters to magazine articles to entire books. Class notes can be mapped. Maps of projects allow for easier assessment of progress and time management. Finally, mapping itself encourages the novel combinations, forced relationships, and thinking in opposites that Michalko found inherent in thinking among geniuses. If you wish to see more creative thought, draw it out.

**QUESTION**

When they encounter a problem, creative geniuses use their knowledge as a springboard and they employ questions as the central vehicle for that thought. Questions are one of the most obvious and least utilized tools for creative thought. Teachers, of course, ask questions constantly. Far too often, they are not the best questions.

In The Ascent of Science, Jacob Bronowski asserts, “Einstein was a man who could ask immensely simple questions” (Niskey, 1990). He asked the key questions—those that take time to ponder, that get at the heart of the matter. His musings on the nature of time, a series of “what if...” questions that led to fascinating images of the universe, provide the classic example.

Teachers should allow questions to drive classroom actions, from a daily activity to entire areas of study. True key questions require some thought. They are both the most obvious and the least obvious ones. Lessons and activities should be built after the questions are developed. These questions remain the focus, opening the discussions and the possibilities.

More importantly, teachers should teach students how to ask questions. Students should have an entire repertoire of question types and levels. They should learn how to formulate questions that change the nature of the inquiry, that open new lines of thought, that challenge their assumptions. Whenever possible, student initiated questions should set the course of study. Yet they must be the best questions possible.

Fermi questions provide good exercise in developing and pursuing questions. This question type is named after Enrico Fermi, the Italian physicist who contributed to the development of nuclear physics and quantum theory. Fermi had legendary skill in figuring out things in his head, using information that originally seemed too meager to arrive at a quantitative result. He would consider each value with a “zeroing in” technique by determining the value in question was larger than some number and he reached a quantified answer within specifically identified limits.

A Fermi question, such as “How many pianos are tuned in New York City each week?” requires estimation of physical quantities to arrive at an answer. The question is posed with limited information and require students to ask many more questions (How many pianos are there? How many pianos can they tune each day, etc.). Fermi questions utilize estimation, often at the edge of the individual or group knowledge. They can be used as springboard for research and inquiry. To reach a group answer, the members must communicate and develop consensus. No single “right”
answer emerges. Rather, the emphasis is upon process, upon how the answer was reached.

In any classroom, question framing should be the work of students as much as of teachers. The answers one gets are only as good as the questions one asks. If we want more creative answers, we must learn to ask better questions.

**MEDITATE**

Creativity, originality, novelty, and innovation all involve special habits of mind. To develop them, one must study them and work to recognize them in others and within oneself. The dictionary defines meditation as “the act of engaging in continuous and contemplative thought.” To develop creativity requires meditation.

Begin with the process modeled in this article. Read Thinkertoys (Michalko, 1991), If It Ain’t Broke... Break It! (Kriegl, 1991), and Lateral Thinking (De Bono, 1970). Examine their strategies and their philosophies. Meditate upon them. Make lists. Post them. Refer to them in planning and in the midst of actions. Perhaps a dose of Zen could also provide inspiration. Dip into The Little Zen Companion (Schiller, 1994) or Zen to Go (Winokur, 1990) or read that classic of forced relationships, Zen and the Art of Motorcycle Maintenance (Pirsig, 1974).

Next, practice metacognition, or reflection upon one’s own thinking. Evaluate your thoughts carefully, considering when they were creative and what happened to make them so. Examine frequency of traits. Reflect upon situations where creativity seemed particularly absent. Determine what mental actions occurred or did not occur.

Thirdly, encourage meditation among students. Constantly seek to know, and have them know, what they thought and why they thought as they did. Plan time for meditation of course material, of class activities, of projects developed. Unless students understand how they produce creative results, they will never develop a consistent creativity.

Develop reflective minds. Reflect constantly, sometimes immediately, sometimes over extended periods of time. Reflect openly. Reflect only within. Reflect in different forms. Reflect with different groups. Reflect. Reflect. Reflect. “The mind of the perfect man is like a mirror.”

**EMULATE**

Finally, paradoxically, to be creative, imitate those whom you most admire for their creativity. Read books on thinking and creativity, not so much for the “worksheets” on creativity (another oxymoron), as for their ideas on strategy and tactics. “Do not seek to follow in the footsteps of the men of old; seek what they sought.”

A fascinating book by Michael J. Gelb (1998) offers a superb emulation model. Gelb examined the life of Leonardo da Vinci for the principles that formed the central essence of his genius. He developed a list of seven Da Vincian Principles. Gelb makes no claim you will become another Da Vinci, no more than studying the golf of Jack Nicklaus makes one a world-class golfer. However, if we choose to study the best role models available, they will “guide and inspire us toward the realization of our potential” (Gelb, 1998).

Gelb formulates these seven principles in Italian:

- **Curiosità**—An insatiably curious approach to life and an unrelenting quest for continuous learning.
- **Dimonstrazione**—A commitment to test knowledge through experience, persistence, and a willingness to learn from mistakes.
- **Sensazione**—The continual refinement of the senses, especially sight, as the means to enliven experience.

- **Sfumato** (literally “Going up in smoke”)—A willingness to embrace ambiguity, paradox, and uncertainty.
- **Arte/Scienza**—The development of the balance between science and art, logic and imagination.
- **Corporalità**—The cultivation of grace, ambidexterity, fitness, and poise.
- **Connessione**—A recognition of and appreciation for the interconnectedness of all things and phenomena.

Gelb elaborates each principle with material from Leonardo’s notebooks and works. He offers questions for meditation and self-assessment. Then he provides a program of practical activities for cultivating that principle. Gelb’s design is “to bring the spirit of the maestro to your daily life” (1998).

Gelb’s book is one example of a program of emulation. It provides an excellent plan to follow. The important point is not that one must follow this particular plan. Rather, the goal is to bring the spirit of emulation to daily life. Like Stephen Covey’s Seven Habits (1989), such lists prove only interesting novelties unless one makes them a consistently practiced reality. Do not copy the master’s works of art, but emulate the art of his or her work. Emulation is not the goal, mastery is. Follow a master as apprentice until you choose to set out as your own master.

While thought and reflection upon creativity are important, the paths to creativity can be found only by traveling them. Perhaps creative genius is more a hologram than a set of steps. Attempting any part of it is to touch all of it. We cannot wait until we are more creative. Like juggling, we must stretch ourselves beyond our perceived level of competence to accelerate our development of competence (Gelb, 1994). We need to keep a beginner’s mind, playing with the possibilities. We will learn more that way. As that Zen master of physics Einstein reminds us, “Imagination is more important than knowledge” (Winokur, 1990).

**References**


*James Collette, a native West Texan, serves as Curriculum Director for McCamey ISD and Gifted and Talented Coordinator for the district. He teaches a concurrent credit U. S. history course and a special elective Gifted class for grades 9-12. Jim is the Secretary/Treasurer for TAGT.*
(from ELAM, page 2)

want work ethic. We would not be where we are today had those ancestors thought great thoughts, and then went home to play whist. To be successful, to transform society, to contribute to the world, children must be both thinkers and producers. The following through to productivity is what breeds success. Adults must model a work ethic and teach children that what we do, we do all the way. One of the greatest joys is the reward of accomplishment, the feeling of elation experienced after something personally well done.

Young children want to please adults they care about. They are open to guidance, and they flourish when nurtured. When adults begin encouraging productive creativity at an early age, it becomes the modus operandi for children.

**Encouraging Courage**

To be different demands personal risk and therefore requires courage and strength. Children must develop an inner resilience to repel scorn. They must learn to bounce back, or they will be wounded too seriously to reach the finish line.

When an elementary school class is assigned a science project, what happens? Many children wait until the last night and then stay up late conducting an experiment and drawing a poster. Often there is one child who works on the project for months, repeats the experiment numerous times, writes a long paper examining the question from every conceivable angle, covers a large hinged board with the pertinent data, and requests permission to turn it in the afternoon before it is due so her dad can haul it in his truck because she is unable to transport it on the school bus in the morning. How positive is the reaction of the teachers, other parents, and students?

We frequently proclaim that we want to encourage divergent thinking but do we actually reward it? Many gifted children learn early that the world accepts and embraces mediocrity. To work harder, to strive for the greater achievement, to produce creatively, involves personal risk. Deviation from the average opens the individual to ridicule; furthermore, the extrinsic rewards are few.

Creativity is accepted and expected in art, music, and theatre. Yet productive creativity in the academic areas is crucial to future developments. Children must develop courage, strength, and stamina to survive and thrive. It is up to adults to provide a safe environment for risks, acknowledge attempts at multi-level products, accept mistakes as part of the process, and reward productive creativity.

**Accepting Mistakes**

We must teach children that mistakes are normal. There are times when we learn the most from mistakes. Trials and errors contribute to our foundation of knowledge and experience. One of the most beneficial experiences for gifted children is to see parents and teachers readily admit mistakes and take them in stride, to see adults laugh at their own mistakes. When we provide a loving, caring, safe environment for children, they will be more comfortable and accepting of their mistakes.

**Knowing When to Stop**

We cannot do everything we would like to do in life, so we must choose those things that are most important to us. Of those we choose, we do not have the time to complete every task to our highest abilities. Adults teach children to strive toward excellence in the areas they choose as the most important. They encourage children to plan and prioritize, the essential skills in the adult world.

Gifted children tend toward perfectionism because they know they can produce a better product than the standard. Adults teach them the difference between striving for excellence and pursuing the illusion of perfection. Gifted children must often learn to value and allocate their time so that they know when to stop.

**Having Fun**

There are innumerable fun ways to nurture productive creativity. When children are actively engaged in living, life is learning and learning is life. They perceive life as an adventure and seek to explore the world. One goal should be to ignite their interests and allow them to pursue their passions into new realms of discovery and understanding. However their endeavors turn, adults should prize their individuality, reward their productivity, and celebrate going all the way to the finish line.

Let's look at some examples of ways for parents to nurture productive creativity by prompting activities at home.

For instance, parents could consider prompting young children to determine which solutions create the most bubbles for a bubble bath. Ask the children what solutions could be tested. After discussion of solutions and mixtures, they decide to test the bubble producing capacity of dishwashing liquid vs. laundry detergent vs. official bubble bath liquid vs. official bubble bath powder. Next suggest they determine the controls and write down the procedure they will use. They debate how much water to draw in the tub and how they are going to measure it, whether the temperature of the water should be controlled, when to add the bubble solutions and how much, and how to churn the water to produce the bubbles. The children gather the materials, approach the tub, and consider the practical aspects, such as who gets to clean the bathtub before the experiment. By this point parents must turn thoughts of "Is this worth it?" to positive thoughts like, "Mmm... multiple days of clean kids and clean bathtub."

An example of an outdoor activity prompt is to imagine a historic battle. Together with the children, stand in an open field in the afternoon heat of a mid-summer day and read an account of a historic war battle. Together imagine the soldiers, hot and sticky in outdoor heat, dirty and hungry, and sick from lack of food, and tired from marching miles, faced with a fight for their lives and their homeland. Children may ask about the soldiers' horses, crops, and homes. They wonder about the medical techniques, supplies, and procedures. Together imagine their loneliness and their lack of privacy. Children may comment that they are hot and hungry and the bugs are biting. Again you imagine the soldiers.

Of all the activities my children and I have tried in the last 15 years, some of our favorites are:

- Conduct brand tests of muffin mixes and brownie mixes. Experiment with substituting mashed bananas, pureed pumpkin, applesauce, strawberry jam, etc. for oil in your favorite mix. Share the baked goods with friends.
• Hand-stitch remnants together to make a quilt for a stuffed animal.
• Play in the rain.
• Eat dessert first.
• Decorate trikes, draw signs, don costumes, and then parade around the neighborhood.
• Design apparel for 100 years from now.
• Hold a neighborhood pet show in the backyard complete with ribbons made for the winners. (Make sure there is plenty of water and that every pet wins something.)
• Write and illustrate a family story or legend. Bind as a book.
• Cut out magazine pictures and compete in composing wild stories using all the picture prompts.
• Experiment with changing your sleep/wake cycle.

LAGNIAPPE

Some of our most cherished moments are those we share with our families. As a bonus gift from our family to yours, here is one of our most fun and most rewarding activities. May your family reap multiple rewards.

One of our family's traditions is a book hunt on Christmas morning. We began innocently (or conspiratorially) the year our children were 7 and 9 and Santa was delivering a set of encyclopedias. Since Mr. & Mrs. Claus were not certain a set of encyclopedias would be a wondrous sight on Christmas morning, they composed a series of 23 rhyming riddle clues, glued one to each wrapped book, and hid the books separately. The book hunt was such fun it became a cherished tradition with the mandate that in future years the girls each wanted their own hunt so they could race. Finding 20 great books for each child each Christmas was the easy part. Through the years Mr. & Mrs. Claus took turns writing the rhyming trails until one year Mr. Claus decreed that the elves write clues for their counterpart. Our Christmas morning book hunt continues, our voracious readers are now 19 and 21, (yes, they know all the hiding places forcing Mr. & Mrs. C. to be ever more creative) and yearly we all lament... so many books, so little time.

So little time, so much to live.

Develop the gifts, enrich the future.

TAGT Executive Director Search

The Texas Association for the Gifted and Talented is inviting applications for the position of executive director. Reporting to the executive board, the executive director is the association’s chief executive officer and public spokesperson. Critical skills and experiences include the abilities to: 1) communicate the association’s vision and translate it into organizational action, 2) manage and sustain association resources and external relations, including community and government relations, 3) provide effective leadership for the implementation of the strategic plan, 4) direct a full-time staff of five and manage multiple service contracts, 5) prepare and implement an annual budget of $1 million, and 6) ensure effective service and benefits to association members.

The Search Committee is seeking an entrepreneurial leader with exceptional communication, organization and managerial skills; one with demonstrated success in the administration of multiple program initiatives; and sufficient knowledge about computer technology and its uses to communicate and market priority association programs. The candidate must have earned an advanced degree and/or comparable professional degree. Salary is commensurate with experience, with total salary and benefits package ranging from $75,000 to $90,000 annually. The association is headquartered in downtown Austin, Texas, two blocks east of the state capitol. Residency in Austin is required. Interested individuals should submit a resume and letter of interest to: Dr. Susan Johnsen, TAGT Executive Director Search, Baylor University, School of Education, P. O. Box 97304, Waco, TX 76798-7304. The deadline for applications is August 27, 1999.
Creativity

(from JUNTUNE, page 11)

of psychometric intelligence, once a threshold IQ of 120 has been reached (p. 20).

Students with high academic achievements may display few of the characteristics needed for creativity. They may be so secure in their accomplishments that they become complacent. The learning of facts becomes so easy that they may have no incentive to question or doubt existing knowledge (Csikszentmihalyi, 1996).

Over the years, Torrance has brought the IQ/creativity dilemma to light by conducting eight studies on the relationship between intelligence and creativity. His studies led him to conclude that the selection of the top 20 percent on IQ or intellectual aptitude measures would exclude 70 percent of the top 20 percent on creativity measures (Khata, 1992). Finding the highly creative students will require one to take a critical look at the identification profile used in most districts.

Amabile (1989) warns us about relying too heavily on creativity test scores. Creativity tests only measure some of the abilities that are related to creativity. Since the tests are often administered in "test-like" school settings, students become more anxious and inflexible in their thinking. Students who choose to spend some time to think about their responses are penalized because many tests are scored on number of responses during a given time period. The lower number of responses results in a lower number of points for novelty and elaboration (Piirto, 1998). Amabile (1989) suggests that parents and teachers should focus on conducting careful observations of a child's creative behaviors. Observation allows for a greater range of creativity related abilities and behaviors to be revealed. The finding and serving of creatively gifted students will require three things from a district (see figure 1).

The teaching of creative thinking is a small part of our educational responsibility to our creatively gifted population. We must examine our programs to ensure that the creatively gifted are being identified and appropriately served. We must commit to helping these students develop more fully the traits and characteristics that brought them to our attention initially.

REFERENCES


Joyce Juntune, Ph.D. is a member of the graduate faculty in the Department of Educational Psychology at Texas A&M University in College Station, Texas. She teaches graduate level courses in the area of gifted education and conducts staff development training sessions for school districts throughout the country.

(from PORTER, page 8)

possibly be that the adjunct of creativity will be the most powerful aptitude that will allow the world to adapt to the complex life styles of the next millennium. Intelligence alone will not be enough.

CREATIVITY IN THE REAL WORLD

PBS from time to time airs shows about thoughtful people creating. The story of Andrew Wiles and his discovery poignantly illustrates the intelligence, motivation, and creativity link. Wiles secluded himself for seven years to study and research Fermat's Last Theorem dealing with elliptical and modular shapes. The sequence of events traced Wiles' unrelenting struggle to solve this theorem. Twice he thought he had conquered it only to discover that he had not. In spite of this setback, he continued on. When faced with a block, Wiles walked along the river to "relax and to allow the subconscious to continue working." He asked himself, "What would happen if?" and "How could it possibly be?" as he continued his task. Finally, after seven years, he was successful. Knowledge, hard work, self-discipline, time to relax, and tenacity, even in the face of setbacks, is a true picture of creativity and intelligence.

Another example occurred during the return flight of Apollo 13 when a problem occurred with the spacecraft. The ground crew was called upon to solve the problem. They came together, under pressure of life and death, with intelligence, knowledge, and creativity to identify both the problem and the underlying problem and to set about finding the solution. It did not come instantly. They brainstormed, they piggy-backed off each other's ideas, they argued, they failed, they corrected, they tried again, they invented, they tore it apart and rebuilt it, and, finally, they were triumphant.

SUMMARY

Creativity is complex and powerful. Identifying creativity in young children and nurturing it in their homes and in their schools is of utmost importance if it is to exist into adulthood. Observable positive and negative behaviors manifest in creative individuals aiding identification. Creativity goes beyond possessing characteristics and is connected with intelligence, talent, motivation, and interest where the creative intersection occurs and productivity flourishes.

REFERENCES

Amabile, Theresa M. (1989). Growing up creative: Nurturing a life-


Shirley C. Porter (M.S. Ed. in Gifted Education from TWU), Coordinator of Secondary Advanced Academic Program in Nocona ISD, has taught Language Arts in the Advanced Academic Program for fifteen years. She is the TAGT Executive Board member from Region IX.

(from WINNER, page 5)

today's abstract, conceptual, minimalist art world, it does not seem that traditional drawing ability plays any role at all.

Perhaps the most important factor in predicting domain creativity is personality. Those who make it into the roster of domain creators tend to have a certain set of personality traits, and these are far more important than possessing high ability or having been a child prodigy. Domain creators are hard-driving, focused, dominant, independent, and risk taking (cf. Barron, 1958; Cattell, 1965; Gardner, 1993; Helson & Crutchfield, 1970; MacKinnon, 1965; Simonton, 1994; Winner, 1996). They have to be willing to risk failure, since anything new is likely at first to be ignored or repudiated. Perhaps most important of all is the desire to shake things up, the desire to alter an established tradition, to reject the prevailing view or way of doing things. Creators are oppositional and discontented with the way things are.

Of course there is no necessary relation between domain creativity and stress or psychopathology, since no one has ever claimed that all creators suffer from these. But there is most probably a necessary relation between domain creativity and personality. One does not have to want to be gifted; one either is or is not. But one does have to want to be creative. Domain creators are motivated to leave their mark on a domain.

The above analysis leads to an important research question, one that has been much discussed (e.g., Simonton, 1994; Winner, 1996; Yewchuk, 1995), but for which we do not have a clear answer. This is the question of whether we can predict which gifted children will become domain creators. One might begin to address this question by looking retrospectively at the childhood abilities and personalities of known domain creators, and comparing these abilities to those of gifted children today. Coupled with this, one could conduct longitudinal studies of gifted children in order to single out those few who become domain creators. This research agenda would have as its goal the elucidation of factors that are predictive of later mastery. Such an understanding is needed if we are to optimize education for highly gifted children so that more may go on to become major creators in their domains as adults.


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Ellen Winner is Professor of Psychology at Boston College and Senior Research Associate at Harvard Project Zero. She is author of Gifted Children: Myths and Realities, Invented Worlds: The Psychology of the Arts, and The Point of Words: Children's Understanding of Metaphor and Irony.
THE CREATIVE PRODUCT ANALYSIS MATRIX

1. NOVELTY: the extent of the newness of the product
   • Original: very rarely seen among products made by people with similar training or experience.
   • Germinal: likely to suggest other highly original products
   • Surprising: likely to shock or startle the mind

2. RESOLUTION: the degree to which a product meets the needs of the problem situation.
   • Logical: follows established rules that exist within a particular discipline.
   • Useful: well-recognized practical applications to its field.
   • Valuable: fulfills observers' needs

3. ELABORATION AND SYNTHESIS: the extent to which the product combines unlike elements into a developed whole.
   • Organic: has central, organizing core
   • Elegant: refined and understated
   • Complex: combines a variety of elements at a variety of levels
   • Understandable: presents itself in clearly stated manner
   • Well-Crafted: shows evidence of revision and refinement

Figure 1

In summary, evaluating creative products is a necessary and valuable part of a program for gifted and talented students. It has been difficult for teachers to find a method for determining objective and unbiased evaluations of their students' work and products. While CPAM provides the basis for this kind of evaluation through its structure of general categories and specific subscales, it is, like most tools, only as good as its user, just as the Burger Buddy depends, to some degree, on the expertise of the griller. Further research and development remains to be done in the area of creative product evaluation.

REFERENCES

After all the student evaluations are complete, they can be summarized both qualitatively and quantitatively using simple statistics and bar or line graphs so that the student can visually see the results of the evaluations.

<table>
<thead>
<tr>
<th>Criterion Ratings for The Burger Buddy</th>
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Figure 2

Dr. Mary Nied Phillips is the Gifted and Talented and Environmental Studies teacher at the Lake Waco Montessori Magnet School for Environmental Studies in the Waco ISD. She is also on the faculty of the University for Young People at Baylor University and serves on the Building a Presence for Science Advisory Council sponsored by the National Science Teachers Association.

Visit the TAGT web site at:
http://www-tenet.cc.utexas.edu/tagt/
(from PIIRTO, page 1)

Creativity

The process in who had been interviewed and researched, talked about their creative with desires for spiritual unity and with the need for personal expres­sion, had some rocky times in their at the many workshops I attended. In fact, I only knew one person who had really used the CPS process in her real life, and SOl (Structure of Intellect) trainers, but my own life contained little through an artist's eyes.

Overhead transparency after overhead transparency bloomed behind him on the giant screen. There were lots of diagrams and curves and arrows and dots and lists. He illustrated his points with cartoons cut out from "Peanuts." There was a list of tests also, but Katherine couldn't believe that you could give a test for creativity.

Well, he must know. She scanned the program as he spoke and underlined all the sessions that were on creativity. If he was a keynote speaker, and the topic was creativity, obviously she was supposed to teach creativity. This would be her main emphasis at this convention. She collected the handouts of the dots and diagrams and psychological words, and she hurried down the hallway of the hotel convention wing to a small room.

There with a pitcher of iced water and two glasses behind a table with a podium and a microphone and a smaller screen and another overhead projector, were two middle-aged women. They were local coordinators in a faraway corner of the state, and they were going to talk about how to enhance creativity in elementary school children. They also had many overheads blooming like flowers on the conference room wall, and they had the group play some simple games. It was fun, and everyone relaxed. But Katherine was getting anxious. The coordinators were very good speakers, and they were using words like "fluency" and "flexibility" and "elaboration" and they talked about creativity as if it were "problem-solving."

Well, they must know. Katherine thought, for they have been in this field a lot longer than I have. But in the back of her mind, she thought that creativity was a little bit more than fun and games and generating alternative solutions (Piirto, 1998).

When I wrote that, I had already been an educator of the gifted and talented for 13 years, had been a county coordinator in two states, a principal of New York City's oldest school for gifted children, and was now a college professor. But in my inner life, my real life, I was also an artist, a published novelist, and a poet, and I saw the world through an artist's eyes. I had worked for awhile as a Poet in the Schools in the National Endowment for the Arts "Artist in the Schools" program during the late 1970s and early 1980s.

I began to think about my own creative process, for I was certainly a creative person, wasn't I? Here I was giving Guilfordian workshops on fluency, flexibility, and elaboration as one of the first SOI (Structure of Intellect) trainers, but my own life contained little brainstorming, SCAMPERing, generating of alternative solutions, or creative problem-solving according to the flow charts I had been given at the many workshops I attended. In fact, I only knew one person who had really used the CPS process in her real life, and she was a fellow professional in our field. She and her husband, a teacher, had had some rocky times in their marriage, and they had gone to a restaurant and had jotted down the "mess," and had brainstormed solutions.

But as I read and reflected, I found that most creative adults who had had biographies written about them, who had written memoirs, who had been interviewed and researched, talked about their creative process in more organic terms. The creative process has engaged the best thinkers of the world from prehistoric times. Common mythological perspectives on the creative process have viewed it as the visitation of the Muse. Historically, the creative process has been tied with desires for spiritual unity and with the need for personal expression. Many creative products have resulted from insight, illumination, and unconscious processing. Solitude seems to be a necessary condition during some aspects of the creative process. The creative process can be viewed in the context of a person's life and the historical milieu. Contemporary psychological and religious thought have emphasized that the creative process has universal implications. What is popularly called "right-brain thinking," as well as visualization, metaphorization, and imagery seem to help people in the creative process. The creative process is a concern of scientists as well as humans. Scientific experimentation has resulted in the demystifying of many popular creative process beliefs. I concluded that the repertoires of school people, who often use only the Creative Problem Solving process in enhancing creativity, should be expanded.

Another, perhaps the most, popular theory of the creative process is that there are four steps. This is the theory propounded by Wallas in 1926. Wallas was one of the pioneers in critical (not creative) thinking, working out of the tradition established by John Dewey and Horace Mann. He said that there are four stages in the creative process:

- Preparation,
- Incubation,
- Illumination, and
- Verification.

In the first stage, the person does both formal and informal work; she gets herself ready for the act of creation by studying, thinking, searching for answers, asking people, etc. In the second stage, the process rests, is in gestation, the person is pregnant with the creative product. The unconscious is working on the problem. In the third stage, a solution arises, and light is thrown on the problem. The most famous example of this in the creativity literature is the vision of Archimedes rising from his bathtub and running naked down the streets, shouting "Eureka! I have it!" when he understands the theory of the displacement of water. The illumination, the "aha," had dawned upon him (Wallas, 1926).

I found much similarity in what I read from people in the various domains. For example, the poet, novelist, and screenwriter Jim Harrison described his creative process in writing poetry, and it seems remarkably like that described by Wallas:

"A poem seems to condense the normal evolutionary process infinitely. There is the distressed, nonadaptive state; an unconscious moving into the darkness of the problem or irritant; a gradual surfacing, then immediate righting or balancing by metaphor, as if you tipped a buoy over by force then let it snap upwards; the sense of relief; and the casting and recasting the work into its final form. The last stage "calcifies," or kills the problem, and you are open to a repetition of the process, though not necessarily willing. Though this is all rather simplified, it captures, I think, the essence of the process. There must be the understanding of time lapse; though the "gradual surfacing" may take months, the space between the first sketch and final form an even longer period of time (Harrison, 1991).

Many of the creative and productive adults whose creativity I read about seemed to have creative processes that fell into thirteen categories.

- They seem to have rituals; for example, they like to walk;
- they crave silence;
- they go to retreats and colonies;
- they are inspired by travel;
- they use imagination;
- they trust their dreams;
- they seek solitude so they may go into a state of reverie (or flow);
Creativity

- they fast;
- they meditate;
- they get inspiration from the muse;
- they are inspired by others' works of art, science, and music;
- they improvise;
- if they are blocked, they read or write self-help books.

In fact, the creative process often verges on the spiritual, but I had never heard that mentioned in the education workshops I attended.

I began to offer an undergraduate interdisciplinary studies course called "Creativity and the Creative Process," and I began to try out some ideas that tapped into this "oceanic consciousness," as Brewster Ghiselin called it (1952). The course became popular with undergraduates majoring in the liberal arts, although not so popular among education majors. A year or so later, I saw a new book by University of Chicago psychologist Mihaly Csikszentmihalyi, called Flow, which confirmed my own experiences and those of the creative adults I knew (1990). When schools asked me to do workshops, and when I spoke at conferences, I began to offer my newly derived and idiosyncratic exercises out with the participants. My students in the graduate course in talent development education, called "Creativity for Teachers of the Talented," also tried them out.

By now, I have assembled a full course, nay, more than that, of activities that tap into the mysterious, nebulous, dreamy, solitary, quietness of the creative process as it has been written about and talked about by adult creators. A typical creativity course taught by me utilizes exercises in the core attitudes of risk-taking and naivety. We do a lot of trust building by cheering each other's creative efforts. The students also try exercises in cultivating self-discipline by working daily in creativity thoughtlogs. We work with the five I's:
- Imagery, including guided imagery and film script visualizing;
- Imagination, including storytelling;
- Intuition, including the intuition probe, psychic intuition, and dreams;
- Insight, including grasping the gestalt, going for the ah!, zen sketching; and
- Inspiration, including the visitation of the muse, creativity rituals such as solitude, creating ideal conditions, and using background music.

We imitate those creative people who treasure nature and its contents, making naturalist Notations and Drawings. I have an exercise called "This is the day which the Lord hath made / Let us rejoice and be glad in it." We try meditation, meditating on beauty, on the dark side, on God. We do improvisation with jazz, theater, word rivers, writing practice, creative movement, rhythm and drumming, scat singing, and doodling. We try to see the humor in everything and one day everyone brings a joke. Last fall I had to caution them not to bring any Monica jokes, as these would descend into areas not appropriate for our small, conservative Christian college. (I failed, and the day descended all right, as we laughed and shifted our embarrassed eyes.)

We cultivate all five of our senses and also blend them for a sense of synaesthesia. We vigorously exercise so endorphins will kick in. We "trance dance" to a sinuous and hypnotic videotape that allows free expression while providing a fine workout, and even the guys participate if I do it late enough in the semester and if the lights are down and the blinds are pulled.

We focus on my notion of the thorn of fiery passion as explicated in my model of the Pyramid of Talent Development (see Figure 1).

We try to find our domains of passion, that which we can't not do. We explore the joys of good conversation and start a monthly salon at my house. We visit a cemetery. We visit a beautiful and silent church with symbolic stained glass windows to meditate on God. We hike in nearby nature parks to meditate on nature. We go to an art museum to meditate on beauty. We visit a bookstore, a library; for the midterm the students must attend a live concert, a play, a poetry reading, or a lecture to honor the creativity of talented others.

The culmination of the course is an individual creativity project. The students may not use already existing kits or molds and must avoid the "season curriculum" of Christmas decorations, Halloween pumpkins, or St. Patrick's Day shammocks. One student in Finland wrote a poem when we visited the art museum, and it became the lyrics for the first song she composed. Other individual creativity projects have included autobiographical video ("My creative self"); performance of an original song; performance of an original radio play; design and modeling of an original dress for a sorority formal; a plan for an advertising campaign; a synchronized swimming routine; a grunge rock band audio tape; a photographic exhibit; an exhibit of original art works; a reading of an original short story; an autobiographical multimedia presentation; a translation into English of Chinese, Greek, or Spanish literature; an original dance routine; a new recipe for scones; an original afghan; designs for costumes for a play; a reading of original poetry; a business plan for a new business; a music video; a capella singing; an original rock 'n' roll song; philosophical musings about the meaning of life; and display and demonstration of a particularly creative Thoughtlog.

One football player, a defensive back, took all the game tapes for his entire college career, spliced them together to show himself in the improvisatory acts of dodging, running, and hitting. One student thought that his creativity came in his preparation for and study of contemporary popular music. He took all the concerts he had attended and did a project on how to get the most out of concert attendance. We laughed uproariously as he peeled off concert t-shirt after concert t-shirt, putting on a tropical Jimmy Buffet hat, passing out Bic lighters for us to sway to the music of the Grateful Dead, flashing strobe lights as he stripped down to his finale, a Black Sabbath t-shirt.

Projects are evaluated with a holistic scoring system, and we are often moved at the projects that we weep. At the end of the course, most agree that indeed, creativity can be enhanced through direct teaching. (See Figure 2 for a list of some of the activities I have devised.)

My students who are becoming licensed to be teachers of the gifted and talented tell me that yes, indeed, the K-12 students that they work with can begin to see the creative process as something that is, at base, an emotional journey more than a cognitive one. Every week they try out the activities we have done in class, modifying them for their own use, for I am a firm believer that what I teach is conceptual and not practical. I am not giving my students exercises to try on Monday morning, but a conceptual framework from which they can devise their own exercises, suitable for the age of the groups they are teaching. The concept of "risk-taking" is what is important; the concept of "inspiration" is important to devise an activity at the application level that is suitable for the children one teaches. This is where the true creativity of the teacher comes in.

Over the past few years, I have learned to trust my own creative process instead of mimicking the thoughts of others. In writing the two big and detailed nonfiction books, Talented Children and Adults: Their Development and Education, and Understanding Those Who Create, I had to draw on everything I knew about the field of the education of the gifted and talented. I read and read, organized, thought, walked, swam, obsessed on, and slept these books, but it...
was self-discipline that got me through. I would write for about an hour every day, seven days a week. When it came time to put it all together, in the last chapter of Understanding Those Who Create, I was no longer so shy about trusting my own knowledge. While swimming lengths at the university pool during its open hours, I began to make a list of what I knew about how to enhance creativity in children. The list came out to have twelve items (see Figure 3, page 24).

Teachers and parents can work in partnership to enhance creativity. First of all, creativity is affective—the necessary risk-taking and sense of openness to experience, or naïveté required demand a safe environment in which to explore. Both the home and the school should try to provide such. Trust is also important; that is, that someone who is trying out creatively should not be put down, and should be permitted to fail as well as to soar. A person who tries out creativity should have a safe group (the class, the family) with whom to be.

My friends help a lot. My course evolves and changes as experiences in my life happen. A friend (a former student, F. Christopher Reynolds) and I began to combine his emphasis on the affective and my emphasis on the creative process as I understood it from the reading I was doing of biographies. He had published an article (1990) on the creativity enhancement course he gives in the high school where he teaches French. He is a singer songwriter and understands, from his own artistic work, how the emotional must be tapped into in order for true creativity to flower. His finger painting exercise in which we

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**THE PIIRTO PYRAMID OF TALENT DEVELOPMENT**


Figure 1

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* Talent becomes a "calling."
paint “where we dwell” became a part of my teaching repertoire. We do workshops together, and he became an adjunct professor at our university as well as an instructor in our summer program for talented adolescents.

A friend who is a poet-beekeeper in Colorado contributed his knowledge of the creative process as he was inspired by his muse. a painter inspired by eros in all of our lives, a musician who experience their creativity in ways similar to the ways we experience it. The point is that we can make conscious what has, for many, been rather unconscious. Perhaps you will do the same.

REFERENCES

Jane Piirto, Ph.D., is the Trustee Professor of Graduate Education at Ashland University in Ashland, Ohio, where she directs the talent development program. She has written over a hundred scholarly articles, poems, and short stories, and has published eight books, including an award-winning novel.

A COURSE IN ORGANIC CREATIVITY

- Working on Core Attitudes
  Cultivating Risk-taking
  Cultivating Naïveté
  Cultivating Self-discipline with Thoughtlogs
  Cultivating group trust (if in a group)

- The Five I’s
  Imagery
  10 Minute Movie
  Guided Imagery
  Imagination
  Intuition
  Intuition Probe, Psychic Intuition, Dreams and Intuition
  Insight
  Grasping the Gestalt, Aha, Zen
  Sketching
  Inspiration
  Visitation of the Muse

- Creativity Rituals
  Solitude
  Creating Ideal Conditions
  Using Background Music

Used with permission by Jane Piirto (1998; 1999).
How Parents and Teachers Can Enhance Creativity in Children

- Provide a private place for creative work to be done.
- Provide materials (e.g., musical instruments, sketch books).
- Encourage and display the child’s creative work and avoid overly evaluating it.
- Do your own creative work and let the child see you.
- Pay attention to what your family mythology is teaching.
- Value the creative work of others.
- Avoid emphasizing sex-role stereotypes.
- Provide private lessons and special classes.
- If hardship comes into your life, use the hardship positively, to encourage the child to express him/herself through metaphor.
- Emphasize that talent is only a small part of creative production and that discipline and practice are important.
- Allow the child to be “odd”; avoid emphasizing socialization at the expense of creative expression.
- Interact with the child with kind humor.
- Get creativity training.

Used with permission by Jane Piirto (1998; 1999).

Figure 3

(from MCLENDON, page 3)


TAGT members should be prepared to counter the testimony of representatives from ultraconservative groups who, no doubt, will be on hand to oppose certain parts of the g/t rules at the State Board meeting in September. The Curriculum and Instruction Committee, chaired by Geraldine Miller, District 12, (1100 Providence Tower West, 5001 Spring Valley Road, Dallas, TX 75244-3910; phone: (972) 419-4000; fax: (972) 522-8560), will hear testimony on the g/t rules. Other members of that committee include: Rosie Collins Sorrells, Ed.D., Vice Chair, District 13, (5506 Glen Forest Lane, Dallas, TX 75241; phone: (214) 374-1521; fax: (214) 376-5107); Mary Helen Berlanga, District 2, (2727 Morgan Avenue, Corpus Christi, TX 78405; phone: (512) 882-8284; fax: (512) 881-1029); Richard B. Neill, District 11, (4701 Alta Mesa Boulevard, Fort Worth, TX 76133; phone: (817) 292-0880; fax: (817) 370-7763); and Richard Watson, District 14, (P.O. Box 249, Gorman, TX 76454; phone: (254) 965-9007; fax: (254) 965-6980).

The TAGT leadership recommends that g/t advocates begin now to write Mrs. Miller and members of her committee confirming their support for the continuation of current g/t rules. We also suggest that a copy of all communications to the Curriculum and Instruction Committee be forwarded to one’s own State Board representative, as the full board must approve rules at all three readings before final adoption in January, 2000. Visit the TAGT Web site for information updates relating to the sunset review of SBOE g/t rules and to see a sample letter with addresses for each member of the State Board.

Update on NAGC’s Federal Legislative Initiative

NAGC deserves congratulations for its focused legislative initiative this session of Congress. To NAGC’s credit, the Gifted and Talented Students Education Act of 1999 (H.R. 637) was introduced this session in the House of Representatives by Congressman Elton Gallegly (California) and in the Senate (S.505) by Senator Charles Grassley (Iowa). If approved, this legislation would provide grant money totaling $160 million directly to states to develop and strengthen services for gifted children. Allocation of grant monies would be based on the state’s student population, with each state receiving a minimum of $1 million. The legislation emphasizes the following priority areas for expenditures:

Personnel Preparation, Innovative Programs and Services, Distance Learning, and Program Administration/Coordination (the latter limited to 10% of a state’s grant money). A recent communication from NAGC staff indicated that both bills are pending before their respective education committees, awaiting hearings. For NAGC updates on the Gifted and Talented Students Education Act of 1999, visit the NAGC Web site at www.nacg.org.
What the Research Says about Creativity

J.P. Guilford is often called the father of modern creativity research. Using factor analysis, he identified divergent production as a missing ingredient of most intelligence tests. This adversarial beginning placed the construct of creativity in a fragile position next to the formidable advocates of intelligence tests. Indeed, the early proliferation of studies related to creativity almost disappeared during the 70’s, recently resurfacing with Gardner, Sternberg, and other theorists.

Many questions remain about creativity and its relationship to the field of gifted education: How are creativity and intelligence related? Is creativity related to personality traits or does it develop over time? Is creativity a separate domain or domain specific? Should creativity skills be taught as a topic in their own right and/or embedded within specific core subject areas? Are gifted programs aligned more with intelligent or creative behaviors? What are the educational, social, emotional, and cultural factors that influence creative production? Some of these questions are addressed in the journals in gifted education, many more in research articles outside the traditional educational sphere. For example, Simonton is using historiometric inquiry to examine genius, creativity and leadership. Feldman, Csikszentmihalyi, and Gardner are proposing frameworks for building new theories. These scholars appear to be moving in a different direction from professionals in gifted education who are focusing on the field’s traditional mission of serving and challenging advanced professionals in the field of gifted education, I

Unfortunately, the teachers associated these latter characteristics with their least favorite students. On the other hand, Hunsaker (1994) found that teachers often included divergent thinking as part of their conception of giftedness. Their conception, however, did not agree with their district definitions. A study in the United Kingdom compared creative and achieving children. They found that creative students were less happy at school, less hostile, showed greater perseverance in following their own interests, seemed more autonomous in their choices, and came from supportive homes that gave them more aesthetic experiences than did achieving students (Freeman, 1994).

Three studies examined characteristics that were specific to the domains of art and writing. Creative writers tend to use strategies in developing ideas or themes (Starico, 1989). Artists tend to report a personal experience with creativity that is both conscious and unconscious, emotionally driven, and intrinsically motivating (Gnezda-Smith, 1994). Gifted young artists also demonstrate their inventiveness and expressiveness in different ways but not in every product (Porath, 1993). The author concluded that multiple criteria should be used when identifying artistically talented children.

Other articles also focused on assessment. Baer (1994) discovered that language arts performance assessments were as stable as divergent thinking tests. There also appears to be a strong stable relationship between creative performance or products in high school and adult life accomplishments—more so than intelligence or school grades (Milgram & Hong, 1993; Torrance, 1993). In selecting products, students may find it helpful to determine their “expression style preference” so that they might have a greater impact on future audiences (Kettle, Renzulli, & Rizza, 1998). New instruments and methods were presented for identifying students who are talented in the arts. To identify those with potential talent in dance and music, professionals used a multisession audition process; for the visual arts, they used a specific drawing instrument that included such scoring criteria as sensory properties, formal properties, expressive properties, technical properties, and a title (Baum, Owen, & Oreck, 1996; Clark & Wilson, 1991). In one study, problem solving and imagery tasks appeared to identify those with high creativity and high intelligence scores (Carroll & Howes, 1991). In another, emotional expressiveness on the Torrance Test of Creative Thinking tended to discriminate between gifted/LD students and gifted students (LaFrance, 1995).

From these seven articles, it appears that assessments need to be matched to the population and to the domain. However, after reviewing 508 schools' assessments of creativity, Hunsaker and Callahan (1995) conclude that school districts tend to select creativity instruments without attending to the definition or the construct of creativity.

Factors that influence creative productivity were the focus of six articles. The majority of these identified influences by examining the lives of successful individuals retrospectively. Support of either a mentor or family, persistence, and high energy level tended to be
present in all of these case studies (Ambrose, Allen, & Huntley, 1994). In the cases of successful writers, they tended to write early and read extensively (McGravy, 1995; Piirto, 1998). All tended to take risks and love what they did (Torance, 1993). Some differences were noted. For example, Rogers (1998) found that successful men reported catalyzing experiences; yet, Piirto (1998) found that women writers struggled with unconventional families, conflicts, personal problems, and societal expectations. Unfortunately, the school mayor may not have supported the talent, and Miller (1998) wondered whether or not the gift of creative genius could prevail against all odds. Two studies did look at the factors that influenced the production of projects in school. Delcourt (1993) found that high school students preferred projects that were interesting, enjoyable, provided opportunities for creative expression, and were successful—the project worked. At the elementary and middle school level, Schack (1989) found that identification of an interesting topic, time to pursue it, feeling in control, quality of instruction and support, and expectations from others were important influences on the successful completion of creative products.

The majority of the articles focused on specific strategies that might be used to develop creativity. Strategies that appeared effective were analog instruction on metaphor comprehension (Castillo, 1998), interdisciplinary field study units on creativity tests and children's drawings (Harris, 1995), early productivity on later productivity (Hébert, 1993; Schack, 1989), synectics on creative growth (Meador, 1994); Type III enrichment on completion of products (Olenchak, 1995); future problem solving on future roles and control over future events (Tallent-Runnels & Yarborough, 1992); and problem solving on problem fluency, solution fluency, flexibility, originality, and use of criteria (Schack, 1993). One frequently used strategy—open-ended activities—may have both positive and negative effects (Hertzog, 1997, 1998). While these activities provided children with opportunities to pursue their interests and differentiate responses, children may select "comfortable" rather than "challenging" options.

Schoolwide enrichment clusters may have positive effects on students and on teachers (Reis, Gentry, & Maxfield, 1998). Within the clusters, students were able to complete a product and work with facilitators who have expertise in a shared area of interest. In addition, teachers who facilitated clusters transferred some of the strategies into their regular classroom practices. Finally, one study focused on the characteristics of a memorable painting teacher (Zimmerman, 1991). He emphasized both cognitive and affective skills, had a sense of humor, was knowledgeable about his subject, understood and communicated effectively with his students, was deeply involved in teaching, and was a model of an artist.

Ambrose, D., Allen, J., & Huntley, S. (1994). Mentorship of the highly creative. Roeper Review, 17, 131-134. This article describes the relationships between three mentors and a highly gifted young artist attending Columbia University. The mentors assisted their protege in becoming more aware of and appreciating their cognitive strengths, supporting his talent emotionally, and in defining the nature of his life's work. The mentors also reported benefits through the mentorship.

Baer, J. (1994). Performance assessments of creativity: Do they have long-term stability? Roeper Review, 17, 7-11. The two reported studies were used to assess the long-term stability of three consensus techniques for evaluating creativity. In the first study 19 fourth graders' poems and stories were evaluated for creativity in two consecutive years by two different groups of experts. The results indicated that the story was more stable (.58) than the poetry writing (.44). In the second study 38 second graders were asked to tell a story about a picture book in October and in June. These stories were evaluated by two different groups of experts. In the second study the correlation between the two scores was .49. The author concluded that the stability coefficients of the performance assessment were as good as those of commonly used divergent thinking tests.

Baum, S. M., Owen, S. V., & Oreck, B. A. (1996). Talent beyond words: Identification of potential talent in dance and music in elementary students. Gifted Child Quarterly, 40, 93-101. This study focused on identifying students who had potential talent in dance and music. The sample was composed of 396 third grade children in two New York City elementary schools. The procedure involved a multisession audition process that incorporated an array of activities to allow observation of many aspects of talent. A panel of raters composed of two professional artist instructors, the classroom teacher, an arts educator, and an outside expert tallied relevant student behaviors. Preliminary data indicate that a psychometrically sound identification process was created for this sample.

Carroll, J., & Bowieson, N. (1991). Recognizing creative thinking talent in the classroom. Roeper Review, 14, 68-71. In this study the authors attempted to identify indicators of creative thinking ability that might be useful in nominating students for gifted programs. Seventh grade students who had been selected using the Torrance Test of Creative Thinking and other placement instruments were invited to participate in a full day at an Australian university during their ninth year in school. The two intelligence groups were matched on creativity and the two creativity groups were matched on IQ using previously collected data. Students participated in problem solving and imagery tasks. The high creativity and high intelligence group had the highest scores across the activities.

Castillo, L. C. (1998). The effect of analogy instruction on young children's metaphor comprehension. Roeper Review, 21, 27-31. This study examined the relationship between analogy solution and metaphor comprehension by instructing young children in analogies. The subjects were 63 children aged 5.6 to 6.6 years. Children were randomly assigned to one of three conditions. Group 1 was given analogy instruction plus modeling. They were then asked to solve 10 new analogies and interpret 12 assessment metaphors. Group 2 was given analogies with no instruction and then asked to solve the new analogy problems and assessment metaphors. Control Group 3 looked through the analogy cards and then was asked to participate in the metaphor assessment. Results indicated that analogy training improved the young gifted children's metaphoric comprehension.

Clark, G. A., & Wilson, T. (1991). Screening and identifying gifted/talented students in the visual arts with Clark's Drawing Abilities Test. Roeper Review, 13, 92-96. This article discusses the design and testing of a new achievement-type test in the visual arts, Clark's Drawing Abilities Test. The test consists of four items that call for the delineation of skills or conceptions. Scoring criteria included sensory properties, formal properties, expressive properties, technical properties, and title. The CDAT significantly correlated with teacher's ratings on drawings and demographic characteristics such as age and grade.

some suggestions for goals and objectives of creativity training. They include raising creativity consciousness and teaching creative attitudes, improving students' metacognitive understanding of creativity, strengthening creative abilities through exercise, teaching creative thinking techniques, and involving students in creative activities.

Delcourt, M. A. B. (1993). Creative productivity among secondary school students: Combining energy, interest, and imagination. Gifted Child Quarterly, 37, 23-31. A sample of 18 students in grades 9 through 12 from four sites in the Northeast who had developed at least three quality products were included in this study that investigated factors influencing creative productive behaviors. Data sources were the family, the school, and the student. A qualitative analysis of student interviews, questionnaires, and documents was conducted. Factors that contributed to the development of products included parental support, childhood interests, positive attitudes toward school, positive peer relationships, positive self-concept, flexible planning, time allocated to the project, and appropriate audiences. Their most preferred projects were those in which they were genuinely interested, enjoyed, received feedback from the audience, had opportunities for creative expression, and were successful—the project "worked."

Freeman, J. (1994). Gifted school performance and creativity. Roeper Review, 17, 15-19. The sample in this study was composed of 169 children in the United Kingdom. About 350 interviews were conducted in the children's and their parents' homes. Every interview was audio-taped, transcribed onto computer disk, and studied closely with statistical analysis. The responses indicated that there were two distinctly different groups—the achievers who took their greatest pleasure from achievement and the creatives who took their greatest pleasure from creativity. While the achievers had the highest hostility scores of any grouping, the creatives did not manage a single hostility score. The achievers clearly had more difficulty in coping with emotion and relationships while the creatives did not see any effect on their relationships. The achievers studied hard for success while the creatives enjoyed their interests more. Both groups' school-leaving examinations were closely related to their attitudes to school achievement. The creatives were less happy at school than those who were academically motivated. While the achievers had a greater variety of spare time activities than the creatives, relatively fewer of these were creative ones. The creatives had significantly greater perseverance in following their own interests and seemed to be more autonomous in their choices. The creatives came from homes that gave them more aesthetic experience and support while the achievers came from homes where school achievement took precedence over artistic activity. Several of the sample of creatives said that it took all their energy to get through a day's travel, school, and homework without considering alternative points of view. The author concludes with reasons that emphasis on academic school achievement can inhibit creativity.

Gnezda-Smith, N. (1994). The internal forces of creativity: When hearts start to flutter. Roeper Review, 17, 138-143. The objectives of this study were to review theories regarding the internal forces of creativity and compare them to information derived from interviews with creative individuals. Four artistic people were interviewed, including an eleven year old, a high school student, a college student, and an adult with a well-established career. The people reported on the personal experience of creativity. They described conscious and unconscious thought, emotions that precipitated creative activity, and intrinsic motivators and rewards. Wallas' stages were evident in the descriptions of the creative process.

Harris, C. R. (1995). Developing creativity for third world gifted: A head start experiment. Gifted and Talented International, 12, 56-60. An ethnographic study of 18 gifted Head Start students in the Republic of the Marshall Islands was the sample used in this study that attempted to examine the academic effects of two interdisciplinary units. The gifted four to six-year-old children were identified using the Draw-A-Person, PRIDE, and GIFT. Qualitative data collection consisted of theoretical sampling, non-participant and participant observation, random audio, video, and photographic recording. Quantitative data were pre- and posttests using the Torrance Tests of Creative Thinking, Figural Form, and Group Inventory for Finding Creative Talent. Field study was carried out three days per week, for six hours per day, with approximately two hours per week dedicated to the Head Start program over a period of four months. Results indicated a rise in creativity as measured by the TTCT and the GIFT and marked differences in the children's drawings. Other differences observed were gains in experimentation, social sensitivity, idea exchange, initiative, and extrapolation.

Hébert, T. P. (1993). Reflections at graduation: The long-term impact of elementary school experiences in creative productivity. Roeper Review, 16, 22-28. This research examined the question: What is the long-term impact of creative productivity experiences in elementary school? Using nine case studies of students who had participated in the Renzulli Enrichment Triad Model in grades four through six, the author conducted in-depth, open-ended, tape-recorded interviews in their homes during the spring of their high school senior year. Products and available management plans provided additional information. The following themes emerged after analyzing the interviews, products, and plans: Type III interests affect post-secondary plans; a desire for creative outlets continues in high school; a decrease in Type III activities in junior high occurs; earlier Type II activities provide training for later productivity; and non-intellectual characteristics such as creativity and task commitment remain constant.

Hertzog, N. B. (1997). Open-ended activities and their role in maintaining challenge. Journal for the Education of the Gifted, 21, 51-64. The author studied open-ended activities in one third-grade and one fourth-grade heterogeneously grouped classroom. Data sources included 115 hours of observations, 33 different open-ended activities, structured and semistructured interviews, and copies of students' responses to open-ended activities. The primary sources of data were field notes from the observations and transcripts from the interviews. In examining five cases, the author concluded that the children had opportunities to pursue their interests and work in their preferred learning styles while pursuing open-ended activities. However, the children chose activities that were "comfortable" and not "challenging." The author recommends that more research on ways to structure and use open-ended activities to challenge students.

Hertzog, N. B. (1998). Open-ended activities: Differentiation through learner responses. Gifted Child Quarterly, 42, 212-227. In this ethnographic study, the researcher focused on how and in what ways the responses to open-ended activities of children identified as gifted differed from responses of children who were not identified as gifted in one third-grade and one fourth-grade heterogeneously grouped classrooms. "Open-ended" activities refer specifically to those
with multiple responses rather than one correct answer. Data sources included observations over the course of one academic year, interviews with teachers and students, learning style and interest assessment instruments, and documents related to over 33 open-ended activities. The author found that the two teachers in the study evaluated students’ responses relative to their expectations of the students, in relationship to the students’ abilities. Frequently, students pursued the same knowledge in different ways, but when choices were provided within the content domain, greatest differences in responses occurred. The author found that differentiation of learner responses occurred even when the product involved limited student choices and was not “open.”

Hunsaker, S. L. (1994). Creativity as a characteristic of giftedness: Teachers see it, then they don’t. Roeper Review, 17, 11-15. The author explored the interplay of official definitions and teachers’ personal conceptions of giftedness. The sample included one district using a data-reduction matrix, one using multiple cut-offs, and one using holistic case studies. Nine teachers were selected from each of the three districts. Interviews and questionnaires were used as the data collection procedures. The researcher found that nearly every teacher mentioned some aspect of divergent thinking. Four teachers mentioned extraordinary convergent thinking such as quick recall and abstract reasoning. Three mentioned curiosity or an active intellect. The teachers’ personal conceptions were not reflected in the official definitions within their school systems.

Hunsaker, S. L., & Callahan, C. M. (1995). Creativity and giftedness: Published instrument uses and abuses. Gifted Child Quarterly, 39, 110-114. Creativity as a concept is complex and has a variety of definitions, and the development of an adequate measure of creativity is dependent upon an adequate conceptual definition. For example, some researchers view creativity as separate from intelligence, others as the foundation for giftedness, and others as a separate category or style. After reviewing methods used in 508 schools’ assessment of creativity, the authors conclude that school districts tend to select instruments without attending to the definition of the construct.

Kettle, K. E., Renzulli, J. S., Rizza, M. G. (1998). Products of mind: Exploring student preferences for product development using ‘My way ... an expression style instrument’ Gifted Child Quarterly, 42, 48-57. A total of 3,532 students from 45 school districts in 24 states completed surveys designed to assess their interest in creating a variety of products. The authors conclude that if individuals understand their personal expression style preferences then they may develop technical skills related to these preferences and in the long run have a greater impact on future audiences. In addition, the instrument may be used in planning Type I activities, planning Type II seminars or mini-courses that teach students how to create certain products, and exploring the type of products students may want to create.

LaFrance, E. B. (1995). Creative thinking differences in three groups of exceptional children as expressed through completion of figural forms. Roeper Review, 17, 248-254. This study focused on the differential performance of gifted/LD students on the Torrance Tests of Creative Thinking figural form B. The sample was drawn from four school districts across Ontario and consisted of 30 children who were gifted, 30 who were learning disabled, and 30 who were gifted and learning disabled. Their performances on the TTCT were analyzed both quantitatively and qualitatively. Qualitative differences existed among and within groups. In emotional expressiveness, the gifted/LD tended to be stronger than the other two groups. In humor, storytelling, and expressiveness of titles, the gifted students were stronger than ten percent of the other groups of students.

McGreevy, A. L. (1995). The parsonage children: An analysis of the creative early years of the Brontës at Haworth. Gifted Child Quarterly, 39, 146-153. After reading about the Brontës’ early lives and later lives, related works, studies of juvenilia, and early writings, the author drew the following conclusions regarding the development of their creativity. First, the Brontës were very productive, writing over 100 manuscripts and 22 books to become fluent and precise in their language. Second, they thought of themselves as “real writers” like their father. Third, the children challenged one another and collaborated with one another with Charlotte encouraging Emily to publish her work. Finally, their father discussed current issues with them and allowed enormous amounts of freedom of thought.

Meador, K. S. (1994). The effect of synectics training on gifted and nongifted kindergarten students. Journal for the Education of the Gifted, 18, 55-73. The purpose of this study was to determine the effect of synectics training on the development of creativity, self-concept, and verbal skills of gifted and nongifted kindergarten students. A sample of five groups of kindergarten students (N=107) in an urban south central United States district were pre- and post-tested using the Torrance Tests of Creative Thinking, the Martinek Zaichkovsky Self-Concept Scale, and the Peabody Picture Vocabulary Tests. Identical synectics sessions were conducted in the gifted experimental and the nongifted experimental classrooms. These twenty minute sessions were held twice a week for 12 weeks. While no differences were found on the measures of self-concept and creativity between groups, the author found qualitative differences between the gifted and nongifted groups in these characteristics: higher level of abstraction, more questioning; greater range of understanding, larger vocabularies; more fluency, flexibility, and originality. These characteristics were more frequently exhibited and developed to a greater extent with the gifted students. The author concludes that synectics training may be used in kindergarten to encourage creative growth.

Milgram, R. M., & Hong, E. (1993). Creative thinking and creative performance in adolescents as predictors of creative attainments in adults: A follow-up study after 18 years. Roeper Review, 15, 135-139. This study examined the relationship between adult accomplishments and performance as an adolescent on measures of intelligence, school grades, creative thinking and overall leisure activities. Subjects were 67 of 159 students who participated in a study of creative thinking and creative performance conducted 18 years ago. The sample included the entire senior class of a high school in Tel Aviv, Israel. The subjects ranged in age from 34 to 36 years. The findings suggest that creative thinking and creative performance are better predictors of adult life accomplishments than intelligence or school grades. In addition, a relationship between leisure activities and adult vocation was impressive with 35% participating in similar fields.

Miller, A. L. (1998). The gift of creativity. Roeper Review, 21, 51-54. This article compared and contrasted the early years of two geniuses: Henri Poincaré who discovered chaos theory in 1890 and Albert Einstein. Similarities and dissimilarities are discussed in how
they reacted to their education systems. While Einstein was identified as a problem child, Poincaré was identified as gifted and probably of genius caliber. Poincaré received all the opportunities available in the French education system while Einstein was not recognized until he published his paper on relativity in 1906 at age 26. Based on comparisons, the author asks teachers to consider these characteristics of mathematically gifted students: they may be poor at rote learning; they have a strong desire to find patterns; they are capable of asking teachers questions that cannot be answered immediately; and they need support. The author wonders whether or not the gift of creative genius can prevail against all odds.

Olenchak, F. R. (1995). Effects of enrichment on gifted/learning-disabled students. *Journal for the Education of the Gifted*, 18, 385-399. This study examined the effects of a highly structured, personally tailored enrichment program on the attitudes, self-concepts, and creative productivity of 108 gifted/LD youngsters enrolled in the fourth through sixth grades. The study administered the Arlin-Hills Survey Toward School Learning Processes, the Piers-Harris Children's Self-Concept Scale, and tallies of completed and uncompleted Type III products. Changes in attitudes and self-concept were reported for the group participating in the enrichment activities with 27 students completing Type III projects. The author concludes that the year-long treatment had positive effects on the group.

Piirto, J. (1998). Themes in the lives of successful contemporary U.S. women creative writers. *Roeper Review*, 21, 60-70. This article examined the question: What are the themes in the lives of successful contemporary female creative writers? The subjects were 80 female creative writers, ages 30 to 65 who were listed in the Directory of American Poets and Writers. Using the analytic induction method of constant comparison, the author triangulated data through multiple sources of information including encyclopedias, directories, published interviews, published autobiographical works, and the initial questionnaires. These themes emerged: They had unconventional families and family traumatic. They had teachers who discovered and encouraged their talent as writers. They read extensively at a young age and frequently had early publications. They used writing as a form of communication to make sense of things. They had lived in New York City. They attended prestigious colleges. They had high academic achievement and won many writing awards. They had a different occupation from their parents. They had conflicts combining motherhood and careers in writing. They had a history of divorce. They exhibited motivation, overexcitabilities, risk-taking, resilience, and creativity. Some developed destructive personal problems and depression. They expressed a marginalization from the mainstream. They knew how to get along in the profession. All of the writers participated in a certain creative process. Most struggled with societal expectations of femininity.

Porath, M. (1993). Gifted young artists: Developmental and individual differences. *Roeper Review*, 16, 29-33. This study examined the ways that gifted young artists are the same as or different from their average peers. Using a developmental perspective, the author collected five different art samples from 24 four year olds, 64 six year olds, 76 eight year olds, and 53 ten year olds. No significant differences were found for gender or ethnicity. Developmental patterns were evident in color use, composition, core elements in human figure drawing, and central spatial structures. Elaboration appeared to develop rapidly in a domain of talent. Giftedness was characterized by what was done with the conceptual structures such as inventiveness and expressiveness. The author concluded that gifted young artists can demonstrate their talents in different ways but not in every product. Consequently, multiple criteria should be used when identifying artistically talented children.

Reis, S. M., Gentry, M., & Maxfield, L. (1998). The application of enrichment clusters to teachers' classroom practices. *Journal for the Education of the Gifted*, 21, 310-334. This study investigated the effects of providing enrichment clusters to the entire population of two urban elementary schools. Enrichment clusters provide a regularly scheduled time for a nongraded group of students to complete a product and work with facilitators who have expertise in a shared interest area. The clusters met together for 10 weeks in one school and 12 weeks in the other school. Each meeting lasted 75 minutes and was facilitated by a teacher, community member, or parent. Data were collected through written descriptions of observations, interviews, evaluations, and questionnaires. Challenging content was integrated into 95% of the clusters using these strategies: developing products or services, using specific authentic methodologies, using advanced vocabulary, using authentic "tools," using advanced resources and reference materials, using advanced thinking and problem-solving, integrating creative thinking and historical perspectives, and developing presentations or performances. Approximately 60% of the teachers who facilitated clusters transferred some of the strategies used in clusters into their regular classroom practices.

Rogers, K. B. (1998). The class of '43 at CIT: A case study of adult creative productivity. *Roeper Review*, 21, 71-76. The author examined these questions: To what extent have the Caltech graduates of the Class of 1943 been creatively productive? And, what factors in their lives may have accounted for this creative productivity? The subjects of this study were the 89 respondents who completed the questionnaire sent by the Caltech Alumni Association before the fiftieth reunion of the class of 1943. The response rate to the questionnaire was calculated as 90% of those alumni still living. This group of men was more likely to pursue levels of education beyond the Bachelor's degree but most gained knowledge "on the job." The men were creatively productive over the course of their lives. In general, they were mobile, physically active, and risk-taking in their pursuit of leisure. Many reported catalyzing experiences—stable families, involvement in wars, and specific experiences. The author hopes that further studies of other cohorts will examine the dynamic interplay of factors that contribute to high levels of creative productivity.

Schack, G. D. (1993). Effects of a creative problem-solving curriculum on students of varying ability levels. *Gifted Child Quarterly*, 37, 32-38. This study investigated the effects of a problem-solving curriculum on 267 middle school students in six schools who had been previously identified as gifted, honors, or average. All three groups benefited from instruction in creative problem solving by improving problem fluency, solution fluency, flexibility, originality, and use of criteria.

Schack, G. D. (1989). Self-efficacy as a mediator in the creative productivity of gifted children. *Journal for the Education of the Gifted*, 12, 231-249. This study investigated the relationship between self-efficacy as a creative producer and initiation of independent investigations in areas of personal interest. The sample included 294 students in grades four through eight who were participants in gifted programs based on the Enrichment Triad Model in eight schools. Data were collected using self-reports about projects and ratings of
self-efficacy. Results indicated that initial self-efficacy was related to final self-efficacy, and that successful completion of Type III products was related to self-efficacy. Since only 19% of the variance was predicted by the variables studied, the author identified other influences on the successful completion of creative products such as identification of a topic of interest, time available to pursue an investigation, feeling in control of other activities, quality of instruction and support within the gifted program, and expectations from others.

Starko, A. J. (1989). Problem finding in creative writing: An exploratory study. *Journal for the Education of the Gifted, 12*, 172-186. This study investigated the ways that problem finding and selecting techniques in creative writing differ among professional writers, high school students with interest and ability in creative writing, high school students in above average English classes, and high school students in average English classes, and whether of not group membership can predict originality of problem finding. The sample included 34 summer writing institute students, 66 students in honors classes, 55 in average classes, and 6 professional writers. Data collection included three activities: a problem identification task, a questionnaire analysis of the problem identification task, and follow-up interviews. Results reported that all three groups used similar strategies, but that the summer institute students were more likely to tie the object to abstract ideas to examine object characteristics and less likely to have ideas just “pop out” or related to familiar movies or books than the other groups. Original students tended to use abstract ideas or themes to develop problems. While writers used similar strategies, they concentrated on the deliberate manipulation of ideas through unusual combinations and perspectives. The author concludes that teaching strategies used by professional writers may enhance creative writing.

Tallent-Runnels, M. K., & Yarbrough, D. W. (1992). Effects of the future problem solving program on children's concerns about the future. *Gifted Child Quarterly, 36*, 190-194. The purpose of this study was to determine if gifted students participating in the Future Problem Solving Program would feel that they had more control over their future and different concerns than other groups of non-participating gifted or average-ability students. The sample was 139 students in grades 4-6 from a school district in the Southwest. Results indicated that gifted students who participated in FPS programs responded in a more positive manner about their roles in the future. They also mentioned world affairs, space, technology, war, school, or education more frequently than the other groups. The authors conclude that if those who participate in FPS feel that they have more control over their future, then non-gifted students might also benefit.

Torrance, E. P. (1993). The beyonders in a thirty year longitudinal study of creative achievement. *Roeper Review, 15*, 131-135. The purpose of this study was to analyze some of the Beyonders in a 30-year follow-up study in creative achievement. The study was initiated in 1959 and involved the total enrollment of a high school noted for enrolling a large number of gifted students. The seniors responded to follow-up questionnaires in 1966, 1970, and 1990. Correlation coefficients between the creativity measures administered in high school and the creative accomplishments reported in adulthood ranged from .46 to .58. Using two case studies, Torrance identified characteristics of those who continued to create. They (a) love their work and they do, (b) have a clear future-focused self-image, (c) do not limit their exploration of the field, (d) go beyond the usual scope of a problem in trying to understand things, (e) have a diversity of experience, and (f) have a persistence and high energy level.

Westby, E. (1997). Do teachers value creativity? *Gifted and Talented International, 12*, 15-17. The authors were interested in studying the degree to which teachers' conceptions of creativity agree with conceptions of creativity held by researchers. Teachers were asked to rate characteristics of their favorite and least favorite students. These characteristics were rated by 35 non-education-major college students on a rating scale to determine their perceptions of the ten traits as most typical or least typical of a creative child when compared to Sternberg and MacKinnon's characteristic lists. There was a high positive relationship between the teachers’ least favorite students and these characteristics. Teachers were then asked if the creative child prototype was typical of a creative child. The authors found differences in the teachers' anecdotal descriptions and researchers checklists. Teachers included “is responsible,” “is good-natured,” and “is sincere” as most typical of creative students while “is impulsive,” “makes up the rules,” “is a nonconformist,” “tends not to know own limitations,” “tries to do what others think is impossible,” and “likes to be alone when creating something new” as least typical. The authors conclude that teachers value only some of the characteristics associated with creativity.

Zimmerman, E. (1991). Rembrandt to Rembrandt: A case study of a memorable painting teacher of artistically talented 13 to 16 year-old students. *Roeper Review, 13*, 76-84. The purpose of this study was to describe and analyze characteristics of a memorable teacher of artistically talented 13 to 16 year-old students in a two-week painting course at the Indiana University Summer Art Institute. Data was collected by means of notes, tapes of five sessions, slides of classroom activities and student art work, taped teacher interviews, student registration forms, and two observer journals. The class met for 10 instructional days for two hours. The 20 painting students in the study were entering grades 8 through 11 the following fall. Teacher characteristics included an emphasis on both cognitive and affective skills—he taught skills as well as an understanding of what it was like to be like an artist. He had a sense of humor and was a model as an artist. He was knowledgeable about his subject, understood and communicated effectively with his students, and was deeply involved in teaching.

Susan Johnsen is Associate Dean of Scholarship and Professional Development at Baylor University. Editor of Gifted Child Today, she was the principal investigator of Project Mustard Seed. She is author of four tests that are used in identifying gifted students: Test of Nonverbal Intelligence (TONI-2), Screening Assessment for Gifted Students (SAGES), Screening Assessment for Gifted Students—Primary Version (SAGES-P), and Test of Mathematical Abilities for Gifted Students. She is a past President of the Texas Association for the Gifted and Talented.
**Q&A Answers to Your Questions**

**Donna Corley**

- I think that everyone understands creativity as it applies to the arts. What are some other ways creativity is expressed in the classroom?

  Look for creativity in the classroom in how the students choose to express themselves in all areas. Look for ingenuity. Having many ideas, having different kinds of ideas, having ideas that are unique, completing and/or embellishing ideas are examples of creative behaviors.

- What do we do in the classroom that “kills” creativity?


- What are some strategies to help avoid creativity killers?

  Offer direct instruction regarding common roadblocks to creativity that is age and or experience appropriate and strategies for avoidance. Encouraging a gifted young person to look at things differently can enhance avoidance of mind-set. One way this viewing from alternative perspectives can be developed is through the easy to find “brainwister” puzzles that abound in gifted education publications. Relaxation techniques can reduce anxiety and support self-reflection. Team building exercises can help with negativity issues within a group and build self-confidence, which in turn aids risk taking. Offer choices that help them to make decisions. Assist gifted young people in the development of intrinsic motivation instead of extrinsic motivation.

- What are things that we can do in the classroom to nurture creativity?

  To nurture creative behaviors, Talbot suggests that there are three elements that must mutually exist: “motive, means, and opportunity.” In other words, we need to help gifted young people to want to be creative, have the skills necessary to be creative, and provide them with opportunities to be creative. Valuing and modeling creative behaviors help build motivation. We are all capable of being creative according to E. Paul Torrance’s *Why Fly? A Philosophy of Creativity.*

  Starting with that premise and moving on to direct instruction in skills that enable creative behaviors create the means. Opportunities to be creative should be ordinary, everyday occurrences. Something as simple as extending opportunities for responses that do not require one “right” answer or approach is an opportunity to be creative. If a person has the skills but does not want to be creative or is not given the opportunity to be creative, he or she will probably not be creative. It has been found that even if a gifted young person wants to be creative but does not have the skills or the opportunities, it is less likely that they will be creative. It is vitally important that we help build motive, means, and opportunities for creativity equally.

- What are skills that enable creative behaviors?

  The first step in teaching skills that enable creative behaviors is to teach gifted young people about the creative process itself. A good place to start is with four constructs of creativity that can be taught and measured, as identified by Torrance: fluency, flexibility, originality, and elaboration. Encourage them to have many ideas, different kinds of ideas, ideas that no one else might think of, and teach them to bring ideas to completion. Teach them to share ideas with others if they wish to trigger ideas or build onto others’ ideas, and remember to teach them to take time for self-reflection. Model appropriate brainstorming techniques that demonstrate the withholding of the evaluation stage until the collection of ideas has been completed. Teach them to evaluate appropriately and most of all teach them that discipline within the creative act is important. An idea that is not meaningful or “adaptive,” as Dr. Howard Gardner puts it, if it is of no practical benefit. Create a safe environment so that students feel comfortable and encouraged to take risks.

- If a person is gifted, does that mean that she/he will automatically be creative?

  Isaksen and Murdock in “The Emergence of a Discipline: Issues and Approaches to the Study of Creativity,” *Understanding and Recognizing Creativity: The Emergence of a Discipline,* edited by Isaksen, et al, discusses an observation from the early work on intelligence testing. They found that success on tasks that required ingenuity could not be accurately predicted from intelligenes test scores alone. Measures of creativity then moved to the realms of cognitive style as opposed to just intelligence alone. We also need to remember that we all have the ability to be creative. We need motive, means, and opportunity to reach our creative potential.

- Are there any organizations devoted to creativity?

  Yes. You can contact one at the following address: American Creativity Association, P.O. Box 26068, St. Paul, MN 55126-0068. Their phone number is (612) 784-8375 and the fax is (612) 784-4579. They have annual conferences. Memberships are opened to anyone interested in advocacy of creativity.

Donna J. Corley, Ph.D., coordinates gifted programs for Conroe Independent School District. She is also a member of the TAGT Executive Board. Submit questions relating to gifted education directly to Donna Corley, 702 N. Thompson, Conroe, TX 77301, or by e-mail: dcorley@conroe.isd.tenet.edu
BOOK REVIEWS


Maker and Nielson combine the principles of the first edition with the changes that have occurred over the last twelve years to develop an even more useful text. This second edition (a companion volume to Maker and Nielson’s Teaching Models in Education of the Gifted, reviewed in the Fall 1998 issue of Tempo) also reflects the current views of the various forms of giftedness and the many ways giftedness is exhibited. This information is particularly important and parallels the Texas State Plan for the Education of Gifted/Talented Students. The authors create tables, charts, and curriculum examples that are easy to synthesize with the TEKS. With its focus on the constructionists, the text contrasts the traditional product orientation and the process orientation. With the “user friendly” charts.tables, a classroom instructor can apply the text’s information efficiently.

The book begins by reviewing studies of gifted and beginning overview of the concepts and principles covered later chapters. In a coherent and sequential manner, the text addresses specific principles for the gifted such as learning environment and content/process/product. The second part of the book is about the application of curriculum principles. This text has a higher level of curriculum examples than the first edition. On a scale of one to five, this book is a four plus.

— review by Towana Wilson


This new edition of Piirto’s book again makes creativity understandable from a variety of perspectives. In a clear, concise fashion, she has synthesized research and approaches to creativity training. Topics include the nature and measurement of creativity, types of creatively gifted, and means for encouraging, enhancing, and nurturing creativity especially during childhood. She improves her previous work with added research on the paths of entrepreneurs, popular musicians, conductors, architects, and athletes. Each of the twelve chapters concludes with a list of summary statements crystallizing insights in that chapter - an excellent resource for those who use the book to teach about creativity.

In addition, the book
• distinguishes types of creatively gifted who show distinct life pattern differences;
• discusses creatively gifted artists, writers, scientists, musicians, entrepreneurs, actors, and dancers;
• emphasizes biographies, autobiographies, memoirs, and psychological studies;
• specifies factors in Piirto’s Pyramid of Creativity which lead to creativity;
• summarizes historical development of theories of creativity in various domains; and
• provides strategies for parents and teachers to nurture creativity in children.

The distinctive life patterns of gifted individuals are explored in this book along with ways to enhance and nurture creativity, especially in children. Adults who struggle with creativity in their children or themselves will find help in this book.


In this volume, Robert Sternberg has assembled an impressive collection of articles from experts in the behavioral sciences, including Teresa Amabile, Mihaly Csikszentmihalyi, Howard Gardner, and Joseph Renzulli, among others. The twenty-two chapters are arranged in the following sections: introduction (which sets out the major themes); methods for studying creativity; origins of creativity; creativity, self, and the environment; special topics in creativity; and the conclusion (which summarizes the previous chapter).

While the articles are all excellent and informative, several are of particular interest to teachers and parents. Raymond S. Nickerson’s article, “Enhancing Creativity,” addresses a number of important issues relating to the theory, research, and practical means to increase creative potential. Sternberg and O’Hara address the link between creativity and intelligence. For those interested in brain research, Colin Martindale’s “Biological Bases of Creativity” discusses research and implications. Cultural differences in creativity are investigated by T. I. Lubart’s “Creativity Across Cultures.” Also of particular value is the concluding chapter by Richard E. Mayer, “Fifty Years of Creativity Research,” which provides a thoughtful and detailed overview of research.

This scholarly book will be an invaluable addition to the library of anyone interested in creativity and/or gifted education.
Publications of Interest

Texas Higher Education Coordinating Board
Governmental Relations/Public Information Office
P. O. Box 12788, Austin, TX 76711-2788

Where can educators find up-to-date information on the new high school graduation plans, reliable information on college admissions criteria, and unbiased information on selecting a college or university? The Texas Higher Education coordinating Board offers all of this information in print and electronically via the internet.

The Coordinating Board, the state’s highest authority in higher education, publishes four helpful booklets that can answer many questions that students (and educators) ask about college.

Educational Opportunities at Texas Public Universities and Educational Opportunities at Texas Public Community and Technical Colleges list the degrees available at each public institution of higher education in Texas. Both also include admission requirements, a map of institutions, and a useful listing of degree programs by subject. Planning for College Admission: Advice for High School Students lists the high school course requirements, plus SAT and ACT test scores required for admission at Texas’ public universities. A new publication, Are You Ready for the Real World?, is a high school course planning guide in an eye-catching, easy-to-keep folder. The planning guide includes the Recommended High School Program, the Distinguished Achievement Program, and the Tech-Prep program. The folder fits into a three-ring binder and gives students a place to keep college admissions and financial aid information, as well as important names and telephone numbers.

High school students, teachers, counselors, and parents reviewed these publications while they were being developed to help ensure that they are easy to understand and easy to use.

The Texas Higher Education Coordinating Board provides complimentary copies on request. However, because of the high demand for these publications, they are available in bulk quantities—at the cost of printing, plus postage and handling.

These publications are also available on the Coordinating Board’s web site at www.thecb.state.tx.us. We are advised that you should feel free to print as many copies from the web site as you like; however, please credit the Coordinating Board as the source.


Have you ever wondered how Finland meets the needs of gifted and talented children? Did you know that in Jordan a computerized identification procedure has been developed? Were you aware of the project at Ostrava University (Czech Republic) for developing the creativity of future teachers? If you are interested in keeping up with recent developments in gifted education in Europe, try this journal. Its purpose is to provide a forum for the expression of ideas on the development of high ability across the lifespan. It publishes refereed theoretical and empirical papers in English on both practice and research, reviews of the literature, descriptions of projects and special measures, reports on the results of original research, book reviews, etc. High ability is understood not only in the intellectual sense, but also in sport, fine arts and music, and other domains in which gifts manifest themselves.

Other recent articles include “Factors Influencing the Realization of Exceptional Mathematical Ability in Girls: An Analysis of the Research,” “Teaching Teachers for Creativity,” and “Gifted Athletes and Complexity of Family Structure: A Condition for Talent Development?”
THE LAST WORD

Examining the Boundaries of Creativity

Michael W. Cannon

When the sculpture inched across the floor, it was surprising. And when another exhibit looked back at me, it was disconcerting. But when two statues start conversing, I knew that as far as my previous ideas of art, I was not in Kansas any more. This was not just creativity, but creativity that looked back at you.

These surprises came at an exhibit of Alan Rath’s robotic constructs at the Austin Museum of Art. Robots as sculpture is an idea that expands the limits of what is expected of the medium. Traditional sculpture, such as the statue of Abraham Lincoln in the Lincoln Memorial, is often monumental. It may also be startling, as René Magritte’s surreal bronzes, or even amusing creations like Claes Oldenburg’s soft sculptures. Even with the many variations in the medium, sculpture usually behaves itself.

Rath’s robotic constructs, while reminding the viewer of the natural world of plants, animals, and people, are bare aluminum, cables, cathode ray tubes, wheels, pulleys, sensors, and computers. The mechanical nature is not hidden, but exposed, and a part of the experience.

For example, “Rover” is a wheeled vehicle that roams around its gallery when activated by human movement. Other exhibits have robots that react with each other. “One Track Mind” consists of two crane-like constructs, each with a single multi-jointed arm. Using sound waves, they respond to the movements of each other, sliding along tracks, arms raised and lowered, seeming to argue, dance, shake hands, or wave. Previous conceptions of sculpture are reexamined, revised, or even discarded when confronted with this creative approach to the medium.

The field of creativity is something like that of sculpture. We have an idea of what is meant by creativity, even if it would be difficult to define succinctly; it is one of those “I-know-it-when-I-see-it” ideas. If interactive robots are not a part of your idea of sculpture, then you will either have to broaden your idea of art, or reject the artistic legitimacy of the exhibit. In judging the creativity of student work, something similar happens.

Armed with some idea of what creativity means, the teacher assesses the product or performance that meets the criteria. Confronted with a hallway transformed into a rain forest with trees and trailing vines, many gush, “How creative!”, when the actual student work may have been no more original than filling in worksheets. The project may be very enriching for the teacher, but offer little opportunity for student creativity. Real creativity may reside just as much in a thoughtfully written essay or a well-conducted survey.

Soften the boundaries of your definitions of the creative in student work. Creative ideas often hide in the most unusual places, in forms that we least expect it. And if something creative waves at you, wave back.
**Winter 2000**

**Leadership**

Developing and encouraging leadership is one of the mandates for gifted education. Articles can address issues of identification, specific programs (especially summer institutes and after school programs), leadership strands in general gifted programs, female leaders, minority concerns, as well as general or theoretical discussions of the topic.

The deadline for submission of articles is September 1, 1999.

**Spring 2000**

**Evaluation and Assessment**

Assessment and evaluation are recurring processes in gifted education, whether in identification, programs and curriculum, or student performance. Articles addressing the evaluation and assessment of students in gifted programs, evaluation of programs and/or curricula, assessment elements of identification are only some of the possibilities for contributors.

The deadline for submission of articles is December 1, 1999.

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**Guidelines for Article Submissions**

*Tempo* welcomes manuscripts from educators, parents, and other advocates of gifted education. *Tempo* is a juried publication, and manuscripts are evaluated by members of the editorial board.

Please keep the following in mind when submitting manuscripts:

1. Manuscripts should be between 1000 and 2500 words on an upcoming topic (see topics above).
2. Use APA style for references and documentation.
3. Submit three copies of your typed, double-spaced manuscript. Use a 1 1/2 inch margin on all sides.
4. Attach a 100-150 word abstract of the article.
5. Include a cover sheet with your name, address, telephone and (if available) FAX number and e-mail address.

Send all submissions or requests for more information to:

Michael Cannon, TAGT Editorial Office, 5521 Martin Lane, El Paso, TX 79903

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