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Perspectives in Gifted Education: Creativity

Institute for the Development of Gifted Education, Ricks Center for Gifted Children, University of Denver

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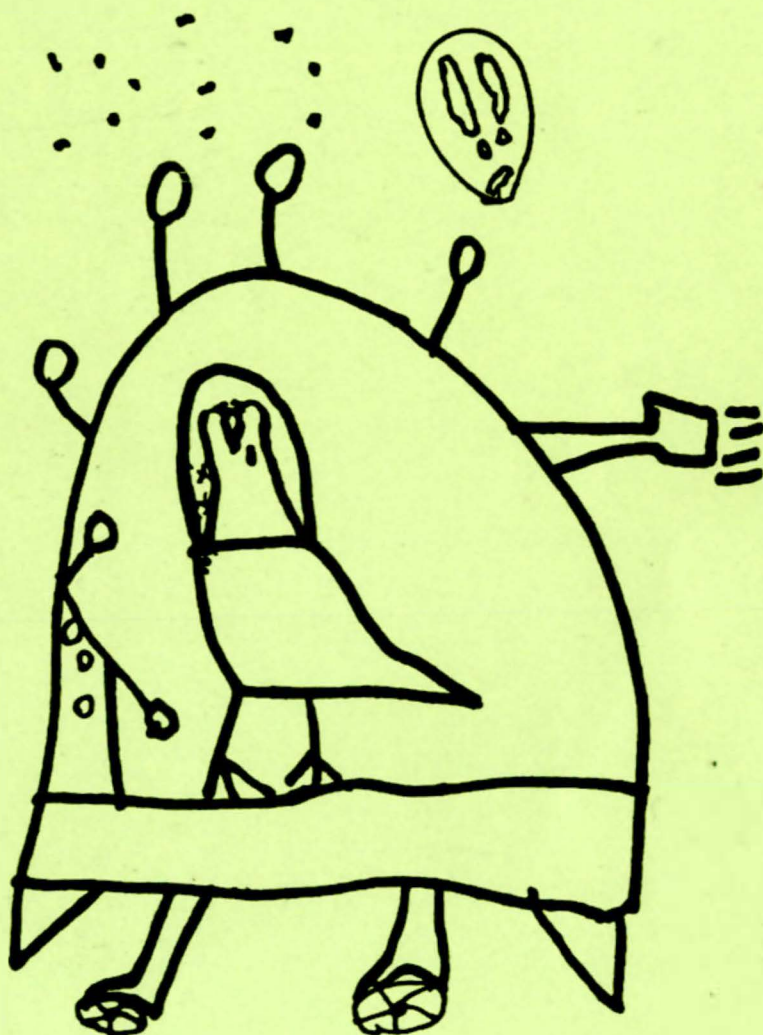
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Perspectives In Gifted Education: Creativity

Institute for the Development of Gifted Education
Ricks Center for Gifted Children
University of Denver



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Perspectives in Gifted Education: Creativity

Volume 5
Fall 2009

Editors

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Kim Haines
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Guest Editor

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University of Denver**

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Preface

This is the fifth in a series of monographs published through the Institute for the Development of Gifted Education at the University of Denver, and it has been graciously funded by the Lynde and Harry Bradley foundation. The first monograph contained different perspectives on the growth and development of young gifted children while the second addressed the characteristics and needs of the twice-exceptional – those who are gifted and also have some type of disabling condition. The third monograph focused on the personality and spiritual and character development of gifted children; the fourth explored giftedness in a variety of diverse, under-represented populations of learners.

It is a pleasure to welcome Dr. Bonnie Cramond as guest editor for this issue, which is focused on aspects of creativity and the gifted learner. Dr. Cramond is currently a Professor in the Department of Educational Psychology and Instructional Technology at the University of Georgia and has formerly been director at the Torrance Center for Creativity and Talent Development. During her career she has worked as a classroom teacher and university professor and researcher, and she has assumed many leadership roles through membership on national boards, editorship of journals, presentations at conferences, and contributions to books, articles and monographs. Her efforts and leadership have furthered professional understanding of creative learners.

Klaus K. Urban presents his model of creativity, one which is composed of six components, and provides reflective questions that allow teachers and administrators to evaluate their programs to determine how well these programs foster creativity. This model lays the groundwork for a more encompassing model that looks at competence and innovation within a broad view of future cultural evolution – Responsible Createlligence®. His chapter continues with an exploration of empirical studies of creativity and schools and concludes with a view on dialectics and chaos theory. It is a thought-provoking examination of creative relationships.

The examination of creativity often occurs within schools and focuses on different thinking processes. Jane Piirto turns a different lens on the subject and discusses what creative

individuals in a variety of domains actually do when they are being creative. Core attitudes of naiveté, self-discipline, risk-taking, ambiguity and group trust facilitate the creative process as do the "Seven I's" (inspiration, imagery, imagination, intuition, insight, incubation, and improvisation). Numerous creative individuals throughout history illustrate these principles in action.

Creativity is commonly expected to be demonstrated in the art classroom, and art teacher, Nan Hathaway, demonstrates how she establishes a classroom that facilitates creative possibility for her students. She does this by working under a philosophy of choice-based art, or Teaching for Artistic Behavior. She presents the fundamentals of the philosophy as well as the practical considerations for implementation and explores unintended outcomes for change.

The Four-C Model of Creativity, developed by James C. Kaufman and Ronald A. Beghetto, expands on the common bi-directional conception of creativity: in addition to everyday creativity ("little-c") and eminent creativity ("Big-C") they add the ideas of "mini-c," creativity inherent in the learning process, and "Pro-c," professional level expertise that is beyond the level of little-c. This multi-level model of creativity facilitates an understanding of the different kinds of creativity expressed by individuals from all walks of life and provides common ground for professional conversations.

Julie L. Milligan takes the frequent question of teachers, "How can I facilitate creativity in the classroom?", and researches the impact of direct instruction on divergent thinking with young elementary students. She offers a sample lesson plan, describes its implementation in the classroom and explores the results on standardized tests of divergent thinking.

Augmenting Jane Piirto's exploration of the creative process and illustration across domains and fields is Suzanne E. Henshon's question into how talent develops within the field of creative writing. While many studies have looked at accomplished adult writers and asked them to reflect on their experiences many years later, this one targets adolescents

who are in an early stage of development and asks what is happening right now to further their expertise.

Dr. Cramond's expertise and assistance have been invaluable in this project, for which we are most grateful. It is our hope that this monograph provides helpful information both for understanding the issues presented and for application in the field, reaching out to touch the lives of gifted children.

Norma Lu Hafenstein, PhD

Director

Institute for the Development of Gifted Education

Ricks Center for Gifted Children

Morgridge College of Education

University Of Denver

RESPONSIBLE CREATELLIGENCE® AS COMPETENCE FOR THE FUTURE: AN INTEGRATIVE APPROACH

Klaus K. Urban, PhD
Leibniz University of Hannover, Germany
Past President, World Council for Gifted and Talented Children

According to Carl Rogers (1959) creative adaptation is the only possible way to keep up with the kaleidoscopic changes in the world. To quote Erika Landau: "A creative attitude towards life does help to master changing conditions instead of leaving them rule over us. Education for creativity procures those traits and abilities, which are necessary to expose oneself to uncertain situations and inconsistencies and to cope with them consciously" (Landau, 1990, p. 9). Due to her experiences with creativity in education and psychotherapy she is deeply convinced that creativity involves the most important and meaningful ways and means to prepare everybody for life.

Thus, creativity, as human potential and its manifestations, is a psychologically important topic, because its reach goes beyond science and arts, touching everybody's daily life as well as political, societal, moral, ethical, and global issues.

As every child is born with the disposition for creativity; society and education has to nurture this fragile capacity. The key for future innovation lies in the nurtured, unfolded, developed, freed creativity of our children. Thus creative education becomes a key issue for each responsible pedagogical concept for the future.

Creative education

"Creative education" as a key to innovation has multiple meanings:

- Education in general needs to be creative because learning, teaching and instruction need to be creative, need to be flexible and innovative. On one hand, these functions have to adapt to changing challenges and conditions from the outside, like changes and expansions in knowledge, curriculum and technologies as well as organization and structure; and on the other hand, teaching and instruction have to adapt creatively to inside conditions, to the personal and learning presuppositions of the individual learner.

- "Creative education" means an education towards creativity as an educational goal and principle. On one hand, creative education shall lead to the capability of effectively applying creative techniques and to the acquisition of certain thinking skills and styles, including divergent or lateral thinking, strategic, evaluative and meta-cognitive thinking; on the other hand, it shall contribute to building up a personality which is characterized by a general open and creative attitude.
- "Creative education" means education for the creative and talented person. Based on a qualitatively high level education for all there should be special consideration of gifted, talented, and creative individuals who still too often are neglected or not even recognized or appreciated in today's schools.

If creativity is a key to innovation, then creative education is the key to creativity. This sounds trivial and self-evident; but if we look into most schools' classroom reality, then this simple, but essential message obviously most often has not arrived or been received; see, for example, Alencar's (1995) research which is mentioned later in this chapter.

WHAT IS CREATIVITY?

If we talk about the so-called "nature" of creativity, we must not forget that creativity does not have a nature; it is not natural or an entity in itself. Creativity remains a hypothetical construct which describes or explains (to a certain extent) a special kind of special human potential or aptitude. Creativity is not a power in itself, it is a human-bound potential, linked with, dependent on, demonstrated and manifested by a person and his/her thinking, acting and doing. This special human activity results in a new, innovative product, which is experienced by others as meaningful and significant.

Let me give my definition, including a process description from problem to product at this point:

Creativity means ...

- (1) the creation of a new, unusual, and surprising product as a solution of an insightfully and sensitively perceived problem or of a given problem whose implications have been perceived sensitively;

(2) on the basis and by means of a sensible, insightful, and broad perception of existing, available and open data as well as of information searched for and acquired openly and purposefully;

(3) by analyzing, by solution-oriented but highly flexible processing and utilizing unusual associations and new combinations of this information and with the help of data from one's own broad and comprehensive knowledge bases (experiences) and/or with imagined elements;

(4) by synthesizing, structuring and composing these data, elements, and structures into a new solution-gestalt (whereby the processes in #3 and #4 may partially run simultaneously on different processing and consciousness levels);

(5) a new solution-gestalt, which is elaborated as a product or (with)in a product in whatever shape or form,

(6) and which finally through communication may be grasped directly via the senses or via symbolic representation and experienced by others as meaningful and significant (Urban, 1990).

A COMPONENTIAL MODEL

The above definition is still strongly cognitive-oriented; yet (cognitive) creative functions are bound to a whole set of personal traits. Therefore it is important and necessary to ask what components of the personal structure may be responsible for creative behavior, i.e., the creative process, thinking and action. What aspects of the human personality may become identified as creativogenic? What are the components involving the mutual dependencies of person and environment in the development and the process of creative activity?

In education and theory regarding creativity we must realize that creativity is not a singular, simple, uniform trait or disposition, but rather a complex construct and process which involves personality components as well as cognitive components. As an attempt to "develop integrative models" as requested by Mumford (2003, p. 107), a more holistic view on creativity is illustrated by Urban's Components Model of Creativity (Urban 1994, 1995, 1996, 1997, 2003).

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Responsible and defensible creative education must be based upon a sound foundation; a comprehensive conceptual framework, which allows true consideration of individual components without neglecting the complex structure. This is offered in the following, as a components model of creativity that includes both cognitive and personality components.

The first three components, representing the cognitive side, are:

- 1 Divergent thinking and acting
- 2 General knowledge and thinking base
- 3 Specific knowledge base and area specific skills;

The other three components, representing the personality, are:

- 4 Focusing and task commitment
- 5 Motivation and motives
- 6 Openness and tolerance of ambiguity.

These components with their subcomponents are represented in Figure 1.

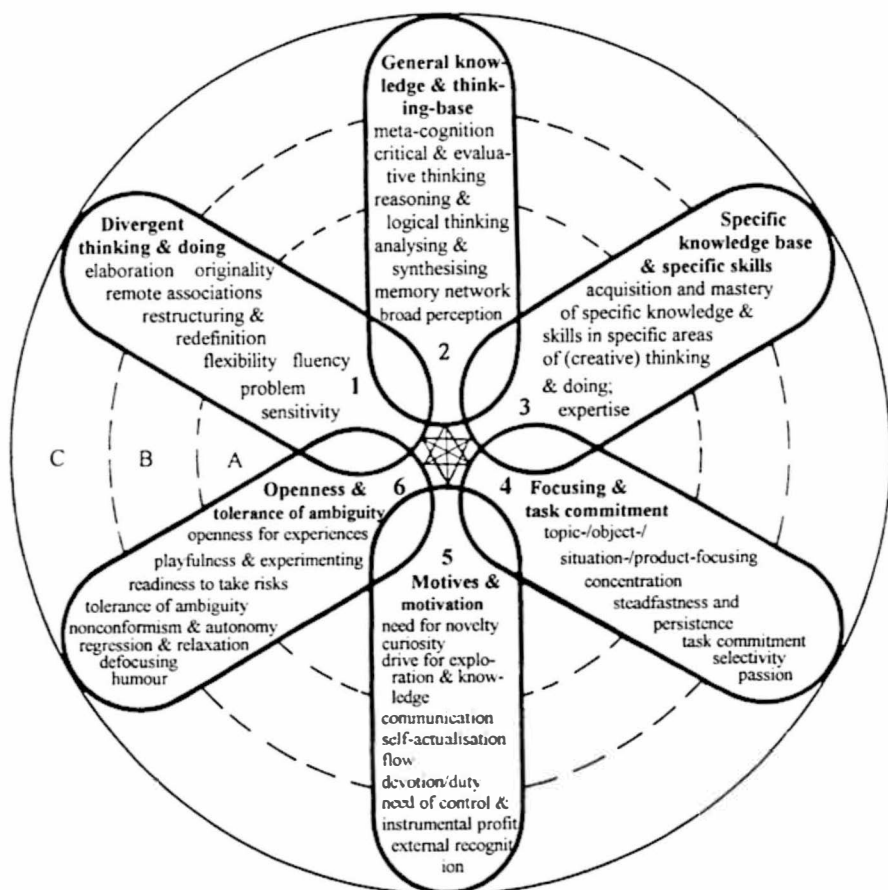


Figure 1: Urban's Components Model of Creativity

Divergent thinking and acting

The component typically linked to creativity, at least since Guilford (1950), is *divergent thinking*, with its subcomponents of *problem sensitivity*, *fluency*, *flexibility*, *originality*, *restructuring*, and *elaboration*. A presupposition and critical starting point for creative

processes is the *problem sensitivity*, the ability to find problems. The same status of facts may evoke a question in one person while another sees nothing questionable. To ask questions seems to be natural to most children; it is one of the very first verbal expressions. This ability to ask is closely linked to children's natural curiosity, the drive for exploration and knowledge. Here the relation of thinking activities, the divergent thinking in our case, to other personal, non-cognitive traits becomes obvious. We will find this interactive relationship between creative thought and action components and their subcomponents again and again; it is basic to this functional system.

General knowledge and thinking base

The sensitivity for problems and all divergent subcomponents are related to the second component, *general knowledge and thinking base*. Divergent thinking depends on *broad perception* and general deep knowledge and thinking base. Quick perception and processing of information and data, and storage in a flexible, accessible *memory network* are prerequisites for fluent, flexible and associational thinking. Reformulations, redefinitions, reconstructions of problems need to be *analyzed* and *evaluated* in regard to their usefulness. *Analyzing, reasoning and logical thinking* are necessary for collecting and preparing the information required in the beginning of the creative process, and again, together with *critical* and *evaluative thinking* in the final phase, when realization and elaboration of the creative idea or product comes about.

Specific knowledge base and area specific skills

Divergent thinking alone will not lead to creative excellence in a special field without special field mastery. In recent years increasing attention has been given to area specific knowledge as a presupposition for generating creative ideas and products, especially for those of outstanding and original, of historic and revolutionizing importance as research on expertise has shown (Ericsson et al., 1993, 2006).

Following Amabile (1983), Brown (1989) considers domain specific skills as being fundamental to creative thinking. A similar position held by Hayes (1989) points at convincing evidence for the statement that in many areas, years of preparation and committed work are necessary in order to achieve really creative products.

Even Weisberg's (1986) results, regardless of his attempts to destroy several so-called myths about creativity, support the component of area specific knowledge. They clearly show that insights are not very likely if relevant task knowledge is missing; insights are dependent on the availability, accessibility, and integration of knowledge representations which are necessary and useful for a given task.

Focusing and task commitment

The acquisition of comprehensive and detailed area specific knowledge and skills requires disciplined *topic commitment* and *persistence* on a high level. The problem in question and the connecting thematic field has to be kept in the *focus* of attention over a longer period of time and with varying intensity. *Concentration* and *selectivity* are necessary for collecting, analyzing, evaluating, and elaborating information and data.

Motivation and motives

Here, again, an appropriate motivation, preferably intrinsic in nature, is necessary. Amabile (1983), focusing on this component in her research, emphasizes the role of *intrinsic motivation* that emerges from the reaction of the individual to intrinsic traits of the task. For example, her research shows the relevance of social and contextual factors for creative productions that can be negatively influenced by external factors, such as the expectation of evaluation or reward or a lack of choice regarding one's own involvement.

Hayes (1989), too, stresses the essential role of motivation for creative achievements. According to Hayes, no purely cognitive variables have been found to differentiate between creative and non-creative people. Thus differences in creativity seem to have their origins in differences of motivation which lead to cognitive differences. For example, according to Hayes, the differing intensity of acquisition and the extent of necessary knowledge and skills together explain the observed differences between creative and non-creative individuals.

The *need for novelty, curiosity, drive for exploration and knowledge* is inborn to each child, but too often unintentionally suppressed by parental or educational environments.

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Openness and tolerance of ambiguity

Finally, in dialectic relationship with focusing and task commitment, the component of *openness and tolerance of ambiguity* is significant. Using Einstein as an example, Lesgold (1988) demonstrates an essential difference between creatively productive processes and "normal" problem solving processes. This lies in the obvious importance of a change from focused, intense activity to withdrawal, the scaling back of intensity, or a *defocused* phase.

Thus the genius of Einstein lies in the adequate combination of mighty, focused thinking and his expertise in natural sciences with his ability to withdraw and muse from time to time. Here again, we find the balance of oppositions. An additional factor is the ability *to postpone quick solutions*, to inhibit or stop a too-quick execution of products and simply allow less-directed thinking to dominate by spreading patterns of activity.

Here the interplay between processes in the musing phase with unconscious divergent, associational thinking, connected with deep domain-specific knowledge and broad, open perception and "interknitted" processing and storing of data and information respectively becomes obvious.

Other related subcomponents are the resistance to group pressure, which maintains *nonconformist* behavior and *autonomy of thinking* at certain times and intervals; the *readiness to take risks* allows for remote associations; *playfulness and experimenting* go with fluency and flexibility; and *tolerance of ambiguity* is supported by passion.

This dialectic combining of subcomponents could be continued at length. To keep it more general, no single component alone may be sufficient or responsible for the whole creative process leading to a creative product. I consider this model as a *functional system*. The (sub)components are used for, participate in, or determine the creative process to differing degrees, with differing subcomponents and combinations of subcomponents respectively. Each (sub)component plays its interdependent, functionally adequate role at a certain stage, a certain level, or a certain situation. Each component is presupposed, intertwined with the other components, and has to be seen in relationship to the environmental frames A, B, and C, which are described in detail below.

Creativity and the creative process, as well as the degree of creativity, are not defined by process and componential variables alone but by the final creative product and the quality of its new gestalt. Its success and acceptability depend on its inherent communicative, innovative, "infectious" power on the one hand and on the receptivity and evaluation of significant others on the other hand.

The dynamics and mechanics of the componential, functional system are dependent on discouraging/inhibiting or nurturing/stimulating/inspiring/cultivating influences of the various environmental (sub)systems in which the creative individual becomes active. Considering the criterion of newness and the aspect of creative development in childhood it is necessary to work with the components model with three different, but interacting "reference levels" (A, B, C):

- A: The individual, subjective dimension includes the direct, situational material and social environment.
- B: The group or local dimension consists of family, peer group, school, and local educational system. This is the micro-environment.
- C: The societal, historical, global dimension contains cultural, political, scientific conditions. This is the macro- and meta-environment.

The assumption of these reference levels is important under at least three considerations. To differing degrees, the environmental frames directly or indirectly influence:

- 1. the development of and education for creativity in children,
- 2. the concrete course and success of the creative process, and
- 3. the evaluation, acceptance, and appreciation of a creative product.

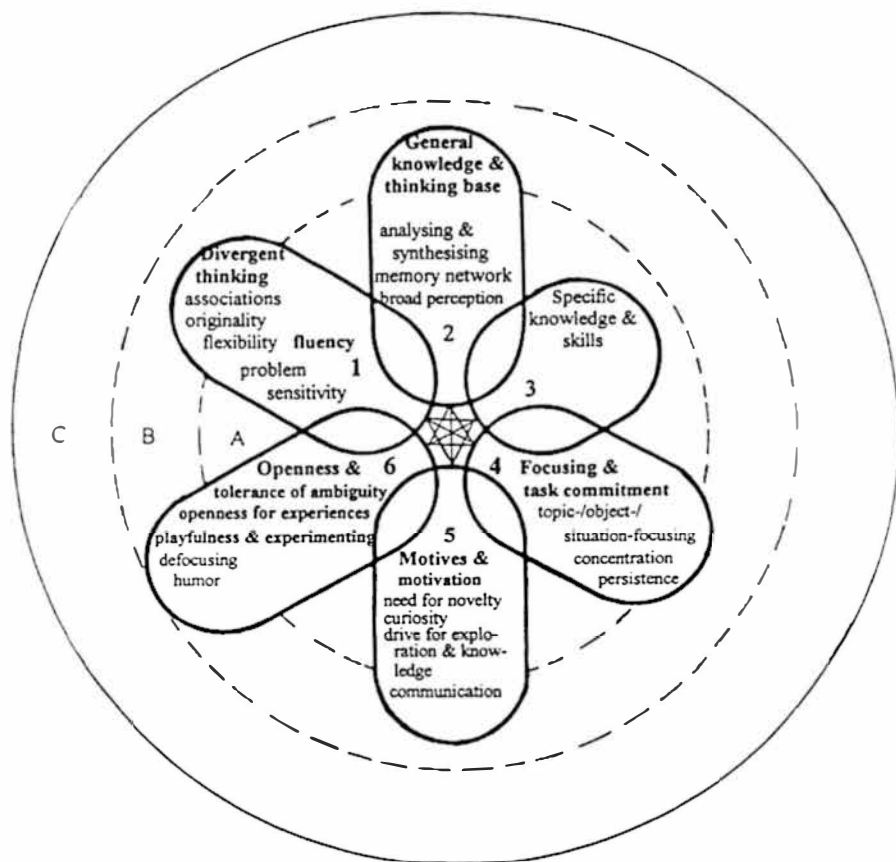
Creativity, as rooted in the curious and playful behavior of the young child, may develop in spiral patterns, becoming broader with increasing creative experiences, developing to full (adult/mature) creativity containing all componential dimensions. As far as possible, the respective subcomponents in Figure 1 are listed in a developmental order from the inner to the outer dimensional circle.

THE DYNAMIC OF THE COMPONENTIAL STRUCTURE

As indicated above, the componential structure has to be considered as a dynamic, functional system. The direction and mode of interaction change according to several variables. The respective componential structures or the different "creativities" are dependent on factors such as:

1. the age of the creative person,
2. the kind of the problem,
3. the stage or phase of the creative process,
4. the kind of process in relation to the kind of the problem,
5. the kind of process in relation to the kind of the product striven for,
6. the different conditions of micro- and macro-environment.

I will show some hypothetical variations of possible, different structures. The first one refers to creative activities of young children (Figure 2). The componential structure is only partially developed. Full of playfulness, driven by curiosity and the need for exploration, their main divergent characteristic is fluency. They may play persistently and concentrate heavily on topics and situations. Specific knowledge and specific skills play a minor role or are acquired more or less incidentally during play.



- A. individual dimension/environment
- B. group- or local dimension/environment
- C. societal, historical, global dimension/environment

Figure 2: The dynamics of creativity components in young children

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Similar to a certain extent is the structure of Figure 3, which refers to the phase when the creative process starts, for example, in problem finding or in the orientation phase. Important is the interplay between the main subcomponents of broad perception and basic divergent thinking. This is supported by openness, intrinsic motivation, and flexible problem-focusing; specific knowledge may assist and strengthen the problem sensitivity. Broadly perceived information has to be processed, analyzed and available stored in the memory network.

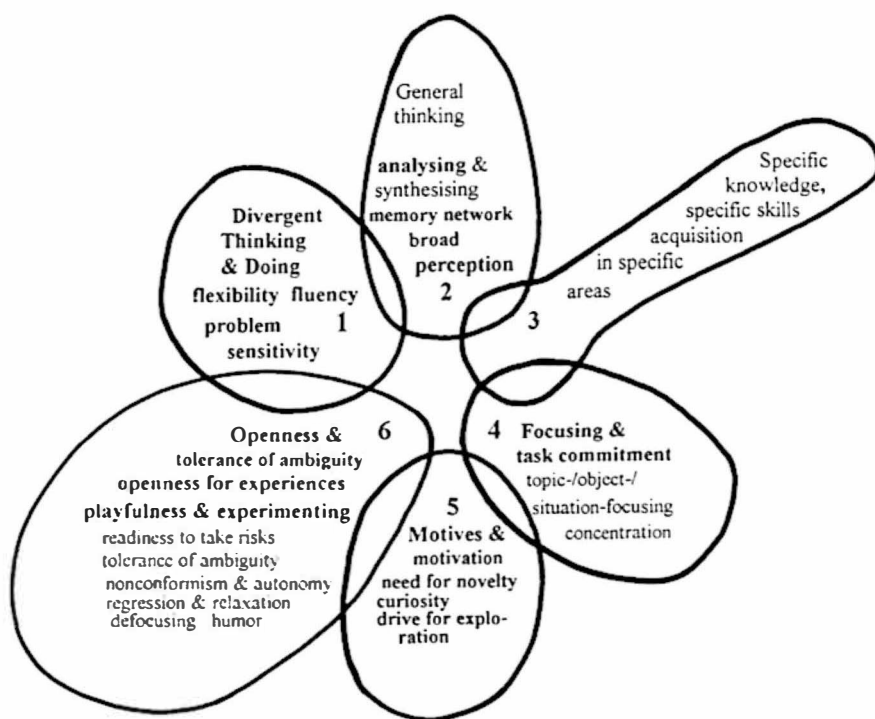


Figure 3: Components Model: Componential dynamics in the problem finding or the orientation phase

Figure 4 illustrates the elaboration of a creative idea. The general knowledge and thinking base combined with all aspects of convergent thinking and specific area expertise play a major role. Product-focusing, persistence, and tolerance of ambiguity help to overcome obstacles in realizing the creative product, which will be communicated to a group which is hopefully accepting.

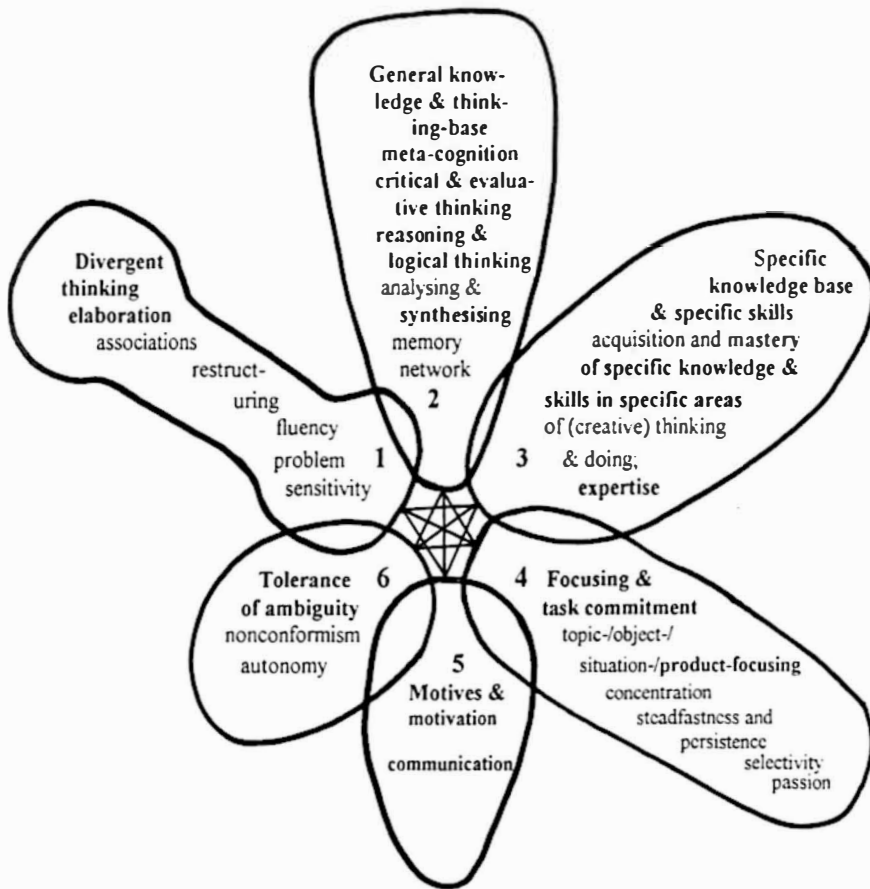


Figure 4.: The componential dynamics of the elaboration phase

Creative thinking and acting is always an activity involving the whole person; thus, the componential model illustrates the more or less conscious surface, as well as partially includes preconscious activities and personality components. The dynamic originates from tension between alert consciousness; cognitive awareness of questioning and deeper unconscious feelings, needs, motives; and inherent curiosity. The process is flexibly guided by the creator's will to bring up an innovative solution to a problem. In a wavelike interchange between various levels of conscious and sub-conscious cognitive activity, it generates a

potentially chaotic mode with inclusion of appropriate subcomponents in a problem-person-specific way to the creative product. The last section of this article will explore the connection to chaos theory more fully.

STOCK-TAKING QUESTIONS ON THE BASIS OF THE COMPONENTS MODEL OF CREATIVITY

If we consider creativity, the development of creativity and the creative process in such a complex view – as I think we should – this evidently has consequences, too, for nurturing, education, and the assessment of creativity. The question of how to nurture creative functions and abilities becomes difficult and complex. Education for creativity is not a matter of just getting better in having as many ideas as possible in the shortest possible time; creative education refers to the whole person and whole personal development. First, it must begin early in life if we really expect creativity as a key to innovation to open new doors in the future; and, second, in order to impact childhood or schooling, it must be focused upon during teacher training as well as in practice. It is a lifelong venture in learning, especially for teachers.

The proposed model can be used for assessing and evaluating educational settings in order to examine creativity-hindering or creativity-fostering conditions. Questions like the following may be applied to a school setting, a teacher training program, or in university with the intent to “take stock” of the various components:

Component 1: Divergent thinking

- Does anything happen in school or in college studies which could be named divergent thinking? Or is learning nothing more than regurgitation of accumulated knowledge which has been mediated by textbooks or teachers?
- Are questions and questioning minds allowed or wanted?
- Are problems offered which are open-ended or so-called weak- or ill-structured problems?
- Is the teacher sensitive to problems and questions of the students, be it personal issues or problems and questions generated by the students?
- Does s/he try to make students aware of open questions, be sensitive to their environment, and use all of their senses?
- Is exploration allowed and desired?
- Are processes flexible and open; are there open paths towards a solution?

- Does time and organization allow for multiple attempts of a solution?
- Are topics considered from different aspects or perspectives?
- Is there a critical openness for redefinition and reformulation of the problem perceived?
- Is a "deviant" solution or originality appreciated?

Component 2: General knowledge and thinking base

- Do learning tasks require and encourage broad and differentiated perception or do they restrict focus?
- Does learning use different sense channels as well as varying methods and ways, so that experiences and knowledge may become better anchored and accessible in memory storage?
- Is the structure of content subjects analyzed with a focus on the learning process in addition to the results?
- Are paths towards a solution examined critically and optimized?
- Are "why-questions" asked and answered, so that cause-effect relations are studied?
- Is there instruction on systematic analysis and synthesis of problems, topics, facts, situations etc.?
- Are there challenges of inductive and deductive reasoning?
- Is evaluation in a broad sense asked for and desired (e. g., evaluation of products, evaluation of teaching and learning, evaluation of content, structure, and organization by students, teachers, experts etc.)?
- Is the learning process observed and reflected with students so that meta-cognitive thinking is initiated and furthered?

Component 3: Specific knowledge base and specific skills

- Is the development of special interests encouraged? For example, through extra-curricular activities, mentoring opportunities, competitions etc.?
- Are individual interests brought or built into school work?
- Are there opportunities for students to get the experience of in-depth studies?
- Do students have the opportunity to build up a special competence profile? To focus in special areas?
- Is expertise appreciated?

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- Is there advisory service for students to support learning and working strategies, practice and research methods, etc.?

Component 4: Focusing and task commitment

- Is longer-term involvement with a special activity of interest allowed or supported (for example, research work or common projects that last a school year or semester)?
- Does the time schedule support extended involvement?
- Is task commitment rewarded?
- Are students prompted to identify and avoid distractions?
- Do students learn effective time management and scheduling skills as well as how to favorably design and organize the working environment?
- Is there a support system for critical working phases?
- Is there a chance for self-direction of one's own achievements and the competence of self-evaluation?
- Is there a self-evident expectation that tasks have to be fulfilled and brought to an end?

Component 5: Motives and motivation

- Is the natural curiosity of the young child stimulated and supported?
- Are there opportunities for both self-determined and discovery learning in order to endorse intrinsic motivation?
- Do students participate in research?
- Is there a fruitful and related rotation of theoretical, research, and practical studies?
- Are unnecessary repetitions avoided?
- Can children identify themselves with their activities? Do students identify with their studies?
- Are individual interests appreciated and supported?
- Is there sound communication between problem solvers, both within and among groups?
- Is there in-service training for teachers on how to motivate students?
- Are teachers ready for innovative transitions and applications of ideas and curricular and methodical concepts?

Component 6: Openness and tolerance of ambiguity

- Is school not only a place for traditional instruction, but also a place of living, fun, (mental) adventure, and is it open for surprise?
- A place for fantasy and imagination?
- A place for eustress (good stress) and relaxation?
- Is there a good balance between phases of focused work and musing/relaxation?
- Is school a place for open learning/teaching? Do classes get reality into their rooms; do they go into the reality of life?
- Can teachers accept an open result of their teaching?
- Are there opportunities for playful and experimental research and experiences?
- Is laughter (assuming it is not about others) seen as a natural and positive human expression? Is humor appreciated?
- Are the individuality and uniqueness of each person appreciated, or is conformist behavior valued?
- Are results always final ones? Is there tolerance for ambiguity in tensions and preliminary or open results?
- Is risk-taking in thinking allowed and rewarded?
- Are errors allowed, or just quick and correct results? Is there readiness for deviation?

Environmental settings

- In which ways do micro- and macro-environments influence the development of componential dispositions?
- In which ways do micro- and macro-environments influence the full functioning of developed components?
- Are components or sub-components furthered or hampered to the same degree?
- Are there different or even contradictory effects between micro- and macro-environments?

The following *environmental settings/conditions* (in a micro-to-macro sequence) may play more- or less-important roles in both the observation of a program and the outcomes of the learners:

- Personal and social atmosphere of situation
- Economic and socio-cultural situation of family
- Availability and use of media

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- Group (pressure)
- Role models
- Spatial and material equipment
- Class and school culture
- School and teaching organization
- Personality and qualifications of teachers and administrators
- Curricular basis and standards
- Local and regional conditions and provisions
- Social traditions
- General degree of knowledge and expertise
- Educational system(s)
- Cultural conditions and provisions
- Economic conditions
- Individual and societal freedom
- (Socio-)Political structure and situation
- Historical background

It is possible that there are discrepancies within and between different environmental levels as far as educational goals, the role of teachers, and the role and importance of creativity are concerned. For example, these differences may occur when there are conflicting opinions between parents, divergent approaches of individual teachers in contrast to school authority, or educational scholars outside the parameters of certain political ideas. Certain societal conditions may challenge and further the construct of individual "everyday-creativity," but at the same time may hinder socially-relevant innovations.

RESPONSIBLE CREATELLIGENCE®

Next I will try to embed the components model of creativity into a capacious model structure which could provide a foundation for general deliberations not only about creative education, but for curriculum planning - not only for the gifted and talented - concerning the challenges and tasks of the future, cultural evolution, and competence for the future.

The components model itself already signals an increasing integration of formerly separated concepts of intelligence and creativity as it is stressed in recent publications (Cropley &

Urban, 2000; Ambrose, Cohen & Tannenbaum, 2003). I consider intelligence and creativity in function as complementary and penetrating each other. In order to give it more efficacy as far as intelligently successful acting is concerned, namely the concrete transfer from idea to action, the six components should be supplemented and supported by a bundle of another six components. (See Figure 5.) These are:

- Foresight
- Planning
- Strategic Thinking
- Flexible Adaptation
- Constructive Shaping
- Decision Making

In connection with the creativity components, they are capacities that are necessary for successful, effective innovation. Like the other components, they are desirable personal abilities as well as educational goals and guides for curricular content. **Foresight** is used in the sense of "outlook;" it does not have the same connotations as "prediction," which would be closer to "forecasting." Based on expertise in the field as well as on broad general knowledge, foresight identifies future trends and makes future questions and demands more clear. **Planning** with **strategic thinking** takes place in regards to foreseen developments. Since foresight gives no guarantee of success, **flexible adaptation** is necessary, as is active and **constructive shaping** of ideas, trends, and actions to be realized by **decision making** and transferred into operations and products.

The combination and interchange of these components' levels I call "Createlligence@," but for a cultural evolution with positive progress we need more than just createlligence because it could be directed toward negative or destructive ends. What we need is "Responsible Createlligence@." Therefore the model needs to become supplemented by two more levels of components—one that reflects personal and social values and another that represents overarching beliefs and attitudes.

Responsible createlligent action must be based upon individually and socially oriented conditions which represent personal capacities as well as socially agreed upon values and strengths. These are:

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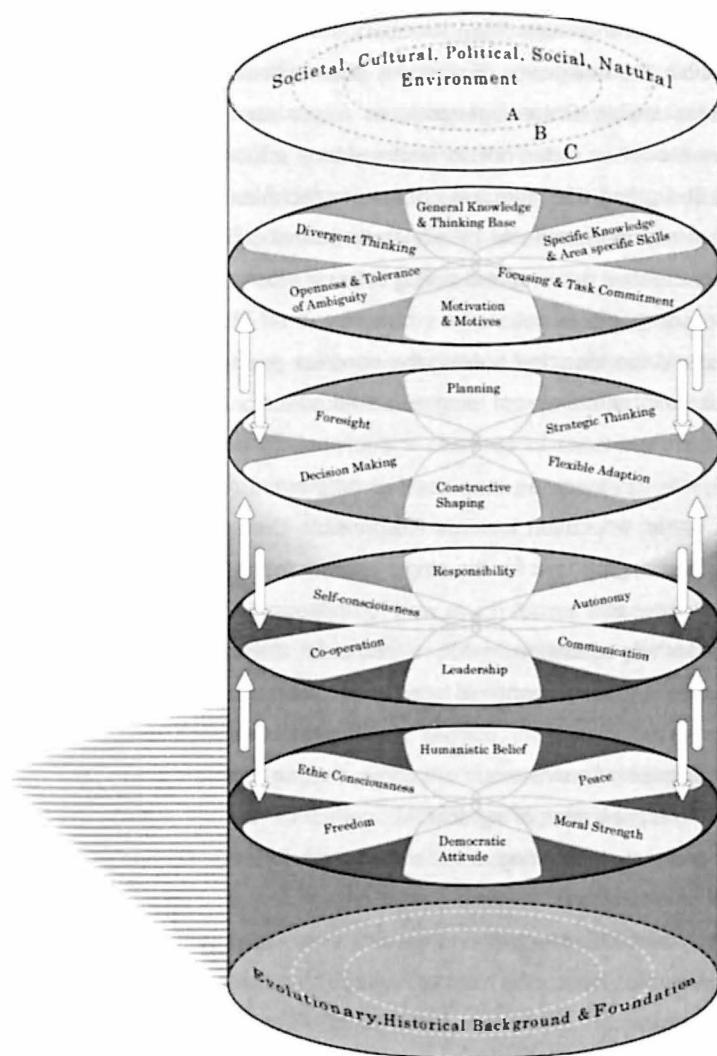
- Responsibility
- Autonomy
- Co-operation
- Self-consciousness
- Leadership
- Communication

These personal and social values derive meaning through the following basic beliefs, attitudes and values which mirror the positive outcomes and aims of evolutionary, historical and cultural development of mankind:

- Humanistic Belief
- Moral Strength
- Peace (competence)
- Democratic Attitude
- Freedom
- Ethic Awareness

This four-level interactive system is framed within and influenced by an environmental and ecological scaffold (see Figure 5) which at the same time is the result of the leveled componential system. As illustrated at the bottom of the model, the historical and (cultural) evolutionary background creates the model's foundation, since there is no future without the past. This, by the way, is not intended to be a negative, destructive or pessimistic view; rather, the past has always provided the opportunity to learn. If we identify the future, in part, as the fruit of what we have learned in the past, we have a direct connection from roots to foresight. At the top of the scaffold are the current natural, social, societal, cultural, and political environments in a macro-, meso- and micro-perspective. That means, we are children of our parents as well as children of our (ethnic) group, of our society and of mother earth; and our creative ideas and products can have an effect not only on our direct environment, but could change our group's conditions and lives and could even be of societal and historic impact. This environment is in permanent flux because humans are active and creative; the grand task and challenge is to make sure that these changes are not detrimental to the world, but lead into real positive progress that shapes a better, joyful, happy, and peaceful future for each individual, for societies, and for mankind.

Figure 5: Urban's Future Competence Model: Responsible Createlligence®



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In these accomplishments and endeavors gifted and talented individuals, as well as their educators, have special responsibilities, since they are likely to be a major force in the shaping processes. Only with these described capacities, strengths and values internalized, will individuals and groups have an adequate competence for the future at their disposal: responsible createlligence. For me it seems necessary to conceptualize creativity, or better Responsible Createlligence®, as future competence embedded in such a comprehensive model in order not to limit creative education and education in general, especially for the gifted and talented, to a mere technical training nor to ignore and neglect important personality aspects or societally-bound conditions and influences which affect responsible creative thinking and acting in favor of a "livable" future.

Family (2003) has stressed the idea that solving the complex problems of the state of our planet is not the task and challenge of single individuals alone, but that "collective creativity" is needed.

Creative education, or better, education towards Responsible Createlligence®, as a key to future competence is a challenging task for the single teacher in the individual classroom. In addition, it presents challenges to:

- kindergarten and family education,
- content, structure, management of curricula, for curriculum and textbook development,
- pedagogical methods and provisions,
- administration and organization of schools,
- vocational and professional training,
- politics, not only in education,
- business, industry and technologies,
- culture and society,
- and global societies.

We know that development and manifestation of creative potential are very much dependent on environmental conditions; education in school plays a major role here. It is astonishing though that there are few empirical studies in the literature dealing with creative education in schools.

EMPIRICAL STUDIES

Does formal education influence top creative achievements?

By means of his quantitative-biographical method Simonton (1976) has investigated the question of how much the level of formal education influences the degree of an individual's eminence; eminence meaning the extraordinary expertise and capacity a person attains in his/her life, mainly because of creative achievements. Simonton's sample consisted of the group of 301 "geniuses" that Cox (1926) had already studied in the frame of Terman's "Genetic Studies of Genius" with her historiometric method. Simonton came to the interesting conclusion that the relationship of the two variables of "eminence" and "formal education" could be described by a function in the shape of an inverted U-curve. This means formal training, such as school and university instruction, seems to increase the probability of top creative achievements up to a certain point. Too much formal education may diminish an individual's chances of reaching the top, probably because then there is too much immersion in traditional perspectives of scientific or arts-specific content.

Simonton's answer to the question of how much formal education is necessary in order to maximize the development of creative potential, reads preliminarily as a "moderate" degree, including undergraduate studies at a college or a university bachelor's degree. A doctoral degree seems to remarkably reduce the likelihood of eminent achievements compared with a master's degree, since the curve then descends in a very steep manner. Positively stated, formal education, including "higher education," is by all means an indispensable presupposition for creative top achievements.

There are several reasons why this astonishing result cannot be generalized without further empirical verification. Firstly, formal education may impact knowledge and achievement areas differently in different disciplines, for example, in the arts versus sciences. Secondly, formal education may have changed substantially over time compared with that available to subjects in Cox's study. Thirdly, formal education cannot be described in a uniform way as there are different organizations of schools, colleges and universities, as well as different curricula, methods and teachers who have varying abilities to influence the development of creativity.

Again, we are responsible to ensure that creative thinking is not destroyed, especially in our most intelligent and diligent learners, and that curiosity and the quest for the unexpected remains implanted.

Have schools changed?

For schools in the USA, Torrance and Goff (1989) indicated that in the previous 30 years there had been a positive change regarding the promotion and nurturing of creativity. In his country-wide TALENT-study, Flanagan (1976) reported remarkable gains in scores for creativity and abstract thinking. These observations are seen as results of increased and stronger consideration of creative problem solving in curricula and teaching.

This is in contradiction to statements of Alencar (1995), who found for her country, Brazil, that school books neglect creative challenges. There are no tasks asking students to search for new information, to use imagination and fantasy, to employ divergent thinking, or to apply higher level cognitive thinking processes to their learning. In the United States, she asserts that there is too much focus on repetition and reproduction of content; most of the time, energy and resources are used for tasks of lower thinking levels or repetition in reading and recitation methods.

In my country Germany, I have the impression that demands and challenges for creative thinking offered by school books are higher than their real use in concrete instructional settings. For the primary grades, the increasing implementation of more open concepts of teaching and instruction have enlarged and broadened the chances for the development of creative potential in children.

I cannot make any judgment about readers' countries. It is up to every teacher to evaluate the opportunities, as well as barriers and limitations, which are present. I hope that the Responsible Createlligence® model may give some ideas and a framework for these stock-taking endeavors.

Very often there is good will and the intention to foster creativity, but the transfer into practice does not work, or something is labeled creative education which, in fact, falls short and does not deserve that name.

Some studies have investigated the relationship between the degree of autonomy that is given by a school or teacher and the creativity of the students. According to a survey by Rejskind (1982) the majority of results support the assumption of a positive relationship between creativity and the allowance of certain autonomy in learning, which develops an education towards independence.

How do teachers view creativity?

There is no doubt that the influence of the teacher is critical for the development of creativity during school time, but there are few studies investigating how teachers themselves see creativity and its development.

In my own, unpublished study, it became evident that all teachers regarded fostering of creativity as important and necessary. The reasons given were that education for creativity

- has broad developmental effects,
- helps develop and stabilize the personality,
- supports self-reliant acting and development of independence,
- strengthens fantasy,
- is a basis for developing problem solving strategies,
- allows the personal expression of thoughts and feelings, and
- compensates for deficits from home.

There was a more critical and negative assessment though about the practical implementation in school. Main reasons for difficulties were identified as: organization of school in general, certain subjects, personnel, lack of material, role of marks/grades, restrictions of time and space, large class groups, time needed for knowledge acquisition, and lack of consensus among colleagues.

Urban (1982, 1983) studied attitudes toward educational goals for students. For teachers and pre-service teachers, the high importance of "creativity" became obvious. It was

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ranked third behind "independence" and "tolerance." It is astonishing though that related goals, like "autonomous thinking" and "cognitive flexibility" were only ranked in the middle of the 15 goals named. For parents, creativity is much less important (rank 7) and traditional virtues are ranked higher.

A study on a large number of teachers was done by Fryer (1989), with more than 1000 British teachers. I will not go into methodological details here but will mention a few general results. Terms most often assigned to a definition of creativity were: imagination, original ideas, and self-expression. Surprisingly, two thirds of the teachers saw creativity as a rare trait. This is explained by the fact that in Great Britain, creativity in schools is only considered in relation to gifted students and their education. It is encouraging that there was common agreement that creativity can be developed. Methods and factors that influence the fostering of creativity were identified as: building up confidence (99%), having a creative teacher (94%), free choice, to a certain degree, at home, (93%), engaged and supporting family (89%), free choice, to a certain degree, of learning methods in school (75%), informal teaching and learning (75%). The last is not synonymous with a permissive atmosphere, which was thought to be helpful by only 50% of respondents. Exams and grading were considered useful by only a few teachers.

There were some gender-specific and subject-specific differences between the teachers. These differences suggest that recommendations for instructional ways and methods must reflect individual personality characteristics and may not be taken like recipes.

Is the ideal pupil a creative pupil or vice versa?

Westby and Dawson (1995) communicated an interesting contradiction. On the one hand, fostering creativity does not seem controversial and teachers report that they like creative pupils. On the other hand, it is very surprising that several studies identify a picture of the ideal pupil which manifests little correlation with creativity. In their study, Westby and Dawson asked teachers to describe their favorite pupils and those they liked the least.

These two groups were compared to a prototype of the creative pupil. The results revealed a negative correlation between favorite pupils of teachers and the creative prototype; that would mean that teachers don't like creative students!

In order to explain the contradiction between these findings and teachers' reports that they liked creative children, Westby and Dawson (1995) investigated the hypothesis that the implicit concept of teachers about creativity and creative traits is different from scientific research outcomes and common concepts from laypeople. Indeed, as results showed, traits which teachers considered most typical for creative children were: "responsible," "good-natured," "logical," and "serious." Atypical responses included: "impulsive," "emotional," "makes rules as fits," "non-conformist," "tends to not recognize own limits," "tries to do something others think to be impossible." In a re-analysis of the first part of the study, the favorite pupils fit very well into the teacher-generated prototype of the creative personality. This differs significantly from the research-generated prototype which is very much agreed by laymen (students; 95% coherence). The coherence with teachers' lists of traits was only 45%.

According to the authors, these implicit and negative attitudes towards creative children may have lasting detrimental effects in a threefold manner. First, these pupils could become increasingly alienated from general class activities. Second, creative pupils might try to suppress those creative characteristics that are not beloved by the teacher. Third, though less likely, some pupils could try successfully to adapt to the teachers' wishes and ideas, while at the same time maintaining their creativity. Their concurrent endeavors toward seriousness, responsibility, and friendliness may help adaptable pupils find success in a traditional classroom. The question is, how many pupils are capable of maintaining a lasting behavior which may lead to a possible diminishment of future creativity.

Such discrepancies between attitudes, perceptions and the practical behavior of teachers underline the necessity of an adequate and responsible education and training for teachers.

In a more recent study, Aljughaiman & Mowrer-Reynolds (2005) found that teachers possessed inaccurate concepts regarding aspects of creativity and experienced conflicts with classroom behaviors demonstrated by creative students. They explain the "paradox between teachers' reported support for creativity enrichment and virtual lack of related

classroom practice ... as a result of multiple misconceptions and contributing variables" (p. 17). among them, inadequate teacher training and preparation.

What about the importance of creativity in teacher training?

In the USA, Mack (1986) in a small study and McDonough & McDonough (1987) in a national survey, have investigated the perception of the importance and implementation of creativity courses in teacher training institutions at universities and colleges. According to Mack, 85% of teacher educators and 90% of pre-service teachers believe seminars on "methods of creativity fostering in children" to be important, but only 50% of them say that such courses really take place.

McDonough & McDonough (1987) asked 1500 universities and colleges if they offer formal creativity courses, i.e. courses, which in addition to an introduction into concepts of creativity, aim to develop and foster creative abilities of the participants. 81% of about 1200 respondents reported no formal creativity courses, 19% offered courses, but only 6% were courses in the narrow sense of the survey. This is quite a low percentage.

Baloche et al. (1992) interviewed more than 100 scholars who offered creativity courses at universities and colleges. Following are the identified goals, listed according to their priority:

- Provide a climate in which students can feel safe and free to investigate their own creativity;
- Give opportunities for the students to participate in creative experiences, including those which apply different creativity techniques;
- Understand the psychological processes of creativity;
- Show concepts and techniques to students which they can use to teach more creatively or to foster the development of creativity in others;
- Improve the creativity of individual students by directly teaching creativity techniques and methods.

Teachers, including pre-service teachers, perhaps through supervision or collaboration, need processes for becoming aware of unintended, subversive learning methods, attitudes, and hidden curricula that diminish their support of creative thinking and

behaviors. Their reflection should focus on their role and its effects, as well as on the inner picture of the pupil.

DIALECTICS IN CREATIVITY

What makes an education towards creativity so difficult and complex is the fact that creativity is not just a simple input-output process; the creative process and action involves the whole person with sometimes seemingly contradictory functions, phases, features and traits.

What is obvious and substantial for the creative process and the creative person is the "interactive" or "dialectic" principle which can be found at several stages and places when "gliding through the cosmos of creativity." This is comparable to what is called "Janusian thinking" by Rothenberg (1979) or "the principle of dichotomy in the creative process" by Jeffmar (1980) or the "balance of opposites" by Vaughan (1985) and others (Urban, 1990).

There are apparent dichotomies, mentioned earlier in this article when discussing the nature of creativity, which have to be linked dialectically. They appear, for example, in

- broad, comprehensive, openness and purposeful, selective perception;
- analyzing and synthesizing modes of thinking;
- logical combining and free associative thinking;
- using both a broad general knowledge base and topic-specific knowledge;
- using "pieces of reality" and imagined elements.

Preiser (1987) stresses the need for control and influence versus the need for security and protection. A dialectic approach integrating intuition and analysis is described by Heller & Facaoaru (1987) in their contribution about self- and system-knowledge as well as by Wolters (1987) in his theory of productive thinking. Csikszentmihalyi (1997) formulated ten antithetic pairs of traits united in a creative person and connected by a dialectic relationship of tension.

These "dialectics in the creative process" (Urban, 1990) are substantial and characteristic for both the cognitive side and the personal side of the creative problem solver; hopefully, this has become clearer by means of the componential model as discussed earlier. The last

section is an attempt to approach an explanation of how these discrepancies may function within the creative process.

EXCURSION: VIEW ON THE CREATIVE PROCESS

Again and again it is the creative process and the detection of the original, innovative solution, i.e. the classic phases of incubation and then inspiration and illumination, which seem to be most mysterious and inexplicable, and therefore stimulate researchers and theorists to a very high degree. During the last decades several theoretical approaches have been used in order to understand and explain the creative process better, like the psycho-economic theory and the investment approach (Runco, 1991a, b), (Rubenson, 1991, 2003), (Sternberg & Lubart, 1991a, b); the catastrophe theory by Zeeman (1977) and Woodcock & Davis (1978); and the idealistic interpretation of the quantum theory for creativity (Goswami, 1988, 1989, 1990a, b), (McCarthy, 1990).

Chaos and complexity theory

Chaos and complexity theory, rather than those listed above, is discussed in detail because it seems to be especially fruitful. Chaos theory has generally been described by Briggs & Peat (1989, 1990), Pagels (1988) and Rasband (1990) and has been expanded as complexity theory by Kauffman (1995, 1996). Chaos theory has been applied to thinking and brain activity by Babloyantz and Destexhe (1986), Babloyantz and Salazar (1985), Freeman (1991), and Skarda & Freeman (1987); specifically to creativity by Briggs and Peat (1990), Guntern (1995), and Richards (2000/2001), who offer a linkage with Guilford's structure of intellect model, as well as Sterling (1991a, b; 2003).

Chaos and complexity theory is the result of endeavors to describe and explain phenomena in nearly all scientific areas, especially the natural sciences, not only, and insufficiently, in a mechanistic, mono-causal, and linear way as aggregates of simple components, but to reinterpret them as complex, non-linear, dynamic systems which "behave" in a chaotic way. Internal and external factors make a dynamic system change continuously whereby cause and effect are not related in a simple proportional way. Non-linear systems behave from time to time in an unpredictable manner, therefore the name "chaotic;" the tendency for such behavior is called chaotic dynamics. This underlying power is dependent upon the highly sensible starting conditions and constellations of the system. Chaotic dynamics lead to a new

self-organization, a process in which a system in a far-from-equilibrium-state makes an abrupt transition into the direction of a more elaborate and complex state. This state is relatively stable until a new "crisis" of equilibrium comes up. Every level of organization produces something fundamentally new which did not exist in the constitutive elements of the previous level (Briggs & Peat, 1989).

Chaos theory seems to be very attractive for explaining the creation of new products because it becomes possible to integrate the discrepancies mentioned above into the system's frame. Open dynamic systems unify seemingly logical contradictions, like simplicity versus complexity or constraints versus openness, in their structures. "The conjunction of discrepancies and the tension between them is part of the dynamic of the system" (Schmidt-Denter, 1992, p. 14).

There are activities on a biological-(neuro)physiological level which may become described and explained in the sense of chaos theory. Recent theory in neurophysiology and cognitive psychology describe the infinitely complex neuronal network of the brain as a non-linear, dynamic system with chaotic dynamics. Besides its theoretical challenge, this view is supported by some empirical evidence. Freeman (1991) is convinced that chaos and chaotic fluctuations are fundamental for brain functions. In keeping the system in a far-from-equilibrium-state it allows for an easy, fast, and direct access to all possible "attractors" latent in the brain; a systematic search through memory stores becomes superfluous.

Especially interesting is the similarity of this chaotic state with the low cortical arousal state, described by Martindale (1981, 1989), which likewise allows for potentially wide-open access of new to old information and for an optimal degree of remote associations. Martindale brought three former concepts in close connection to his neuro-cognitive functioning approach by including Mendelsohn's (1976) defocusing hypothesis, Mednick's (1962) associational approach, and Kris' (1952) primary and secondary process thinking approach. Chaos theory might be the theoretical approach requested by Lesgold (1989) and Martindale (1981, 1989).

It seems that an application of chaos theory, along with recent studies in neurophysiology of the brain, may enlighten a substantial part of creative activity. To use a metaphor, chaos theory can be represented as the motor and steering unit of the creative process. This is only

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one side of the dialectic pair, which may be labeled the "bottom-up-process." What is still missing is the explanation of the role of the conscious will of the creator in this defocused or chaotic process. It is he/she who has to allow such chaotic states and who has to use them. He/she is responsible for the way in which goal-directedness and purposefully striving for a creative solution affects this process.

Again, in stressing the dialectics of opposites, besides the chaotic, uncontrolled processes the second, dialectically integrated unit must be seen in the powerful will of the creator and his/her conscious striving for a new solution. The creative person "detects" new patterns of order in complex or chaotic systems; his/her sensitivity for nuances (Briggs & Peat, 1990) may be an initiating point for the organization into new structures as well as for the detection and recognition of the new solution. As long as creativity is seen more as a "bottom-up" rather than a "top-down"-process, the personal side and the responsibility of the creator remains excluded. This idea is touching Safan-Gerard's (1985) question of "chaos and control." Thus, it seems problematic to describe the creative process only in the sense of an autopoietic system, i.e. one that is self-constructing and autonomous. Even in connection with creativity, dynamics and changes cannot be considered to be directed system-immanently only, but in dialectical balance and interactive exchange and with other systems and/or within larger ecological systems.

In conclusion the creator and the society must decide on the creative product and if the responsibility for the creative product can be accepted as a valuable contribution to further humane progress of society and mankind in the sense of Responsible Createlligence®.

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THE CREATIVE PROCESS AS CREATORS PRACTICE IT: A VIEW OF CREATIVITY WITH EMPHASIS ON WHAT CREATORS REALLY DO¹

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INTRODUCTION: CREATIVITY AND PSYCHOLOGY

Creativity has been a topic of discussion and of research in the field of psychology for approximately sixty years. Psychology, the scientific study of mental operations and behavior, asks: What makes people creative? How can creativity be measured? How can creativity be enhanced? What can we learn from creative adults that will help us raise more creative children? Is creativity an aptitude? Is creativity ability? Is creativity a domain? Is creativity acquired? Is creativity innate? What happens in the mind while a person is creating? What are the conditions for creative production? What inhibits creative production? What does the social setting contribute to creativity? Is creativity a solitary or community activity? All these, and more, are questions psychologists have sought to study with regard to creativity.

The idea of domain and field is pertinent here (Feldman, Csikszentmihalyi, & Gardner, 1994). A domain is part of a field with special organization, rules of practice, and body of knowledge. Mathematics is a field, but algebra, geometry, and number theory are domains. Literature is a field, but poetry is a domain. Education is a field, but educational research is a domain. Educational psychology is a hybrid domain that crosses two fields, education and psychology. Each domain has ways of knowing and representation that are unique to it. This is done through symbol systems special to the domain, including a special vocabulary and special technologies used only within that domain. A field is transformed through individual creators pushing the boundaries of their domains. People working within the domain, and connoisseurs of the domain decide what creative products

¹ This essay is based on principles expounded upon in the author's books, *Understanding Creativity* (2004), and *"My Teeming Brain": Understanding Creative Writers* (2002); in *Understanding Those Who Create* (1992/1998), in *Talented Children and Adults* (1994, 1999/2007); in speeches given at various conferences and taught in various workshops; in articles published in the newsletters of the California Association for the Gifted and the Texas Association for the Gifted; in an entry in the *Educational Psychology Handbook* (Greenwood Press, 2008). While the principles have evolved slightly since their first iterations, with additions and refinements, the biographical examples in this particular essay are different, illustrating that the principles do have credence across the domains.

are to be valued. In order to transform a field, the creator, must have mastery of the theory, the rules, the ways of knowing of that field, and also of the domain that is being used to transform it.

Psychology has several threads of research into creativity. *Psychometricians* (Guilford, Torrance), *developmentalists* (Feldman, Gardner, Csikszentmihalyi), *social psychologists* (Simonton, Amabile), *personality psychologists* (Barron, MacKinnon, Gough, and the other researchers at the Institute of Personality Assessment and Research), *humanistic psychologists* (Rogers, Maslow, May), *cognitive psychologists* (Sternberg, Ward, Perkins), *psychoanalysts* (Freud, Jung, Panter, Rothenberg, Weisberg), and *domain psychologists* (Benbow, Bloom) have all contributed work to psychological research on creativity. Educational psychology, however, has, to its detriment, concentrated on the psychometric approach to understanding creativity, to the exclusion of the others listed above. Following are some basic summaries of the approaches.

Psychometric Approaches to Creativity

In 1950, J.P. Guilford, who was then President of the American Psychological Association, gave a speech that is often called the beginning of the modern interest in creativity as a measurable phenomenon. Guilford was the developer of a theory called The Structure of Intellect (SI), where he theorized that there are 120 kinds of measurable intelligence factored across five operations, four contents, and six products. One of the five operations was divergent intellect.

Guilford differentiated between "convergent" intellect and "divergent" intellect. "Convergent" intellect is a way of thinking that emphasized remembering what is known, being able to learn what exists, and being able to save that information in one's brain. "Divergent" intellect is a mode of cognition that emphasized the revision of what was already known, of exploring what would be known, and of building new information. People who prefer the "convergent" mode of intellect supposedly tend to do what is expected of them, while those who prefer the "divergent" mode of intellect supposedly tend to take risks and to speculate.

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Here are Guilford's original psychometric terms: (1) Fluency, (2) Novelty, (3) Flexibility (4) Synthesizing ability, (5) Analyzing ability, (6) Reorganization or redefinition of already existing ideas, (7) Degree of complexity, and (8) Evaluation. He developed ways to measure each of these, and called them *divergent production*. Divergent production has been confused with creativity. Whole industries of exercise books, curricula, assessment systems, and suggestions have been based on the psychometrically measured Guilfordian "operation" of divergent production.

Taking up Guilford's call, researchers at the University of Chicago did several studies in the 1960s. Among the most frequently cited were those by Getzels, Jackson, Wallach, and Kogan (Getzels & Csikszentmihalyi, 1976; Getzels & Jackson, 1962; Wallach, 1971; Wallach & Kogan, 1965). They were trying to quantify creativity, to make tests of divergent production. These studies were widely interpreted to mean that those with high creative potential need a certain *threshold of intelligence*, about one standard deviation above the mean, but not necessarily the highest intelligence (two or more standard deviations above the mean). This separation of creativity and intelligence has led to much confusion. However, by the early 1970s, Wallach said that the most fruitful researches would probably be into the areas of creativity within domains. Bloom, in the 1980s, was one of the first psychologists to study creativity in domains (Bloom, 1985). He and his colleagues explored the patterns in the lives of research neurologists, pianists, sculptors, mathematicians, and tennis players. Likewise, a multitude of studies done at the Study for Mathematically Precocious Youth (SMPY) by Benbow, Brody, and Stanley have exposed the paths that lead to high mathematical creativity and its cousin, scientific creativity. They have also found that literary creativity has precedents in early high SAT scores (Park, Lubinski, & Benbow, 2007).

Another educational psychologist, E.P. Torrance (1968; 1974), set out to create and validate tests that would identify creative potential in children. His Torrance Tests of Creative Thinking (TTCT) have been used in schools to select students for programs that feature creative thinking. These tests were similar to the Guilford tests of divergent production, and tested the ability to be fluent, flexible, and the like. The higher the score, the more potentially creative the child was. The logical fallacy was engaged. Scoring high

on a *divergent production* test meant that a student was called *creative*. Torrance and his colleagues continued, until his death in 2003, to publish follow-up studies and refinements on his tests. He also invented many activities and exercises meant to help people be more creative (again, a logical fallacy, for they were mostly exercises in divergent production, which may be a part of creativity, but which was taken for creativity).

Two other psychologists have influenced the education enterprise. Educational psychologist Joseph Renzulli came up with a definition of giftedness, which said that a gifted person had three characteristics: above average intelligence, creativity, and task commitment (Renzulli, 1978). Renzulli insisted that the gifted person must have "creativity," and not simply a high IQ. Renzulli and his colleagues developed a widely used creativity checklist to identify creative children (Renzulli, Smith, White, Callahan, & Hartman, 1997). Renzulli's definition is widely accepted and applied and it continues the idea that creators have above average intelligence, but it is not necessary that they have the highest intelligence. [In my own work, I make the statement that, depending on domain, the level of intelligence needed for creative adult production varies; I have constructed a model called the Piirto Pyramid of Talent Development, which calls for the minimum threshold of intelligence necessary for each domain, as well as for other aspects and environments (Piirto, 1994; 1998; 1999; 2000; 2002; 2004; 2008)].

Cognitive psychologist Howard Gardner's theory of multiple intelligences (1983) and creativity was explicated in a book (1993) illustrating that creativity is possible within each of his first seven intelligences (he has since added an eighth), and he explicated this using case examples of a famous writer (T.S. Eliot), painter (Pablo Picasso), social reformer (Gandhi), scientist (Darwin), dancer (Martha Graham), composer (Stravinsky), and psychoanalyst (Freud). Gardner's intelligences are abstractions that have to meet eight criteria, including being psychometrically measurable. These intelligences are not domains of creativity. For example, bodily kinesthetic intelligence is related to the domain of dance, but it is not dance. However, a dancer needs other types of Gardner's intelligences, for example, spatial intelligence. None of the intelligences exists in a pure form in human creators.

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Educational psychology and Creativity

Many books of exercises in fluency, flexibility, elaboration, and the like, exist. When one looks at the content of these books, one notices that they are not domain-specific, but rather seek to enhance creativity generally by applying techniques based on Guilford's cognitive fluency, flexibility, etc. Creativity enhancement programs must modify their tasks to be specific to the domain. For example, brainstorming is a common divergent production fluency technique, but it should be used to enhance creativity within the domain. People in business can brainstorm about business-related problems; people writing a comedy show can brainstorm about ideas for the next episode; people in a dance troupe can brainstorm with their bodies, ideas for new dances.

A popular technique taught in creativity enhancement classes is SCAMPER (Substitute, Combine, Alter, Modify, Put to another use, Eliminate, Reverse) (Eberle, 1996). It and other techniques are based on the Guilfordian psychometric model, and they do not go far enough in describing the creative process as practiced by real creators in the domains. Real creators in real domains, as demonstrated in their memoirs, biographies, and interviews, do not talk about fluency, flexibility, elaboration, or SCAMPER. Domain-based creativity emphasizes that the domain itself (literature, visual arts, science, mathematics, music, theater, dance, and the like) defines what products are creative and what people are creative. The creative person is creative in *something*, not just generally creative. Creativity in domains is task specific, idiosyncratic to the domain.

Successful creators in domains have similar patterns of education and familial influence, depending on the *domain* in which the creativity is practiced (Kaufman & Baer, 2004; Piirto, 1992; 1994; 1998; 1999; 2002; 2004; 2008). I have studied persons by domain of creativity rather than by general creativity aptitude, with a view to how their life paths can inform the educational process. Studies of creative people within domains of achievement have led to some of the best evidence of what behaviors and situations predict the likelihood of creative productivity in adulthood. Each domain has its own rules of accomplishment and paths to achievement. These biographical materials have also yielded information on the creative process as practiced by creators in domains. There are certain commonalities across domains, and this is what I have chosen to focus on in my

writing and teaching. I have developed a course that teaches students the creative process as creators have practiced it. The principles of these discoveries are briefly discussed below.

CREATIVITY AS CREATORS IN DOMAINS PRACTICE IT

In their creative process, creators in domains seem to demonstrate several core attitudes (Piirto, 2004; 2008). These are attitudes of (1) naiveté, of (2) self-discipline, of (3) risk-taking, and of (4) group trust if in collaboration. A fifth core attitude is that creators have a high tolerance for ambiguity. I have developed concrete exercises that illustrate these attitudes, and when I teach creativity classes, students strive to practice them throughout the time of the class, so that they can assimilate them into their lives.

Core Attitude of Naiveté

Naiveté means openness. Openness is one of the Big Five personality attributes, and some studies are finding that creators score highest in openness on such instruments as the NEO PI-R (Costa & McCrae, 1992). Naiveté as a core attitude refers to the fact that creative people pay attention to the small things, and are able to view their fields and domains by seeing the old as if it were new. Naiveté is an attitude of acceptance and curiosity about the odd and strange. Naiveté includes the ability to notice and to remark differences in details. The artists Arshile Gorky and Willem de Kooning used to walk the streets of New York at night, pointing out the reflections of the few neon lights in paper thrown on the streets, remarking on the shapes and shadows (Spender, 1999). Igor Stravinsky (1990) called it "the gift of observation." He said, "The true creator may be recognized by his ability always to find about him, in the commonest and humblest thing, items worthy of note" (p. 11).

Core Attitude of Self-Discipline

When one studies the lives of creators, one often finds they have created many, many works, even though they are only known for one, two, or a few (Simonton, 1995). This self-discipline leads to the great productivity of creators. Van Gogh (1937) wrote to Theo, "I am daily working on drawing figures. I shall make a hundred of them before I paint them" (p. 45). Choreographer Agnes de Mille, noted that "all artists—indeed all great

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careerists—submit themselves, as well as their friends, to lifelong, relentless discipline, largely self-imposed and never for any reason relinquished.” (de Mille, 1991, p. 124). Most well known creators are known for only a few of their voluminous numbers of creative works, produced through great self-discipline over a period of years. Expertise research says that one cannot contribute anything new to a domain unless one has been working in the domain for at least ten years (Ericsson, 1996).

Core Attitude of Risk-Taking

Risk-taking in creative people has been noticed since creativity began to be studied at the Institute of Personality Assessment and Research in the 1950s (Barron, 1968; Mackinnon, 1978). Risk-taking enables one to try new things. While introverted and shy creators may eschew physical risk-taking, professional risk-taking in creators may be manifested in trying new forms, styles, or subjects. The kind of courage they have is the courage to stumble, fail, and, after rejection, to try again. May (1975) called it creative courage, which is finding the new, providing the vanguard's warning of what is about to happen in the culture, showing in image and symbol, through their imaginations, what is possible. The creative artists and scientists threaten what is. That is why, in repressive societies, those creators who speak out in image and in symbol are jailed or exiled. This requires courage in the presence of censure and rejection.

Core Attitude of Tolerance for Ambiguity

The term *tolerance for ambiguity* comes from the research done by the IPAR (Institute for Personality Assessment and Research) group in the 1950s, especially that of the late Frank Barron. Likewise, psychiatrist Albert Rothenberg (1979), in his research, found that creators used a Janusian process in creating, referring to the two-faced god Janus, who was able to face in opposite directions. In fact, few research findings are cut and dried—true without any doubt. The researcher must set out the study's method, participants, and findings according to a prescribed way, and then must take into account the arguments that would be opposing. Tolerance for ambiguity is necessary in order to not focus on one solution too soon. It is related to the “I” of Incubation, which is described later in this chapter.

Core Attitude of Group Trust

In collaborative creativity, which is the kind that is usually encouraged in business and manufacturing, theater, dance, athletics, and music, the group doing the creating has to trust each other. Leaders make sure that the people in the group feel comfortable taking risks, are open and naïve, have acceptance for differing views and for incomplete answers, and that they do the work with regularity and discipline. From the raucous team in a closed room writing the jokes for a talk show or situation comedy, to the football team studying the game mistakes after losing the big one, members of a group must be confident enough and have enough trust in the process and in the group to be able to move on, to take criticism, and to do more. Working in a group creates interdependency, as each member has a role to play, and a job to do, and they cannot be egotistical or selfish, or the whole project will suffer. One person cannot dominate; everyone must play and experience together. Trust is necessary among the members of the group. Each team or ensemble has its own culture. One must look for a "good fit." Sawyer (2007) called it "group genius," and he chronicled studies where the creative community had more juice than the individual. However, even when the creator creates alone, he/she is really not alone, for what I have called the "Sun of Community and Culture" is operative; the work is judged by peers and connoisseurs of the domain; the creator socializes with and learns from other creators in the domain. No creator is isolated from the domain's rules, laws, and members.

The American Abstract Artists group in the 1930s gave each other problems at their meetings, as they experienced rivalry as to who would be the best teacher of abstract art, and who was the best abstract artist:

Gorky suggested that they all go off and produce a painting restricted to the colors black and red. At the next meeting they would decide whose was the best. Or else they could produce a communal painting, choosing from among themselves who was the best draftsman, who the best colorist, who the best in textures, and so forth. They would produce a masterpiece in which each would set his hand to a different task, and they would exhibit the result, naturally, unsigned. Or—craziest idea of all—they should go home to their studios and come back next week with an object made from a light bulb and a piece of string.

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That would surely determine who was best qualified to teach abstraction.
(Spender, 1999, p. 159)

The Seven I's

Here are some further aspects of the creative process as really practiced by real creators in the arts, sciences, and business (Piirto, 2004). I have called them the Seven I's: several types of (1) Inspiration, (2) Imagery, (3) Imagination, (4) Intuition, (5) Insight, (6) Incubation, and (7) Improvisation. I have developed exercises for each of these so that my students can themselves teach them in their classes and practice them in their lives.

Inspiration

All creators talk about inspiration. Literally, inspiration is a taking in of breath. In terms of creativity, inspiration provides the motivation to create. Inspiration is a breathing or infusion into the mind or soul of an exaltation. Creators in domains discuss several types of inspiration.

The Visitation of the Muse: The Inspiration of Love

Being inspired by regard for another has been called the visitation of the muse. Muse originally meant "reminder." Today, when we speak of the muse, we speak of the inspiration that is related to desire. The Muses were inspirations for creators in various domains. Each muse had her own province in music, literature, art, and science. Calliope was the muse of epic poetry while lyric poetry had Clio (remember the painting of Clio, *The Allegory of Painting* by Vermeer?). Euterpe inspired tragedy and Thalia inspired comedy. Melpomene inspired choral singing. Terspichore inspired dance. Polyhymnia inspired poetry celebrating the divine. Erato was the muse of love poetry.

The person experiencing desire is inspired by that feeling, and seeks to impress the object of desire, by making something or showing something. The whole industry of greetings related to February 14 is an example of the pervasive inspiration of love. One need only study art history to see the myriads of works dedicated to desire. The paintings of Gerome (the Pygmalion and Galatea series), Tura, Poussin, of Chagall (*Apparition: Self Portrait with Muse*), of Picasso's many models and several wives, of Dali—the list is infinite.

Listening to the popular radio songs also illustrates the power of desire and erotic love to inspire songwriters. The desire inspires longing and the longing leads to the creative work.

Inspiration by the muse also has a mystical aspect. The people who are inspired often say that they are possessed. This idea is an ancient one, with a long literature that is seldom referred to by psychologists working on the creative process. The Platonic view is that the work comes from elsewhere than the intellect. The surrealists elaborated on this idea to theorize that the inspiration is from the unconscious, the unknown within (Maritain, 1953; Plato, *Dialogues*). Thus, "visitation" of the Muse. Creators often speak as if what they write was sent from something within but afar. Inspirations "come." Some creators feel as if they are go-betweens, mediums. Some mysterious force impels them, works through their hands, wiggles through them, shoots from them. This type of inspiration also applies in theater. For example, some actors speak of being receptacles for their characters' souls, of being possessed. Today actors talk about "getting into" character. Athletes talk of putting on their "game face." They often have pre-performance rituals for entering the state of mind necessary. This might include putting on their makeup, meditating, or being alone for a period of time.

The Inspiration of Nature

The inspiration of the natural world, from mountains, plains, animals, landscapes, insects, snakes, and all things natural pervades much creative work, and creators are frank in their gratitude to nature. One of the most telling differences between scientists and mathematicians is that scientists are inspired by the opportunity to solve mysteries of nature, while mathematicians seek to solve theorems and abstract problems. Mathematics is a tool for scientists, a tool which helps them understand nature. The inspiration of nature was particularly pervasive in the works of the nineteenth century British and American transcendentalists and romantics, writers such as Wordsworth, Coleridge, Byron, Emerson, Dickinson, and Thoreau. They decried the industrial revolution and sought to return to simpler times when nature was pre-eminent rather than the conquering of nature.

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Inspiration through Substances

The use of substances—alcohol, drugs, herbs—has a long and respectable reputation within the literature on the creative process in writers, artists, musicians, and others. Mescaline Aldous Huxley wrote about the influence of mescaline; Samuel Taylor Coleridge about the influence of opium; Jack Kerouac about amphetamines; Edgar Allen Poe about absinthe; the seventh century Chinese Zen poet Li Po about wine; Fyodor Dostoevsky about whiskey; Allen Ginsberg about LSD; Michael McClure about mushrooms—peyote— and also about heroin and cocaine.

The list of substances used could go on and on. The altered mental state brought about by substances has been thought to enhance creativity—to a certain extent. The partaker must have enough wits about self to descend into the abyss to reap what is learned there, but to also be able to return and put it aside. The danger of turning from creative messenger to addicted body is great, and many creators have succumbed, especially to the siren song of alcohol.

After taking drugs, Allen Ginsberg had a vision of William Blake. "I had the impression of the entire universe as poetry filled with light and intelligence and communication and signals. Kind of like the top of my head coming off, letting in the rest of the universe connected to my own brain" (Miles, 1989, p. 79). Ginsberg viewed the initial vision as the most important, most genuine experience he ever had, and he spent many years trying to recapture it through drugs, and, after he gave up drugs, through meditation.

Inspiration by Others' Creativity, Especially Works of Art and Music

Many creators are inspired by others' creativity, especially by works of art and music produced by other artists. Art inspires. Music also inspires. Friendships between artists of different genres abound in biographical literature.

The Canadian artists called The Group of Seven made history by creating an art that was truly Canadian, of the Canadian landscapes. They were Tom Thomson, Arthur Lismer, F. H. Varley, A. Y. Jackson, Arthur Lismer, and Lawren Harris. Harris was one of the leaders. He had studied in Berlin early in the 20th century, and then returned to Toronto, Ontario,

where his family was prominent. Having been away, his return enabled him to re-view the Canadian landscape with naiveté, with new eyes and a sense of openness. A traveling exhibit of Scandinavian art firmed up his resolve to paint Canada (Harris, 1964). Seeing how the Scandinavian artists painted the north was transformational. He was also influenced by the postimpressionists being exhibited at Stieglitz's Gallery 291 in New York. An art movement called synchromism (Chilvers, 1990), which was founded by American artists McDonald-Wright and Russell, whereby colors were treated like sounds (similar to synaesthesia), also influenced Harris' work. The onset of World War I and his brother's death led Harris to a nervous breakdown and early discharge from the army. While recovering he traveled to the Algoma region north of Sault Ste. Marie, Ontario, where he experienced a spiritual reawakening that led him to paint local landscapes, unique to Canada and the north (Murray, 2003).

Several other Canadian artists were feeling the same way. A letter to Harris by A. Y. Jackson, an artist from Montreal, denounced the Canadian art exhibits that featured paintings by Canadians of Europe: "Ye gods, imagine Monet pottering around Jamaica, Pissaro hard at it in Japan, Renoir out in the Rockies, Sisley in Sicily—and the French Impressionists would not have existed" (in Harris, 1964, p. 56). Harris (1964) wrote that creators cannot create without first knowing where they come from, that "a love of the land" was essential to their creativity: "From the cities, towns, and countrysides to the far reaches of the northern ice-fields, it was an ever clearer and deeply moving experience of oneness with the spirit of the whole land." They influenced each other as they painted across Canada, and they admitted one woman to their number, Emily Carr of British Columbia, who also had a passion for painting and writing about western Canada (Carr, 1971; Crean, 2001; Walker, 1990). Carr had felt isolated and persecuted. Harris and Carr met at an exhibition in Toronto in 1927 and they began to correspond. Over the years, they became great friends. Harris called Carr "one of us," and though she was very frank and independent, he encouraged her in her solitary attempts to paint what she saw in the West.

In physics, the creation of the Manhattan Project put scientist Neils Bohr, Joseph Carter, Enrico Fermi, Richard Feynman, Hans Bethe, and J. Robert Oppenheimer, among others,

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together in a remote location in New Mexico, where they inspired each other to perfect the atomic bomb that was later dropped on Hiroshima and Nagasaki. Bird and Sherwin (2005) biographers of Oppenheimer, said, "Wartime compelled some mild-mannered men to contemplate what was once unthinkable" (p. 222).

Inspiration from Dreams

Dreams have inspired many creative works. Dreams often have personal meanings that solve problems that the dreamers are incubating. Dreams can also present images that entice creators to make their works. The Surrealists encouraged creators to use their dreams as inspiration. Freudian psychology had a great influence on the Surrealists. Both Freud and Jung wrote extensively on the significance of dreams. Freud believed that dreams are wish fulfillment and Jung asserted that dreams capture the collective unconscious—the primitive archetypes lost to us in our waking state. The Indian-born and wholly naturally talented mathematical genius, Ramanujan said that his genius came in dreams from a goddess named Namagiri (Hoffman, 1998). Sculptor David Smith said that dream images were "exchange" images; that is, even though he didn't "consciously use either signs or symbols . . . they've arrived in my mind as exchange images," that is "dream images, subconscious images, after-images" (Kuh, 1990 p. 219).

The Inspiration of Novel Surroundings: Travel

Travel makes it easy to maintain openness and naiveté. Being in a new setting, seeing new places, makes everyone burn with the fire of apprehending what is new, novel. Often, the traveler awakens to deep insight about his or her own reality, his or her own life. Oftentimes, the subject of the creative work is the creator's homeland. Picasso and Miró traveled to Paris and painted Spain. The contemporary humorous essays of American David Sedaris about the mores and foibles of his French countryside neighbors have produced some of the most creative writing of the past decade.

Imagery

Imagery is also part of the creative process. The term *imagery* is psychological, the ability to mentally represent imagined or previously perceived objects accurately and vividly. Imagery is an attribute of imagination. Imagery is not only visual, but also auditory, tactile,

olfactory, and gustatory. Three types of studies of creativity and imagery have been done; (1) biographical and anecdotal studies of creators telling about their personal imagery and how it inspired them; (2) studies which compared people's ability to create imagery and their scores on certain tests of creative potential; and (3) studies about creative imagery and creative productivity.

Guided imagery training goes on in schools and in business and industry. This training attempts to help people learn to manipulate images in their minds. Imagery is essentially spatial, and as such, concrete evidence of the mind's power to construct. Coaches teach athletes to image their performances before they do them; they visualize the ski run, the football play, or the course for the marathon. Studies have shown that athletes who use imagery perform better.

Imagination

Imagination in the creative process refers to a mental faculty whereby one can create concepts or representations of objects not immediately present or seen. The philosopher Aristotle, considered works of the imagination such as poetry, drama, and fiction, more true than history because the artist could fabricate truth from the elements of history rather than exhaustively tell all the facts. The artist is able to tell the truth on a deep level, being able to see the patterns, and the overarching themes, using the imagination. Working from the imagination is both stimulating and entertaining. Visual imagination is not the only kind that creators use. Composers imagine works in their "mind's ear," and mechanics imagine problems in their physical/spatial array. Imaginative thought is also called daydreaming, and may be called night dreaming, as well as being called fantasy.

Inventor Nicoli Tesla had, from his childhood, an imagination that could create images of inventions, without the help of drawings (Cheney, 1981). Tesla wrote in a 1919 essay about his inventions,

When I get an idea I start at once building it up in my imagination. I change the construction, make improvements and operate the device in my mind. It is absolutely immaterial to me whether I run my turbine in my thought or test it in my shop. I even note if it is out of balance. (in Cheney, p. 12)

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Intuition

Intuition is having a hunch, "just knowing," having a gut feeling. Creative people trust and prefer to use their intuition. Everyone has intuition, but many don't trust intuition. Intuition is ambiguous, nebulous. Biographical information, testing, historical and archival research, and experimental studies have shown that creative people use intuition in doing their work. For example, skipping steps in mathematics is an indicator that intuition is being used. The great Hungarian-born mathematician, Paul Erdős, frustrated even fellow mathematicians with his tendency to skip steps and then expect that people understand him (Hoffman, 1998). The intuitive also prefer not to read technical manuals, but jump straight to the tasks, using trial and error to solve the problems.

Intuition is not verifiable by scientific or empirical means. Intuition seems to be a personality preference on the Myers Briggs Type Indicator (MBTI) for artists, scientists, and writers, entrepreneurs, mathematicians, actors, inventors, and composers (Myers & McCaulley, 1985). The place of intuition in creating has long been honored. Jung (1971) thought that intuition was a message from the collective unconscious of the archetypes of the deep human experience. He defined intuition as "neither sense nor perception . . . a content presents itself whole and complete, without our being able to explain or discover how this content came into existence" (p. 453). Jung wrote that introverted intuition makes mystical dreamers, creative artists, or cranks: "If he is an artist, he reveals strange, far-off things in his art, shimmering in all colours, at once portentous and banal, beautiful and grotesque, sublime and whimsical. If not an artist, he is frequently a misunderstood genius . . ." (p. 401).

The importance of intuitive perception of the world, of a non-concrete but still tangible apprehension of underlying truth informs the creator's view of life.

Insight

Insight in the creative process is the ability to see and understand clearly the inner nature of things, especially by intuition. Several types of insight have been researched by cognitive psychologists. The studies have shown that insight has the appearance of

suddenness, requires preparatory hard work, relies on reconceptualization, involves old and new information, and applies to ill-structured problems.

Insight involves restructuring the problem so that it can be seen in a different way. Many notable creative works have originated from insights. When insight happens, we just have to say "Aha! So that's how it works. So that's the answer. So that's what it's all about. So that's what the pattern is." The most famous image of insight is that of Archimedes rising from the bathtub, saying "Aha!" and running down the street, after he discovered the principle of the displacement of water. The "Aha!" comes after knowing the field really well, and after incubation.

Physicist J. Robert Oppenheimer was known as an idea man. He would have an insight and publish a small paper, just ahead of the scientists who would develop the elegant solutions to the problems. He published about black holes before anyone, but then moved on to another insight and another, having no patience for developing the problem further (Bird and Sherwin, 2005).

Incubation

Incubation as a part of the creative process occurs when the mind is at rest. The body is at rest. The creator has gone on to something else. The problem is percolating silently through the mind and body. But somewhere, inside, down there below the surface, the dormant problem is arising. A solution is sifting. Incubation was one of the steps in Wallas' four-part description of problem solving (1926). Psychologists speak of an "incubation effect," which may be caused by conscious work on the problem, and afterward, overwhelming fatigue, where what doesn't work has been forgotten. While resting, the mind works on putting unlike things together. All the ideas may be assimilated through this time period. Then awareness comes and the answer is there. Experiments have shown that if people are given a problem and told to solve it right away, they solve it less successfully than if they are given the problem and told to go away and think about it. People often incubate while driving, sleeping, exercising, even showering. Kary Mullis, a Nobel-prize winner, came up with PCR (Polymerase chain reaction) while driving (Mullis, 1997).

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Improvisation

The importance of improvisation in the creative process cannot be understated. To play your musical instrument without music in front of you is frightening to some who have learned to trust in their reading ability and not in their intuition and musical memory. The idea of "play" in improvisation is a necessity. Think of children making up the game as they go along, lost in imagination, forming teams and sides in a fluid all-day motion generated by the discourse of the moment.

Improvisation seems to be a key part of the creative process. Although improvisation is a key skill in the domains of music and theater, other creators also use it. Visual artist Edward Hopper relied on improvisation as he painted: "More of me comes out when I improvise" (Kuh, 1990, p. 131). The poet James Merrill used automatic writing as an improvisational technique. William Butler Yeats used automatic writing as inspiration for work. Improvisation underlies all creativity, but in music and theater, the performer cannot revise the work as writers or painters can. Improvisation in theater and music is almost always collaborative, and requires instant communication between people in the improvisation group. Improvisation reveals inner truth. Dance choreographers rely almost universally on improvisation in order to begin to make a dance. Martha Graham would begin to dance, outlining the pattern she wanted, and her dancers would imitate her. Then she would work on fixing the gestures so that the dancers would be moving together.

OTHER ASPECTS OF THE CREATIVE PROCESS

In studies, biographies, and memoirs, several other aspects of the creative process seem apparent (Piirto, 2002; 2004): (1) the need for solitude; (2) creativity rituals; (3) meditation; and (4) creativity as the process of a life.

The Need for Solitude

The core of the creative process in domains such as creative writing, music composition, mathematics, and visual arts, is solitude. Solitude is not loneliness, but a fertile state where the creator can think and work freely. Poet Amy Clampitt said, "I think the happiest times in my childhood were spent in solitude—reading . . . Socially, I was a misfit"

(Hosmer, 1993, p. 80). Today, those who seek solitude are often looked at askance, for people are supposed to be in society, and to crave companionship. The internet abounds with dating sites, comradeship sites, chat rooms, gaming sites, where for a minimal sum, people can connect with each other. People who don't have human relationships, who are not married, or in love, or in a family, are viewed as somehow sick. In creative people's lives, their work is often the most important thing. The Ipod may be playing, for the need for broadcast noise seems to be omnipresent, but the work is often done while in solitude. Creative people may be solitary, but that doesn't make them neurotic or unhappy. There is something transcendental about such experiences. When the person is suddenly alone and able to concentrate, she is able to decipher what may have seemed too puzzling, and to unite ideas that may have seemed too different. Not being able to achieve solitude frustrates many creative people. Loneliness often ensues after the solitude; the creator seeks society.

Solitude induces reverie. The state between sleeping and waking is relaxed, allowing images and ideas to come so that attention can be paid. What is important is a state of passivity and receptivity. Some people achieve this while cooking, cleaning, or sewing alone, walking in the woods, or during a long, boring drive. It is here, in solitude that, as Buber (1985), said, "We listen to our inmost selves—and do not know which sea we hear murmuring" (p. 11).

Creativity Rituals

Ritual is repetitive practice. Ritual involves special places, special procedures, and special repetitive acts during or before creating. Rituals are sometimes personal. The artist Arshile Gorky would, every week, scrub the parquet floor of his studio with lye, keep his hallway dark so he could see who was knocking without being observed. His biographer said, "His working day was governed by ritual. A certain state of dreamy exhaustion was necessary, he used to say, to create freely and spontaneously" (Spender, 1999, p. 83).

Ritual serves to remove the creator from the outer and propel her to the inner. Some people walk or exercise before creating, and they often get their best ideas while doing it. Some people go for a long drive. Some arrange their rooms or desks a certain way.

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Some like to work at a certain time of day. The approach to the work is ritualistic, and the work itself could be called, perhaps, the ceremony.

Meditation

Meditation is a part of the creative process in all domains. Whether or not it is formal, tied to a religion like Buddhism, or informal, tied to a need for inner quiet, creators meditate. Visual artist Morris Graves said of painting, "The act is a meditation in itself" (Kuh, 1990, p. 116). A 1991 anthology of poetry contained works by contemporary poets who practice Buddhism (Johnson & Paulenich, 1991). In his introduction, poet Gary Snyder stated:

In this world of onrushing events the act of meditation—even just a "one-breath" meditation—straightening the back, clearing the mind for a moment—is a refreshing island in the stream . . . it is a simple and plain activity. Attention; deliberate stillness and silence . . . the quieted mind has many paths, most of them tedious and ordinary. Then, right in the midst of meditation, totally unexpected images or feelings may suddenly erupt, and there is a way into a vivid transparency. (p. 1)

The vehicles for discovering one's self are breathing, sitting still, and waiting. Often the creative work follows the meditation, and the meditation is a preparatory ritual for the creative work. Others have embraced the contemplative life of the Christian monastery, for example, the poets Kathleen Norris and Daniel Berrigan.

In fact, many writers, such as poet Gerald Stern, consider writing itself a form of meditation: "For whatever else it is, writing for me is also meditation." Stern, as other writers, views poetry as akin to religion: "my poetry is a kind of religion for me. It's a way of seeking redemption for myself, but just on the page. It is, finally, a way of understanding things so that they can be reconciled, explained, justified, redeemed" (Moyers, 1995, p. 383). The idea that the practice of writing itself is meditation is not a new one. The connection of writing to the spiritual resounds since the time of the Greeks.

Descriptions of the creative process among writers often take on language that is spiritual, mystical. Take this comment by poet Dick Allen: "A sense of mysticism, a complete

dissolving into wonder and beauty has been with me through my life. I remember always feeling nearly ecstatic in childhood. I had known I would be a writer since the third grade" (*Contemporary Authors Autobiography series, 11, (CAA)* p. 4).

Wonder. Beauty. Dissolving. Disintegrating. Ecstasy. What "unscientific" words these are! What language used by those who treasure precision in language. In more prosaic terms, the experimental research psychologists seeking to justify creativity studies as "science," have categorized such responses and examples as the "mystical" approach, an approach that has hampered the study of creativity (Sternberg & Lubart, 1999). However, such examples exist and pervade the discussions of creativity in other domains, and perhaps experimental psychologists would do well to pay a little more attention to these accounts rather than to dismiss them as "mystical" and therefore not scientific.

Creativity as the Process of a Life

In the past few years, the creative process has gained cachet. Best-selling books have detailed how creativity is The Way. Richard Florida (2003) described a "creative class." His book on economic development has sparked interest among foundations, which seek to fund the efforts of cities and regions to retain their youth in local enclaves, which would provide the excitement, and vitality that would attract development. The Four T's necessary for economic development in such cities are Technology, Talent, Tolerance, and Territory. The Knight Foundation Creative Communities Initiative (KFCCI) in particular, has awarded grants to such cities as Charlotte, NC, Tampa, FL, and Duluth, MN. These communities are seeking to attract young professionals in the health, business, and finance industries, as well as those who are core to creativity, the innovators in science, engineering, the arts and design, including visual artists, musicians, and writers. This is the creative class, which is predicted to provide the most growth in jobs and salaries for the future.

Others have viewed the creative process not merely as an altered consciousness, an immense concentration, an attainment of solitude, but as more. That is, we can look at the process of a creative person's life. The creative process is viewed these days as the province of every human being, and not just of the Einsteins, O'Keeffes, or Darwins of the

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world, or of those who make creative products such as music, or poems, or mathematical formulas. People's lives are their creative products.

In enhancing people's creativity, new age teachers sometimes use methods such as visualization, imagery, metaphorization, chanting, and the formulation of affirmations. People hold sacred objects such as quartz crystals and sit beneath pyramids. They go on vision quests and bang drums, chant in tones and dance like dervishes, seeking inner peace and the guidance for living a creative life. Creativity is intertwined in the feeling of awe, of closeness to the essential that results.

Other, less exotic methods such as writing in journals (Cameron, 1990; Goldberg, 1986; Progoff, 1980), drawing (Edwards, 1979), crooning and engaging with the Mozart effect (Campbell, 1997), or dancing (Roth, 1992) are also employed in teaching people to be more creative, and thus to enhance the process of their lives. Again, the educational psychology of divergent production is notably absent.

An outgrowth of the humanistic psychology movement and of the work of such humanistic psychologists as Rogers (1976), Maslow (1968), and Perls (Amendt-Lyon, 2001), this quest for inner meaning has even made it to public television stations, where fund-raising is led by former Detroit high school guidance counselor, Wayne Dyer (2006), who recently talked about inspiration. Public television has also hosted the Bill Moyers *Creativity* series (1982) and the series called *The Creative Spirit* (Goleman, Kaufman, & Ray, 1992), both of which spoke to creativity as the process of a life. The Open Center and the Omega Institute in New York offer creativity-focused sessions such as intensive journal workshops, dream, singing, empowerment, improvisational theater, and dance workshops. Almost all the teachers of these workshops have written books that tell us how to enhance our creativity. All have in common the probing of the inner psyche, making one's life a work of art, and the attainment of inner peace through auto-therapy done by making creative products.

Thus, the postpositivist educational psychological idea that divergent production, the teaching and testing of Guilford's cognitive operations is creativity, has given way to the

new educational psychology of creativity, a consideration and practice of what real creators in domains do when they are being creative.

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TEACHING FOR ARTISTIC BEHAVIOR: FOSTERING CREATIVE POSSIBILITY²

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"Art used to be a ten, now it's a thousand!"

(Tucker, age ten, after his first year of choice-based art)

As an art teacher, it is almost impossible to go wrong; kids love art. But as the above quote illustrates, there is art, and then there is ART. I have been working with gifted, creative children for over a decade, but I did not understand that I was largely missing the point until a six-year-old student lamented, "Every day I come to school with great ideas in my head and no time in school to paint them." Providing capable, imaginative learners the opportunity to engage in the real work of artists demands a move away from what is known and accepted as "school art," (Efland, 1976, p. 37) toward more meaningful, authentic art education. *Authentic* art education requires an overhaul of the status quo, away from prescribed art, toward a curriculum that addresses the unique abilities and promise of creative children to become creative producers; to become artists, in the very truest sense of the word. By developing practices which are learner-directed and studio based, educators provide a setting to support and nurture creativity. This concept is embodied in classrooms adopting the philosophy of Teaching for Artistic Behavior.

TEACHING FOR ARTISTIC BEHAVIOR

Choice-based art, or Teaching for Artistic Behavior, (sometimes also referred to as TAB or authentic art education) is an approach for teaching art which originated in the classroom by practicing art teachers. TAB is not a packaged curriculum, explicit teaching model or prescribed program but instead varies in appearance and application depending on a kaleidoscope of factors. Teaching for Artistic Behavior, far from the next new thing, has a thirty-year history in art education. It was developed in public school classrooms in the

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Boston area and is still evolving as it is applied to diverse settings by innovative educators. This practice continues to be adopted in public and private school classrooms, kindergarten through high school, nationwide. TAB began when like-minded practicing art teachers Pauline Joseph, Kathleen Douglas (both now retired), Diane Jaquith (currently teaching elementary art) and John Crowe (then a high school art teacher and now an Art Education professor at Massachusetts College of Art and Design), became interested and involved in what has come to be referred to as "choice-based art." These four teachers formed an informal partnership to explore, support and promote the learner-driven, studio-based approach to art education which they shared. The concept has grown, through a grassroots movement, across the United States and is making an appearance in classrooms around the world (Teaching for Artistic Behavior webpage, 2009).

Although not originally developed for gifted programs, choice-based art and the ideas promoted through Teaching for Artistic Behavior pedagogy are especially relevant and rich for gifted children, providing qualitatively different learning opportunities and requisite breadth and depth prescribed in best practices in gifted education. Supporting the wide-ranging needs of diverse groups of children is a hallmark for choice-based art. Additionally, this concept, because of its focus on individual needs, strengths and interests, is promising for at-risk, unconventional or marginalized students. TAB has the potential to inform educational practice and promote creativity outside of art education and supports those skills identified as essential for twenty-first century learners including: thinking creatively, working creatively with others, implementing innovations, communicating clearly, collaborating, effective reasoning, using systems thinking, making judgments and decisions, and solving problems (Partnership for 21st Century Learning website, 2009).

Fostering creativity and nurturing artistic behaviors are central in choice-based art programs founded on the TAB concept. While all important components exemplifying a complete art education program are present, including topics in art history, art criticism and aesthetics, and domain-specific knowledge, understandings, and skills; a choice-based program is primarily child-centered, according to the definition forwarded by Clark & Zimmerman in *Teaching Talented Art Students* (2004):

In a *child-centered program*, expressed interests and needs of students determine content and structure for the curriculum: individual problem solving and self expression are the dominant methods. The major role of the teacher is to act as facilitator for each student's need for expression and as a mentor for each student's instruction. In an art program, emphasis would be upon helping each student express his or her personal needs and develop his or her capacities and abilities in art. (p 101)

The old practice of call-response teaching, where the teacher initiates projects and problems, is flipped in a choice-based classroom. Now it is the students who call and the teacher who responds. In a choice-based art studio, students actively "construct knowledge and meaning in the process of making art" (Douglas, Crowe, Jaquith & Branigan, 2002). Discovery learning and emergent curriculum are integral, informing student and teacher goal setting and lesson planning. Learning in this way is powerful and appreciated. Students in choice-based classes routinely report that they are grateful for the opportunity to work autonomously in pursuit of their passions. For some, the art studio is the only place in school where they may set their own agenda and decide their own course of study. Students are thankful for a place and space to chase their ideas and follow their muse.

I cannot tell you how many times a day, students beg me to stay in the art room after their class is over because they "hate" to go to the next class... "We want to stay in the art room because we like to learn in here..."etc., etc., – they are so involved and focused in their creative processes that we as teachers have facilitated. At what point does all of this anecdotal evidence become scientific data that is the foundation for profound, eye popping empirical research? (Gaw, TAB electronic mailing list, 2007)

In the choice-studio, the creative process, once monopolized by the teacher, is owned by the students. It is important for an artist of any age to be afforded time to think and plan, to incubate ideas, to try and to struggle. Instead of training students with the skills and techniques they may one day require, if they choose to become artists, learners in a choice-based setting benefit from participating in the real work of artists right now. It is not

unusual for educators to justify much of what they teach as requisite preparation for the future, but Dewey (1938) advised over sixty years ago that this is poor practice: "The ideal of using the present to get ready for the future contradicts itself" (p. 49). Best practice demands, then and now, that learning be meaningful and relevant in the present, not just as preparation for the future (Brooks & Brooks, 1993). By examining what artists do, a program emerges featuring personal relevancy and student choice, attributes essential for meaningful learning and creative production (Chase, & Doan, 1996, Robinson, Shore & Enersen, 2007, Tomlinson, Kaplan, Renzulli, Purcell, Leppien & Burns, 2002). Instead of "teaching art" or "teaching about art," the art educator strives to teach "for artistic behavior" (Douglas & Jaquith, 2009, p.2). Responding to the question, "What do artists do?" is an appropriate point of entry.

WHAT DO ARTISTS DO?

"If you want to be an artist, act like an artist."

(Robert Burkhardt, Director of Eagle Rock School, June 2008)

By considering what it is that artists do, students can begin to explore their own creative process and to develop their own inner artist. Keeping the student-artist central to the program, creativity is supported and authentic art-making experiences result. Capitalizing on just-in-time learning is central to this concept, which celebrates and facilitates first-hand inquiry. The affinity for innovation and invention so often observed in gifted and creative learners is supported in programs which optimize discovery learning (Robinson, Shore & Enersen, 2007). A recent study by researchers affiliated with Harvard-based Project Zero validates the current practice of choice-based art educators. In *Studio Thinking* (2006), Hetland, Winner, Veenema & Sheridan described eight studio habits of mind (develop craft, engage and persist, envision, express, observe, reflect, stretch and explore, and understand art world), which are taught for and cultivated in studio-based art programs. The authors argue that these habits, once considered to be the "hidden curriculum," may in truth be the "real curriculum" (p.4). Of course these creative habits are not all specific to the field of visual art and may be developed within and across all disciplines.

INSTRUCTIONAL STRATEGIES IN A CHOICE-BASED ART PROGRAM

How can educators address the diverse needs of students with different abilities, widespread interests, various skill levels, idiosyncratic needs and ranging readiness? Although there is no recipe for a dynamic, comprehensive, learner-centered art program, there are a number of teaching and learning strategies that have proven to be successful for supporting creativity and artistic endeavor. The assortment of strategies which follow may appear on the surface to be familiar, conventional and present in any ordinary classroom. The difference lies in the uniquely responsive nature of a choice-based art program to address learning and teaching opportunities as they appear. The TAB concept capitalizes on emergent curriculum, permitting students and teachers to impact learning in unprecedented ways. Instruction provided in this manner can be thought of as a subtle dance in which the child leads.

Classroom as Silent Lesson Plan

"I like how I can see and get everything I need."

(Student visiting a choice-based classroom for the first time)

Setting up the environment so that kids learn is the most important thing that teachers can do, but so often that is not what is recognized as the goal of teaching. We work hard to reverse the misconception that children must be taught in order to learn. (Chase, & Doan, 1996, p. 35-36)

The classroom is organized with distinct centers or studios, each appointed with the materials and tools needed to make art, and it functions as a silent lesson plan. Here students also find related references and resources (books, prints, examples of student work, etc.) which reinforce learning in specific areas. "Menus" (signs, lists, diagrams) are created and displayed, describing procedures for set-up, clean-up, and other essential information for accessing the center. Students sometimes add to the menus, leaving information behind that they deem important for others, crafting signs or instructions informed by their specific knowledge or discoveries. In recognition of the varied preferences students have for accessing information, these centers also include written

information, pictographs, interesting objects and real art, all of which help to convey necessary information to students with various learning predispositions.

In many classroom arrangements, most centers are available for students all year. After a center is introduced and students have been instructed in its use, students are free to access the center at their discretion. Students appreciate the opportunity to access needed supplies and information readily and independently. This system also frees the teacher from routine set-up and clean-up chores that might detract from more meaningful support for student learning. Students who use and maintain learning centers are afforded a sense of ownership and control of their classroom, which functions as a communal art studio. Students are gradually given responsibility for correct use and maintenance of these centers so that a clear understanding of expectations can be developed. If the centers become unmanageable, the natural consequence of restricting their use is an option for teachers seeking to re-enforce appropriate care of tools and materials. It is not uncommon for students to pitch in to clean up a center, even if they did not work there, in order to assure that it will remain open for future use. "The setting itself teaches and is subject to the teacher's design choices. Teaching is not restricted to the direct instruction between teacher and student" (Eisner, 2002, p. 57). This is particularly true of a choice-based art studio.

Teacher-Delivered Whole Group Mini-Lesson

Most classes begin with a brief (five minute) lesson, delivered by the teacher. This may be a demonstration of a new material or technique or an introduction of a featured artist or style. Topics often emerge from students' current activity or the resulting artwork. Flexible and responsive, this is an opportunity for the teacher to reply in a timely manner to observed student need or direction, capitalizing on the heightened opportunity presented by recent inquiry or muse.

The lesson addresses topics of interest or import for the whole class but is intentionally kept short to preserve maximum studio work time. Material presented in this format is selected carefully and honed to include only the most essential elements of the given topic. What is the least information students need to know in order to begin? A short

hands-on demonstration is often sufficient when introducing a new art material or tool. Asking an essential question (such as: "What do artists do?" or "Where do artists get ideas?") provokes discussion and raises awareness about relevant topics of general interest. Sometimes an interesting object is displayed and considered. Often, original art (student or adult), or art reproductions are viewed and discussed. Video clips, online resources or slide shows can be implemented to expose students to various works of art. The idea is to keep this presentation brief, focused and of general interest (Douglas & Jaquith, 2009).

Topics presented to the whole class help to assure that standards and benchmarks are addressed for all students. While most students will move to their individual work following the whole group lesson, some choose to stay and work with the new concept, material or technique. All students know that they have the option to further explore this new material at any point during the year. Due in part to the reliable set-up of the studio with its predictable media centers, students in a choice-studio routinely think about what they would like to do ahead of time and arrive ready to work. It is not unusual for students to come to class prepared with sketches, diagrams, objects and other needed resources. A seven-year-old boy, accustomed to coming to class prepared, remarked, "I'm usually thinking, 'I'm going to do *that* next art class.' I feel better doing choice art."

Teacher-Delivered Small Group Lesson

Sometimes clusters of students have similar needs or interests or work together on a single project, dividing and sharing the work. Other times, like-minded individuals engage in parallel work. Specific lessons can be targeted to facilitate small interest groups sharing a common goal.

Teachers in differentiated classes use time flexibly, call upon a range of instructional strategies, and become partners with their students to see that both what is learned and the learning environment are shaped to the learner. They do not force-fit learners into a standard mold. You might say these teachers are students of their students. They are diagnosticians, prescribing the best possible instruction for their students. These teachers also are

artists who use the tools of their craft to address students' needs.
(Tomlinson, 2005, p.2)

Observant teachers, as students of their students, are poised to fit appropriate lessons to the developing needs of learners and provide more detailed, timely or complex demonstrations, as needed, delivering potent, targeted learning opportunities. Discussion and critique groups are facilitated and encouraged, addressing topics not relevant to the class as a whole, but pertinent to special interest groups that emerge. For the artist-teacher in a choice-based studio, every moment is a teachable-moment.

Teacher-Delivered Individual Lesson

We learn more enthusiastically those things that connect to our interests, and we learn more efficiently if we have suitable background of experience. (Tomlinson, 2005, p. 49)

When students are self-sufficient and working autonomously as artists in the studio, the artist-teacher is freed up to work one-on-one with individual students. These lessons address specific skills and techniques desired by an individual student, but not necessarily germane to others. Mentoring and shared-inquiry (between teacher and student) to meet individual need or interest, are routine in this arrangement.

By noting and illustrating ties between student art and the art of others—throughout time and across cultures—the teacher addresses art history and aesthetics in a way that is uniquely relevant and personally meaningful to individual students. If the teacher notices, for instance, a student using big blocks of color in a large-scale painting, then a reproduction of color-field artist Mark Rothko could be shared. A student happily inventing splatter painting could be introduced to another kid, named Jackson Pollock, who also enjoyed making art this way. Constructing this sort of personal connection between student-generated art and the larger world of art carries greater import when specifically targeted to students' own work. Personal relevancy is often lacking in the delivery of art history lessons in more traditional programs. Students in a choice-based program learn about art from an artist's perspective, in fact, from their own perspective as artists.

Peer Teaching and Learning

Teachers in healthy classrooms continually invite their students to be a part of the teaching. They do this in a number of ways. First, these teachers make it possible for students to teach one another.
(Tomlinson, 2005, p. 33)

The art studio provides countless opportunities for students to attain specific, sought after skills. In a student-centered classroom, peer teaching frequently occurs spontaneously with little or no adult intervention. Children recognize expertise in their peers. Friends like to share experiences with each other. It is fruitful to create an environment where students can move around and seek out suitable locations to do their work. Freedom of movement can in itself facilitate student-to-student support and cooperation, and help to cultivate peer teaching. Authentic collaboration of this kind benefits students with varied abilities but similar interests; in essence, differentiating activities by student interest without regard to ability. Students choosing to work alongside other students with similar interests often elevate each other's skills or extend ideas, much as athletes train better with others.

By encouraging peer teaching, the teacher affirms mastery and positively impacts students' self-image. Encouragement of this kind should not be confused with the undesirable practice of teachers using more able students to teach less able peers. Consensual, spontaneous peer teaching is an authentic way to provide opportunity for leadership within the classroom. Students who are strong in visual art are not always achievers in the regular classroom and may be overlooked for leadership roles. Being good at something that is genuinely valued by others, and being in a position to teach what one knows are reinforcing activities for students, perhaps especially for those with alternative learning styles.

Student "Experts" Teaching Whole Group

In a classroom set up as a studio, artists naturally learn from one another. The teacher may, however, encourage more formal peer teaching and learning, positively highlighting

the skills a particular student has acquired. When a student's knowledge or ability can benefit the whole group, an opportunity may be offered for the student to deliver the more formal, preliminary group lesson. This practice acknowledges individual accomplishment and expertise and creates a respectful, equal opportunity environment for learning. Students can offer singular insight and advice about processes they have invented or mastered.

Sometimes students work in series, creating a body of related work. Other times a prolific student amasses a large volume of creative products. The alert art teacher is poised to act upon these opportunities. A student's collection may be viewed and discussed during an Artist's Sharing Time, or through a slide presentation made up of the student's work over time. It is interesting to preserve accumulated work from year to year in an electronic portfolio, in order to examine growth over an extended period of time. A powerful statement is made by a compilation of work viewed in this way. The student feels validated and accomplished, seeing how far the work has come and the audience (fellow students, parents, administrators) benefits from noting that persistence and practice, over time, have measurable results.

Teacher as Artist

Too many good teachers, alas – and this includes many professors – seem never to travel far from the books they have studied, but that is only where the instruments of learning are polished and got ready for personal adventure. The peculiar mark of the creative teacher – as different from all other businesses of man – is not his learning alone but his ability to transform others by the contagion of his own peculiar creative powers. (Mearns, 1929, p. 267)

The art teacher in a student-centered program is the school's own artist-in-residence (Szekely, 2006). "When the teacher shares art experiences with children, he or she becomes a model of the artist" (Szekely, 1988, p. 167). As artist-teacher, there are possibilities daily to model artistic behavior beyond the familiar how-to formula. Students may be surprised to discover that adult artists too make mistakes, search for ideas, practice to improve and exhibit their finished work.

When I am surrounded by a group of children, I must ask myself what these children need to learn. Is it about what I make as an artist, or is it about my artistic working and thinking habits. I certainly do not want others to tell me what to make, nor can they tell me what to think. However, I might be open to how an artist approaches the things that go into being an artist. (Bartel, TAB electronic mailing list, 2008)

Art teachers typically do a great deal of demonstrating for students. While this is a time-honored practice and can be used to advantage, it is disconcerting for teachers when students produce exact copies of the demonstrated object. This natural, but bothersome, imitative response can discourage future demonstrations. In a learner-directed, studio environment, there is singular opportunity instead for the teacher to genuinely and wholeheartedly participate as an artist within a community of artists. Imitation does not proliferate in a culture developed to nurture each individual's creative course. As students pursue their own path, the artist-teacher is able to model the behavior of an artist-at-work, without undue influence.

Guest Experts

It is not reasonable to expect that the art teacher possesses all the collective skills and know-how inherent to the field. Teachers must cultivate a network of artists and experts to enrich and extend student learning. These invited guests can connect to student interests or spark new possibilities when they speak about their work and expertise.

Guest experts may be found within the school community, possibly even other teachers or parents. Pre-service teachers, enrolled in their teaching practicum, are showcased and asked to bring in their own work to share artist to artist. Teachers also benefit from attending local open studio nights and other community art events to begin to collect a repertoire of artists within their area. It is important for art teachers to give time to their own art as well. Perhaps they have a mentor of their own who could be shared with students. It is enlightening for students to find that their teacher is also a student.

Artists of all ages need to talk about their art with other artists. Every community has a wealth of artists who could be invited to share their art and their stories with student artists. This sort of exchange is both inspirational and nourishing for all involved, and is part of a comprehensive program.

Field Trips

Artists often find inspiration in the work of other artists. Wider exposure to the art of others adds further to the possibilities for student inquiry. Trips to art museums, art events and galleries heightens awareness and exposes students to the greater world of art outside of their school and home environments. Guided tours and demonstrations provide exposure to adult experts, offering learners variety in perspective. In these settings, the teacher looks for opportunities to stand eye to eye with students, viewing artwork together for the very first time. Discoveries experienced together provoke interesting dialog about art experienced on equal terms.

Individual Inquiry

Watching young artists at work – their energy sparkling with the intensity of a summer lightening storm – is an exercise in humility. You soon realize that your real purpose as a teacher may simply be as a catalyst, offering a few provocative ideas here, clearing the way past a few technical hurdles there, and eventually just pointing the way to the far horizon. (Orland, 2006, p.61)

In some art programs, students are introduced to a wide variety of processes, materials and styles but have little opportunity for sustained practice to fully develop their facility. While similar exposure to a variety of options exists in choice-based classrooms, provisions are made for students to have art experiences that develop at their own pace, over time. Instead of receiving a cursory exposure to media, students go deep into areas of interest and gain true proficiency with their selected medium or favored technique. Students with a passion for clay, for example, can return to this medium time and again, gaining knowledge and skill about the intricacies and nature of clay. It is possible, under these circumstances, for an able, impassioned kindergartner to delve into clay with the

intensity of a master potter, developing skills far beyond the mundane pinch-pot. Very young children in a choice-studio are observed crafting large bowls using the slab technique, or attaching handles to cups covered in clay-spaghetti squeezed from a garlic press. By removing conventional ceilings, gifted children are capable of extraordinary flare and confidence. Mastery is a real possibility in a choice-based setting. Due in part to the predictable structure of the classroom environment, students often pick up in the fall where they left off before summer vacation, and continue a line of work or train of artistic thought from one year to the next. This sort of artistic growth and continuity is not often observed in traditional school art programs, yet these examples describe authentic artistic behaviors, typical of how professional artists work. The studio environment unleashes possibilities for children to grow at their own rate, regardless of expectations imposed by age, grade or convention.

Some students, on the other hand, may never be inclined to work with certain media. It is not unusual for gifted students to be sensory defensive when touching clay, papier-mâché or other messy art materials. While accommodations are offered (latex gloves, for instance,) no pressure is exerted which could alienate students. Even Picasso had someone else make the pots that he painted! Although students are not coerced to manipulate a material they find abhorrent, they still receive the basic introduction and demonstration during the whole group lesson, benefit from observing classmates manipulate the material, and later may participate in critiques and sharing about the process and resulting products, thereby amassing considerable information and insight into these materials.

Through individual exploration, practice, research and presentation, students may act as their own guide and their own teacher. Additionally, when the learners choose the subject matter for their art, the diverse student body is represented organically and earnestly. Authentic expression of cultural diversity originating with the students helps to avoid the risks of engaging in cultural tourism and trivializing (or misrepresenting) non-dominant cultures.

Class Discussion and Reflection

At the end of class, students have an opportunity to talk briefly about their work during an Artist's Sharing Time. This is a time to highlight the day's work and to celebrate invention, innovation, craftsmanship, and developing ideas. Students practice being respectful of the art of others and learn to talk meaningfully about their own art. Students are guided in providing thoughtful feedback for classmates and in ways to discuss art, over and beyond a simple show and tell format. Where did the idea come from? How did you surmount difficulty? Is the piece done? Did it turn out the way you expected? Since time is short, the teacher may have a system in which only three or four students comment on their work in a given class. Alternatively, everyone may be invited to "pair-share" simultaneously with a partner. As students talk about their art, there is opportunity for the teacher to frame student work using pertinent art vocabulary and to reinforce artistic behaviors. Although there are usually only a few minutes at the end of class reserved for this activity, it is highly valued by all involved. Artist's Sharing Time is a vital assessment tool and an opportunity to evaluate the day's work while looking toward a broader context. This is a time to ask "what if?" and "what next?" (Douglas, TAB electronic newsletter, 2007)

Another assessment tool, central to many studio programs, is the written artist's statement. Students in many choice-based art classrooms routinely practice writing statements to accompany work that will be displayed. In some cases, teachers may require a statement for each finished work, while others request a brief reflection in the students' sketchbook or art journal each day. This activity reinforces the habit of reflecting and communicating about ideas, purposes and vision and is standard practice in galleries and museums as a means for the artist to state their purpose or reveal otherwise unknown information about their work.

DISCUSSION

Choice

*I never liked art because at my old school
the teacher even told us what to paint, what to put in your picture."*

(Kate, seven-year-old student at Rocky Mountain School for the Gifted and Creative,
2004)

*"At my old school there was an explanation and then we had to do what [the art teacher]
told us to do. There was only a little time to do what we wanted."* (Ilana, seven-year-old girl
at Rocky Mountain School for the Gifted and Creative, 2004)

When students are asked what they like best about their choice-based art program, they invariably refer to being able to make their own art; to decide what materials to use, to pursue their own ideas and interests, to make their own plans and their own decisions. The most frequent response from students who are new to this opportunity is gratitude.

While all students have or can develop a broad range of interests, some who have domain-specific talents develop strong or even passionate interests and sustain these interests for extended periods of time....these students may prefer to pursue learning in more inductive or investigative ways..." (Tomlinson, et al., 2002, p.6)

Personal Relevance and Praxis

I think we have more freedom and it's more enjoyable. This year people can say 'that's a good idea' when you walk out with your artwork, because they know it's a unique, one-of-a-kind, once-in-the-universe idea that has never been made before. It makes you feel kind of proud because they know that it's not someone else's idea. (Naomi, age 10, after her first year of choice-based art)

One of the greatest joys of teaching in a learner-centered studio classroom occurs when a student produces something that would never, ever have been assigned as an art project by the teacher. In these cases, the student's vision is so free of convention that it defies the appearance of typical "school art" (Efland, 1976, p. 37). In fact, re-learning what

authentic child-created art looks like is a challenge for many adults who have come to view teacher-directed art as the norm. Efland (1976) explains that child art differs from school art in that the former is a natural activity children engage in without adult intervention and evaluation to satisfy themselves. He contrasted this with school art, which requires children to use specific tools, techniques and media in specific ways to produce dictated works.

This art has seldom been allowed into our highly controlled art classes. It is the spontaneous *play art* of young people....It has little of the polished lushness of art classroom art, but once one learns to look at tattered little drawings done in ballpoint on lined paper, a whole world of excitement unfolds. From play art we can learn why people make art in the first place and why some keep on making it while others stop. (Wilson, 1974, p. 3)

Efland (1976) concluded that "there is little resemblance or relation between what professional artists do and what children are asked to do" (p. 39). In a choice-based art setting, the conventions of the school art style are set aside. The resulting authentic art of children may challenge adults to re-think the underlying purpose of art education. It may be found, upon further study, that the relative discomfort experienced by art teachers and other adult stakeholders when confronted with authentic children's art in a school setting—art which is developmentally appropriate but not manipulated by an adult aesthetic—constitutes the greatest reason some find they shy away from this practice.

Likewise, subject matter in the choice-based studio is idiosyncratic. It is not dictated by the teacher or by the season or by integrated lessons coordinated with the classroom teacher. For inspiration learners are asked to consider what they think about and what they dream about; what they cannot help but pursue. Students understand that following specific directions to produce a work of art, even a beautiful, sophisticated one, compromises their own artistic integrity. In a choice-studio, learners are empowered to make art about their lives and interests, in the manner and style they choose, with the tools and materials they love. "Indeed, it is interest – the drive to keep reading, to invent, to explain, to express one's self, to make meaning – that is the heart of any field of study" (Kohn, 1999, p.128).

So in the art room, rockets sprout, inventions grow and mixed-media assumes a whole new dimension. Learners may indulge emerging ideas and their passions and find new infatuation with the many varied materials, methods and tools of the artist. Some artists start with an idea and search for the right materials and techniques to bring the idea to life. Other artists discover materials or processes they love, and ideas develop as a result. Sometimes, it is through experimentation, discovery or even accident that ideas emerge. In a choice-based art studio, it is the privilege of the learner to explore these elements in their own way and in their own time and in the end to generate their own understanding and working definition of art. Children are empowered and supported as they struggle to develop their own unique, creative process. When the teacher supplies topics, assigns media and directs the project, creative opportunity and artistic growth are compromised. Students understand and appreciate the opportunity to genuinely affect the direction and nature of their own creative path, as evidenced by this high school student participating in a student-driven, studio art class:

Ever since I was a little kid I have enjoyed art. But when I was little I was able to do the types of art that I enjoyed doing. So when I got to school and had to follow a set curriculum I began to lose some of my flare and interest in art. (Andrews, 2001, p. 34)

Creativity and autonomy in a choice-based art studio is supported in a manner rarely experienced by students in a school setting. The lines between visual art and every other possible discipline are blurred. Working at the "construction center" in the art room, a six-year-old student collaborates with two older peers (one seven, the other eight), searching for a way to employ a battery and some wire to construct an "electricity capturer." This team passionately discusses the problems and possibilities while employing their collective knowledge of electricity. The six-year-old breaks away long enough to approach the art teacher with an observation: "We are doing experiments like scientists, but we are being creative like artists. I guess that's okay." This, and the hundreds of innovative endeavors in which students engage, find support in a choice-based art room. There are days that it is unclear if this is art, but that it is creative is never in question.

Where else in a typical day at school can children engage in this kind of spontaneous, absorbing, just-in-time learning of their own design? Is it any wonder that students rejoice in this almost intoxicating delight? Learning of this kind is profound and exhilarating. This may be particularly true for gifted and creative students, who often have a heightened thirst for knowledge and novelty, a love of complexity, and the drive to take action on their own behalf to forward their own learning.

Time Reconsidered

Having time to honor the creative ideas and aspirations of students' thinking and planning is imperative. Most theories of creativity include the description of an incubation period (Davis, 1999). In the tightly scheduled program of a typical school day, little, if any, time is afforded to incubation. Reaching a state of creative flow requires time (Csikszentmihayl, 1996). When students know that their creative experience is compromised by the inadequate allotment of time, they may justifiably feel that there is little use in their becoming emotionally or physically invested. It is unreasonable to expect creativity to flourish in these conditions.

How can students reach a productive state of flow in the few minutes afforded them, after the transition into class, after the introduction and motivational set, after the exemplar is displayed and discussed, after the materials are handed out and *before* it is time to line up? In a typical art, music, science or math class, this leaves approximately twenty minutes for creative flow to occur. Students often recognize that during a short class period, it might not be worthwhile to fully engage in creative endeavors. Knowing that an experience is almost over before it begins compromises both commitment and artistic possibility.

Just as grade-skipping may be the simplest, most effective course toward accommodating the needs of many academically gifted learners (Colangelo, Assouline & Gross, 2004), block scheduling might be the most ready answer for unlocking potential in creative students. Creative production takes time. It also takes inspiration, incubation, motivation, and in the words often attributed to Thomas Edison; a good imagination and a pile of junk. It is clear that a typical school schedule is not set up to support meaningful creative work.

Supporting Creativity

"Becoming a teacher who helps students to search rather than follow is challenging and in many ways, frightening" (Brooks & Brooks, 1993, p.102).

How many times a day, in how many classrooms, do children hear the following statement or others of similar sentiment: "Class, at the end of the unit you will create a 'visual' to demonstrate your learning. This can be *anything you want – be creative!*" The teacher, by chirping "be creative," is unwittingly compromising the very outcome desired. Likewise, the practice of holding up example after example of exemplary products, thought to encourage excellence, may serve instead to throttle truly original, creative possibilities.

While "image flooding" (showing many examples) may be inspirational, it can also be intimidating and very suggestive. It can be argued that "image flooding" creates slicker work, but less creative thinking skills. It may win the scholastic awards, but it teaches us to go through life in other people's skins. We never learn the ecstasy of having original ideas. (Bartel, 2008a)

By offering lists of possible creative responses and previous out-of-the-box solutions, teachers unintentionally rob students of the opportunity to consider the options without prejudice. A veteran artist-educator reflects:

I have learned that it helps to stop showing products and start with a process. I have found that I have to stop showing products and start asking idea questions. I have found that I have to stop showing products and start sharing my secrets of how I have learned to see, practice, sketch ideas, experiment, discover, fail and try another approach, and so on. (Bartel, 2008b)

The following list, found on the Colorado Department of Education web page, is a valuable resource for teachers who seek to nurture creativity in their classrooms. (Colorado Department of Education, 2008)

Frequently Asked Questions

What can I do to enhance creativity in my classroom?

- Provide a private place for creative work to be done.
- Provide materials (e.g. musical instruments, sketch books, scientific instruments).
- Encourage self-expression and display the students' creative work.
- Create a creative atmosphere with good music, books, and pictures.
- Do your own creative work.
- Value the unusual, the divergent, and the creative work of others.
- Provide special classes.
- Emphasize that talent is only a small part of creative production and that discipline and practice are important.
- Get creativity training.
- Reduce anxiety in classroom, especially that created by the teachers.
- Nurture individuation and differences within the class.
- Provide situations that present incompleteness and openness.
- Allow and encourage lots of questions.
- Emphasize self-initiated exploring, observing, questioning, feeling, classifying, recording, translating, inferring, testing inferences, and communication.
- Help the student learn by mistakes.
- Reinforce creativity, but do not place too high a reward on it, as this makes creative behavior "high stakes" and increases anxiety.
- Give opportunities to investigate ideas of successful, eminent people who used the creative process.

What are some blocks to creativity?

- Expectation of judging and evaluating.
- Constantly being watched or observed while working on a creative project.
- Creating a competitive atmosphere.
- Conforming to others' expectations.
- Anxiety.
- Perfectionism.

- Reward systems.
- Authoritarianism.
- External locus of control.
- Trying to be creative.
- Requiring the one right answer.

The above suggestions for enhancing creativity compare favorably to the teaching and learning strategies practiced in choice-based art programs. The identified *blocks to creativity* are important to consider also, and are provided as a caution.

Unexpected Outcomes of Implementing Choice-Based Art with Gifted Students

It is not surprising that creativity flourishes in a learner-centric environment populated by gifted children. There are, however, some enlightening and unplanned-for outcomes which may be observed after implementing a TAB philosophy in a school art program.

Benefit for at-risk students

Art teachers are well aware of the impact arts education holds for at-risk students. Some students report that arts programming is the only thing that makes attending school tolerable (Andrews, 2005). This reality may be especially true for those highly creative, gifted or unorthodox students for whom difficulty conforming to sometimes rigid school norms can become unbearable.

The characteristics of some children that put them at risk in a normal school setting may be the very same ones that permit them to thrive in the less restrictive setting characteristic of studio-based art programs. A very creative, curious, driven learner, who may also have learning differences or twice-exceptionalities, asked daily to conform to artificially imposed time-frames and inflexible methodologies, may become so frustrated that attendance in school can be in question. It may also be natural for inquisitive, spontaneous, impulsive, highly imaginative students to move erratically between a wide range of topics. These students show such intense focus and become so engrossed in learning that stopping to transition becomes a form of institutional torture. Their ideas and questions flow much more quickly, and in many more directions, than their teacher or

standard curricula are able to address. Because of more exaggerated and sometimes tenacious needs, as a result of both unusual abilities and disabilities, these students do not possess the facility to conform to school demands and expectations.

It is instructive to observe that marginalized students who have left school due to serious emotional or behavioral issues are able to return to the art studio and function successfully, often showing no signs of the problems which led them to leave in the first place. For some students, choice-based art has been the bridge that facilitates re-entry into their regular classroom and the resumption of a normal school day. Further study in this area is needed to discern the factors implicated in these observed successes.

Choice-Based Art as Agent of Change

Due in part to the unexpected but undeniable success that learner-centered art education promises for students, stakeholders (parents, teachers, administrators) are interested and involved in examining choice-based learning for possible application in other disciplines and learning settings. Obviously, the arts cannot lay sole claim to creativity. Parents, sometimes particularly those of gifted students with learning differences and those of twice-exceptional students, are especially grateful for a program which celebrates creativity and provides a good fit for their uniquely challenged (and uniquely able) children. These parents "get it" and want to know how the essence of the choice-based art philosophy can be implemented in other disciplines and subject areas. Students themselves also lobby enthusiastically for the freedom to pursue their interests, style and ideas in other domains, as they do in the art studio.

The enthusiasm expressed by these vital populations becomes a catalyst for school reform. Administrators, aware of the success and popularity of choice-based art in their schools, are willing to support other innovations and to consider alternative programming. An independent school for the gifted in Boulder, Colorado has begun the process of adopting a studio model school-wide, based in part on the observable success of its choice-based art program over the past five years. The desire is to create a model in which the majority of the school day features authentic learning by capitalizing upon emergent curriculum (that which is informed by the observed interest of the students). By

focusing on learning that is "just in time rather than just in case" (Partnership for 21st Century Skills, 2009a, p. 5) student interest and relevance are assured and deeper learning is facilitated.

The concept of Teaching for Artistic Behavior (TAB) is currently practiced in schools nationwide, mostly in public elementary school classrooms, but also in middle school and sometimes in high school classes. The idea is spreading, in part, through a lively virtual (online) community of educators as well as a result of the efforts of a handful of teachers who speak about their experiences with this pedagogy at professional conferences. Many art educators, learning about choice-based art and TAB, report that they felt that something was missing from their teaching, and just couldn't identify it until they learned about TAB. For many, TAB is what finally feels right.

The grassroots movement that originated with a handful of innovative, creative teachers seeking authentic, meaningful programming in art education may show the way for breakthrough programming system wide. Gifted, creative learners stand to benefit immeasurably, due in part to their extraordinary exceptionalities and uncommon potential.

SUMMARY

Creative endeavor is the building block for innovation – and innovation is what advances society from one generation to the next; it always has. The Teaching for Artistic Behavior concept may serve as a model for infusing creativity into our schools in service to this universal goal. These practices align with national content standards, agree with best practices in gifted education, and may inform innovative practice in other disciplines. "A major premise underlying gifted education is that special programs or learning opportunities should contribute to the development of persons who may become the inventors, leaders, and creative producers of the next generation" (Tomlinson, et al., 2002 p. 8). The significance this practice holds for gifted education cannot be overlooked, nor can the fact that choice-based art is successful for children of all abilities and in a myriad of settings.

Learning is the most powerful and relevant when choice and personal relevancy are provided and when students are encouraged to approach a subject as first hand inquirers (Chase & Doan, 1996, Westburg & Archambault, 1997, Renzulli, Leppien and Hays, 2000, Tomlinson, et al., 2002). "A theory of curriculum with the goal of developing high potential should place a premium on the pursuit of authentic knowledge" (Tomlinson, et al., 2002, p. 8). In a choice-based art classroom, students do the authentic work of artists every day. In addition, in a choice-based setting, it is accepted that all learners of all ages can also assume the role of teacher and that teachers are also learners. "Education at all levels ought to be about providing environments and opportunities designed to maximize individual capacity" (Tomlinson, et al., 2002, p. 3). In a choice-based classroom, the environment is carefully designed and appointed to facilitate the diverse needs and potential of all learners, while nurturing creativity.

The teaching and learning strategies outlined here combine to form a multi-faceted, elegant solution for student learning. Individuality, flexibility, personal relevancy, independence and accountability are valued and supported within this framework. But most importantly, this concept provides fertile ground for creativity to blossom. Can the enthusiasm, productivity and love of learning occurring in this art studio inform teaching practices in other domains? "Show me the kind of class where kids groan when the dismissal bell rings, and I'll show you a place where kids are doing marvelously sophisticated thinking" (Kohn, 1999, p. 128). Choice-based art classrooms subscribing to the philosophy of Teaching for Artistic Behavior are just that type of place and may show the way to the future, not just for art education, but toward a new studio-based model approach in education.

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EXPLORING THE FOUR-C MODEL OF CREATIVITY: IMPLICATIONS FOR GIFTEDNESS

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EXPLORING THE FOUR-C MODEL OF CREATIVITY: IMPLICATIONS FOR GIFTEDNESS

When most people think of creatively gifted individuals, images of eminent trend setters and innovative pioneers typically come to mind (e.g., Thomas Edison, Emily Dickinson, John Coltrane, or Rachel Carson). However -- thanks to the work of creativity researchers and gifted educators -- many people also recognize that creativity can occur in the everyday settings of schools and classrooms. In fact, definitions of giftedness (going back at least as far as the Marland Report, 1972) often include some aspect of creativity in their definition, and gifted education programs are responsible for the majority of creativity assessment that occurs in the U.S. (Kaufman, Plucker, & Baer, 2008). Still, many conceptions of creativity remain limited and unnecessarily constrain the role creativity can play in the development and delivery of gifted education curricula.

In this chapter we discuss how most conceptions of creativity are limited in that they tend to take one of two directions: everyday creativity (also called "little-c"), which can be found in nearly all people, and eminent creativity (also called "Big-C"), which is reserved for the great. We then discuss our Four-C Model of Creativity (Kaufman & Beghetto, 2009a), which expands this dichotomy. Specifically, we add the idea of "mini-c," creativity inherent in the learning process (Beghetto & Kaufman, 2007), and "Pro-c", the developmental and effortful progression beyond little-c that represents professional-level expertise in any creative area. We close with a discussion of the significance of this model for gifted education.

THE FOUR CS OF CREATIVITY

Recently we developed a Four-C Model of Creativity (Kaufman & Beghetto, 2009a) to help broaden the conceptions of creativity used by creativity researchers and, in this case,

gifted educators. Each of the following sections (adapted from Kaufman and Beghetto, 2009a) provides a definition and examples of each of the four categories of creativity. We start by briefly discussing the most common categories of creativity, Big-C and little-c. We then introduce mini-c and Pro-c and highlight the importance of these additional categories.

Big-C Creativity

Big-C creativity is what most people think of when it comes to creativity. Big-C consists of clear-cut, eminent creative contributions – legendary scientists, for example, whose contributions have impacted the world, such as Marie Curie, Linus Pauling, Jonas Salk, Galileo Galilei, or Robert Oppenheimer. A qualification for inclusion in the Big-C category might be the winning of a prestigious award (such as the Nobel Prize) or being included in an encyclopedia. Many theories have focused on the concepts of Big-C, such as Csikszentmihalyi's (1999) Systems Model of Creativity. Creativity is presented as an interaction between the domain, the field, and the person. A domain could be as broad as writing; it could be as specific as composing haiku. The field is defined as the "gatekeepers," such as teachers, editors, and critics. The third component is the person – the one who creates an idea or theory or piece of art that the field accepts and the domain incorporates. In a later section, we discuss the implications of Big-C creativity for gifted educators.

Little-c

The other predominant approach to creativity is more focused on everyday activities, such as those creative actions in which the non-expert may participate each day (e.g., Richards, Kinney, Benet, & Merzel, 1988). The theories and studies along this line of thinking usually are said to focus on little-c. Areas of research that focus on little-c creativity are often aimed at illustrating how creative potential is widely distributed (see Runco & Richards, 1998; Kaufman & Baer, 2006, for reviews). Similarly, one of the earliest conceptions of levels of creativity was proposed by Taylor (1959). He proposed five hierarchical levels of creativity, these levels (as discussed by Cramond, 2005) range from: expressive creativity (e.g., often found in artwork of children) to emergentive creativity (the development of new paradigms and schools of thought).

Some specific examples of this type of research include investigations of layperson perceptions of creativity. Layperson theories of creativity tend to de-emphasize analytical abilities, which are usually associated more with IQ tests, and emphasize such characteristics as unconventionality, inquisitiveness, imagination, and freedom (Sternberg, 1985). Eastern conceptions, much more than Westerners, value the characteristic of "goodness," including "moral goodness," "contribution to the society," as well as the "connections between old and new knowledge" (Niu & Sternberg, 2002). According to standard Chinese traditions, a great person must not only satisfy his or her own needs as a human being but must also be devoted to other people and the interests of the society as a whole (Niu & Sternberg, 2006).

There are also several creativity theories that seem grounded in little-c, even if they do not discuss it in these terms. One example is Amabile's (1996) componential model of creativity, in which she has argued that three variables were needed for creativity to occur: domain-relevant skills, creativity-relevant skills, and task motivation. Again, although her model would certainly apply to Big-C creativity, it seems more aimed at everyday, little-c creativity. Domain-relevant skills include knowledge, technical skills, and specialized talent. If you're going to be a creative nuclear scientist, you'd better know the difference between fission and fusion. Creativity-relevant skills are personal factors that are associated with creativity. One example is tolerance for ambiguity – can you handle not knowing how a project might turn out, or not knowing your plans for a weekend? Other creativity-relevant skills include self-discipline and being willing to take risks. Amabile (1996) argues that those who are driven more by enjoyment and passion tend to be more creative than those motivated by money, praise, or grades.

Finally, consider the following definition of creativity proposed by Plucker, Beghetto, and Dow (2004), which was based on a synthesis of published definitional attributes and inspired by longstanding scholarly conceptions of creativity (e.g., Guilford, 1950): "Creativity is the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context" (p. 90). At the Big-C level, the twin components of novel and useful

are automatically assumed to be present. An analysis of movie directors that studies Martin Scorsese, John Ford, Frank Capra, Woody Allen, and Stanley Kubrick does not need to begin by asserting that their work was new or useful. Rather, the larger question rests on how these creators have impacted cinema and influenced generations of young filmmakers.

A little-c creativity conception is most helpful for most creativity-related encounters. If a friend shared a musical composition with you, he or she would not expect you to begin your critique by comparing it to Beethoven or Chopin. Rather, you would be expected to explain whether you found it to be unique and aesthetically pleasing (within the context of what you know about that particular type of music and your friend's current level of accomplishment).

To summarize, the little-c category has been useful for addressing common misconceptions about creativity (Plucker, et al., 2004). For instance, too much of a focus on Big-C leads to the ideas that only certain people can be creative, the only creativity that matters is that of the Big-C kind, or that creativity involves negative forms of deviance (e.g., drug use, mental illness). Moreover, the category of little-c helps underscore the important (and, at times, essential) role that creativity plays in everyday life (Richards, 2007) and points to the importance of identifying and nurturing creativity in the classroom (Beghetto & Plucker, 2006).

Introducing mini-c

The need for the mini-c category becomes clear when we consider the standards used to judge the creative insights of elementary or high school students. Most teachers are aware that none of their students likely are in the Big-C category – how many students are genuine Van Goghs or Isaac Newtons? Yet attempting to use the little-c category to classify students' creative insights can also be too restrictive – resulting in such insights being dismissed, discouraged, and overlooked (as opposed to recognized and nurtured). For instance, a junior high student learning about graphic design -- as part of working on her school newspaper -- may have unique and personally meaningful insights as to how to arrange graphics and text. If the little-c category is the only alternative to Big-C, this

student's creative insights might be lumped in with those of a student enrolled in a graphic arts degree program, or even a professional graphic artist who is discussing the history of combining text and illustration in printing, publication, and advertisement for a segment on the *Learning Channel*. In this situation, the junior high student is held, even implicitly, to unfair standards.

Even when compared amongst peers, the creative insights of students who currently lack the experience or knowledge necessary to fully express their ideas, may be overlooked in favor of the few students who can more effectively communicate their ideas. Although effectively communicating one's ideas is an important aspect of creative development (Sternberg & Lubart, 1996), judging creative potential by this criterion, at too early a stage, unnecessarily limits who is considered creative. Such possible disadvantages are particularly unfortunate for the creative child who is both gifted and has learning disabilities. Creativity is often one way of bringing out the best in these children (e.g., Leroux & Levitt-Perlman, 2000; Shaw & Brown, 1990). Although theories and empirical work in the area of little-c creativity has focused on expanding the awareness and acceptance of everyday conceptions of creativity, important questions remain. People who are very creative but not at the Big-C level are considered to be at the little-c level. People who score high on a creativity test might also be considered high on little-c, just as those people who produce works judged as more creative than their peer groups. Yet where does that leave the creative insights and interpretations involved in the learning?

This is why we proposed a new category, a smaller-c for the little-c category. This category, which we called mini-c (Beghetto & Kaufman, 2007), was designed to encompass the creativity inherent in the learning process. Mini-c is defined as the *novel and personally meaningful interpretation of experiences, actions, and events* (Beghetto & Kaufman, 2007). This category includes Runco's (2004) description of "personal creativity;" and is also similar to Niu and Sternberg's (2006) notion of "individual creativity," as well as developmental conceptions of creativity (Beghetto & Plucker, 2006; Cohen, 1989; Sawyer et al. 2003). Central to the definition of mini-c creativity is the dynamic, interpretive process of constructing personal knowledge and understanding within a particular socio-cultural context.

Our conception of mini-c creativity aligns with a Vygotskian conception of cognitive and creative development, which posits that all individuals have the creative potential that starts with an "internalization or appropriation of cultural tools and social interaction... not just copying but rather a transformation or reorganization of incoming information and mental structures based on the individual's characteristics and existing knowledge" (Moran & John-Steiner, 2003, p. 63).

Including the category of mini-c in our model of creativity helps protect against the neglect and loss of students' creative talent by highlighting the importance of recognizing the creativity inherent in students' unique and personally meaningful insights and interpretations as they learn new subject matter. Moreover, mini-c stresses that mental constructions that have not (yet) been expressed in a tangible way can still be considered highly creative. Indeed, as Vygotsky (1967/2004) noted nearly half a century ago, "any human act that gives rise to something new is referred to as a creative act, regardless of whether what is created is a physical object *or some mental or emotional construct that lives within the person who created it and is known only to him*" (p. 7, emphasis added). Thus, the category of mini-c creativity helps to broaden current conceptions of creativity by recognizing that intrapersonal insights and interpretations, which often live only within the person who created them, are still considered creative acts.

In sum, including mini-c in conceptions of creativity helps bring a level of specificity necessary to ensure that the creative potential of children is nurtured. Indeed, traditional little-c conceptions are not only too general but place too great an emphasis on creative expression. Mini-c, on the other hand, highlights the intrapersonal, and more process-focused aspects of creativity. Moreover, it represents the initial, creative interpretations that all creators have and which later may manifest into recognizable (and in some instances, historically celebrated) creations.

Introducing Pro-c

The application of mini-c creativity to gifted education is likely immediately clear. The relationship of Pro-c is less direct, but nonetheless important. Adding mini-c to the

traditional little-c and Big-C dichotomy helps resolve the issue of little-c being too general a concept to account for the genesis and development of creativity. Still, the issue remains that there is not an appropriate category for individuals who are professional creators, but have not reached eminent status. For example, the little-c category is useful for the everyday creativity of the person who writes mystery stories for fun and shares them with friends. The Big-C category is appropriate for mystery writers who have dramatically impacted the field (such as Agatha Christie, Arthur Conan Doyle, Raymond Chandler, Erle Stanley Gardner, Dashiell Hammet, and Dorothy L. Sayers). Yet what about the mystery writer who is well-known for writing popular mystery novels but has not yet attained (or may never attain) Big-C status? Consider Harlan Coben, Jeffrey Deaver, Dennis Lehane, Jonathan and Faye Kellerman, and Lawrence Sanders; all of these writers might conceivably be remembered fifty years hence, or perhaps none of them will make a lasting impact. To place them with Edgar Allan Poe is premature, and to lump them with your Uncle Steve who has been polishing a mystery story for the last ten years is equally unhelpful.

Big-C creativity often requires a certain amount of time to pass. It may take decades to truly ascertain the actual impact. Creativity that seems revolutionary may turn out to simply be a footnote to history. Moreover, geniuses are rarely lauded as geniuses in their own time, and the vagaries of fame and fortune may result in a supposed Big-C creator being long forgotten after his death. Indeed, most theoretical conceptions of Big-C nearly require a posthumous evaluation. As a result, the concept of Big-C is less helpful in real-world, practical situations.

Indeed, the need for posthumous evaluations and historical contexts creates a great problem in research: It is nearly impossible to conduct a study of living people in Big-C. There are certainly people who would seem to qualify (Toni Morrison, E. O. Wilson, Martin Scorsese, Steve Jobs, Stephen Sondheim, and Joyce Carol Oates), but it would still be a guess. The element of posterity in most conceptions of Big-C is too strong. The Pulitzer Prize for fiction each year is an example of a possible rubric for Big-C, yet you end up with genuine legends (Ernest Hemingway, William Faulkner, and William Styron) mixed in with respectable footnotes (James Gould Cozzens, Edwin O'Connor, and A. B. Guthrie). We simply cannot be certain which works are "merely" of the day or are for all time.

It is these types of questions that have led us to propose an additional category, which we call Pro-c. Pro-c represents developmental and effortful progression beyond little-c that has not yet attained Big-C status. Anyone who attains professional-level expertise in any creative area is likely to have attained Pro-c status. Not all working professionals in creative fields will necessarily reach Pro-c (an artist who paints pictures of people's pet poodles, for example, may make a good living but may not necessarily be Pro-c level creative in his or her craft). Similarly, some people may reach Pro-c level without being able to necessarily quit day jobs; some areas of creative expression may not provide enough monetary sustenance to allow financial freedom from other responsibilities. Yet many "amateur" artists are being creative at the Pro-c level, even if it is not their primary means of support.

The concept of Pro-c is consistent with the expertise acquisition approach of creativity (Ericsson, 1996). Hayes (1989) found that a decade of intensive preparation is necessary to become an international performer in a broader range of domains including chess, sports, the arts, and science. Gardner's (1993) analysis of seven eminent creators led him to argue that the 10 years are not necessarily spent simply learning and following standard protocol, but rather actively experimenting and exploring. There is also evidence that it may take even longer than 10 years of active acquisition. For example, Kaufman and Kaufman (2007) analyzed contemporary fiction writers, and found that there was a further time lag (also approximately 10 years) between an author's first publication and a peak publication. This finding is consistent with Simonton's (2000) work with classical composers, which suggests that although it does take about 10 years to learn the mechanics of a field, it may take further time to reach a level of eminence depending on the domain. Some domains that focus more on consistent strong performance (such as chess, sports, and medicine) may only need 10 years, whereas domains that require a variety of styles and ranges may take longer (Martindale, 1999).

The level that takes (at least) 10 years to reach is not the level of Big-C. This level, which requires training (usually formal) and some specific achievement (such as a published article or performed play or exhibited painting), can be reached by hundreds and hundreds

of people in a given domain. You can spend hours in a bookstore and find many great books by authors who nonetheless would not come close to reaching Big-C creativity. The Big-C/little-c not only shortchanges burgeoning creators; it also fails to truly acknowledge a solid, professional creative contribution. In much the same way that little-c standards are too demanding for mini-c level creators, so too are they not demanding enough for Pro-c contributions.

Consider Maria, an associate psychology professor (fictional) who has published 20 papers about animal cognition. One paper was her dissertation, which made a contribution to our knowledge about bird song. Another paper built on several of her studies to apply someone else's theory about human cognition to animals. A third paper, written with a graduate student, developed a new method for analyzing bird songs across different geographical regions. Maria has tenure and may eventually become a full professor. Her work has advanced the field of animal cognition in a small but significant way, and she has used her creativity in both her empirical studies and in her analysis of past work. Maybe one of her three papers will continue to be cited in the twenty years after she is no longer actively doing research.

If we stick to little-c vs. Big-C distinctions, where do we place Maria? Sticking her into the little-c category diminishes everything she has earned. Maria is placed in a category next to novices taking an animal cognition class and someone who records and transcribes lions roaring for his own pleasure. Yet placing Maria in the Big-C category is equally inappropriate. Maria's work is creative, but she hasn't made the kind of contribution that will place her in the history books (or the intro to psychology books). She has attained a level of creative acumen in a professional field, and should be compared with similar-stage psychologists. Comparing her with Skinner, Wundt, Vygotsky, and Piaget does her no favors; neither does placing her with those who have yet to prove themselves. The Pro-c category offers accomplished creative individuals their own category.

An example of an existing theory that would seem to fit into the Pro-c category is the Propulsion Theory of Creative Contributions (Sternberg, Kaufman, & Pretz, 2002), which focuses on how a creative act can change an entire field. The first four contributions all

stay within the framework of an existing paradigm. Perhaps the most basic type of contribution that someone can make is replication. Replication tries to keep things status quo – to reproduce past work. An example might be a traditional movie sequel, such as the endless string of *Saw* horror movies. The second type of contribution, redefinition, takes a new look at the domain. A redefinitive contribution does not necessarily try to push forward, but rather tries to present a different perspective (e.g., a recent production of *Pirates of Penzance* that set the show in the Caribbean and placed the music in this style). A third contribution, and perhaps the type of contribution that achieves the most immediate success, is called forward incrementation. This type of contribution pushes forward the domain just a little. Maybe the creator makes a slight change in what already exists. These additions usually are not groundbreaking – it takes the domain in the same direction it was heading. One example might be Eric Garcia's private investigator novels – which take the interesting perspective that dinosaurs are not extinct but rather hiding under latex masks. Such a comedic and fantastical twist on traditional mysteries (in books such as *Casual Rex* and *Anonymous Rex*) represents a forward incrementation. The final contribution that stays within the existing definitions of a domain is the advance forward incrementation. This contribution pushes the domain ahead two steps instead of one – and the creator often suffers for it. This type of creative product includes people who were a little before their time (e.g., Andy Kaufman's humor, which is now considered a major influence on top comedians, yet never brought Kaufman mainstream fame).

The final four types of creative contributions represent attempts to reject and replace the current paradigm. Redirection represents an attempt to redirect the domain to head in a new direction (e.g., Run DMC targeting their rap music at a mainstream audience with fan-friendly melodies and famous collaborators). If most of these contribution types represent "forward" thinking, Reconstruction/Redirection looks backwards. This contribution is an attempt to move the field back to where it once was (a reconstruction of the past) so that it may move forward from this point – in a different direction (e.g., Rupert Holmes's *Mystery of Edwin Drood*, based on the Dickens novel, which recreates an old fashioned music hall for modern day theatre-goers). Perhaps the most radical of all of the creative contributions is reinitiation. In reinitiation, the creator tries to move the field to a new (as-yet-unreached) starting point and then progress from there (e.g., James Joyce's *Finnegan's Wake*).

Finally, the last contribution is integration, in which two diverse domains are merged to create a new idea (e.g., George Lucas combining samurai movies and science fiction to create *Star Wars*).

IMPLICATIONS FOR GIFTED EDUCATION

Thus far we have discussed how traditional conceptions of creativity are limited by focusing either on everyday creativity (also called "little-c") or eminent creativity (also called "Big-C"). We have argued how our Four C model – which includes the idea of "mini-c" and Pro-c creativity – offers additional creative categories for consideration. We close our chapter by exploring the significance of this model for gifted education. Specifically, we briefly consider the implications of each level of creativity (mini-c to Big-C) for gifted education; whether and how gifted educators might nurture multi-creative potential; and issues of creativity assessment in gifted education programs.

The Four Cs and Gifted Education

Big-C Exemplars

As we have already mentioned, most gifted educators will be teaching children who demonstrate lower levels of creativity than a Shakespeare or Mozart. Still, eminent creators can serve as important illustrations of the levels of creative achievement that have occurred in various disciplines – particularly if considered along the full trajectory of creative development (from mini-c to Big-C).

Consider, for example, Bob Fosse, the legendary dancer and choreographer. Fosse attended dance school as of a very young age, and was soon demonstrating his mini-c in how he used his arms in his dancing. Although his teacher told him to hold his hands so that his palms faced the ceiling or the floor, Fosse experimented and tried holding his hands with their palms facing the audience (Gottfried, 1998). His teacher became frustrated (as do many teachers of gifted students), yet Fosse continued playing with his ideas. By the age of 13, he had progressed into little-c, touring vaudeville as part of the Riff brothers (Grubb, 1991). They performed as amateurs around the country. Fosse transitioned into Pro-c as he began working professionally as, among other roles, a dancer in the film of *Kiss Me, Kate*. He began choreographing Broadway shows (such as

Damn Yankees and *The Pajama Game*), slowly developing his sexualized style of open-palmed, hip-rolling, finger-snapping, head-tilting dancing. He continued to work as one of the most-honored directors-choreographers of all time (in 1973, he became the only person to win the Tony, Emmy, and Oscar in the same year). Near the end of his life, he directed the movie *All That Jazz*, a fictionalized autobiography that ended in his own death. The Fosse style of dancing had already influenced a generation of talent when he died in 1987. In the decades following his death, his legend continues to grow with a successful Broadway revival and film that recreated his work on *Chicago* and a popular dancing revue simply called *Fosse*.

Gifted educators might share biographies (like Bob Fosse's) to help capture students' imaginations (and dispel misconceptions) by highlighting the developmental trajectory of individuals who have made major creative contributions in particular fields and professions – including the amount of creative effort, perseverance, and chance events that have gone into such life trajectories. Educators need to be careful not to use such examples to reinforce persistent and pernicious myths about creativity (e.g., only certain people can be creative), but rather to help illustrate the full trajectory of possibilities from individual insights to trend setting breakthroughs.

Pro-C Goals

Similar to Big-C biographies, research that examines and documents Pro-c level creativity can offer gifted educators important insights into the creative process of experts in a field. Consider, for instance, Sriraman's qualitative study of the creativity of professional mathematicians. In his study, Sriraman (2004) investigated the thought process of five creative mathematicians and identified several common characteristics of mathematical creativity (social interaction, imagery, heuristics, intuition, and proof). Sriraman also documented how the creative process of the mathematicians aligned with the more general four-stage Gestalt model (Wallas, 1926) of creativity (preparation, incubation, illumination, verification). Such studies help to clarify the specific skills, knowledge, dispositions, and strategies necessary for creative work in a particular academic discipline. Teachers in programs of gifted education can draw on such insights to support their students' understanding of the nature of creative work in various professional fields.

In this way, Pro-c levels of creativity can serve as long range goals for which gifted students can strive. And students can start to make progress toward such goals by becoming aware of and starting to develop the requisite knowledge, skills, and understanding of the nature of creative work in a particular academic discipline or professional field.

Little-c Realizations

Little-c creativity is the most widely accessible and attainable level of creative expression for students in schools and classrooms. Indeed, just about any student, given the requisite support and encouragement, can find ways to express their creativity in academic projects, tasks, and activities. What becomes important, then, is not whether students have creative potential (they most certainly do), but rather how teachers can create conditions supportive of creative expression in their classrooms.

Fortunately, Amabile and her colleagues (e.g., Amabile, 1996; Amabile, Hennessey, & Grossman, 1986; Amabile, Hill, Hennessey, & Tighe, 1994) have a long standing program of research that offers insights into how the classroom environment – and the motivational messages sent by teachers in those environments – might influence whether little-c creative expression will be supported or undermined. This line of research typically reports that students' expressions of little-c creativity are more likely in environments that offer intrinsically motivating activities and tasks – tasks that promote high levels of interest, enjoyment, and curiosity – as opposed to those that offer external rewards. This research suggests that when these intrinsic motivators are present, students will be more likely to commit themselves to the task, take risks, and express themselves creativity.

This is not to say the extrinsic motivators (rewards and praise) are necessarily detrimental to creativity. Although there is evidence that rewards can have a negative impact on performance (e.g., Cooper, Clasen, Silva-Jalonen, & Butler, 1999), it seems that rewards can be beneficial if given wisely. For example, neither an individual's intrinsic motivation nor creativity were negatively affected by a reward (particularly a verbal reward), and could actually be improved, if the reward was not visible during the creative activity (Eisenberger & Selbst, 1994). Eisenberger and Shanock (2003), in reviewing the many

studies on the harm or benefits of reward, conclude that much of the debate involves methodological issues. Rewarding creative performance, they argue, increases both intrinsic motivation and creativity; rewarding conventional performance decreases both intrinsic motivation and creativity.

Given that expressions of little-c creativity seem to be strongly influenced by the classroom environment, gifted educators have a responsibility to consider how the motivational messages they send in their classroom may influence their students' willingness to develop and express their little-c creativity. The following recommendations – adapted from Beghetto (2005) – may prove useful for helping gifted educators support their students' little-c creative expression. Those recommendations include the following: (a) set challenging goals and encourage students to identify features of a task that are interesting and personally meaningful (rather than using grades or some other external motivator to encourage students to complete the tasks); (b) encourage students to generate a wide array of novel ideas and then focus their attention on evaluating and selecting the most promising and appropriate ideas for a given task; (c) minimize the pressures of assessment and other forms of evaluation (particularly during the stage of idea generation); (d) encourage students to focus on improvement and understanding as goals when working on tasks (rather than just showing others that they can successfully complete a task or outperform others), (e) help students focus on learning from (rather than avoiding) mistakes and recognizing that making mistakes – and persevering through mistakes -- is a natural and necessary part of learning; and (f) help students consider what grades and assessment results mean with respect to what they did well and how they might improve in the future.

Mini-c Recognition

We would like to further emphasize how important it is for teachers of gifted students to recognize that creativity is present in the interpretations and insights of everyday classroom learning. Given that mini-c creativity argues that creativity is inherent in any act of learning – an idea advocated by Guilford in his 1950 presidential address to the American Psychological Association – gifted educators need to be prepared to recognize, cultivate, and draw out creative potential of their students anytime they engage them in

learning activities and tasks. This includes everything from encouraging students to take the intellectual risks involved in sharing their own unique insights and interpretations to helping articulate how their mini-c insights are appropriate and meaningful for the particular academic activity or task.

In order for this to happen, educators will need to welcome and work with – rather than dismiss – students' unexpected interpretations and insights. Ideally, teachers should provide students with supportive feedback aimed at developing such insights into appropriate understandings without undermining the mini-c nature of those insights.

Supportive teacher feedback is a non-trivial issue when it comes to students' creativity development. For instance, Beghetto (2006) found that middle and secondary students' reports of teachers providing positive feedback on their creativity was the strongest unique predictor of students' beliefs in their own creativity. As such, teachers have good reason to actively seek out (and develop) strategies for providing supportive feedback that helps students develop their confidence in their own creativity and moves from mini-c interpretations to real world innovations.

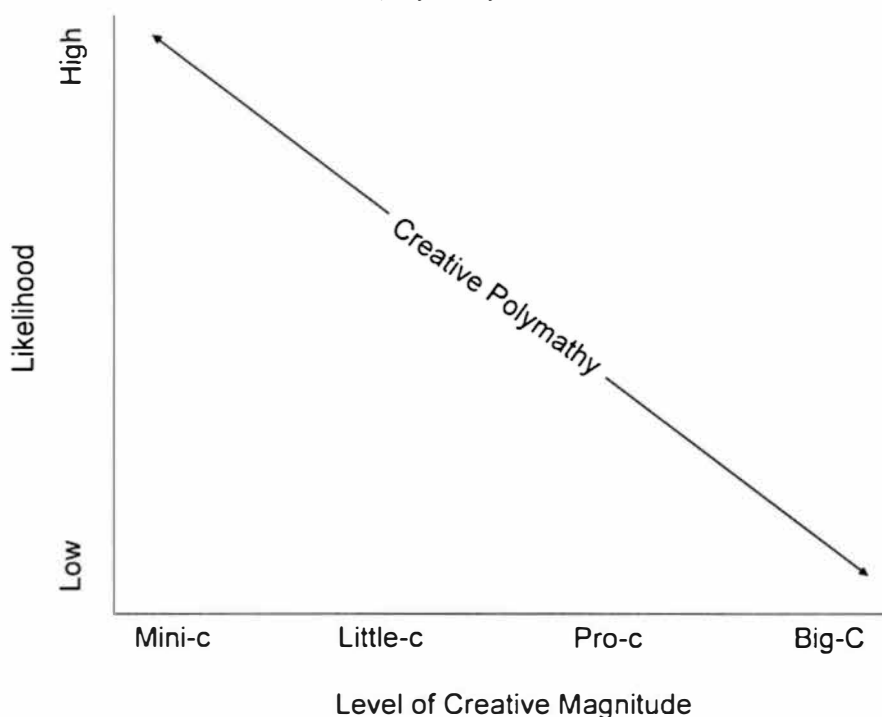
How might this type of feedback look in the classroom? An example can be found in Beghetto's (2007) discussion of how teachers might support students in moving between their creative interpretations (mini-c) and interpersonally (little-c) vetted expressions of their ideas. Teachers encourage movement from mini-c interpretations to little-c expressions by: (a) taking the time to carefully listen to how students are interpreting what they are learning; (b) helping students recognize when their insights and interpretations are not making sense given the domain constraints, conventions, and standards of a particular activity or task, and (c) providing multiple opportunities for students to practice developing the skills of a particular domain or task. These suggestions highlight the importance of teachers recognizing the value of mini-c creativity while introducing students to the conventions and standards of a particular academic activity or task.

Focus on Creative or MultiCreative Potential?

We – along with many creativity researchers – often are asked whether educators should (or even can) focus on nurturing creativity in a single academic area (such as literature) or creativity across areas (such as science, math, and literature). The topic of multicreative potential – or creative polymathy – has generated much debate in the field of creative studies. Certainly, being a renaissance person at the Big-C (or even Pro-c) level is rare, and exemplars stand out because of their infrequency. People such as Linus Pauling and Marie Curie, who won Nobel Prizes in two different categories, are uncommon. Creators such as Leonardo Da Vinci, Benjamin Franklin, and Paul Robeson are remarkable because of their accomplishments across so many disparate domains. Yet we argue that approaching this question with the Four-C model reveals that the answer may be quite complex.

Using our Four-C model as a guide, we have asserted that the likelihood for the expression of multicreative potential varies as a function of creative magnitude (Beghetto & Kaufman, submitted). We also developed a figure that illustrates this likelihood (see Figure 1).

FIGURE 1 Likelihood of creative polymathy



As illustrated in Figure 1, the most likely manifestation of multicreative potential is at smaller-c levels of creativity. At the mini-c level, multicreative potential is realized anytime a student has new and personally meaningful insights and interpretations. Little-c polymathy (or some combination of Pro-c and little-c) is still relatively likely – it is easy to find examples of students who express themselves creatively across many domains. There are also numerous examples of creative professionals (professors) who also have creative avocations (e.g., amateur chefs, poets, musicians). Multicreative Pro-c creativity is possible, but of lower probability than little or mini-c polymathy. This is because professional levels of creativity require many years of work within a domain – and most people simply don't have the time to devote to such endeavors. Finally, when it comes to Big-C (eminent) creativity – although it is possible for someone to be a Big-C polymath – the likelihood is extremely low. Eminent levels of creativity – as we have discussed – involve a combination of personal (domain expertise, creative disposition) and social

factors (relevant acknowledging the profound impact of the contribution) -- and a good dose of chance (Simonton, 2004).

We acknowledge that our likelihood model is somewhat speculative, however, we believe that it provides a useful way of considering the likelihood of multicreative expression across the four c's of creativity. It may also serve as a useful guide for educators in considering how they might best focus their attention to nurture the creative potential of their students (e.g., focus their attention on nurturing the more likely, smaller-c forms of creativity -- accessible to all students -- without precluding the possibility that some of their students may go on to manifest multicreative abilities at the larger-c levels).

Creativity Measurement and the Four Cs

Another issue central to whether and how creativity will be nurtured in gifted education programs and classrooms relates to how it is measured (Kaufman & Beghetto, 2009b). There are many ways to assess creativity, although there is no single measurement that is commonly used. One obvious way to find out if youth are creative is to ask them to estimate their own creativity (e.g., Furnham, 1999). Such self-assessments are feasible for mini-c or some little-c investigations of creativity, although they would be less valid for high stakes situations (such as admission to college). The advantage to such assessment is that it is quick and free. The disadvantages, however, are that some people may perceive themselves as being less or more creative than they really are (Kaufman 2006; see also discussion in Kaufman, Plucker, & Baer, 2008). Peer or teacher assessments are also a popular way of measuring creativity (such as Scales for Rating the Behavioral Characteristics of Superior Students; Renzulli et al., 2004). As with self-assessments, questions of validity and reliability pose a problem; teacher and peer assessments are a wonderful supplement to other measures of creativity but may be less ideal as a sole measure. Certainly, all three measures (self, teacher, and peer) are outstanding teaching tools for gifted mini-c creativity.

The popular *Torrance Tests of Creative Thinking* (TTCT; Torrance, 1974, 2008) measures creativity conceptualized as divergent production (e.g., Guilford, 1950). The TTCT items typically involve responses to questions with no single, specific correct answer. Verbal-

oriented questions might ask for different uses one could make of an egg carton, or what might happen if all people were born with three arms. Figural-oriented questions might ask someone to modify a circle into an illustration or to finish an incomplete drawing. A person's responses would then be scored for *fluency* (how many different responses were produced), *flexibility* (how many categories of responses were produced), *originality* (how novel and unique the responses were), and *elaboration* (how much detail and development is present). More recently, flexibility was dropped from the most recent version of the tests because of its high correlation to fluency (Hébert, Cramond, Neumeister, Millar, & Silvian, 2002). Replacing flexibility were two new categories in the Figural test, abstractness of titles and resistance to premature closure (Torrance, 2008).

The TTCT assumes a creativity-general perspective; by measuring creativity on problem-solving items, it makes assumptions about someone's overall creativity. An alternate perspective is that creativity is domain-specific (e.g., Kaufman & Baer, 2005), which means that creativity in one area, such as problem-solving, does not necessarily translate to creativity in another area, such as math or music (see studies in Baer, 1993 for empirical studies of this question). At the mini-c level, creativity may be general enough that the TTCT's focus may not matter. At the little-c level and higher, such a focus is, we believe, problematic. Another popular assessment method, the Consensual Assessment Technique (CAT), allows evaluation in a specific domain that one may wish to examine (such as poetry) while the TTCT does not. Indeed, one analogy that may be used is that divergent thinking tests are to creativity as vocabulary tests are to intelligence—certainly related to the concept, but a poor substitute for a fuller battery of tests (Kaufman, Lee, Baer, & Lee, 2007). Such a battery of tests for creativity has not been developed.

In the Consensual Assessment Technique (Amabile, 1996), qualified experts assign ratings to creative products (such as a poem or a collage). This technique has been widely used by creativity researchers, but it is not readily amenable for use in most educational contexts because it provides only comparative measurements within the group of products evaluated by a specific group of experts (Kaufman, Plucker, & Baer, 2008). Baer, Kaufman, and Gentile (2004) have recently shown how the Consensual Assessment Technique can be extended to creative products produced under both diverse and

ecologically valid (as opposed to experimentally controlled) conditions. In a related study, Kaufman, Gentile, and Baer (2005) found evidence that gifted novices can produce comparably reliable ratings to experts. Whereas gifted novices may be comparable, non-gifted novices do not show the same levels of agreement to expert opinion (Kaufman, Baer, Cole, & Sexton, 2008). Similar techniques to the CAT are often used in assessing Big-C (i.e., an appropriate group of experts selects the Nobel Prize winners) and Pro-c (i.e., reviewing a professor's papers for promotion to full professor). The often prohibitive cost and effort of getting appropriate experts makes the CAT less useful to gifted teachers.

CONCLUSION

In K-12 settings, the nurturance of creativity represents a key opportunity to help ensure that students experience the benefits of developing and expressing their curiosity, imagination, and unique talents. Of course, such opportunities come with a host of challenges (e.g., finding ways to nurture creativity given the ever increasing external curricular demands placed on educators). Fortunately, identifying and nurturing creative potential has a longstanding tradition in programs of gifted education. Although there still is much to be learned and determined about how to best nurture creativity in students, gifted educators will have an opportunity to lead the way in helping identify and nurture creativity in schools and classrooms. A gifted child with caring mentors can truly develop her or his creativity from the mini-c level upward – perhaps even to the Big-C level. We hope that our Four-C Model will place gifted educators in a better position to ensure that they and their students experience the full range of benefits associated with realizing their creative potential.

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DISCOVERING EXCEPTIONAL CREATIVE POTENTIAL OF CHILDREN IN PRIMARY GRADES USING THE C.R.E.A.T.E. MODEL

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Why do facilitators of programs for the gifted go into classrooms and provide enrichment activities for all children, especially in the primary grades? There are some who might answer this question in a variety of humorous ways including (a) to give the classroom teacher a break, (b) to give the teacher of the gifted something to do, or (c) to satisfy administrators who plan schedules. While educators of the gifted know nothing could be farther from the truth, there are many who do not understand why enrichment at the primary grades is many times an integral part of the assessment process for identifying giftedness in young children. There are some important ways enrichment can greatly enhance the accurate identification of students who need a different curriculum – to nurture creative and critical thinking, to observe exceptional creative ability, and to document potential giftedness.

Educators may question, "Aren't all children in the primary grades curious and creative?" The answer is, yes. The next time you have the opportunity to listen to young children (i.e., ages 4 - 7) at play, notice their world of pretend. Their imaginary adventures range from journeys around the moon to slaying purple dragons. Watch to see if they are curious. They can't wait for you to turn the next page of the book, see what's around the next corner, or see what surprise is in the bag. Perhaps a better question is, "Are all children in the primary grades exceptionally creative?" The answer is no. Other questions emerge after drawing such a conclusion. They are: (1) how can creativity, including curiosity, be used to determine giftedness among primary students, (2) what kind of curriculum should be presented in order to foster creative thinking so a distinction can be made between ordinary and extraordinary creative potential or production, and (3) who should deliver the curriculum and document the potential? We will begin by defining creativity and examining assessment according to this definition.

Torrance (1962, 1977, 1987) may be the most influential of all researchers or authors on the subject of identifying and nurturing creative giftedness. Torrance's 1977 definition for creativity encompassed the process of sensing problems, forming ideas, modifying ideas, and communicating uniqueness within ideas. The original work by Torrance (Torrance, 1962) led to the development of an assessment instrument (i.e., *Torrance Test of Creative Thinking – Figural & Verbal: TTCT*), which was renormed in 2008. This instrument assesses and calculates scores for fluency (the number of ideas), originality (uniqueness of ideas), abstractness of titles (a measure of the ability to synthesize the idea expressed in the drawing), elaboration (amount of detail) and resistance to premature closure (the ability to keep the transformation open). The first subtest of the figural test for creative thinking includes an egg shaped form in the center of the page which is used as the basis for an imaginative drawing. The second sub-test presents the test taker with ten simple abstract shapes to be completed and given a title. The third figural activity includes two pages of circles or parallel lines which again are incorporated into complete, meaningful and clever drawings. The TTCT may be hand scored. However, a benefit of using this measure is the opportunity to send it to the company for scoring at a slight expense.

Torrance (1977) also made suggestions for teachers to include "creative ways of teaching" in each classroom. He suggested that teachers provide opportunities for creative behavior which include: (a) creating assignments that call for original work, (b) asking questions that call for productive thinking, (c) using materials which allow for a flow of thoughts, and (d) developing skills in the use of analogy.

Another highly used measure of creativity over the past two decades is the Williams (1993) Creativity Assessment Packet. This packet contains three assessments: 1) a test of divergent thinking administered to the student, 2) a scale of divergent feeling answered by the test taker, and 3) a rating scale for parents or teachers. The Test of Divergent Thinking consists of 12 boxes; each box contains lines or shapes. The test taker, makes pictures using the lines and shapes much like the *Torrance Test of Creative Thinking* (2008). A title is given to each picture and is scored based on literal or abstract descriptions. The assessment is scored using fluency, flexibility, originality, and elaboration as the guidelines for creativity. The Divergent Feeling Inventory is a 50-item

rating scale. It contains questions pertaining to curiosity, imagination, complexity, and risk taking. The Williams Scale is a 48-item rating scale of items used by parents or teachers to evaluate student creativeness.

An understanding of fluency, flexibility, originality, and elaboration as measures of divergent or creative thinking is essential in preparing curriculum to foster creativity and document creative potential. If these or similar standardized assessments are going to be used to determine creative giftedness, then curriculum should be congruent.

PRESENTING CURRICULUM THAT EMPHASIZES CREATIVITY: A COOPERATIVE EFFORT

Over the past decade, researchers (Cropley, 1994; Fleith, 2000; Gentry, Rizza & Owen, 2002; Tan, 2001) have also taken an interest in the role that teachers play in the use of curriculum designed to enhance and elicit creative thinking in the classroom. According to Maker and Nielson (1995), teachers of the gifted incorporated models designed to encourage creative process and production more readily than classroom teachers. Teachers of the gifted were more apt to use models such as Bloom's Taxonomy, Renzulli's Enrichment Triad, Taba's Teaching Strategies, and Parnes' Creative Problem Solving. Other authors (Fleith, 2000; Gentry, et al., 2002) indicated that one reason for classroom teachers' lack of eagerness to use curriculum designed to nurture creative thinking was based on their lack of knowledge regarding what to use.

To support the notion that not all teachers understand creativity in the classroom, Sak (2004) reported that:

Teachers in general seem to lack two types of knowledge about creative children. One is the nature of creativity; in other words, the kinds of behaviors a creative child displays. The other one is about teaching for creativity; that is, how children's creativity can be fostered in the classroom. One assumption based on research findings is that most teachers do not favor creative behaviors and do not know how to foster creativity, probably because most do not understand the nature of creativity. (p. 217)

The conclusion may then be drawn that when teachers of the gifted present lessons of whole class enrichment in the presence of classroom teachers, they are modeling strategies beneficial for encouraging creative and critical thinking skills. Further, it is an opportunity for the teacher of the gifted and the classroom teacher to work together regarding the recognition and potential of giftedness among all learners. Thus, when considering the implementation of models that emphasize creative thinking, it is important to view the presentation and documentation of creativity as a cooperative effort.

To summarize, when presenting lessons based on enhancing potential, enriching the existing curriculum, and searching for giftedness, there are some things to consider.

- 1) Presenting a systematic curriculum based on creative processes provides the opportunity to nurture potential.
- 2) Content and skills from the regular classroom can be used and incorporated into curriculum developed to enrich creative thinking.
- 3) Standardized assessment instruments exist to measure creative thinking and may be used to assess learners' creative potential or ability.
- 4) The observation skills of the facilitator of gifted children and the classroom teacher should be used to document creative potential among primary students.

The C.R.E.A.T.E. Model (Figure 1) is one way to engage students in the creative process as introduced and assessed by Torrance (2008) and Williams (1993). It also offers some unique components to the process of developing curriculum specifically designed to nurture creative process. C.R.E.A.T.E. is an acronym for each of the steps. C is for Creative Process. This process encompasses fluency, flexibility, originality, and elaboration – the elements assessed on standardized creativity measures. R is for React and Interact. At this level the students respond to one another's ideas during a lesson. E is for Enhance Knowledge. Every lesson introduces or reinforces some academic skill. This may include math, science, language, social studies, etc. A is for Associative Properties. While students are engaged in the C.R.E.A.T.E. lesson, there is a connection between academic content and thinking skills as students make predications. T is for Thinking Skills. During lessons students compare and contrast or create something new in the form

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of transformations. E is for Evaluate Students' Progress. At the end of each lesson, following the students' transformations, teachers critique the students' progress in terms of the most original ideas. Thus, this model is a combination of many existing notions about teaching creative thinking and processes with a new, systematic means for developing curriculum in order to engage young children in creative process and production. Again, the purpose is to better observe which children are exhibiting exceptional creative potential in order to determine which children might qualify for program services offered to the gifted, talented, or creative.

Figure 1 is a chart which delineates each one of the processes by defining its function. Thus, it is a description of C.R.E.A.T.E.:

Figure 1: The C.R.E.A.T.E. Model

Creative Process

These lessons will emphasize fluency, flexibility, originality, & elaboration.

React & Interact

During the lessons students will interact and react to one another's creative production.

Enhance Knowledge

These lessons will enhance and enrich the classroom content.

Associative Properties

Students will associate and link basic skills and thinking skills.

Thinking Skills

These lessons will utilize creative and analytical skills.

Evaluate Students' Progress

Following each lesson, the students' creative products will be evaluated.

Each lesson, according to the C.R.E.A.T.E. model, has three stages. The stages are *Warm-up*, *Interact*, and *Produce Creatively*. The children warm-up their thinking by brainstorming ideas according to a topic the teacher provides; the topic is always related to the upcoming story. During the second stage of the lesson, the children listen to the story which provides them the opportunity to interact by completing ideas, making predictions, or expanding on classmates' ideas. At the conclusion or final stage of each lesson, students create something new by transforming lines or shapes which are provided by the teacher.

Through this systematic plan, the children are given the opportunity to practice and enhance creative potential. A series of skills (i.e., academic, creative, and analytical) enrich the classroom content. Creative production is demonstrated by students. Finally, gifted potential may be documented.

The following is a specific lesson based on the model introduced in this text. This sample lesson, presented according to the C.R.E.A.T.E. model, may be found in Figure 2.

Figure 2: Sample C.R.E.A.T.E. Lesson

UNIT – IT'S ALL ABOUT BEARS!

Lesson 1 - Wishing on a Star

Objective: Students will use C.R.E.A.T.E. to engage in creative process while using various skills - listening, making predictions, and creating original products. Academic content in science may be noted in state frameworks.

Before every lesson have children stand and follow this chant with accompanying movement:

Teacher says: Raise your right hand and tap, tap, tap, tap tap on your "noggin"; raise your left hand and tap, tap, tap, tap, tap on your "noggin". With both pointer fingers, we will tap, tap, tap, tap on our "noggin". Now, move your head around and round. Move your shoulders up and down. Move your hips with a wiggle and jiggle, a wiggle and jiggle, a

wiggle and jiggle and STOP. Sit very gently -- crisscross, applesauce, hands in your lap. Bear Lee will watch the most polite thinkers and not stinkers to see with whom he would like to come and sit today. While he watches, we will warm-up our thinking. (Stuffed bears will be waiting to be distributed to children who are listening intently. Teachers should prepare in advance to have one bear per child so that each child has a bear to hold during the story.)

Warm Up

Teacher says: Boys and girls, we will think of lots of ideas (**fluency**) about making wishes. Think about all the many wishes you could make. Think silently of as many ideas as you can while I time 60 seconds or 1 minute.

As time ends, have students share one idea each until all the ideas are stated. No idea may be repeated during share time. Call attention to ideas that are **flexible**. For example if ideas have been toys, a bike, a Barbie doll, a Barbie house, etc., call attention to an idea such as, "my own bedroom so I don't have to share with my brother." This child's answer will be documented on the C.R.E.A.T.E. Potential Chart.

Interact

Read the interactive story, *I Wish I Could, I Wish I Might, Have This Wish I Wish Tonight*. (The story follows the lesson plan.) During the story, students will be asked to make predictions, create characters, and analyze pieces of the story. (Before reading the story, give each child a number card.) During the story the child, who is holding the number in the blank, will fill in the blank with his or her idea, thus completing a piece of the story. There are also questions along the way, let the students make predictions about what might happen next and discuss the questions following the story.

Produce Creatively

Following the story, allow students to go to a desk or table. Give them the star sheet (see Figure 3). Say, "This is a wishing star; you will hide it in a picture by adding shapes and lines to transform it into something new and different. Use your star in a picture anyway you wish. You have only a few minutes to transform your star into something new

(originality)." When time is up, have each child look at his/her picture. Tell them to look very carefully at the way they have used the star in a creative picture. Have them think of a title for the picture and label it **(elaborate)**.

Each week, the teacher will take all the pictures and choose the most creative – the one with the most unique use of the shape into a new picture. During the next class period, the children who have completed the most unique transformation will be awarded a creativity award (e.g., bear stickers, gummy bears, or Teddy Grahams).

**I Wish I Could, I Wish I Might,
Have This Wish I Wish Tonight**

Bear Lee was an adorable bear. His hair was adorably soft. His eyes were adorably brown, and his parents thought he was absolutely adorable. As adorable as he was, Bear Lee was a bit adventuresome at times.

One night as he and his father were taking an evening walk, they saw a star falling from the sky.

Bear Lee's dad explained that it was really a meteorite, which is a large, rock-like material. He explained further that when meteorites get too close to the earth's atmosphere, the magnetic pull of earth's gravity pulls them down toward earth. And they burn on their way down making them look like a falling star. [Enhance Knowledge] Then Bear Lee's dad said something very intriguing. He said that some people make a wish on falling stars.

Just then, Bear Lee made a wish that he would have pancakes dripping in his favorite honey for breakfast the next morning. The next day, he woke to the smell of sweet honey. To his delight, when he entered the kitchen, there sat his mom and dad with stacks of

pancakes and the biggest jar of fresh honey his big brown eyes had ever beheld. Bear Lee decided this was his wish on a falling star come true.

That day, Bear Lee decided he would find another falling star and make another special wish. And how he wanted this wish more than anything in the world! His wish was _____ (4, 8, 11, 19). [React & Interact]

So that very night, just as dark came, he climbed out of his bedroom window to find another falling star upon which he could make a wish.

He walked along and walked along until he was deep in the darkness. It was quiet at first, but as the darkness grew, he noticed noises all around. He thought the noises might be _____ (5, 17, 20, 23). [React & Interact] When he looked closely in the direction of the sounds, he saw the crickets and frogs, but no falling stars.

He walked through some trees and felt a tickle. He thought the tickle was _____ (9, 21, 22). [React & Interact] So, when the light from the moon trickled through the trees, he could see the wind was blowing leaves against his furry side. But he could still see no falling stars.

Just as he rounded the next tree, he saw something long and dark on the ground. "Oh my, I wonder what that could be," said Bear Lee. He thought it might be _____ (2, 6, 12, 16). [React & Interact] (Boys and girls, what forms on the ground when you stand with a bright light, perhaps sunlight, behind you?) [Associative Property] As he looked way up into the tree above, he saw an owl. With the moon in front of her, the owl's shadow was long on the ground. [Enhance Knowledge] Still, as he looked beyond the owl, he saw no falling star.

Suddenly he said out loud, "I know, I must keep looking straight up so I won't miss any falling stars; thus, I won't miss my wish." Up he looked as he continued his walk. But as he was looking up for falling stars, he wasn't looking down where his feet met _____ (1, 3, 14, 18). [React & Interact] This made him go tumbling down, down, down the side of a hill.

As he landed on his back, he lay looking up at the night sky for a long time, but still he saw no falling stars. Bear Lee was growing very tired from his journey and search for a falling star upon which to make his special wish, _____ (7, 10, 13, 15). [React & Interact] He started growing sleepy. Sometime later, he woke to the sounds of the night. He made his way home very sad that he had missed his chance to make a wish on a falling star.

Oh how good his bed felt! As he was drifting off to sleep, he thought, "I'll make my wish anyway." And so he did.

The next morning as the sunshine warmed his face, he awoke to the sweet smell of honey which was waiting to be poured over breakfast – stacks and stacks of pancakes. As he entered the kitchen, his mom gave him the biggest bear hug and poured the honey deep over his breakfast.

Questions or inquiry: [Thinking Skills]

What do you think his wish was as he was drifting off to sleep? How do you know?

Make a new ending for the story.

Was it right for him to go wondering off to try and find a wishing star? Why or why not?

Figure 3: Transformation Task

Use the star in the center of the page to create something new. Try to think of a way to use the star in a picture that will be different from everyone else.



At the end of class, the creative products or transformations should be collected. The teachers select the most unique creative transformation. In other words, several children may use the star as a scene in the night sky. But the child who uses the star as a wheel on a vehicle, the body part of a prehistoric animal or a scene at the end of a kaleidoscope should be recognized as a creativity winner. Milligan (2007) has provided additional lessons according to the C.R.E.A.T.E. model. The lessons include a variety of academic content including math, social studies, and language development. Each lesson contains a story and figure for the transformation.

Based on the documentation of students' creative thought and production, the chart may reveal a pattern showing which students are performing creatively on a consistent basis. In the event of repeated creativity, the child may be referred for assessment toward identification. The evidence collected through charting or documenting this performance-based creativity may be used in the total assessment case study.

Documentation should occur for students who have the most ideas, who think of an idea which is in a category all its own or who think of the most unique ideas. For example, when brainstorming things about blue, the student who says, 'sad' would be documented. The child or children who create(s) something unlike the other children would receive a check for originality, the child who labeled her or his picture with something other than the literal object would receive a check for elaboration. For example, the child who draws a picture of a kitten, but instead of calling the picture 'kitten,' titles the picture, "Give me some milk" would receive a check for elaboration. Another example of elaboration would be a transformation with detail different from the other children's products.

The basis for presenting enrichment-based curriculum, which emphasizes creative thinking, is to document potential giftedness of primary students. This process works best in a cooperative setting between the classroom teacher and the teacher of gifted students. Effectively, the teacher of the gifted would present a lesson to engage students in creative process and performance. While students are processing and responding to the lesson, the classroom teacher documents the student's reactions.

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This process was established by Kingore (1990), who devised one of the first observational checklists to include advanced language, analytical thinking, meaning motivated, perspective, sense of humor, sensitivity, and accelerated learning. The original work by Kingore involved a checklist with students' names and listed behaviors that were indicative of characteristics of giftedness. The process involved the documentation of these characteristics during the presentation of a lesson. Kingore (2001) recently developed a more sophisticated guide for interpreting results and developed a parent assessment to accompany the observation and documentation of gifted attributes in young children. I have used a simplified version by developing a chart that documents creative process and performance. A sample chart used for documentation of creative potential during C.R.E.A.T.E. lessons is presented in Figure 4.

Figure 4: C.R.E.A.T.E. Documentation Chart for Exceptional Creative Potential

CREATIVE THINKERS	FLUENCY (Number of Ideas)	FLEXIBILITY (Divergent Category)	ORIGINALITY (Creativity Award)	ELABORATION (Descriptive Title & Detailed Transformations)	Comments
Brandon					
Samuel					
Toya					
Ashley					
Joshua					
John					
Ellis					
Michael					

METHOD

Participants

Kindergarten, first and second grade students from one school participated in lessons based on the C.R.E.A.T.E. model for three consecutive years. Year one, there was one kindergarten, one first grade and one second grade class. Year two, there was one kindergarten, one first grade and one second grade class. Year three, there were two kindergarten classes and one first and second grade classroom. The children ranged in age from 5 to 8 years old.

While the state where this study transpired mandates gifted education, this school was chosen since it does not have full-time personnel to direct a program for the gifted. Thus, no enrichment at the primary grades based on creative thinking had previously been made available to the children in this setting.

Each child was given the Creativity Assessment Packet Test of Divergent Thinking - Form A (Williams, 1993) during the 2005-06 school year before beginning the project. One semester for three years, the participant observer went into each classroom and presented lessons based on the C.R.E.A.T.E. model. One lesson was presented each week for the duration of the semester. While the lesson was being presented, classroom teachers documented any exceptionally unique ideas according to the use of the criteria established (i.e., many ideas, change of topics, abstract ideas, unique ideas from age peers). The transformations were collected at the end of each lesson and analyzed to determine the most unique use of the shapes or lines compared to the rest of the class.

As each group exited the program, they were given the Creativity Assessment Packet (CAP) Test of Divergent Thinking - Form B (Williams, 1993). A comparison was then made between the pre and post assessments.

This study combined quantitative and qualitative research. Qualitative research included an analysis of classroom observations, videotapes of classroom activities during the use of C.R.E.A.T.E., and interactions with the classroom teachers. During the process of analyzing the data, standardized tests for creative thinking were utilized and pre- and posttests results determined changes from the beginning to the end of the study in

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children's responses. The study was designed to answer two questions. The first question related to differences in primary students' scores on a creativity measure through the primary grades: Is there a significant difference in primary students' scores on a creativity measure from the beginning of kindergarten to the end of second grade? Due to the non-experimental nature (i.e., no randomization and no control group) there was no control for internal validity. In other words, any gains between the pre- and posttests might be the result of history and maturation. And in this instance, I was only interested to see if there were changes and was not concerned that any growth might be due to developmental maturity. The second question was related to the use of a systematic plan to document creative potential: By engaging primary students in lessons designed to elicit creative process, do any students consistently exhibit exceptional creative behaviors? Thus, the primary focus of the study was to explore the use of the C.R.E.A.T.E. model for documenting creative potential among the students in order to see if a pattern developed. As the classroom teachers and the expert in gifted education worked together, the goal was to determine if any children could be recognized as exceptionally creative based on the documentation of potential during and following the lessons presented according to C.R.E.A.T.E. In other words, we were interested to see if any of the children would be documented consistently as exhibiting creative characteristics (i.e., fluency, flexibility, originality and elaboration). These reflected the elements of the assessment instruments; the weekly lessons were providing an opportunity for the children to engage in these elements of creativity based on C.R.E.A.T.E.

RESULTS

In 2005-2006 school year 17 kindergarten children, 16 first graders, and 20 second graders were given form A of the CAP Test of Divergent Thinking. At the end of the year, only second grade students were given form B of the Williams Divergent Thinking. These children received enrichment based on creative thinking for one semester of the school year. During the 2006-2007 school year, the current second grade class was given form B of the CAP Test of Divergent Thinking following the C.R.E.A.T.E. lessons. These children had engaged in the lessons for two academic years. During the 2007-2008 school year, the children who began in 2005 were administered Form B of the CAP Test of Divergent Thinking after three years of creative enrichment.

On the CAP the maximum raw score for fluency is 12, flexibility is 11, originality is 36, elaboration is 36 and titles is 36. According to the group upon which the instrument was normed, the mean score for fluency is 9, flexibility is 7, originality is 20, elaboration is 16, and titles is 24.

Each of the groups tested with pretest and posttest results will be described here. The first table illustrates the scores for the second graders during year one. These are the students who engaged in C.R.E.A.T.E. for only one semester of one academic year. The pre- and posttest results for the first class during the 2005-2006 school year are noted in Table 1.

Table 1
2006 Pretests and Posttests for Creative Thinking
2nd Grade at the End of Year 1

	PRETESTS		POSTTESTS		
	Mean	Stdev	Mean	Stdev	Sig.
Fluency	11.95	.224	12.00	.000	.330
Flexibility	8.30	1.559	8.05	1.538	.680
Originality	28.25	5.389	28.35	3.498	.938
Elaboration	12.65	5.743	17.10	6.223	.027
Title	17.90	3.810	19.75	5.108	.240

n=20

p<.05

While there were slight increases in the mean scores during the 2005-06 school year, second grade children made no statistically significant gains from the pretest to posttest on the CAP Test of Divergent Thinking in fluency, flexibility, originality or the titles. The mean scores improved in the category of elaboration from the beginning to the end of one academic year. It is possible that the children were more aware of using the whole space provided while completing transformations on the posttest since it was emphasized during class time when they were required to complete transformations at the end of each C.R.E.A.T.E. lesson.

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As stated earlier, the primary focus of this project was to determine if a pattern would emerge for exceptional creativity while children engaged in the activities. In this group of second graders, patterns did emerge in the frequency of times particular students were documented exhibiting exceptionally creative responses and production. Of the 20 children in the classroom, three of them (i.e., Ashley, Michael, and Shelly [pseudonyms]) were documented 6 to 8 times during 12 lesson opportunities as receiving creativity awards for transforming a shape into the most unique picture compared to classmates' ideas. The creativity awards (i.e., a sticker or gummy bear) were given for creative expressions – the unique transformation. Teachers and children should see how these drawings were unique. This was a tangible means of expressing and explaining creative production. It should also be noted that Ashley and Shelly were recognized by the teachers for having elaborative and/or abstract titles for their transformations. The following comparison chart is used to demonstrate the numbers of times the children expressed exceptionally creative ideas. Pseudonyms are used in the chart shown as Figure 5.

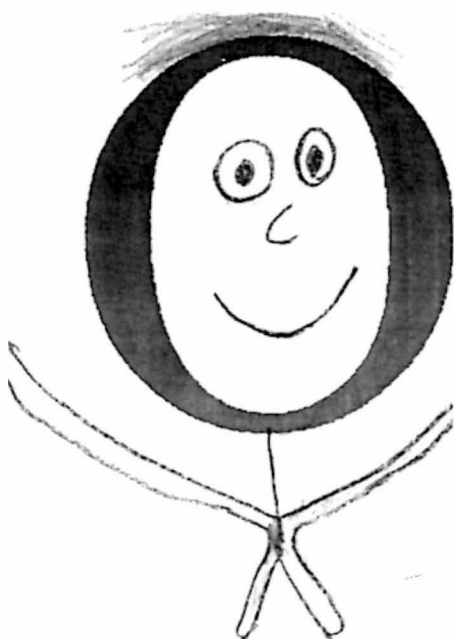
Figure 5: C.R.E.A.T.E. Documentation Chart for Exceptional Creative Potential

CREATIVE THINKERS	FLUENCY (Number of Ideas)	FLEXIBILITY (Divergent Category)	ORIGINALITY (Creativity Award)	ELABORATION (Descriptive Title & Detailed Transformations)	Comments
Brandon			I		
Samuel		I	II	I	
Toya			III	I	
Ashley		III	IIIIII	III	
Joshua					
John					
Jill					
Michael		I	IIIIII	I	
Isaiah					
Steven			II		
Dawn					
Robert					
Shelly		III	IIIIIIII	IIII	
Jace					
Angie					
Tony			I		
Sara		I	III		
Seth		I	I		
Beth					
Gracie					

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Figure 6 is presented in order to provide a sample of the students' work and to demonstrate what constituted recognition for originality. At the end of one of the lessons, the students were given a circle which was to be transformed into a unique picture. Three of the children used the circle to construct a face which was a common response to the transformation (see sample 1, 2, and 3). One child (i.e., Shelly) used the shape as a cookie jar. This transformation was unique. When this kind of response occurred multiple times throughout the course of the semester, a pattern emerged on the chart documenting potential. It should also be noted that samples 2 and 3 (i.e., Toya and Sam) were given a point or tally on the chart documenting elaboration for details in their transformations. See Figure 6 to view the transformations.

Figure 6: Transformations from one C.R.E.A.T.E. lesson



Sample 1
Happy Face



Sample 2
Kitty



Sample 3

Alien



Sample 4

Cookie Jar - Yum

The second group of children participated in the C.R.E.A.T.E. lessons for two semesters – one semester as first graders and one semester as second grades. The results of their pretests and posttests are presented in Table 2.

Table 2: 2007 Pretests and Posttests for Creative Thinking

2nd Grade at the End of Year 2

PRETESTS			POSTTESTS		
	Mean	Stdev	Mean	Stdev	Sig.
Fluency	10.31	1.195	10.56	1.263.	.643
Flexibility	7.19	1.276	7.75	1.915.	.339
Originality	24.38	5.572	24.94	4.057	.771
Elaboration	11.81	7.626	15.00	7.083	.292
Title	15.25	3.587	22.56	4.082	.001

n=16

p<.05

While there were slight increases in the mean scores on posttests from the beginning of the 2005-2006 school year, this group of second grade children made no statistically significant gains in four areas – fluency, flexibility, originality, or elaboration. There was, however, a significant statistical difference from the pre- to posttest scores in the titles for elaboration and abstractness of thought. The mean scores increased from 15.25 on the pretest to 22.56 on the posttests. These improved scores indicated that from the first grade to the end of second grade, this group of children used more detail and went from less literal to more abstract descriptions while describing the transformations they created.

Just as the second grade before them, as this group of children engaged in the C.R.E.A.T.E. lessons, some patterns emerged in the frequency of times particular students were documented as exhibiting exceptionally creative responses and production. Figure 5 illustrated how patterns emerged for the first group of second grade children. Of the 16 children in this classroom, two were documented more frequently than their peers for demonstrating flexibility, originality and elaboration. The documentation chart indicated that these children received recognition for the most creative transformations (i.e., 8 to 14 times) during the C.R.E.A.T.E. activities over the course of two semesters.

The final group of children engaged in C.R.E.A.T.E. lessons over the course of three academic years. They were pre-tested with the CAP Test of Divergent Thinking during

their kindergarten year. They were administered the posttests as they exited second grade just as the two groups before them. The results of their pretests and posttests are documented in Table 3.

Table 3: 2008 Pretests and Posttests for Creative Thinking
2nd Grade at the End of Year 3

	PRETESTS		POSTTESTS		
	Mean	Stdev	Mean	Stdev	Sig.
Fluency	10.19	1.515	11.94	.250	.002
Flexibility	7.38	2.446	9.88	1.500	.004
Originality	23.25	3.873	31.13	7.999	.006
Elaboration	12.75	9.518	18.63	6.120	.033
Title	18.75	4.960	21.19	5.528	.269

n=17

p<.05

This group made the most noticeable gains from the pretest to posttests. They began the C.R.E.A.T.E. activities while in kindergarten. At the end of their second grade year, their mean scores improved in all categories. There were statistically significant gains in fluency, flexibility, originality, and elaboration.

The documentation of potential on the chart was done in the same four categories as the standardized measure for creative thinking – fluency, flexibility, originality, and elaboration. There were two children from this group, who over the course of the three years, received consistent and numerous recognitions for creative behaviors, as indicated by the documentation chart. The two children were noted for multiple accounts of flexibility and elaboration; one received 22, the other received 31 recognitions for creativity with unique transformations out of 54 opportunities.

DISCUSSION

Over the course of three years, there was no indication, according to the documentation chart in the category of fluency of ideas, that any of the children at the primary level were

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exceptional in this area. This is most likely because documentation only occurred during the C.R.E.A.T.E. lessons. And the lessons offered a structured method for students to express their ideas in the brainstorming sessions. For example, students would be asked to think of things for which they wished. Then around the room each child would share one idea until everyone had shared an equal amount of times. Thus, the opportunity did not avail itself for the children to demonstrate the numbers of ideas that they possessed.

In the area of flexibility, a theme emerged in two instances where students repeatedly gave answers that were different from the other children. For example, when thinking about wishes, and one after the next, children named a toy or a pet, the children thinking differently gave answers like "to be an astronaut and go to the moon" or "to have a plant that could eat all my vegetables and my mom wouldn't know." Not only did these children receive tallies for flexible thinking, they were also documented for originality of thought.

The most apparent themes emerged in the area of originality. There were seven children from the three classes combined who exhibited exceptional creativity by receiving the creativity award multiple times. For example, when most children used a round shape as a face of a person or an animal, these children used it as a wheel of a vehicle, as a clock, or as a pie that grandma made.

In the realm of elaboration the students were asked to give their picture a name when the transformations were complete. In kindergarten and at the beginning of first grade the teachers wrote the title for the children. Most of the children were very literal and the title named the picture. For example, a title might be dog, kitty, or house. In only a few instances did children use more abstract titles like I Want a Bone, Fluffy, or Home Sweet Home. While no consistent patterns emerged in this category, it was interesting to note that the same children who exhibited the most original ideas also obtained the most points or tallies for elaboration on the documentation charts

It appeals to our logical thinking when we consider possible reasons for the increase in the posttest scores of the second grade students compared to their scores as kindergarten students. The group who engaged in the lessons according to C.R.E.A.T.E. for three

years improved their creative thinking scores from the beginning to the end of the study. While the reason for the change cannot be statistically linked to the lessons presented, gains were made. (No control group was available to determine if the improvements were based on developmental maturity or the opportunity to engage in creative thinking and express creative ideas.) But their weekly practice was correlated to the format of the creativity assessment used, and there was the weekly opportunity to practice transformations of shapes and lines into pictures in the same manner as the creativity tests. Perhaps a combination of the two contributed to improved creativity – opportunity for the students to engage in creative thinking and maturation.

During the collection of the data for this project, some of the children emerged more readily competent to think of unique ideas and to produce transformations that were exceptionally unique as compared to their age peers. It is interesting to note that while some children exhibited exceptional creativity through the transformations, there was a noticeable difference in the numbers of children who were rewarded from week to week. Upon beginning the project only two or three children per class received recognition for unique and different ideas on the transformation pictures. By the end of the study in the groups of older children, who had been doing the project for three years, there would most often be as many as six from one class that were exceptionally different from the majority of the other transformations.

The next phase of this project will be to determine if any of the children, who have appeared multiple times on the documentation chart as being exceptionally creative might qualify for program services for the gifted based on a complete case study of their capabilities in the realm of intellectual and academic giftedness. Some suggestions for others who might consider replicating this project are to have an experimental and control group while implementing the C.R.E.A.T.E model. It would behoove us to know if there is any difference between the two groups on pretests and posttests for creative thinking after the implementation of this model.

Studying creativity in young children is a pursuit full of endless possibilities. We can be certain that all young children share some common traits in the realm of creative

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imagination and potential. We can be just as certain that a minority of children in the primary grades possess creative abilities that exceed those of their age peers and require recognition in order to best serve the learning needs of the child. It is the responsibility of educators to provide the opportunities for the creative excellence to be shared and the development of creative potential to emerge.

Consequently, it is the duty of all educators to provide a learning environment and the opportunities for all children to express creativity. It was over 30 years ago that Paul Torrance (Rothenberg & Hausman, 1976) said it best:

I am asked frequently if...recent studies advance us any further in the direction of a more creative kind of education than did Progressive Education. If one examines what we have learned...it should become evident that it is possible for us to advance...closer to achieving the American dream of a kind of education that will give every child a chance to grow and to achieve his potentialities. (p. 226)

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TALENT DEVELOPMENT AND THE CREATIVE WRITING PROCESS: A CROSS-CASE STUDY OF HIGH-ABILITY AND GIFTED TEENAGERS

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During the past 30 years, talent development has become a central metaphor of gifted education (VanTassel-Baska, 1998). In this time period the federal government has taken three substantial initiatives in defining giftedness and talent: the report by U.S. Commissioner of Education Sidney Marland (1972), the Jacob Javits Gifted & Talented Students Education Act (1988), and *National Excellence* (1993). Since the publication of *National Excellence: A Case for Developing America's Talent* (1993), Bloom's *Developing Talent in Young People* (1985), and Gardner's *Frames of Mind* (1983), talent development has emerged as a focal point in the field, the paradigm for program development.

Gifted education has transcended from a psychometric perspective on intelligence and taken on the paradigm of a "multifaceted view of talents and abilities" (VanTassel-Baska, 1998), catering to developing talent in domains that are valued by society. Talent development and the writing process are particularly difficult because creative writing is a longer apprenticeship than most other talent fields (Pirto, 1994) and is concerned with the "internal life of the individual" (VanTassel-Baska, 1998).

Talent development is a complex and difficult process to study, since the development of any talent involves the interweaving of many factors (Bloom, 1985; VanTassel-Baska, 1996). The study of creative writing talent is complicated by the fact that writers do not always understand their own creative processes (Perkins, 1981; Wurtzel, 1995) and because the most valuable aspect of the self is the interior (Oates, 1999). Writing talent development studies have been conducted by notable writers in retrospect through the study of documents, writings, and biographical information (McGreevy, 1994). While these studies provide insights about childhood writing habits, the habits of gifted adolescent writers in real time have not been widely analyzed. This article will provide a summary of results from a qualitative study of The Talent Search Writing Program along with implications for the talent development of young writers.

BACKGROUND INFORMATION

This mixed-design study concerns the development of writing habits and skills of young writers who received prizes through the Talent Search Writing Program during 1999-2001. During 1997-2001, The Talent Search Writing Program flourished at The College of William & Mary. Young writers submitted work for publication and later attended classes with published writers on the college campus.

My study included the following research questions:

1. What markers of talent development do gifted high school students demonstrate in the area of creative writing?
2. How do gifted high school students describe their own patterns of talent development?
3. What roles do parents play in their children's creative writing talent development?
4. What observations do parents make of their children's talent development process?

This qualitative study focused on students who attained writing awards during grades 5-8 which generally placed them in grades 9-12 during the course of the study. I wanted to see if students progressed to higher levels of writing after winning awards between 1999 and 2001. By looking at talent development among teenagers, (all of the students who took part in this study were between the ages of 14-20), I hoped to gain new insights into talent development in real life (rather than retrospectively) and compare this data with parental perceptions.

CONCEPTUAL FRAMEWORK

Talent development is a complex entity, and the development of talent is a lifelong process beginning in early childhood and extending into late adulthood. The conceptual framework for this study was Gagne's Differentiated Model of Giftedness and Talent (1995) which describes the many different personal and environmental factors that affect the development of talent. The five aptitude domains included in this model are intellectual, creative, socio-affective, sensor-motor, perceptual motor, and other, which relates to personal abilities. Through a developmental process that includes training and

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practice, these domains are translated into talent in a variety of areas, including academics. High aptitudes are eventually transformed into refined talents with personal factors and environment having a major impact upon the evolution of the particular talent. Gagne (1995) theorized that talents emerged from the transformation of aptitudes "into well-trained and systematically developed skills characteristic of a particular field of human activity or performance" (p. 107). Gagne also emphasized the importance of intra-personal and environmental influences on a person's life and their role as catalysts in the development of talent. Using Gagne's Differentiated Model of Giftedness and Talent (1995) as a guide, I studied the development of creative writing talent among award-winning young writers. While investigating the impact of various environments and personal attributes on talent development, I also looked at educational experiences provided to students and the support given by parents. I developed the initial questionnaire and the follow-up questions in response to Gagne's paradigm.

My study also looked at the paradigm of talent development outlined by Bloom (1985). Bloom's study delineated three major phases of talent development – the early years, the middle years, and the later years. During the "early years," students are exposed to their talent field for the first time. In the "middle years," students refine their talent while training with a more specialized teacher. During the "later years," adults attain high levels of training and contribute to the greater field. High school students would generally be in the second stage of talent development; they are just becoming acquainted with the craft of writing but have not yet reached the third stage, where talent development is at a matured stage. By studying the early process of talent development, I contributed to the framework created by Bloom. Students have different insights about their writing while they are in Stage Two compared to more experienced writers reflecting back on their childhood writing habits.

PURPOSE OF THE STUDY

Within the context of my study, I looked at creative production in a qualitative manner. Instead of looking at creativity in isolation, I studied talent development within the context of the student's educational and home environment through the initial use of

questionnaires (completed by parents and students). I analyzed this quantitative data and selected five students (and parents) for follow-up interviews.

This mixed-design study used the cross-case methodology to observe five high-ability and gifted students in grades 9-12 who received awards for their writing in The Talent Search Writing Program during 1999-2001. I used several methods of instrumentation including questionnaires and interviews with the parents and students.

METHOD

Participants

During November of 2004, I mailed out 50 questionnaires to students and parents who participated in The Talent Search Writing Program during 1999-2001.

Because this study took place several years after The Talent Search Writing Program was discontinued, the database had not been updated. Ten questionnaires were not deliverable to the participant's address, and I was unable to retrieve addresses for these students. Of the 40 remaining questionnaires, 17 were returned during either the initial or the follow-up mailings, representing a return rate of approximately 42.50%. Because one set of parents and child declined to answer any questions in the returned questionnaire, there were sixteen complete responses to questionnaires, a true response rate of approximately 40%.

Sixteen students participated in the first part of the study: seven boys and nine girls. All of the students were high school age with the exception of one student who attended an elite university. Students and parents who returned questionnaires were assessed to determine if they were good candidates for a cross-case study based on (1) their willingness to participate in the interview, (2) the level of articulateness in responses to questionnaires and open-ended questions, and (3) their self-reported growth and development in the area of writing since The Talent Writing Search experience, approximately 4-6 years earlier. I selected four students who were between the ages of 14-17 in January 2005; I also selected the university student, who was 20 years old at the time. I selected Serena, age 16, Mary, age 20, Linda, age 15, Colin, age 17, and Charlie, age 14.

Instruments

Using the research questions as a guide, I constructed a questionnaire that was mailed to students and parents who met the criteria based on The Talent Search Writing awards. Sections of the student questionnaire included demographic information, the role of educational opportunities, the role of practice, the role of support aspirations, and personal characteristics. Parents filled out a separate questionnaire with questions probing similar components.

External and internal reliability are critical issues in research, particularly in qualitative research. According to Goetz and LeCompte (1984), "external validity relates to whether independent researchers would discover the same phenomena or generate the same constructs in the same or similar settings, while internal reliability refers to the degree to which other researchers, given a set of previously generated constructs, would match them with data in the same way as did the original researcher" (p. 210). Every attempt was made to reduce threats to data-collection reliability, and I carefully took field notes and prepared transcripts.

This qualitative study utilized a mixed design to examine research questions concerning how students learn to write creatively in the context of education and home environments. Themes of interest included students' behavior, the implementation of writing skills, and the catalytic effects of developing creativity in the context of a home and classroom that nurtured young writers.

Procedure

When I was able to meet the participants in person, the interviews took on a dimension that extended beyond the original scope of the study. I witnessed interactions between students and parents, getting a better sense of the support system provided at home. In the telephone interviews, students and parents provided helpful insights but certain nuances about personality and parent-child interactions were difficult to gauge. One student specifically requested an email interview, and her responses were extremely articulate.

When I conducted the interviews, I protected the privacy of participants by using pseudonyms instead of real names. This was essential because four out of the five interviewees were legally minors. Before conducting the interview, I informed participants that their responses would be confidential, and that identifiable remarks might be omitted from the study to protect their privacy. Students and parents were provided with a transcript of the interview questions and given the option of revising their statements via e-mail communication. Several parents submitted revised answers and one student revised his original answers.

Data Analysis for Case Studies

After the questionnaire data was delineated, I moved on to selecting case studies and interviewing them separately, preferably in person. I conducted data analysis while simultaneously collecting data, interpreting data, and writing a narrative report (Cresswell, 1994, p. 153). I collected information in the field, sorted the information into categories, formatted the information into a graph form, and then wrote a qualitative text (Cresswell, 1994, p. 153).

Then I processed this qualitative data through reduction and interpretation. I looked at a voluminous amount of information and reduced it to patterns, categories, and themes (Cresswell, 1994, p. 154). These themes were summarized into different categories in response to each research question; synonyms were summarized into a common response rather than being reflected separately in the content analysis.

Every effort was made to structure the data into categories, themes, and patterns that would provide a more cognizant narrative (Cresswell, 1994, p. 154). Categories and codes formed the basis for the emerging story, due to the fact that data collected in interview questions often has little structure in the responses (Cresswell, 1994, p. 154). Topics were abbreviated into codes, and during the preliminary organization I anticipated that new categories and codes would emerge (Cresswell, 1994, p. 155). I used the most descriptive words in each topic and turned them into categories (Cresswell, 1994, p. 155). Topics that

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were similar were grouped together to make a clear and concise compilation of information.

A coding system slowly emerged, focusing on the perspectives held by subjects, subjects' ways of thinking about people, subjects' thoughts about themselves, and activity codes. All of this coding directly related to the research questions, and has been delineated in this article.

In response to each research question, I compiled the most common responses and tallied the exact response in each category. The information was then provided in matrix form and discussed in a textual sense.

I began data analysis on interviews by looking at within-case analysis, focusing on content analysis and coding. Once the data was analyzed, I compiled a written report (Cresswell, 1994, p. 152). After the report was written, I contacted the individuals to show them their reports for member-checking, or verification, of the information. If the students or parents requested revisions, I made revisions to the interview data (Cresswell, 1994, p. 152).

Then I conducted a cross-case analysis, studying the similarities and differences across the five case studies. I looked at the similarities and differences and measures along a continuum for these five students and their parents. I hoped to find trends and themes in the questionnaires and in the interviews that would allow me to develop new insights about talent development among young writers.

Limitations

Limitations are potential weaknesses in the research (Cresswell, 1994, p. 110) and within this study there are several limitations. Internal validity is an important consideration in all research, particularly with children (Borg & Gall, 1989, p. 405). The most serious threats to internal validity include history, maturation, experimental mortality, and instrumentation. There were maturation effects as students learned writing skills and experienced affective and cognitive development. It is not always possible to know the history of each individual student ahead of time and to differentiate the background effects in their educational

settings and at home; this knowledge is essential in determining the full impact of the talent development process.

This longitudinal study of the winners of the Talent Search Writing Program would have been more effective if the database had been updated. Because the program became defunct in 2001, the database had not been updated since, and as a result I was not able to contact all the winners. Not only were the winners who responded a self-selecting group, but they were taken exclusively from the pool of people who happened to live at the same address that they had four to six years previously. These lost participants weakened the validity of the study. In this case, 20% of participants were immediately lost because they had moved and their forwarding addresses were no longer valid through the United States Postal Service.

RESULTS

Summary of Analysis

The questionnaire data was analyzed through descriptive statistics. Students and parents provided a myriad of information about the child's talent development process. Most parents were college-educated and expected their child to pursue higher education; parents provided their children with many cultural experiences and encouraged their children to pursue creative writing in the years following Talent Search. Students were encouraged to explore new ideas, express their opinions, set goals, and join in family discussions. Many parents saw The Talent Search Program as being critical for their child; the program validated the student's talent and provided him/her with the opportunity to meet with peer writers. One mother wrote, "It developed her confidence in herself as a writer, developed her identity as a writer. My daughter realized she could make an impression on the world." Most importantly, parents supported their child's interest in writing and reading through trips to the library, writing classes, and writing competitions. Students also believed that the Talent Search program was critical to their later development as writers; many students progressed by writing every day and by taking creative writing classes.

Cross-Case Analysis of the Research Questions

After interviewing the students, I conducted a cross-case analysis of all five students in an attempt to delineate emergent themes and patterns in individual talent development. For each of the four research questions, I looked across the case studies for particular themes; themes were developed as I collected the data. A content analysis was done of the answers, and common answers are presented in Table 1. For the first research question – what markers of talent development do gifted high school students demonstrate in the area of creative writing – a content analysis of answers yielded these responses: discipline, work with intensity/passion, work in different genres, and innovation.

Table 1: What markers of talent development do gifted high school students demonstrate in the area of creative writing?

	Demonstrate discipline	Work with intensity/passion	Work in different genres	Innovate
Serena, 16	X	X	X	X
Linda, 15	X	X		X
Mary, 20	X	X	X	X
Colin, 17	X	X		
Charlie, 14	X	X	X	X

Within the context of this study, students demonstrated a high percentage of identified markers of talent development. One mother described her daughter, "She has an uncanny ability to connect ideas with images. She always has an incredible sense of rhythm in her poetry. She has a different take on things. Her stuff seems more adult." Many of the students demonstrated discipline, intensity/passion, and innovation. During the context of the interview, all students demonstrated several markers of talent development. A few students did not demonstrate all of the talent development markers, but perhaps clear evidence of these processes would have come forth in a longer interview. While I purposely crafted eight open-ended questions, it is possible that students did not articulate the full scope of their writing talent development and accomplishments due to modesty.

Table 2: How do gifted high school students describe their own patterns of talent development?

	Expect it to be lengthy	Requires study and practice	Perceive selves to be at beginning of talent development
Serena, 16	X	X	
Linda, 15	X	X	X
Mary, 20	X	X	
Colin, 17	X	X	
Charlie, 14	X	X	

In the cross-case analysis of the second research question (Table 2), students believed that talent development was a long, arduous process. Significantly, all the participants were between the ages of 14-20, relatively young for writing talent development. But in many cases, these writers had focused and applied themselves from an early age, so they were no longer at the beginning of the talent development process. While all The Talent Search Writing Award winners understood that they were progressing and had much development yet to come, they perceived their abilities to be intermediate rather than novice. One girl advised would-be writers, "I would tell them to practice all the time. Practice makes perfect." A boy advised peers to "find the style you like the best but be open to as many different writing styles as possible – to incorporate writing styles into your own style."

See Table 3 for an analysis of the third research question: What roles do parents play in children's creative writing talent development? Upon a content analysis of the answers, I discovered that three responses were most prevalent: parents provide support, act as facilitators, and help students to develop independence and initiative.

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Table 3: What roles do parents play in children's creative writing talent development? (Student and parent perceptions)

	Provide support	Act as facilitators	Help students develop independence and initiative
Serena, 16	X	X	X
Linda, 15	X	X	X
Mary, 20	X	X	X
Colin, 17	X	X	X
Charlie, 14	X	X	X

Parents and students had similar perceptions about parental involvement in the talent development process. Parents provided support, facilitation of talent development, and steady encouragement. One girl said, "They (parents and teachers) nurture it by giving me time to write. I don't write well when it's been pushed to the last minute." A mother stated, "We travel a lot, try to expose her to different types of experiences. We go to lots of plays and museums." Not surprisingly, students developed these habits of mind by the high school years, and as a result parents were less involved in the talent development process than they had been at an earlier time.

In Table 4, I did a content analysis of the responses to the fourth research question – What observations do parents make of their children's talent development process? – focusing on the four most common themes and patterns of response.

Table 4: What observations do parents make of their children's talent development process?

	Systematic studying of the craft of writing	Reading	Writing on a regular basis	Receptive to criticism
Serena, 16	X	X	X	X
Linda, 15		X	X	X
Mary, 20	X	X	X	X
Colin, 17		X	X	X
Charlie, 14	X	X	X	X

These five students were highly accomplished in many different areas. Three out of the five students emphasized the fact that they systematically studied writing, read, wrote on a regular basis, and received constructive criticism. One mother stated, "Each time I see her papers, I can see that she has opened herself to a deeper thought process. Even the questions that she brings up for debate are more world-focused than self-focused." Another mother observed, "It's very easy in retrospect to identify periods when Linda's writing improved dramatically. In every case, it's when a teacher or mentor takes an interest in her and suggests contests or new projects she might try." A father said, "She has a lot of potential. With the skill she is developing, she could go into a political career and write speeches." Two students did not emphasize the systematic studying of the craft of writing in their responses. Yet these two students wrote on a regular basis, read, and were receptive to criticism – indications that they were also seriously pursuing the craft of writing.

In Table 5, I delineated the most common cross-case findings for all four research questions. I conducted a general content analysis, looking for common themes and patterns that emerged in the cross-case findings.

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Table 5: Connecting research questions to cross-case findings

Research Questions	Cross-case findings
1. What markers of talent development in the field of creative writing do gifted high school students demonstrate?	Students demonstrate discipline, intensity, passion for the craft, ability to work in a variety of genres, flexibility, and innovation.
2. How do gifted high school students describe their own patterns of talent development?	Students described the talent development process as lengthy, requiring much study and perceived that they were only at the beginning stages.
3. What roles do parents play in their children's creative writing talent development?	Parents were supportive and acted as facilitators of talent development, rather than directing their children. As a result, students developed independence, initiative, and high levels of creativity.
4. What observations do parents make of their children's talent development process?	Parents see their children systematically pursuing careers in writing; activities include reading, studying the craft of writing, and actually writing on a regular basis. Students were receptive to constructive criticism and willing to work many hours to improve their craft.

The primary unit of analysis for this mixed design research was the five students and their families. An important aspect of this research was how individual students developed their writing talents within the context of the family and the community.

DISCUSSION

During the interview process, I developed a better appreciation for the complexity of the writing process. Young writers need privacy, a support system, encouragement, and support. Parents were supportive when their children needed them to be and allowed

children to develop independence and initiative at other times. Early in the talent development process, parents played a more active role in critiquing their children's work. As students became teenagers, parents stepped back and allowed their children more independence.

During the interviews parents and students shared similar insights. Perhaps this reflected the child-parent relationships and the connectivity in their perspectives. Parents and students might have had more concurrence because in many cases they completed the interview together, or in near vicinity to each other.

The Talent Search Writing Program represented a critical point in the career of these young writers. Writing is inherently difficult because there is no specific way of "breaking in" to the field. As students reached adolescence, they found it difficult to move beyond contests and awards and into more demanding projects like books and novels. Such projects require discipline, intensity, and resilience – habits of mind that take many years to develop. As one boy remarked, "Putting words on paper is not difficult, but getting the right words, words that mean exactly what you're trying to say, is trickier. It requires careful thought on wording, and that in turn requires extensive trial and error in every single individual document, whatever it may be."

Even for the most dedicated artists, creative writing took a backseat to school assignments. However, students recognized that the analytical skills they were developing in English and history classes would eventually translate into higher quality work in literary areas. One young man remarked, "Sometimes I read a book many times – at least two or three times – and I start to think, okay, how would I change this to make it better? What is the meaning?" Based on their awards, persistence, and support systems, I expect these students to launch into successful writing careers in the near future.

Creative writing is a complex and difficult field to enter. One boy remarked, "Creativity by definition means something completely new, not worded properly, but it is impossible to do something completely new. You have to get your idea from somewhere."

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What about the future? How can these results be useful for others? This study provides insights into the importance of writing talent development during the middle grade and high school years; the most successful writers had supportive home and school environments, yet progressed independently in developing their crafts. Knowing that writing is an internal process, it is best for teachers and parents to provide support while allowing young writers the freedom to develop their talent in the direction of choice. Perhaps future researchers will explore young writers at the first stage of talent development, attaining insight into the first sparks of imagination.

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Appendix A
Talent Search Winners
Parent Questionnaire

Demographic Information

1. Name _____
2. Address _____

3. E-mail Address _____
4. Phone _____
5. Please check the highest level of father's and mother's education.

a.	High school	_____ Father	_____ Mother
b.	Some College	_____ Father	_____ Mother
c.	College degree	_____ Father	_____ Mother
d.	Post-college	_____ Father	_____ Mother
e.	Master's	_____ Father	_____ Mother
f.	Doctoral	_____ Father	_____ Mother
6. Please check father's and mother's employment

Father _____	Mother _____	Professional (doctor, lawyer, teacher)
Father _____	Mother _____	Business executive, administrative, managerial
Father _____	Mother _____	Technical
Father _____	Mother _____	Sales
Father _____	Mother _____	Administrative support, clerical
Father _____	Mother _____	Service occupations
Father _____	Mother _____	Machine operators, textile, general laborers
Father _____	Mother _____	Not employed at this time

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7. Please indicate approximately how many times during the past year family activities centered around the following:

___ Museums	___ Demonstrations/lectures	___ Tours
___ Movies	___ Zoo/aquarium/botanical gardens	___ Plays
___ Exhibits	___ Educational enrichment trips	___ Concerts

8. How important is each of the following in your home life?

1=Not important 2=Of little importance 3=In the middle 4=Important 5=Very

Exploration of new ideas	1	2	3	4	5
Consistency	1	2	3	4	5
Expressing personal opinions	1	2	3	4	5
Exchange of information	1	2	3	4	5
Structure	1	2	3	4	5
Family discussion	1	2	3	4	5
Organization	1	2	3	4	5
Exploring controversial issues	1	2	3	4	5
Routine	1	2	3	4	5
Reading	1	2	3	4	5
Goal setting	1	2	3	4	5
Cooperation	1	2	3	4	5
Accommodating children's interests	1	2	3	4	5

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9. What are your aspirations for your children's educational attainment? (Please specify for each individual child if your aspirations for them are different.)

For all children	First child	Second child	Third child
Below high school	Below high school	Below high school	Below high school
High school	High school	High school	High school
College	College	College	College
Master's	Master's	Master's	Master's
Doctoral	Doctoral	Doctoral	Doctoral

10. As your children consider career choices, what are the issues you and they will face?

Section B: Role of Educational Opportunities

11. How long has your child been interested in writing?
12. How have you helped your child develop an interest in writing?
13. What kinds of educational opportunities have been especially important to his/her development as a writer?
14. What kinds of books does your child like to read?
15. Do you see your child's reading interests transforming into writing projects and ideas? How?
16. What intellectual growth patterns do you see in your child, as he develops his artistic ability?
17. Do you feel that Talent Search was a valuable educational opportunity for your child? In what way?

Section C: Role of Support

18. How do you support your child's interest in writing?
19. What sorts of support system does your child have at school?
20. Does your child have a mentor figure in her life?
21. Do you feel that your support has helped your child develop his abilities to a higher level?

Section D: Role of Practice

22. What sorts of learning and training opportunities has your child had in writing?
23. How often does your child write?
24. Is your child motivated to become a better writer? Yes No
25. What kinds of practice does he to improve his skills?
26. What sort of environment does she like to work in?

Section E: Role of Personal Characteristics

27. Do you think perseverance is an important part of writing? Is your child persistent?
28. What kinds of practice does she do to improve her skills?
29. If you could describe your child in three adjectives, relating to writing, what would they be?
30. What kinds of intellectual processes do you see in your child's writing?
31. What makes her writing creative?
32. What sorts of traits do young, creative writers exhibit?
33. What skills/performance/ability did your child acquire by:
Age 5 _____
Age 10 _____
Age 15 _____

Section F: Aspirations

34. What kinds of aspirations does she have?
35. How did winning an award in Talent Search affect those aspirations?
36. Since winning an award in Talent Search, has he become more inspired?
Motivated?
37. Do you see your child having a professional career as a writer?
Yes No
38. If you answered yes, in what genre?
39. How difficult do you think it will be for your child to develop her abilities to a more professional level?

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Please answer the following on a 1-5 scale.

1=Not at all 2=A little 3=Sometimes 4=Often 5= Always/Nearly Always

40. My child is very creative. 5 4 3 2 1
41. My child has developed as a creative writer over the past 6 years.
5 4 3 2 1
42. Tension/frustration is rt of the creative process. 5 4 3 2 1
43. My child reads a lot as a routine activity. 5 4 3 2 1
44. My child likes to be by himself/herself. 5 4 3 2 1
45. My child feels that writing is important. 5 4 3 2 1
46. My child demonstrated precocity in writing (early age productivity) 5 4 3 2 1
47. My child's creativity is stifled by school. 5 4 3 2 1
48. My child's creativity is facilitated by school. 5 4 3 2 1
49. My child has a sense of humor. 5 4 3 2 1
50. My child likes to experiment with language. 5 4 3 2 1
51. Would you be willing to be interviewed as a research study participant?
Yes _____ No _____

Appendix B
Talent Search Winners
Student Questionnaire

Please answer the following questions: All information will be kept strictly confidential.

Section A: Demographic Information

1. Full name _____
2. Date of Birth _____
3. Gender Female _____ Male _____
4. Ethnicity _____
5. Telephone Number _____
6. Email Address _____
7. Honors and Awards _____
8. Current GPA _____
9. PSAT/SAT scores math/verbal _____

Section B: Role of Educational Opportunities

9. How long have you been interested in writing?
10. What sort of support system do you have, as a young writer? How has this helped you develop your talent and interest in writing?
11. Do you feel that your school program has helped you become a better writer? If yes, how? If no, why not?
12. Do you feel that Talent Search was an important educational opportunity for you? In what way?
13. Do you feel you have progressively developed your writing skills to a higher level? How?

Section C: Role of Support

14. Are your parents supportive of your writing? Yes No
15. If your parents are supportive, how do they support your writing?
16. What sorts of encouragement do your teachers give you?
17. What sorts of learning and training opportunities have you had in writing?
18. Do you have a mentor?

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19. How many different opportunities have you had over the past five years to develop your talent? Since winning an award in Talent Search, what opportunities have you had to take classes and practice the craft of writing?

Section D: Role of Personal Characteristics

20. Do you feel motivated to become a better writer? Yes No
21. If yes, what kinds of practice do you do to improve your skills?
22. What insights have you recently learned about the writing/creative process?
23. Do you call yourself a writer?
24. Are you persistent? In what ways?
25. What are you thinking about as you write?
26. What do you learn about yourself as you write?
27. When you read a book, what attracts your attention the most?
28. When you are writing, what environment/setting do you feel most comfortable in?
29. How do personal events, and the context of your own life, affect what you choose to write?
30. How do you feel when you get an award? Does it make you value yourself as a writer more? (If so, in what way?)
31. Do you believe you are intellectually gifted? Yes No
32. Why or why not?

Section E: Aspirations

34. Do you see yourself possibly having a professional career as a writer? Yes No
35. What kinds of aspirations do you have as a writer?
36. How did winning an award in Talent Search affect your aspirations?
37. Since winning an award in Talent Search, have you become more inspired or motivated? How?
38. Do you believe you have other specific abilities or gifts? Yes No
39. If you answered "Yes," please describe these abilities and gifts.
40. Would you be willing to be interviewed as a research study participant?
- Yes _____ No _____

Thank you. I really appreciate your taking the time to complete and return both this preliminary questionnaire and the consent form.

Appendix C
Interview Questions for Students

1. How do you feel when you are writing? Is it easy or difficult for you?
2. What advice would you give other students who are learning to write?
3. What kinds of practice and training do you do, on a regular basis, to improve your writing?
4. How has your writing improved? Why?
5. What sort of environment do you work best in?
6. How do your parents/teachers nurture your creativity?
7. What kind of educational opportunities do you wish you could have? Why?
8. What other insights do you have into your own development as a creative writer?

Appendix D
Interview Questions for Parents

1. Is writing a difficult process for your child?
2. Do you feel your child is progressively developing her skills to a higher level of writing? How difficult is this process?
3. What kinds of practice and training does your child do, on a regular basis, to improve his writing?
4. How has your child's writing improved? Why?
5. What kinds of environments/surroundings does your child work best in?
6. How do you nurture your child's creativity?
7. What makes her writing creative?
8. What other insights do you have into your child's creative writing development?

* Please note that the child and parental interview questions are intended to complement and parallel each other. Many questions are in fact very similar – and are merely reworded to suit the parental perspective. Questions 1, 3, 4, 5, 6, 7, and 8 are directly parallel between the parents and the children, emphasizing the importance of comparing data from these two critical sources.



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