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# A General Theory for the Development of Creative Productivity Through the Pursuit of Ideal Acts of Learning[1]

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*The great thing in this world*
is *not so much where we stand*
as *in what direction we are moving.*
-Oliver Wendell Holmes

## Abstract

This article presents a general theory for developing creative productivity in young learners by examining the interactions between and among the learner, the curriculum, and the teacher. Further interactions within the learner dimension of the theory are examined by analyzing the relationships between and among learners' abilities, interests, and learning styles. Teacher interactions are examined by analyzing teachers' knowledge of the discipline that they are teaching, instructional techniques, and the teachers' "romance" with the discipline. The curriculum is examined by analyzing the structure of disciplines, the content and methodology of disciplines, and the discipline's appeal to the imagination of students. Also proposed is a three-dimensional research paradigm for examining creative productivity: (a) the types of creativity we are attempting to develop, (b) the domains in which creative pursuits are carried out, and (c) the contextual variables that influence the creative process.

## Putting the Research to Use

The value of any theory in an applied discipline resides mainly in the power of that theory to generate research. Many of the ideas put forth in this article are derived from observations of outstanding learning experiences that have been characterized by the several interactions between and among teachers, learners, and the curriculum that form the organizational components of the theory. Practical applications would include additional methods of analyzing learner dimensions, more effective ways of selecting and training teachers, and greater attention to the development of curriculum that respects the subcomponents that form the three dimensions of the curriculum component of the theory. Although an emphasis in our field has been on teacher training, the advanced levels of knowledge, requirements for curriculum development, and especially the need for teachers with a "romantic" relationship with

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a discipline may require that future practice focus on teacher selection as much as teacher training.

## Introduction

The history and culture of mankind can be charted to a large extent by the creative contributions of the world's most gifted and talented men and women. What causes some people to use their intellectual, motivational, and creative assets to achieve outstanding manifestations of creative productivity, while others with similar or perhaps even more considerable assets fail to attain high levels of accomplishment? The folk wisdom, research literature, and biographical and anecdotal accounts about creativity and giftedness are nothing short of mindboggling; yet we are still unable to answer this fundamental question. Although it would be tempting to present yet another "combination-of-ingredients theory" to explain why some people achieve and others do not, I will forgo this temptation for two reasons. First, several writers (Mönks, Van Boxtel, Roelofs, & Sanders, 1985; Renzulli, 1978a, 1986; Sternberg & Davidson, 1986; Tannenbaum, 1986) have already speculated about the necessary ingredients for creative productivity. These theories have called attention to important components of and conditions for creative accomplishment, but they fail to explain how the confluence of desirable traits ignites that inexplicable spark that gives rise to what Briggs (1990) has called "the fire in the crucible." That certain ingredients are necessary for creative productivity is not debatable; however, the specific traits, the extent to which they exist, and the ways they interact with one another will continue to be the basis for future theorizing, research, and controversy. For the present, we can assume that there are indeed minimum levels or thresholds of desirable combinations of assets that can be collectively summarized under the general headings of cognition, personality, and environment. Major contributions to these general areas of theory and research have been summarized in collected works on the topic such as *Conceptions of Giftedness* (Sternberg & Davidson, 1986), although most theorists agree that there is considerable overlap between and among the general categories.

Most theorists would agree that excess amounts of certain traits (e.g., intelligence) do not necessarily compensate for limited assets in other areas; and that some characteristics in extreme forms (e.g., perfectionism) may even be detrimental to creative productivity (Sternberg & Lubart, 1991, pp. 17–18). We need to learn more about all aspects of trait theory, but I also believe that new research in the 1990s and in the century ahead must begin to focus on that elusive "thing" that is left over when everything explainable has been explained. This "thing" is the true mystery of our common interest in creative productivity and the area that might represent a new frontier for research in the 21st century. I am not so bold as to think I can specify an agenda for this research; however, the suggestions offered here are certainly logical next steps that build upon what we already know and that hopefully will point the way toward future breakthroughs in understanding the manifestation of human potential.

The second reason that I will not revisit trait theory is that my own orientation is both psychological and educational; therefore, my work over the years has focused on the application of theory and research to practical situations in schools and classrooms. My major concern, from the perspective of an educational psychologist, is that my work be grounded in theory and research that allows for hypothesis testing but at the same time have practical applications that

show promise for teaching and guiding the development of our most potentially able young people. Thus, when reference is made to the overall goal of my work—increasing creative productivity in young people—I am most concerned about this phenomenon in a developmental perspective. What we know about world-famous creative producers, the Edisons and the Curies, certainly guides us on our journey toward understanding this mysterious phenomenon, but my concern is with how we can promote a disposition toward creative productivity in today's classrooms. This kind of creative productivity, in most cases, will never be recorded in the annals of eminence, but if we can create a *modus operandi* for such productivity in larger and larger numbers of young people, then we may actually be contributing to the encouragement and development of Nobel Prize winners in the 21st century.

If we have learned anything over the past several years about human abilities, it is that knowledge about theories and research dealing with creative productivity are only an entry point for the pragmatist and the educational practitioner. Unless we can find ways of putting knowledge to work in practical real-life situations (schools and classrooms), our knowledge may lead us to more and better theories and to higher and higher degrees of sophisticated research, but it will not help us to increase the number and quality of creative persons on this earth. What also intrigues me in this regard is the distinct advantages that may result from practical applications, even if such applications fall short of rigorous theoretical underpinnings. One of my favorite sayings is, "If you truly want to understand something ... try changing it!" I believe that our understanding of creative productivity will increase if we expand the rate of change through practical applications in an experimental context, even if such experimentation deals with some admittedly unconventional, obscure, ambiguous, and even downright nonsensical concepts. All of the knowledge in the world about the learner will come to naught unless we also examine the two other components that affect the act of learning: the teacher and the curriculum. Finally, if we are to advance our understanding of creative productivity, we must have a sense of the ideal, the way that things should be under optimal conditions. But we also must be cognizant of the realities that prevent us from achieving the ideal, and most of all we must learn to devote our resources to those conditions which we have the highest probability of changing. We cannot tell young people when and into which families they should be born or what their parents should be like, nor can we influence to a large extent their nutrition, home life, financial support, or a broad range of chance factors that will affect their lives. But we can influence a number of school-related factors, and it is these factors that I will focus on in pointing out how we can promote creative productivity by devoting our resources to the development of ideal acts of learning.

The purpose of this paper, therefore, is to present a general theory for the development of creative productivity by providing students with opportunities to engage in what I will refer to as ideal acts of learning. The three major components of the theory are *the learner, the teacher,* and *the curriculum*. The relationship between and among these components and their respective subcomponents are presented in Figure 1. The Venn diagram has been selected to portray these relationships because this type of diagram emphasizes dynamic *interactions* rather than linear relations. I would like to say at the outset that I am not proposing equity among the components and subcomponents. The circles undoubtedly vary in size from one learning situation to another, and even within a single learning situation. I am proposing, however, that all components must be present to some degree for ideal acts of learning to occur, an assertion, like any other theoretical proposition, which must ultimately be tested through research. Before proceeding, I

would also like to say that this paper will not attempt to summarize the vast number of studies dealing with the learner, the teacher, and the curriculum. Rather, some pertinent examples will be cited within each component and subcomponent of the theory, and I will point out what I believe to be promising areas of future research and development.

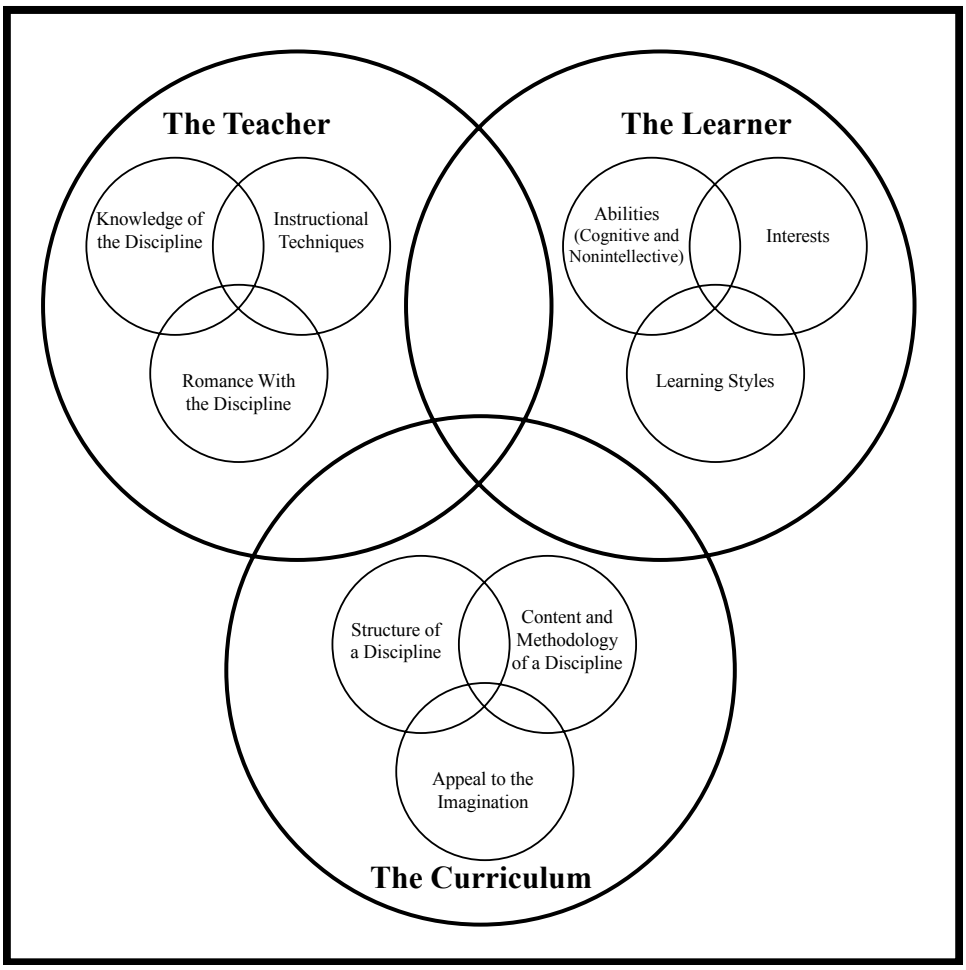


**Figure 1.** An Ideal Act of Learning

## The Learner

### Abilities

The vast majority of theory and research on human potential has focused on the cognitive and personality traits of the learner. One need only look at the almost endless list of tests for measuring intelligence, achievement, aptitude, and personality traits to realize the amount of research and development that has been devoted to this aspect of the learner. Although a good deal of this research has dealt with single traits (e.g., intelligence, risk taking, tolerance for ambiguity, perseverance, etc.), the confluence-of-trait theories have clearly emerged as the most promising vehicles for characterizing what we know about human abilities. In spite of all that has been done within trait and confluence theories, we still need more research that deals with the study of human abilities within the context of how these abilities are applied in the everyday world. We also need to examine why some persons who have the necessary components for

creative productivity do not automatically manifest their potential in rigorous problem-finding and problem-solving situations. This recommendation is not a criticism of laboratory research or multivariate studies; however, a closer examination of *how* creative people do their work in real life situations will I believe, add new insights beyond those that have focused on why they pursue complex tasks and which abilities they bring to their respective endeavors. The evolving-systems approach developed by Gruber and Davis (1988) uses a case-study methodology that allows researchers to focus on the interactions and relationships between and among a large number of issues. This approach seeks to understand how one organizes and reconstructs a life to form a system of knowledge, purpose, and affect that can lead to creative work. Gruber and Davis recommend the following three propositions for understanding the events related to creative problem solving:

1. Each creative person is a unique configuration.
2. The most challenging task of creativity research is to invent means of describing and explaining each unique configuration.
3. A theory of creativity that chooses to look only at common features of creative people probably is missing the main point of each life and evading the main responsibility of research on creativity. (p. 245)

Although past and present paradigms have served us well in advancing our understanding of creative productivity, the above propositions suggest that we need to go beyond the person, process, product paradigm that has guided research on creativity for the past several decades. And we also need to go beyond case studies of eminent persons, however valuable these studies have been in helping us to gain insights into the creative process. Because of my own interest in examining creative productivity in young people, I would like to recommend that the methodology suggested by Gruber and Davis (i.e., intensive studies of eminent persons) be applied to intensive studies of young people *at work* on problems that focus on authentic applications of cognitive, affective, and motivational processes. A figural representation of such a research paradigm is presented in Figure 2. In addition to the personological variables that have dominated research for so many years, these studies should also examine the influence of environmental variables, the contexts in which young people pursue their work, and the domains within which they are working. As Feldman (1988) has pointed out, creative work requires mastery of a domain but does not necessarily require mastery as an end point. Rather, the significant extension and examination of the domain are the goals of the creative work. The personological variables studied should also be extended to include new and exciting ideas such as Feldman's perspectives on the role of insight and transformations (Feldman, 1988, p. 284). And although major new research initiatives should be made in the segment of Figure 2 dealing with real problem creativity, there is still much to be learned about the types of situational creativity that are popular training activities in programs for the gifted and talented.

It would be difficult to leave the abilities dimension of the learner without speculating about some of the areas in which future research might be considered. Some of these recommendations overlap with the interest and learning styles sub-components of the learner; however, interrelationships rather than discrete categories are the junctures that are emphasized in the Venn diagrams of the general model. The suggestions that follow are not necessarily drawn from the research literature. History, biography, autobiography, folklore, drama,

journalism, and fiction form the nonscientific rationale for these suggestions, some of which undoubtedly fall into the unconventional and ambiguous categories mentioned earlier.

| | |
|---|---|
| Moral Courage | Positive Feelings From Hard Work |
| Optimism | Sense of Power to Change Things |
| Vision | Sense of Direction |
| Charisma | Satisfying Life Styles |
| Hope | Sense of Destiny |
| Absorption | Sensitivity to Human Concerns |
| Gender | Romance With a Topic or Discipline |
| Personal Choice | Physical and Mental Energy |

One or a combination of these factors is usually present in persons who are the object of our common concern; and indeed, it is usually these factors that have brought such persons to our attention in the first place. My rationale for a list such as this is that a better understanding of these factors *might* hold the key to finding that elusive thing that is left over when everything explainable has been explained.

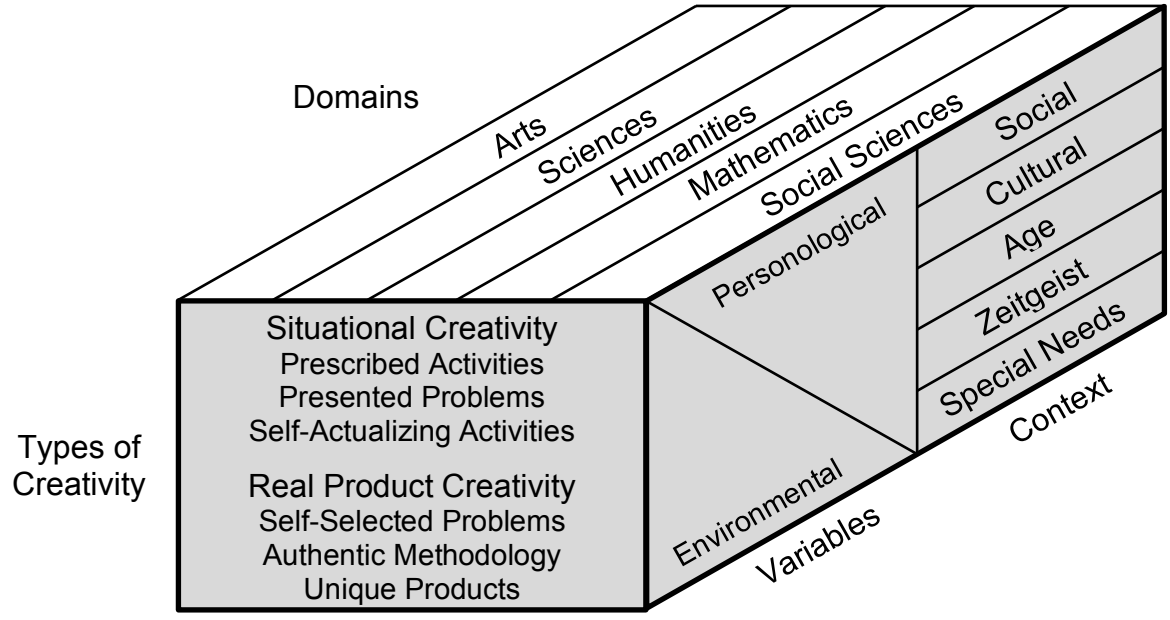


**Figure 2.** Paradigm for Case Study Research on the Development of Creative Productivity in Young People

**Interests**

If there is a favored component in this overall model, and indeed in all of the work that I have done over the years, that component is interests. But what amazes and perplexes me the most about interests is that in spite of all that we know about the absolutely crucial role they play in learning and high levels of creative productivity; we know remarkably little about how and why interests originate in young people. I believe that all cognitive behavior is enhanced as a function of the degree of interest that is present in an act of learning, wherever that cognitive behavior may be on the continuum from basic skill learning to higher levels of creative

productivity. The relationship between interest and learning was undoubtedly recognized by the first humans on earth, and it became a topic of scientific inquiry in the 19th century when philosophers recognized the close relationship between interest and learning (Herbart, 1806/1965, 1841/1965; James, 1890). Dewey(l913) and Thorndike (l935) called attention to the important role that interests play in all forms and levels of learning. They also recognized the importance of the *interestingness* of tasks and objects[2] as well as the personal characteristics of the learner. Piaget (1981) argued that all intellectual functioning depends on the energizing role that is played by affective processes such as interests, and he used the term *energetic* to describe this dimension of human information processing. Numerous empirical studies have also demonstrated that individual interests have profound influences on learning (Krapp, 1989; Renninger, 1989, 1990; Schiefele, 1988), and developmental theorists have acknowledged the importance of interests. Albert and Runco (1986) state that "it is primarily in those areas in which one takes a deep personal interest and has staked a salient aspect of one's identity that the more individualized and 'creative' components of one's personality are energized" (p. 343). Gruber (1986) argued that the main force in the self-construction of the extraordinary is the person's own activities and interests. Gruber also maintained that the shaping of a creative life may not necessarily involve precocity, early achievement, and single-mindedness, qualities that many scholars have attributed to the gifted.

Research studies that have examined the long-range effects of participation in programs based on the Enrichment Triad Model (Renzulli, 1977b) have indicated that the single best indicator of college majors and expressions of career choice on the part of young adults have been intensive involvement in projects (i.e., Type III Enrichment) based on early interests (Hebert, in preparation). We also have learned that high-ability students who participated in a gifted program for 5 years or longer in which they displayed higher levels of creative productivity than their equally able peers were remarkably similar to their peers, with one notable exception. The more creatively productive group displayed early, consistent, and more intense interests (Reis & Renzulli, in preparation).

Although this research does not unravel the mystery of why interests are formed, the procedures used in Triad-based programs may provide some clues about how we can promote interest development. First, general interest assessment information is gathered through an informal instrument called the *Interest-A-Lyzer* (Renzulli, 1977a) or a parallel form of the instrument specifically designed for primary age students entitled *My Book of Things and Stuff* (McGreevy, 1982). Next, a variety of interest development activities (Type I Enrichment) based on the general categories of interests for a given group are provided. An effort is made to select activities (e.g., speakers, demonstrations, visitations, etc.) within any given category that are likely to promote excitement and motivation. Subsequent discussions and debriefings are designed to explore potential follow-up investigations, but the follow-up must adhere to guidelines that define Type III Enrichment (i.e., based on the *modus operandi* of the practicing professional rather than the lesson learner). Student choice is the key ingredient in determining whether or not follow-up will be pursued. At this point, every effort must be made to promote interestingness of tasks or objects at each progressively complex level of involvement with the topic.

[2] The interestingness of a task or object is viewed as a property of the task or object rather than a property of the person. Interestingness does, however, have the power to promote personal interests in the learner.

Interestingness of tasks and task commitment are interdependent constructs. One of the most frequently asked questions about my own work in connection with the three-ring conception of giftedness (Renzulli, 1978a, 1986) is: Where does task commitment come from? Although the answer to this question is undoubtedly a complex one, a major contribution to what may be called the energizing function is unquestionably the interaction between the amount of energy that is part of the individual's personality and physical make-up on one hand, and the interestingness of the task or object on the other. This relationship is represented in Figure 3.

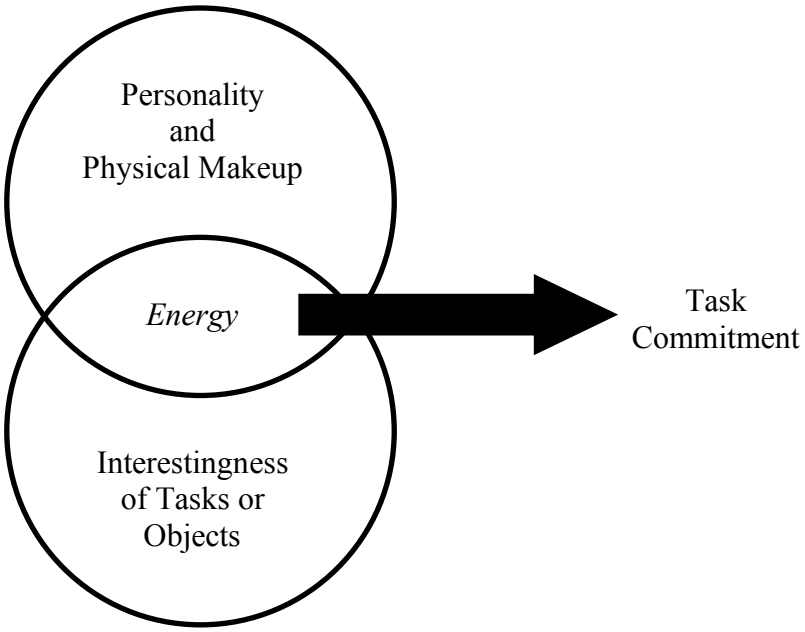


**Figure 3.** The Energizing Function

Not all tasks and objects within a given domain are created equal so far as interestingness is concerned, and unfortunately there has been very little if any research that deals directly with ways of evaluating interestingness. Amabile (1989) reviewed several studies dealing with the ways in which work environments influence creativity, and Ward (1969) found that children who pursue creativity tasks in an environmentally rich room show higher levels of ideational fluency than children who performed in a bare room. Feldhusen, Hobson, and Treffinger (1975) found that subjects engaged in a divergent thinking task produced more original responses when provided with verbal stimuli associated with remote responses. If we are to capitalize on what we know about the crucial roles played by interest and task commitment in creative productivity, this type of research, which examines factors outside the individual, might help us to identify those topics that have the highest degrees of interestingness. This research might begin by recruiting persons with experience in a domain to identify those aspects of a topic that hold the greatest potential for stimulating interest and excitement on the parts of students. Although investigations of the energizing function will certainly add to our understanding of interest development and task commitment, this function is undoubtedly buried deep within the physical and psychological make-up of the individual. It is for this reason that a careful analysis of interestingness of tasks or objects is recommended as a potentially valuable area of inquiry within this general model.

**Learning Styles**

Several investigators have suggested that an area of major importance in which students differ is their style of learning. Learning styles have been variously defined according to psychological types such as introversion *versus* extroversion (Myers, 1980) and preference for varying degrees of structure in the learning process (Hunt, 1975). Kolb, Rubin, and McIntyre (1971) and Gregorc (1985) have proposed that styles vary according to preferences that can be plotted on axes ranging from concrete to abstract and from sequential to random. Dunn, Dunn, and Price (1975) proposed a definition and instrument based on student preferences for various physical characteristics of the learning environment (e.g., auditory and mobility preferences, comfort requirements, and preference for individual versus group work), and Barbe and Swassing (1979) have examined learning styles in terms of sensory modality preference (visual, auditory, tactile, and kinesthetic). Renzulli and Smith (1978) developed an instrument that assesses styles in correspondence with the following instructional techniques: Projects, Drill and Recitation, Peer Teaching, Discussion, Simulation and Teaching Games, Independent Study, Programmed Instruction, and Lecture (Smith, 1976). Sternberg's (1988) recent work on intellectual styles proposes that we examine this dimension of the learner according to preferences for function, which he describes in terms of legislative (creation, formulation, and planning), executive (the execution of plans and ideas), and judicial (monitoring, judging, and evaluating).

Most of the persons who have contributed to the literature on learning styles are in agreement about certain issues. First, there may be "natural" preferences for a particular style that are a function of personality variables; however, styles are also a function of socialization, and therefore several styles can be developed. Second, there is a complexity of interactions between and among styles, and styles further interact with abilities and interests. Third, certain curricular or environmental situations favor the applicability of some styles over others. In other words, there is a style-by-task interaction that is dictated by the nature of the material to be learned. Thus, for example, learning traditional mathematical concepts may favor structured, sequential styles and corresponding modes of instruction, whereas brainstorming possible approaches to addressing a societal problem will undoubtedly favor persons who are more extroverted, have greater preference for unstructured situations, and derive satisfaction from interacting with their peers. Finally, the reward structure of learning situations influences the development of style. Teachers who place a premium on order, control, and conformity are likely to promote more structured and less innovative styles in malleable learners. It is conceivable that long-term exposure to highly structured teaching may eventually result in a rigidity of style that minimizes adaptability to situations requiring the skills necessary for creative productivity. If personality factors or supportive family or peer intervention do not override school-created styles, persons with extremely high degrees of ability and interest in a particular area may fail to achieve their potential for creatively productive contributions.

Since it is the intent of this paper to focus on school-related recommendations, I will first offer an ideal (and perhaps obvious) suggestion, but I will also add a more realistic and systematic approach that we should consider in the majority of cases where the ideal cannot be accomplished. Ideally, we should attempt to match students with teachers and learning environments that capitalize upon their preferred style. Several studies have indicated that more effective learning results from this type of matching, especially in areas where the matching is

based on preference for instructional methods rather than personality variables (Hunt, 1971; James, 1962; Pascal, 1971; Smith & Renzulli, 1984; Yando & Kagen, 1968). We should, therefore, devote considerable effort to analyzing the preferred learning styles of students and look for opportunities to place students with teachers who have compatible styles. But the style-by-task interaction mentioned above, and the fact that most teaching situations are group rather than individually oriented, ordinarily prevents us from achieving this ideal. To a large extent, the teacher and the nature of the subject matter structure the ways in which certain tasks will be pursued. Even in cases in which a single mentor can be arranged for an individual student, the match may be more in harmony with mutual interest in the topic rather than with a compatible learning or intellectual style.

A more realistic approach to capitalizing upon differences in learning style is to begin in the early years of schooling to provide young students with a broad range of experiences that expose them to various styles. In much the same ways that we provide systematic coverage and documentation of content, so also should we be exposing students to carefully planned ways of using various instructional styles. Thus, for example, a teacher might announce at the beginning of an instructional unit, "We are going to study the economic law of supply and demand by engaging in a simulation in which each of you will have control over the buying and selling of major food product groups." The teacher should explain what a simulation is, why it has been selected for use in connection with this topic, and how it compares with other instructional styles through which the topic might be taught. These advanced organizers should call attention to the pedagogy of the learning situation as well as the content and processes to be learned.

Following exposure to a particular style, a careful postlearning analysis should be conducted that focuses on the unique properties of the purposefully selected instructional technique. Students should be encouraged to discuss and record in their journals their reactions to the instructional technique in terms of both efficiency in learning and the amount of pleasure they derive from the technique. The goal of the postlearning analysis is to help students understand more about themselves by understanding more about their preferences in a particular situation. The collective experiences in learning styles should provide: (a) exposure to many styles, (b) an understanding of which styles are the most personally applicable to particular subjects, and (c) experience in how to blend styles in order to maximize both the effectiveness and satisfaction of learning. The ultimate goal of teaching students about learning styles should be to develop in each student both a repertoire of styles and the strategies that are necessary to assist students in modifying their styles better to fit future learning or career tasks. In much the same way that a golf player examines distance, wind conditions, and obstacles before selecting the appropriate golf club, so also should we teach students to examine learning situations with an eye toward selecting and applying the most appropriate styles.

In a certain sense, the type of training and analysis of styles suggested here might be viewed as a specific form of flexibility training typically associated with the pedagogy used in creative thinking. Although there are undoubtedly a variety of ways in which such training might be organized, the approach recommended here would focus on instructional methods that vary by degree of structure and how structure interacts with the nature of the material to be learned.

## The Curriculum

Although much has been written about curriculum development for the gifted, a good deal of this material might best be described as ordinary lists of curricular principles or "should lists" that focus on thinking skills, abstract concepts, advanced level content, interdisciplinary studies, thematic approaches, and a blending of content, process, and product. A careful examination of these principles leads to the conclusion that they are applicable to most, if not all, of the general curriculum. The fact that there have been very few "small wars" between general and special curricular advocates or among persons writing about curriculum for the gifted is testimony to the acceptance of these lists of principles by both general and special educators. But the lack of controversy may also be indicative of a shortage of truly differentiated curriculum theory.

In an effort to identify what might be relatively unique aspects of curriculum for the gifted, a rationale was developed that combines a theory of knowledge (James, 1885; Whitehead, 1929) with contemporary conceptions of giftedness and the anticipated professional roles that we expect persons of high potential to fulfill in their future lives. This rationale also draws upon selected concepts from curricular and instructional theory, and it has been configured into a practical guide for curriculum writers entitled *The Multiple Menu Model for Developing Differentiated Curriculum for the Gifted* (Renzulli, 1988). A graphic representation of this model is presented in Figure 4; three of the major components of the model will be discussed in the sections that follow.

### Structure of a Discipline

The predominant value of a discipline lies not so much in its accumulated facts and principles as in its systematic way of thinking about a body of knowledge—its forms and connections, its unsolved problems, its methods of inquiry, its aspirations for improving mankind, and the special way it looks at phenomena. A concern for structure even includes the folklore, humor, personalities, gossip, and insiders' knowledge that causes a person to be a member of the discipline rather than merely a student studying about the discipline. Curricular emphasis on the structure or "psychology" of a discipline is recommended because *advanced* involvement in any area of study requires that the interested novitiate learn how to think *in* the discipline. Perhaps an analogy will clarify what thinking in a discipline means. Some people can communicate in a non-native language, but they don't know how to think in that language. They communicate by simply translating words they hear or read into their native language, formulating a mental response in their native language, and then translating that response into written or spoken words in the non-native language. Similarly, in mathematics, some people can solve standard problems, even very complex ones, by using replicative thinking—simply "plugging" information into a formula and performing customary calculations. But without being able to think *mathematically,* it is unlikely that this person will be able to deal with nonstandard problems, let alone make contributions that will lead to the advancement of the discipline.

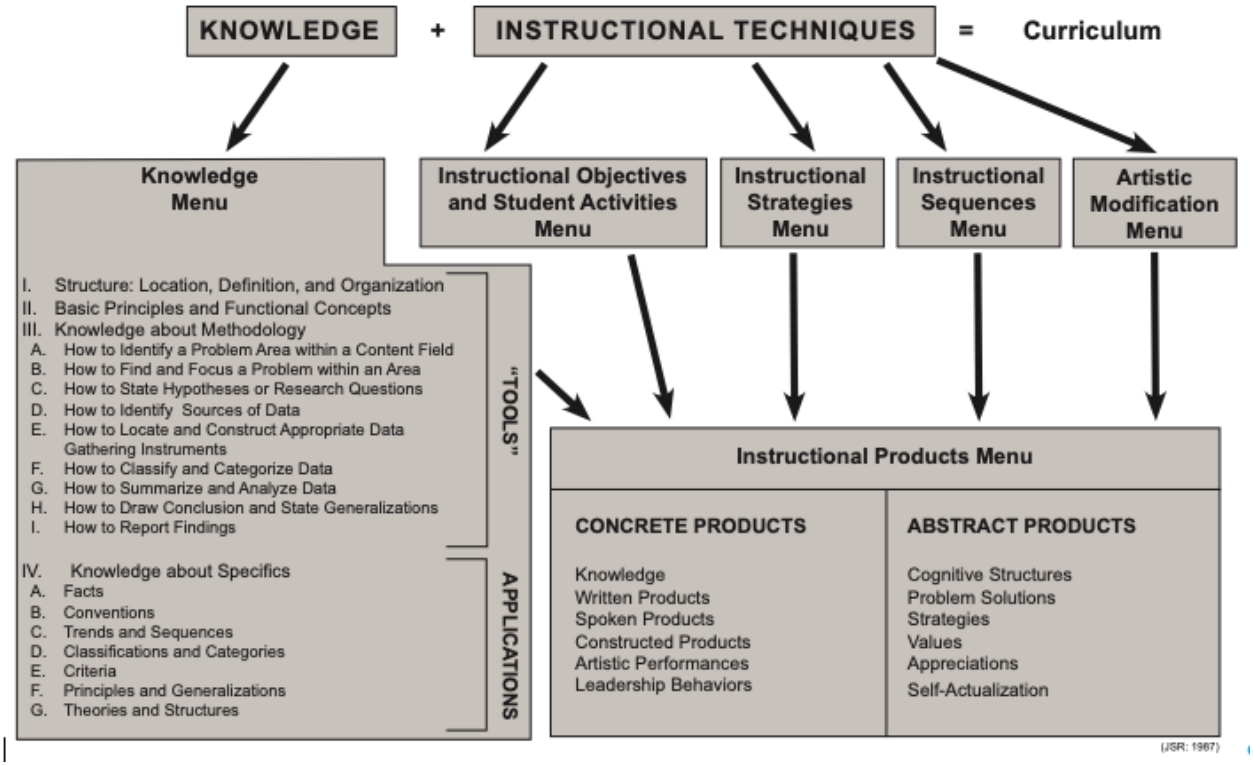


**Figure 4.** The Multiple Menu Model for Developing Differentiated Curriculum

One of the most debated issues in curriculum is, shouldn't all students be taught to think in the discipline? My answer to this question will obviously be controversial because it has implications about the grouping of students and, indeed, the very justification for having special programs for the gifted. I believe that all students should have the opportunity for experiences that lead to within-discipline thinking, but I also believe that *all curriculum should be arranged so that whatever paths students travel and whatever distances they travel on these paths must be appropriate to their unique abilities, interests, and learning styles.*

An attempt has been made in the Multiple Menu Model to promote within-discipline thinking by recommending a series of curricular experiences based on the following questions:

1. What is the overall purpose or mission of this field of study?
2. What are the major areas of concentration of the field and its subdivisions?
3. What kinds of questions are asked in the subdivisions?
4. What are the major sources of data in each subdivision?
5. How is knowledge organized and classified in this field or subdivision?
6. What are the basic reference books in the field or subdivision?
7. What are the major professional journals?
8. What are the major data bases? How can we gain access to them?
9. Is there a history or chronology of events that will lead to a better understanding of the field or subdivision?
10. Are there any major events, persons, places, or beliefs that are predominant concerns of the field or best-case examples of what the field is all about?

11. What are some selected examples of "insiders' knowledge" such as field-specific humor, trivia, abbreviations and acronyms, "meccas," scandals, hidden realities, or unspoken beliefs?

Activities based on these questions should be developed in a way that places the learner in the role of a professional or first-hand inquirer in a field rather than that of a mere assimilator of information, however advanced that information may be. This can be done by creating a mind set in students that all knowledge should be viewed as temporary, imperfect, and imprecise. Every experience should be viewed as a confrontation with knowledge, and students should be empowered to believe that they have the license to question, criticize, and, most importantly, add their own interpretations and contributions to existing knowledge. The concept of validation of knowledge and the direct teaching of epistemology (i.e., different ways of knowing such as authoritarianism, empiricism, revelation, etc.) is another kind of confrontation that teaches students the metacognitive procedures for examining critically their own interpretations and creative contributions. A confrontation with knowledge means that everything that is already known, or that we hope students will acquire, is secondary to the development of mind in general and within-discipline thinking in particular.

**Content and Methodology of a Discipline**

Content selection is undoubtedly one of the most difficult problems curriculum developers face, and within this problem two overriding issues must be addressed. The first issue deals with which topics should be included in a course or curricular unit, and the second is the level of advancement or complexity with which the topics should be covered. With regard to the first issue, the approach suggested here is based on the work of Phenix (1964), who recommends that a focus on representative concepts and ideas is the best way to capture the essence of a discipline. Representative ideas or concepts consist of themes, patterns, main features, sequences, organizing principles and structures, and the logic that defines a discipline and distinguishes it from other disciplines. Representative ideas and concepts can also be used as the bases for interdisciplinary or multidisciplinary studies; however, issues related to structure that were discussed above should be considered when drawing on two or more domains of knowledge.

Building a curriculum on representative concepts also allows us to introduce an element of economy into content selection. The vast amount of material within any given discipline prevents unlimited coverage of content; therefore, material must be selected so that it is both representative and maximally transferable. A three-phase approach is recommended that takes into consideration the interaction between intensive versus extensive coverage and group versus individual learning situations. Thus, in Phase I (Intensive/Group), a representative concept in literature such as tragic heroes might be dealt with through intensive examination of two or three prototypical examples (e.g., *King Lear* and *The Autobiography of Malcolm* X). Selections of more than a single exemplar of the concept allow for both in-depth analysis and opportunities to compare and contrast authors' styles, historical perspectives, cultural differences, and a host of other comparative factors that single selections would prohibit. The payoff so far as transfer is concerned is to follow the in-depth coverage with a meta-analysis or debriefing of factors (i.e., characteristic themes, patterns, etc.) that define the representative concept. The goal of the meta-analysis is to help consolidate cognitive structures and patterns of analysis developed through in-

depth study of a small number of literary selections so that they are readily available for use in future situations.

Phase II (Extensive/Group) consists of the perusal of large numbers of literary contributions dealing with tragic heroes to which similar cognitive structures and patterns of analysis can be applied. Although perusal of large numbers is recommended, coverage should be *purposefully* superficial but geared toward stimulating follow-up by interested individuals. This follow-up, which might take place immediately or in later life, represents Phase III of the process, an Intensive/Individual examination of material dealing with the concept of tragic heroes. Phase III might be formal study or simply the more sophisticated appreciation that one derives from reading for pleasure or viewing a play.

The second issue in content selection, the level of advancement or complexity of material, must first and foremost take into consideration age and ability, maturity, previous study, and experiential background. Beyond these considerations, three principles of content selection are recommended. First, curricular material for high-ability students should escalate along a hierarchy of the following dimensions of knowledge: facts, conventions, trends and sequences, classifications and categories, criteria, principles and generalizations, and theories and structures. Second, movement toward the highest level, theories and structures, should involve continuous recycling to lower levels so that facts, trends and sequences, and so forth can be understood in relation to a more integrated whole rather than isolated bits of irrelevant information. Third, the cluster of diverse procedures that surround the acquisition of knowledge—that dimension of learning commonly referred to as "process" or thinking skills—should themselves be viewed as a form of content. It is these more enduring skills that form the cognitive structures and problem-solving strategies that have the greatest transfer value. When we view process as content, we avoid the artificial dichotomy and the endless arguments about whether content or process should be the primary goal of learning. Combining content and process leads to a goal that is larger than the sum of the respective parts. Simply stated, this goal is the acquisition of a scheme for acquiring, managing, and producing information in an organized and systematic fashion.

The best example of process as content can be found in teaching the methodology of a discipline. In my own work, and especially the Type III dimension of the Enrichment Triad Model (Renzulli, 1977b), the focus on methodology is mainly directed toward providing young people with first-hand experiences in the production of knowledge and helping them to confront the all-important issue of "what makes a problem real" (Renzulli, 1982). This focus is based on what I believe to be the most powerful rationale for special education for the gifted and talented. Justification for special services for the gifted rests, in part, on the anticipated social roles that we expect young people of high potential to play in their future lives, both in terms of their own self-fulfillment and in the advancement of the human condition. Supplementary investments in their education are justified because we assert that these young people will be the leaders and contributors to their respective fields of professional involvement. If we accept this assertion, then it follows logically that a focus on methods of inquiry is the most direct way to prepare high-potential youth for these roles.

A focus on methodology means more than just teaching students methods of inquiry as content. Rather, it is designed to promote an understanding of and appreciation for the application of methods to the kinds of problems that are the essence of particular fields of knowledge. The goal of a focus on methodology is to cast the young person in the role of a first-hand inquirer rather than a mere learner-of-lessons, even if this role is carried out at a more junior level than the adult professional. This role encourages young learners to engage in the kinds of thinking, feeling, and doing that characterize the work of the practicing professional because it automatically creates the kind of confrontation with knowledge described above.

**Appeal to the Imagination**

Within the context of curricular decision making, there is one additional consideration that should be addressed. Phenix (1964) has termed this concept the appeal to the imagination, and he argues very persuasively for the selection of curricular material that will lift students to new planes of experience and meaning. Material drawn from the extraordinary should allow students to "see more deeply, feel more intensely, and comprehend more fully" (p. 346). Phenix sets forth three conditions that should guide our thinking with regard to this concept and the role that teachers play in the pursuit of imaginative teaching. First, he points out that the means for stimulating the imagination differ according to the individual, his or her level of maturity, and the cultural context in which the individual is located. Second, the teacher must exemplify the imaginative qualities of mind we are trying to develop in students and be able to enter sympathetically into the lives of students. Finally, imaginative teaching requires faith in the possibility of awakening imagination in any and every student, regardless of the kinds of constraints that may be placed on the learning process.

There are, undoubtedly, different perspectives about how to select content that will appeal to the imagination. A curriculum with such a focus could easily fall prey to material that deals with seductive details or esoteric and sensational topics. I do not believe that seductive details and so forth are inherently inappropriate as curriculum material. Indeed, they often serve the important function of stimulating initial interest and creating what Whitehead (1929) called the romance stage with a topic or field of study. But if seductive details and sensational topics become ends rather than means for promoting advanced understanding, then we have traded appeal to the imagination for romanticism and showmanship.

How then should we go about selecting curriculum material that appeals to the imagination but is not based purely on sensationalism? I believe the answer rests, in part, on selecting content that represents powerful and controversial manifestations of basic ideas and concepts. Thus, for example, the concepts of loyalty versus betrayal might be examined and compared in political, literary, military, or family perspectives, but always in ways that bring intensity, debate, and personal involvement to the concepts. An adversarial approach to ideas and concepts (i.e., loyalty versus betrayal) also guarantees that the essential element of confrontation with knowledge will be present in selected curricular topics. In a certain sense, it would be feasible to write the history of creative productivity as a chronicle of men and women who confronted existing ideas and concepts in an adversarial fashion and who used existing information only as counterpoints to what eventually became their own unique contributions to the growth of knowledge. It was these confrontations that sparked their imaginations, and it is for

this reason, I believe, that an appeal to the imagination should be a major curricular focus for the gifted.

## The Teacher

The role of the teacher in almost any formal learning situation is well-recognized and may indeed be the most important single ingredient in this or any other model of learning. And when we view teachers in expanded roles as mentors and models, their significance in the lives of young people with high potential becomes more prominent. When Walberg, Rasher, and Parkerson (1980) examined the biographical antecedents of persons of accomplishment, they found that almost two thirds of their subjects were exposed to creatively productive persons at very early ages. Bloom (1985) reported that demanding teachers and mentors played an important role in the development of high-achieving youth, and Goertzel, Goertzel, and Goertzel (1978) concluded in their biographical study of eminent persons that mentors were especially important in evoking motivation. And a compendious biographical and autobiographical literature also points to the significant roles that dedicated teachers-as-mentors have played in the development of persons who have made important contributions to their respective areas of study.

Extensive studies on various aspects of teacher effectiveness have been summarized in publications such as the *Handbook of Educational Research on Teaching* (Gage, 1963, 1973; Wittrock, 1986), and a number of studies have been reported that deal with the general characteristics of teachers of the gifted (Bishop, 1981; Feldhusen & Hansen, 1988; Gear, 1979; Gowan & Brunch, 1967; Lindsey, 1980; Maker, 1975; McNary, 1967; Mulhern & Ward, 1983; Pierson, 1985; Whitlock & DuCette, 1989). Only a small number of studies have focused on the kinds of teachers that promote high levels of creative productivity in their students. One large sample study ($N$=671) dealing with this topic (Chambers, 1973) found that teachers who fostered creativity tended to allow students greater choice in the selection of topics, welcomed unorthodox views, rewarded divergent thinking, expressed enthusiasm for teaching, interacted with their students outside of class, and generally conducted classes in an informal manner. In a study by Torrance (1981) that examined follow-up data of adolescent and adult creative behavior, 220 subjects provided anecdotal reflections about "teachers that made a difference." The findings support Chambers' conclusions and also point out teacher attitudes and techniques that helped young learners "fall in love" with a topic or subject to such an extent that it became the center of their future career image.

In a qualitative study by Story (1985) that focused on six teachers who were guiding students through Type III investigations, teachers of the gifted displayed several common characteristics. First, they established positive relationships with their students by always working in close proximity with them. The frequent verbal interaction between teacher and student was of high quality, including verbal motivation, higher level questioning skills, and a reciprocal sense of humor. The teachers were flexible about their use of time and scheduling, spending more time with students as it became necessary. Finally, the teachers recognized that their students' creative productivity was an ultimate goal, and thus, the teachers provided human and physical resources to help students realize this goal.

An attempt will not be made here to draw conclusions from the voluminous literature on teachers and teaching, nor will an attempt be made to point out the controversies that currently exist with regard to the selection and preparation of teachers. Rather, the focus will be on three major components that constitute the ideal teacher of the gifted and the ways in which these components interact with one another and with the learner and curriculum dimensions of the model. Finally, recommendations will be made for some suggested areas of research dealing with this crucial component of ideal acts of learning.

**Knowledge of the Discipline**

Arguments go back and forth about the degree to which teachers should be masters of the content area(s) in which they teach. For a number of years, a major emphasis in gifted education was placed on "process," and although no one ever stated directly that knowledge of a discipline was unimportant, an unspoken reality was that the majority of teacher training within the field dealt almost exclusively with instructional technique rather than advanced mastery of an academic or artistic discipline.

Many problems are inherent in the content versus process controversy in preparing teachers of the gifted, not the least of which is the age or grade level of one's students. It is reasonable to argue that primary and elementary grade teachers, those who are responsible for teaching several subjects rather than specializing in one area, cannot be expected to be expert in all areas. But it can also be argued that advanced coverage of any topic requires advanced knowledge and understanding on the part of persons who are directing the work of bright young people. The position taken here is that advanced competency in at least one discipline is important because it is through such content mastery and personal involvement that teachers, even if they are dealing with topics outside of their major area, develop the kind of appreciation for within-discipline thinking that improves the guidance of learning in other areas. Equally important for teachers of high-potential young children is an understanding of general research methodologies[3] and a repertoire of managerial skills that allow them to guide students through investigative activities (Renzulli & Reis, 1985).

Teachers at upper grade levels must, of course, develop advanced competency in their field of specialization, and I do not think that anyone would argue against advanced study in one's academic discipline as a minimum requirement for teachers of upper grade gifted youth. But advanced competency, in and of itself, is no guarantee that high-quality teaching will take place. We only need look at typical university teaching to realize that highly competent specialists often teach in uninspiring ways that are characterized by what Schwab and Brandwein (1962) described disparagingly as "memorizing a rhetoric of conclusions" (p. 24) and what Dewey (1929) critically called "the spectator theory of knowledge" (p. 23). Knowledge of the discipline means far more than merely knowing the facts, principles, and theories that define an area of knowledge. It also means knowing and understanding the role of methodology and being able to guide students through the application of methodology in real problem situations. It is this level of involvement-the application of authentic investigative methods to self-selected and

[3] At the University of Connecticut, all persons enrolled in our program for teachers of the gifted are required to take at least one course in research methods. Additionally, persons enrolled in a course dealing with curriculum development for the gifted are required to gain at least introductory college-level familiarity with an academic area in which they are planning to prepare curricular materials.

personally meaningful problems—that I believe represents true differentiation in learning. In the sections that follow, two additional characteristics of teachers that transcend advanced knowledge and that are modeled on the teacher-as-mentor literature mentioned above will be discussed.

**Instructional Technique**

The essential issue regarding instructional technique, and especially technique that fosters creative productivity, is best phrased as a question. To what extent is effective technique a "natural" characteristic of the individual teacher, and to what extent can it be taught? Both personality and training contribute to the development of teachers who encourage and facilitate creativity. Years of training teachers of the gifted have led me to believe that certain personality characteristics are necessary for highly effective teaching of the gifted. These characteristics, which are generally found in confident but nonauthoritative persons, include flexibility, openness to experience and new ideas, a high energy level, optimism, commitment to excellence, and enthusiasm for living. These characteristics are viewed as "starting material," and they are important enough for me to recommend that *teacher selection should be a consideration that precedes teacher training.*

But training in pedagogy also plays an important role, and I have attempted to describe the areas upon which teacher training should focus in the four menus subsumed under Instructional Technique in Figure 4. The Instructional Objectives and Student Activities Menu addresses the following hierarchy of thinking processes: Information Pick-up (assimilation and retention), Information Analysis (higher order processing), Information Output (synthesis and application), and Evaluation (review and critique). The Instructional Strategies Menu identifies 14 teaching strategies that range along a continuum from structured to unstructured patterns for organizing learning. The Instructional Sequence Menu deals mainly with organizational and management techniques, and the Artistic Modification Menu focuses on techniques that personalize the teaching process and encourage teachers to put themselves *into* the material rather than merely teaching about it. Although teachers undoubtedly have "natural" preferences for specific techniques within the several categories that constitute each instructional menu, the broad range of differences that will be encountered in working with gifted students requires that a repertoire of techniques be developed. Ideal acts of learning will obviously be enhanced if there is a perfect match between teacher and learner styles. Perfect matches, however, are the exception rather than the rule; therefore, teacher training should be geared toward developing a range of teaching styles and encouraging a flexible use of styles to accommodate individual abilities, interests, and learning styles.

**Romance With the Discipline**

One of the characteristics that distinguishes truly inspiring teachers is their love for the material they are teaching. Most of what we know about teachers who have this romance with their discipline comes from biographical and autobiographical accounts of well-known persons who were inspired and guided by an outstanding teacher. A recent book edited by John C. Board, *A Special Relationship: Our Teachers and How We Learned* (1991), consists of the memoirs of eminent persons from all walks of life who describe the important roles that outstanding teachers played in their early development. In analyzing the common themes that existed between teachers and learners, Board comments:

> These teachers, almost without exception, displayed masterful command of their subject matter. All were caring. All were possessed of an uncanny ability to unleash youthful potential. All were demanding, all relentless in their determination to ignite in every student the will to excel. And all were, to borrow Louis Nizer's words, "alike in their boundless energy." (p. 19)

Board goes on to describe what he calls "an uncommon characteristic that great teachers hold in common," and that characteristic is their own passion for knowledge and learning. They view themselves as a part of the discipline rather than as a person who merely studies about it or teaches it to others. This characteristic may have more important consequences for the identification and development of high-level talent than is immediately obvious.

Although it is only speculation on my part, I believe that it is this romantic relationship with a discipline that causes certain teachers to seek out and nurture students of remarkable potential. In much the same way that the owner of a successful business or *objet d'art* wants to insure that a prized possession is passed on to someone who is a trustworthy recipient, teachers who have a romantic relationship with a discipline will be similarly concerned about the intellectual heirs of their beloved field of study. Our most obvious paradigm for master/apprentice relations is that the apprentice seeks out the master because of his or her reputation in a particular area of study. This scenario may very well be the case in most instances and at the earliest points of contact. But in cases where teachers are responsible for many students, and especially if the group is a highly select one to begin with, it may be the passionate teacher who identifies the *most* promising student and who provides this student with extraordinary opportunities, resources, and encouragement.

Although the teacher's technique and romance with a discipline may not be as objectively verifiable as the extent of knowledge and methodology that the teacher possesses, the importance of these characteristics in the development of creative productivity in young people should cause us to examine them more carefully. The careful study of talented teachers *at work* with high-potential students in learning situations that place a premium on creative productivity should be documented so that we can learn more about the special relationships that have been described in the literature. A good starting point for such studies might be to compile lists of teachers whose students have consistently performed well in situations where high-quality products (rather than test scores or grades) were the criteria for success; and the best procedure for this type of research is the qualitative, case study method. Studies of this type will undoubtedly be more time-consuming and less precise than multivariate or retrospective studies because we are seeking to examine a process rather than "measure traits," and we are also looking at a large number of contextual variables at the same time. But case studies that focus on painstaking examinations of the interactions between teachers and students in various age groups, cultures, disciplines, and learning environments may lead to some conclusions and generalizations that are replicable, even within these areas of teaching that many view as an art rather than a science.

**Toward the Year 2000 and Beyond**

Educational and psychological research has made remarkable progress during the past two centuries in helping us to understand the complex nature of giftedness. And the wide variety of programming options that have emerged during the latter part of the present century have

helped us learn a great deal about practical ways better to serve young people of exceptional promise. But the continued growth of our field requires that we extend our research and development efforts into areas that have only been touched upon or largely ignored. It is time to go beyond the multitude of studies that deal with the same cluster of traits that have been the repeated focus of so much of our research. We still have not found "that elusive 'thing' that is left over when everything explainable has been explained." Therefore, we need to strike out on a path of bold new investigations that consider some of the admittedly vague but intriguingly enigmatic characteristics about which I speculated earlier in this article. We need to explore new research paradigms that focus on the intensive study of young people at work in practical and realistic learning situations that place a premium on creative productivity rather than structured lesson learning, regardless of how advanced that learning may be. In this regard, we must learn to view special programs as places that make giftedness rather than as places that merely find and nurture it. If we have learned anything during the last decade or two, it is that valid new conceptions of giftedness have emerged from the research and theoretical literature. But if we continue to operate programs based largely on the older IQ cut-off score models and the advanced lesson learning models, we will stifle the development of new and innovative programs where pioneering research can take place.

It is also time to put aside the endless arguments about whether acceleration or enrichment is the best way of serving high-ability youth or whether special classes, special schools, or pull-out programs are the best way to organize services for the gifted. And it is time to stop debating whether content or process is the right and proper focus of curriculum for the gifted—as if one could conceivably be taught without the other! Most of all, we need to focus our research efforts on the core issue of education for the gifted and talented, *the process of learning how to become a creatively productive person.* The model presented in this paper represents what I believe are the key components for studying this process—the interactions between and among the learner, the curriculum, and the teacher. A better understanding of these components and interactions will lead to more effective ways of developing in young people not only high levels of competence, but also the within-discipline thinking, the *modus operandi* of the first-hand investigator, the self-understanding, and the passion for scholarship that has characterized the creative producers of our world.

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