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Assessing Creativity: A Guide for Educators

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December 2002
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Assessing Creativity: A Guide for Educators*

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ABSTRACT

This monograph deals specifically with the challenge of recognizing or assessing creativity. It is intended for teachers, program coordinators, administrators, counselors, or researchers who are concerned with such questions as, "Can creativity be measured?" "What assessment tools are available to assist us in recognizing creativity in students?" or "How might we evaluate and compare various ways of assessing creativity?" These questions are often posed by researchers interested in studying creativity and by educators concerned with identifying creative talent or evaluating the effectiveness of program goals involving creativity. The primary goals of the monograph are to:

- provide information about the nature of creativity;
- identify many key characteristics and indicators of creativity as expressed among elementary, middle, and high school students;
- examine ways to locate, evaluate, select, and use instruments that are helpful in assessing those characteristics;
- identify and review many existing creativity assessment resources;
- suggest some important considerations in linking assessment with instructional programming.

The monograph includes an introduction (Chapter I) and four additional chapters, dealing with definitions and characteristics (Chapter II); reviewing, evaluating, selecting, and using instruments (Chapter III); a design and plan for systematic assessment (Chapter IV); and linking assessment and instruction (Chapter V).

The initial chapter on definitions and characteristics provides information to help clarify the nature and meaning of "creativity and creative thinking," and to consider the implications of those definitions for assessment. The chapter also reviews and synthesizes the literature regarding the personal characteristics associated with the construct of creativity, since these characteristics provide the foundation for assessment

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tools. The next chapter defines and clarifies important basic principles and terms in educational assessment and relates them specifically to the challenge of assessing creativity. It also provides a practical set of criteria for reviewing and evaluating instruments and presents basic principles to guide the wise and appropriate use of creativity assessment instruments. Chapter IV presents a matrix to guide systematic efforts to assess creativity in students, involving four major sources of assessment data and four specific levels of present performance in relation to creativity. The final chapter explores possible implications of creativity assessment and our specific assessment plan for effective, differentiated instructional planning; it also identifies important directions for future reading and study for anyone interested in creativity assessment and instruction.

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EXECUTIVE SUMMARY

This guide deals specifically with the challenge of *recognizing* or *assessing* creativity. It is intended for teachers, program coordinators, administrators, counselors, or researchers who are concerned with such questions as, "Can creativity be measured?" "What assessment tools are available to assist us in recognizing creativity in students?" or "How might we evaluate and compare various ways of assessing creativity?" The primary goals of the guide are to:

- provide information about the nature of creativity;
- identify many key characteristics and indicators of creativity as expressed among elementary, middle, and high school students;
- examine ways to locate, evaluate, select, and use instruments that are helpful in assessing those characteristics;
- identify and review many existing creativity assessment resources;
- suggest some important considerations in linking assessment with instructional programming.

Definitions

The terms *creativity* or *imagination* can be found in writings as early as those of ancient Greece and Rome, but modern interest in creativity among educators and psychologists is usually thought to have its roots in the mid-20th Century. In 1950, J. P. Guilford gave a presidential address to the American Psychological Association, expressing a concern for research on creativity. That address, along with the pioneering efforts of several other leaders at about the same time, provided the foundation that has influenced more than five decades of theory, research, and practice. Many definitions of creativity have been put forward since then, but because creativity is complex and multi-faceted in nature, there is no single, universally accepted definition. Treffinger (1996) reviewed and presented more than 100 different definitions from the literature. Aleinikov, Kackmeister, and Koenig (2000) offered 101 contemporary definitions from children and adults.

What Is Important to Remember?

1. There are many definitions of creativity, none of which is universally accepted.
2. Even though different theorists, researchers, or educators may use the term *creativity*, they may be referring to very different constructs.
3. The definition you adopt will determine the factors or characteristics you consider to be essential to understanding and locating evidence about creativity within an individual.

In Search of Creativity Characteristics

Creativity characteristics vary within and among people and across disciplines. No one person possesses all the characteristics, nor does anyone display them all the time. Furthermore, much of the research on creativity characteristics involved studies of adults, rather than school age children. Many of these characteristics can be taught and nurtured. As a result, it is difficult to predict which students may become creatively productive adults. We do not believe, however, that should prevent us from actively looking for and supporting creativity characteristics among students in the classroom setting, recognizing that those characteristics may still be developing and emerging over time. We clustered our final list of characteristics into four categories: Generating Ideas, Digging Deeper Into Ideas, Openness and Courage to Explore Ideas, and Listening to One's "Inner Voice," as illustrated in the Figure 1.

The *generating ideas* category includes the cognitive characteristics commonly referred to as divergent thinking or creative thinking abilities and metaphorical thinking. The specific characteristics in this category include fluency, flexibility, originality, elaboration, and metaphorical thinking. The *digging deeper into ideas* category includes cognitive characteristics commonly referred to as convergent thinking or critical thinking. The characteristics in this category include analyzing, synthesizing, reorganizing or redefining, evaluating, seeing relationships, desiring to resolve ambiguity or bringing order to disorder, and preferring complexity or understanding complexity. The *openness and courage to explore ideas* category includes some personality traits that relate to one's interests, experiences, attitudes, and self-confidence. The characteristics in this category include problem sensitivity, aesthetic sensitivity, curiosity, sense of humor, playfulness, fantasy and imagination, risk-taking, tolerance for ambiguity, tenacity, openness to experience, emotional sensitivity, adaptability, intuition, willingness to grow, unwillingness to accept authoritarian assertions without critical examination, and integration of dichotomies or opposites. The *listening to one's "inner voice"* category includes traits that involve a personal understanding of who you are, a vision of where you want to go, and a commitment to do whatever it takes to get there. The characteristics in this category include awareness of creativeness, persistence or perseverance, self-direction, internal locus of control, introspective, freedom from stereotyping, concentration, energy, and work ethic.

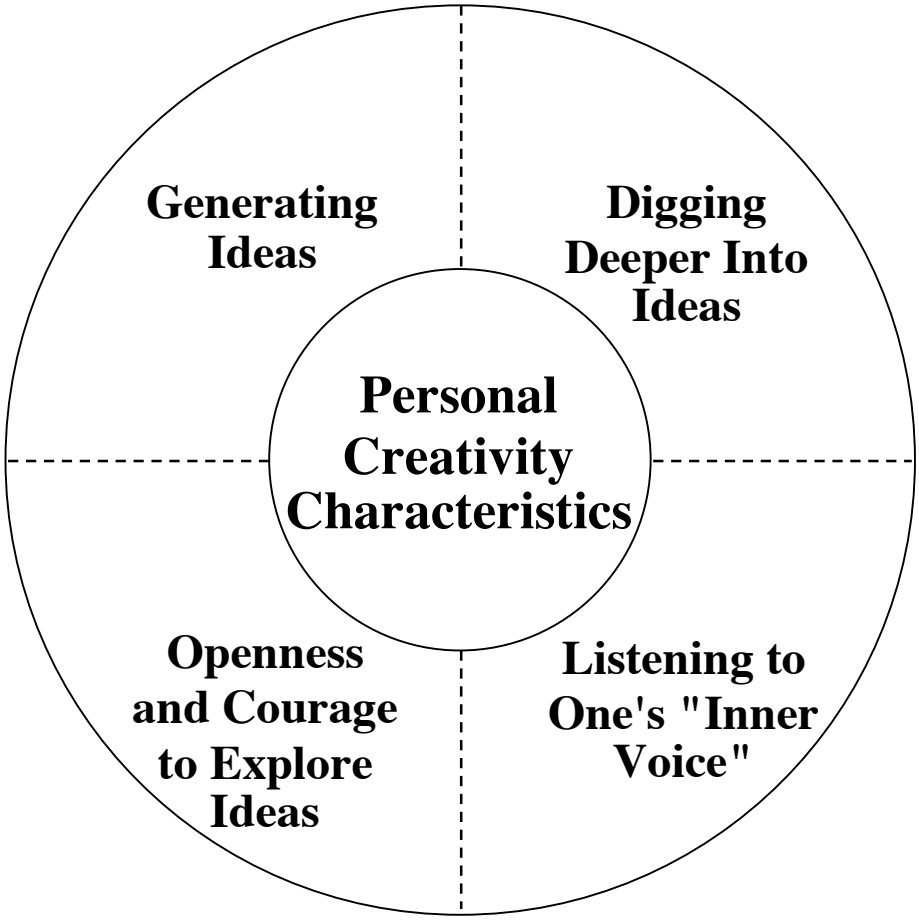

Figure 1. Four categories of personal creativity characteristics.

What Is Important to Remember?

1. Characteristics include cognitive abilities, personality traits, and past experiences.
2. Characteristics vary among people and across disciplines.
3. No one person possesses all the characteristics or displays them all the time.
4. Characteristics are derived mostly from research about creative adults and may still be developing in K-12 students.
5. Characteristics can sometimes be manifested in negative ways.
6. Characteristics sometimes involve the integration of opposites.

Looking Beyond the "Creative Person"

It is important to mention that there are three other areas of research in regard to understanding the creative person, identifying those with creative potentials, and nurturing the development of creatively productive behaviors among all people. Rhodes (1961) identified four strands of inquiry, each with its own unique identity, but yet intertwined and when taken together help us to better understand the whole concept of creativity. His four strands, commonly referred to as the four P's, are person, process, product, and press. Treffinger (1988, 1991), recognizing the complex nature of creativity and the need to not only to recognize creative potentials but also to enhance and develop creative productive thinking in classrooms, introduced the *COCO* model. He proposed that creative productivity arises from the dynamic interactions among four essential components: *Characteristics, Operations, Context,* and *Outcomes.*

Characteristics include the personal characteristics as discussed above. *Operations* involve the strategies and techniques people employ to generate and analyze ideas, solve problems, make decisions, and manage their thinking. *Context* includes the culture, the climate, the situational dynamics such as communication and collaboration, and the physical environment in which one is operating. *Outcomes* are the products and ideas that result from people's efforts. Creative productivity is best described as a dynamic, complex system, in which all four components are interdependent. These components can either facilitate or inhibit one's expression of creativity in observable ways within any domain of human effort.

What Is Important to Remember?

1. Creative production involves more than characteristics.
2. The operations people use, and the context within which they work, are also important for obtaining creative outcomes.
3. Schools and teachers can make an important difference in all of these areas to help students to become creative producers.

Evaluating, Selecting, and Using Instruments

Many resources have been developed over the past four decades to assess creativity and creative thinking across the life span. The term *measurement* refers to the use of any instrument or testing procedure through which quantitative data can be obtained, and thus can be treated statistically. *Assessment* is a process of "taking stock" of an individual (or a group) by drawing together information from a number of sources and attempting to organize and synthesize those data in a meaningful way. Assessment draws upon many different kinds of data and frequently includes (but does not rely only upon) measurement sources. Assessment might be undertaken to identify and understand a person's (or a group's or team's) strengths and deficiencies, or for more prescriptive reasons, such as for instructional planning or for placement in a specific experimental treatment or program. Assessment is, therefore, a broader and more inclusive term than

measurement. *Test* refers to a particular kind of assessment that typically includes a standard set of items or questions that can be administered to individuals or groups under well-defined, controlled conditions.

In both creativity assessment (recognizing creativity in individuals or groups) and evaluation (determining whether creativity objectives have been attained), tests may be used, but they are not the only method of assessment that can be used, and measurement will often play an important role. *Creativity assessment might be regarded as an attempt to recognize or identify creative characteristics or abilities among people or to understand their creative strengths and potentials*. Measurement might play a specific role in creativity assessment to the extent that specific tests, inventories, or rating scales provide evidence to help answer such questions.

Measurement commonly plays an important role in evaluating instructional or training efforts related to creativity. If a special program for students purported to enhance or stimulate students' creative thinking skills, for example, pre- and post-tests might be used as part of an evaluation design. Assessment involves gathering, organizing, analyzing, and interpreting *qualitative* or *quantitative* data. The complex and multidimensional nature of creativity cannot be captured effectively and comprehensively by any single instrument or analytical procedure. Systematic efforts to understand creativity require a well-planned process of studying individuals or groups, including *both* qualitative and quantitative data. The use of tests in education has been criticized by many individuals and groups, often justifiably. However, let us keep in mind that, as Linn and Gronlund (1995) observed: "Although most of the criticisms of testing have some merit, most problems are not caused by the use of tests, but by the misuse of tests" (p. 496). We hope this report will guide professionals and policy-makers in gifted education to be wise in selecting, evaluating, and using creativity assessment resources and tools.

Development of Review and Evaluation Criteria

We formulated specific criteria to review and evaluate specific assessment resources. We grouped the criteria into three broad categories: general information, technical information, and relevant literature.

General Information. This category represents basic, descriptive information that any prospective test user requires to locate and examine prospective instruments. The questions in this category are intended to respond to the broad question, "What is this instrument?" The specific criteria in the General Information category are title; category (test, self-report inventory, rating scale, performance, or behavioral); ages or grade levels for which intended; form(s) or format(s) available; cost; author or developer; copyright date; publisher or source; name, address, phone, fax, email/web; current availability; limitations or restrictions for purchase (if any); definition of creativity; author's purposes for the instrument; keywords for creativity characteristics that this instrument purports to assess.

Technical Information. This category deals with our independent evaluation of the adequacy or quality of the instrument, based on the fundamental dimensions and criteria for psychological and educational tests and measures. The criteria in this set address the broad question, "What can we determine about the quality of the instrument?" The criteria we used for assessing the technical information category are *Test Manual* (organization, clarity, completeness, adequacy); *Validity*; *Reliability*; *Utility and Appropriateness* (administration, intended audience, timing, scoring); *Interpretation and Context* (norms, group differences, support for application and interpretation); and *Propriety Standards* (ethical or professional standards, obligations, and disclosures).

Assessment Databases

Two databases, one providing information about creativity assessment instruments and one dealing with critical thinking instruments, correlated with this guide, can be accessed at the Center for Creative Learning website (www.creativelearning.com). The databases include information about nearly 100 tests, rating scales, checklists, self-report inventories, and other tools for assessing creativity.

Systematic Assessment: A Design and Plan

If creativity is a complex construct, that can be expressed in many different ways, how is it possible to identify creative strengths among children or adolescents in a fair and meaningful way? We sought to design an assessment plan that would represent a practical and workable way for educators to use multiple assessment resources when assessing creativity. We developed a structured matrix to guide systematic efforts to assess creativity in students, combing four data sources and four levels of present performance.

Data Sources

We described four different ways to gather information about a person's creative abilities, strengths, skills, or potentials. These data sources are:

- *Behavior or performance data*. One important way to obtain information about a people's creativity is through their actual behavior—their creative products, performances, or accomplishments. There are two general ways to obtain these kinds of data: through records or first-hand observations in natural ("real-life") settings, or through the person's performance in constructed tasks that simulate or approximate the real-life settings but can be arranged and observed under controlled conditions. It might be useful to think of the former set as documentation of real-life creativity and the latter as demonstration of creativity under realistic or simulated conditions.
- *Self-report data*. It is also possible to obtain information about people's creativity from the responses they provide to questions about themselves

and their behavior. Some writers in the creativity literature have argued, quite seriously, that the best way to determine whether or not people are creative is, in fact, simply to ask them! This source of data deals with resources in which people respond to questions about themselves and their own skills, abilities, activities, and behavior. The tools in this category include, for example, attitude inventories, personal checklists, or biographical inventories.

- *Rating scales.* The third data source involves instruments that provide specific descriptions of qualities or behaviors that describe (or are associated with) creativity characteristics and ask people to rate the creativity of others. These might call for ratings by teachers, parents, mentors, or other adults who may be in a position to know and describe a person in relation to those questions; occasionally, instruments in this category might call for ratings by peers.
- *Tests.* The fourth data source is test data. This refers to the person's responses to a structured set of tasks or questions, administered under controlled or standardized conditions, through which the person demonstrates his or her ability to think or respond creatively. There is often a tendency among some people to trust test data because it is (or appears to be) objective, readily quantifiable, and comparable for all who respond by virtue of its standardized format. Other people argue that, especially in relation to creativity, the very concept of a "standardized" test that can be "scored objectively" is a contradiction in terms.

Each of these four data sources has both pluses and minuses, so experts recommend caution in their use. It is very clear, for example, that it is unwise to rely on a single instrument, or to use results as if they represent absolute, fixed classifications of a person's creative ability.

What Is Important to Remember?

1. Begin with a specific definition of creativity that will guide you in specifying the characteristics you will see to assess.
2. The factors or characteristics that are most important in your understanding of creativity will influence the kinds of assessment procedures and tools you will seek, select, and use.
3. Use multiple sources of data to assess the relevant characteristics. No single assessment instrument or test provides evidence about all the possible meanings or elements associated with the construct of creativity.
4. Be aware of the advantages and limitations of any instrument or tool, from any of the four sources of data.
5. Data about a student's apparent strengths can be used for inclusion, or to document the appropriateness of services, but data should not be used for "strong exclusion," since what does not appear at one time, in one area, or with one assessment tool may appear at another time, in another context, or with other tools.

6. Use the results of all data gathering in a flexible way, rather than to establish rigid categorizations of students as "highly creative" or "not creative."

Level of Present Performance

We also described four ways of classifying the level of development and expression of creativity—the "creative strength"—manifest in the person's behavior or performance at the present time, under particular circumstances or conditions (or within a particular talent area or domain), using the specific sources of data that are available. Once again, we emphasize that these characterizations are dynamic, not static. People change and grow, respond differently in different areas and under changing circumstances, and assessment is always a dynamic process, not a single, "one-time, one-shot" event. The four levels are:

Not Yet Evident. This level indicates that, in relation to information from the data sources (rows), the person's present level of performance does not reveal characteristics or behaviors that are consistent with the selected definition of creativity. Notice two important qualifications in this statement. First, the category is not called "uncreative" or "not creative." It does not suggest that creativity is unattainable for the person but only that creativity characteristics are not presently evident or observable. The category is about performance, not about ability, aptitude, or potential. Second, the category relates only to characteristics of creativity as defined for the assessment; under a different definition of creativity, which might involve other characteristics, the person's level of performance might differ.

Emerging. This column indicates that there is limited evidence of creativity characteristics in the person's present performance. Creativity is beginning to emerge in ways that are consistent with the definition of creativity being assessed, although the creative behavior may be limited in quality, inconsistent, or tentative.

Expressing. When data indicate signs of creativity characteristics in the student's present behavior with regularity and occasional signs of high quality, we might characterize the student's present level of creativity as "expressing." This category suggests that the characteristics of creativity can often be observed in the student's typical behavior and products.

Excelling. When data indicate consistently the presence of creativity characteristics (as defined for the assessment), and those characteristics are accompanied by creative accomplishments in one or more areas of performance or talent, with outstanding depth, quality, and originality, we categorize the student's present level of performance as "excelling."

It is important to keep in mind that these levels represent a continuum of performance, rather than separate, independent categories with rigid boundaries. As

much as we might yearn for precise, objective categories, the reality of the complexity of creativity, its attendant characteristics, and our assessment tools reminds us that such precision is seldom attainable at the highest levels of human behavior.

If you have multiple sources of data that all "point to" the same column, you can be reasonably confident of that description of the person's present performance level. If you have some sources of data that suggest a certain present level of performance, but other data that suggest a different level, additional analysis may be warranted, and additional data collection might also be helpful. In general to summarize the level of present performance, use the highest level that is supported by data from two or more data sources.

When the relevant creativity characteristics are "not yet evident," it is reasonable to conclude that the instructional options or services associated with gifted/talented programming would not be appropriate for the student at the present time. However, if creativity is an important educational goal for all students, it is possible to define learning activities that would be appropriate for the student at this level. It would be important and appropriate to identify ways to provide such services for all students as elements of an effective, challenging regular education program.

When the relevant creativity characteristics are "emerging," it is reasonable to conclude that the instructional options or services associated with gifted/talented programming would not be appropriate for the student at the present time. Again, it is possible to define learning activities that would be appropriate for the student at this level, and it would be appropriate to adopt a "watch and wait" strategy, monitoring the student's on-going performance for indicators of increasing confidence and competence in creativity-related behavior.

When the student's current level of performance is at the "expressing" level, certain kinds of services may be particularly appropriate. Students who are expressing creativity characteristics regularly in their performance certainly demonstrate a need for activities and services that are appropriate and challenging in relation to their creativity. Whether or not those are considered "gifted education services" may depend on the specific programming model the school uses as much or more as it reflects a certain level of "creative ability" in the student. In many ways, the difference between the "expressing" and "excelling" levels may often be related to opportunities and instruction.

When there is evidence of creativity characteristics that are accompanied by high levels of performance (representing the "excelling" level), there is certainly documentation of the need for the high-level programming or services that can be offered through gifted education. Of course, it is also important that the services should be appropriate and challenging for the student and linked carefully and explicitly to the creative characteristics of the student. Students whose high-level creativity is evident in varied ways or in different talent areas will not all "need" the same programming activities or services. Effectively, differentiated instruction is not a "one-size-fits-all" prescription of activities. We believe that this design and plan for systematic assessment

can also serve two other valuable functions. First, it can guide schools in planning appropriate and challenging instructional programs and services that can be linked to assessment data. Second, these procedures can serve as a valuable foundation for professional development. Effective assessment depends on the expertise and experience of educators in this area, as in any other.

What Is Important to Remember?

1. Students may demonstrate any of the four sets of creativity characteristics (from Chapter II) in varied ways, so it is important to use multiple sources of data.
2. The definition of creativity you select will influence the characteristics you look for and the instruments you might use to assess them.
3. When you observe creativity characteristics in a student, it is important to ask, "What programming activities or services would be appropriate for a student with these characteristics?"
4. When you do not observe creativity characteristics in a student, it does not mean that the student is uncreative. The results might change over time, in different talent areas, or using a different definition of creativity (and assessment tools for that definition).
5. Assessment of the student's present level of performance tells you more about how to respond to the student effectively than about whether or not to respond. (The appropriate responses may involve building a high-quality regular school program and may not all take place as a part of gifted education services.)
6. Judgments about the specific results for any data source or instrument that correspond to a specific level of present performance (e.g., "excelling") involve many important factors that extend beyond the data from the instrument itself. These include professional judgment, policy considerations, public and political influences, and economic considerations.

Summary: Essential Steps in Creativity Assessment

1. Adopt a specific definition of creativity and be clear about its implications for the characteristics you plan to assess.
2. Examine and review carefully assessment tools, representing several different sources of data, that may be appropriate for the definition and characteristics, for your setting, and for the students you will be assessing. Use only resources that meet professional standards for practice.
3. After gathering data, determine the student's present level of performance. Do not exclude students from consideration for services on the basis of any single score or result. Seek two or more sources of data that enable you to understand the student's current level of performance as accurately as possible.

4. Be aware that students can change and grow and that no assessment is entirely free of error; remain flexible in making decisions (especially avoiding labeling students as "creative" or "uncreative").
5. Remember that the purpose of the assessment is to understand the student's needs for appropriate and challenging educational experience. Think beyond the question of what the student "is" or "is not;" instead, ask: "What do these data tell us about the student's need for services?"
6. Consider the best way to provide the services that seem necessary for the student. Is it through your gifted/talented program? Is it through other ways of responding that might be open to you?
7. Carry out programming that is appropriate and challenging for the student. Monitor all students' performance to see if there may be changing evidence regarding their needs, strengths, or talents.

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CHAPTER I: Introduction and Overview

This monograph deals specifically with the challenge of *recognizing* or *assessing* creativity. It is intended for teachers, program coordinators, administrators, counselors, or researchers who are concerned with such questions as, "Can creativity be measured?" "What assessment tools are available to assist us in recognizing creativity in students?" or "How might we evaluate and compare various ways of assessing creativity?" These questions are often posed by researchers interested in studying creativity and by educators concerned with identifying creative talent or evaluating the effectiveness of program goals involving creativity. They are often concerns expressed by specialists or administrators in gifted education, in which creativity is a commonly stated program goal, and in which educators are often concerned with identifying students' creativity strengths and talents. Many states and school districts include creativity, at least nominally, in their policies, procedures, or recommendations for identifying students for gifted programming. For years, we have received many inquiries about how to respond effectively to such policies or about how to document the extent to which program goals pertaining to creativity have been accomplished. This monograph provides practical resources and guidelines to help educators address such concerns effectively. The primary goals of the monograph are, therefore, to:

- provide information about the nature of creativity;
- identify many key characteristics and indicators of creativity as expressed among elementary, middle, and high school students;
- examine ways to locate, evaluate, select, and use instruments that are helpful in assessing those characteristics;
- identify and review many existing creativity assessment resources;
- suggest some important considerations in linking assessment with instructional programming.

In addition to this Introduction and Overview (Chapter I), this guide includes four main chapters, each of which will provide assistance and support for one important aspect of this complex topic. The main chapters are:

CHAPTER II: Definitions and Characteristics

This chapter provides information to help you clarify the nature and meaning of "creativity and creative thinking." These terms have been defined in many different ways in the literature. It is important to understand the issues regarding definition, since various definitions will lead to different assumptions and approaches for assessment and instruction. This chapter also reviews and synthesizes the literature regarding the personal characteristics associated with the construct of creativity. It is important to understand these characteristics to be complete and accurate in describing what you are seeking in any assessments you conduct. Simply put: if you don't know what you are attempting to locate, you cannot really be certain whether or not you have been successful in finding it.

CHAPTER III: Reviewing, Evaluating, Selecting, and Using Instruments

This chapter defines and clarifies some important basic principles and terms in educational assessment. These include some essential terms that apply to all assessment efforts, as a foundation for examining issues that are particularly relevant to creativity assessment. Next, this chapter provides a practical set of criteria for reviewing and evaluating instruments. Finally, it presents some basic principles to guide the wise and appropriate use of creativity assessment instruments. Two extensive databases of information about nearly 100 instruments that relate specifically to assessing creativity or critical thinking can also be accessed at the Center for Creative Learning's website (www.creativelearning.com). These databases include our ratings of the instruments in relation to the criteria presented in this chapter and our classification of the instruments in relation to the characteristics we reviewed and synthesized in Chapter II.

CHAPTER IV: Systematic Assessment: A Design and Plan

In this chapter, we present a matrix to guide systematic efforts to assess creativity in students. In developing this chapter, we were guided by the clear and strong admonitions throughout the educational and psychological assessment literature regarding effective and appropriate practices. We created the design and assessment plan to establish a practical and workable way for educators to use multiple assessment sources and resources when assessing creativity. We are mindful of the many demands on educators today and of the limited resources with which schools operate. At the same time, we are aware that assessment decisions, and especially those that relate to determining eligibility for certain educational services, are relatively "high stakes" decisions that must be made with care and great respect for the students we serve. We tried to create a plan that keeps both of these sets of concerns balanced and responsible. The plan considers four major sources of assessment data and four specific levels of present performance in relation to creativity. This chapter also identifies a set of specific

recommendations regarding instruments that warrant consideration for use in school settings.

CHAPTER V: Linking Assessment and Instruction

We are strongly committed to the principle that effective assessment guides and serves instruction. The major implication of this principle is that identification is not, and should not be, an end in itself; rather, identification data and procedures should guide educators in planning or designing appropriate and challenging learning opportunities for students. Therefore, in this chapter, we describe the implications of and uses for the assessment plan in instructional planning.

CHAPTER II: Definitions and Characteristics

In this chapter, we begin by discussing many and varied definitions of creativity and creative thinking. Next, we describe the procedures we followed in conducting a review of the research literature on the characteristics associated with creativity. Then, we present a model for organizing or categorizing the key characteristics, linking them with citations from research to document their foundation in theory and research. We provide practical descriptions of each of the four categories. We also examine cognitive characteristics, personality traits, and biographical events that contribute to creative productivity by individuals and groups.

Definitions: The Many Faces of Creativity

It is appropriate to begin this guide by asking, "What is it that you are really attempting to assess?" Creativity can be expressed in a nearly infinite number of ways in human behavior and has its origins in several components of individual and social experience. Your understanding of what *creativity* means, or your definition of the term, will have a major influence on the characteristics you consider essential to assess and on the kinds of evidence and assessment tools you decide to use.

The terms *creativity* or *imagination* can be found in writings as early as those of ancient Greece and Rome, but modern interest in creativity among educators and psychologists is usually thought to have its roots in the mid-20th Century. In 1950, J. P. Guilford gave a presidential address to the American Psychological Association, expressing a concern for research on creativity. That address, along with the pioneering efforts of several other leaders at about the same time, provided the foundation that has influenced more than five decades of theory, research, and practice.

Many definitions of creativity have been put forward, but because creativity is complex and multi-faceted in nature, there is no single, universally accepted definition. Treffinger (1996) reviewed and presented more than 100 different definitions from the literature. Aleinikov, Kackmeister, and Koenig (2000) offered 101 contemporary definitions from children and adults. To illustrate the diversity of creativity definitions, we will present a brief sample of the definitions from the literature.

1. Teresa M. Amabile's view of creativity involves an interaction of three components: domain-relevant skills, creativity-relevant skills, and task motivation. *Domain-Relevant Skills* include knowledge about the domain, technical skills, and special domain-related talent. The *Creativity-Relevant Skills* include working styles, thinking styles, and personality traits. The *Task Motivation* dimension involves the desire to do something for its own sake, or based on the interest in the activity by a particular person at a particular point in time.

2. Erich Fromm described creativity as "the ability to see (or to be aware) and to respond" (Fromm, 1959, p. 44). The creative attitude requires the capacity to be puzzled, the ability to concentrate, the ability to experience oneself as the initiator of ideas and actions, and the ability to accept, rather than to avoid, conflict or tension. Creativity involves the "willingness to be born every day" (p. 53).

3. Howard Gardner offered this definition: "The creative individual is a person who regularly solves problems, fashions products, or defines new questions in a domain in a way that is initially considered novel but that ultimately becomes accepted in a particular cultural setting" (Gardner, 1993, p. 35).

4. William J. J. Gordon's approach to creativity emphasizes the use of metaphor and analogy for "connection-making." To describe the essential element of his approach, Gordon chose the Greek word, *synectics*, which refers to the joining together of different and apparently irrelevant elements. The synectics approach holds that people can increase markedly their ability to make creative connections if they understand and use metaphoric thinking deliberately. The synectics approach involves seeking and using direct, personal, and symbolic analogies to find new solutions to problems.

5. J. P. Guilford emphasized that "problem solving and creative thinking are closely related. The very definitions of these two activities show logical connections. Creative thinking produces novel outcomes, and problem solving involves producing a new response to a new situation, which is a novel outcome" (Guilford, 1977, p. 161). Guilford emphasized: sensitivity to problems, fluency, flexibility, novelty, synthesis, reorganization or redefinition, complexity, and evaluation. In Guilford's Structure of Intellect Model (currently used extensively by Mary Meeker and her associates at the SOI Institute in Oregon), creativity has usually been associated with the mental operation described as divergent production. Guilford also emphasized in his research, however, the importance of other factors in creativity, including, for example, transformations and implications as products, and the behavioral content area. The SOI model emphasizes the role of specific intellectual factors, or mental abilities, in creativity and problem solving.

6. Joe Khatena, the co-developer (with E. P. Torrance) of several creativity assessment instruments, defined *creativity* in terms of ". . . the power of the imagination to break away from perceptual set so as to restructure or structure anew ideas, thoughts, and feelings into novel and associative bonds" (Khatena & Torrance, 1973, p. 28).

7. Donald W. MacKinnon, whose classic studies of highly creative architects provided much information about personal characteristics associated with creativity, emphasized that creative responses must be both novel and adaptive to reality (i.e., useful). MacKinnon found that creative people were frequently characterized by inventiveness, individuality, independence, enthusiasm, determination, and industry. Highly creative people were self-confident and self-accepting and could address both their personal strengths and limitations openly and honestly. They were also able to deal with ambiguity and lack of closure.

8. Abraham H. Maslow approached creativity by emphasizing the importance of self-actualization in human behavior. In general, Maslow held that many people are afraid to learn too much about themselves, and thus never become self-actualized. Creative people are able to overcome those fears and the rigid pressures of society, and are thus able to free themselves to attain personal integration, wholeness, and creativity. Creative, self-actualizing people were described by Maslow as bold, courageous, autonomous, spontaneous, and confident. Creativity in Maslow's view is as much concerned with people and the way they deal with their daily lives as it is with impressive products.

9. Sarnoff A. Mednick proposed that creativity involves the process by which ideas already in one's mind are associated in unusual but original ways to form new ideas. He emphasized the need to dig deeply into one's associative structure, probing beyond obvious connections, to find the novel or remote associative linkages among ideas out of which original solutions are formed. For Mednick, then, creativity involves combining mutually remote associations in an original and useful way.

10. Mel Rhodes felt that, "Creativity cannot be explained alone in terms of the emotional component of the process or in terms of any other single component, no matter how vital that component may be" (Rhodes, 1961, p. 306). In an effort to synthesize many definitions, Rhodes proposed that it is essential to consider four factors in a multi-faceted conception of creativity. These are *person* (personality characteristics or traits of creative people); *process* (elements of motivation, perception, learning, thinking, and communicating); *product* (ideas translated into tangible forms); and *press* (the relationship between human beings and their environment).

11. Carl R. Rogers approached creative personality development by emphasizing three major "inner conditions" of the creative person: (a) an openness to experience that prohibits rigidity; (b) ability to use one's personal standards to evaluate situations; and (c) ability to accept the unstable and to experiment with many possibilities. He emphasized that creative people are "fully-functioning" or psychologically-healthy individuals.

12. E. Paul Torrance, arguably the person whose work is most widely associated with creativity testing, defined creativity as "a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results" (Torrance, 1974, p. 8).

13. Donald J. Treffinger, Scott G. Isaksen and **Brian K. Dorval** emphasize the importance of harmony or balance between creative and critical thinking during effective problem solving and decision-making. In their definition, *creative thinking* involves, "encountering gaps, paradoxes, opportunities, challenges, or concerns, and then searching for meaningful new connections by *generating* many possibilities, varied possibilities

(from different viewpoints or perspectives), unusual or original possibilities, and details to expand or enrich possibilities." *Critical thinking* involves "examining possibilities carefully, fairly, and constructively, and then *focusing* thoughts and actions by organizing and analyzing possibilities, refining and developing promising possibilities, ranking or prioritizing options, and choosing or deciding on certain options" (Treffinger, Isaksen, & Dorval, 2000, p. 7).

14. Graham Wallas, author of one of the early classic studies in the field, defined four major stages in the creative process: *preparation* (detecting a problem and gathering data), *incubation* (stepping away from the problem for a period of time), *illumination* (a new idea or solution emerges, often unexpectedly), and *verification* (the new idea or solution is examined or tested).

So, just what is creativity? What might one learn from this sampler of definitions? It is clear that there are many different definitions in which the experts emphasize different elements or factors in creativity. It is also clear, we believe, that whatever aspect of creativity receives emphasis in any definition will have specific implications for how one seeks to assess that conception of creativity. Table 1 summarizes the major emphasis of the sample definitions and their implications for assessment.

In the next chapter, we will review and summarize the literature on personal characteristics associated with creativity. Since many definitions challenge us to look at creativity as a complex interaction among several factors, not just as a trait or set of traits located entirely within the person, we will also review a more complex, interactive approach to creativity and its implications for assessing creativity.

What Is Important to Remember?

1. There are many definitions of creativity, none of which is universally accepted.
2. Even though different theorists, researchers, or educators may use the term *creativity*, they may be referring to very different constructs.
3. The definition you adopt will determine the factors or characteristics you consider to be essential to understanding and locating evidence about creativity within an individual.

Table 1

Sample Definitions of Creativity and Their Implications for Assessment

Sample Definitions	**Emphasis in Definition**	**Primary Focus**	**Implications for Assessment** ***Identify creativity through:***
Fromm, Khatena, MacKinnon	Person	Characteristics of highly creative people	Assessment of creative personality traits
Gordon, Guilford, Mednick, Torrance, Treffinger et al., Wallas	Cognitive process or operations	Skills involved in creative thinking or in solving complex problems	Testing for specific creative thinking and problem solving aptitudes or skills
Maslow, Rogers	Lifestyle or personal development	Self-confidence, personal health and growth; self-actualization; creative context or setting	Assessing personal adjustment, health, and self-image; assessing the climate that nurtures or inhibits creativity
Gardner, Khatena	Product	Results, outcomes, or creative accomplishments	Assessing and evaluating products or demonstrated accomplishments
Amabile, Rhodes	Interaction among person, process, situation, and outcomes	Multiple factors within specific contexts or tasks	Assessing multiple dimensions in a profile, with various tools

In Search of Creativity Characteristics

We reviewed the literature on creativity including its many definitions and characteristics along with their implications for assessment and instruction. Our search included many hours in the Center for Creative Learning library scouring books and journals. It also included conducting an electronic search of ERIC Clearing House on Disabilities and Gifted Education (ericec.org), AskERIC (ericir.syr.edu), and Tests (ericae.net/testcol.htm) using key words such as *ability identification*; *creativity*; *divergent thinking*; *evaluation methods*; *measurement techniques*; *standardized tests*; *student evaluation*; *test reliability*; *test validity*; *check lists*; *gifted*; *talent*; and *talent*

identification. We reviewed 120 definitions of creativity and literally skimmed thousands of pages from more than 100 books and journal articles.

We then compiled a working list of characteristics that we documented according to their source in the literature. We retained those that were cited in at least three sources and therefore commonly accepted by the education research community. We then clustered the list of characteristics into four categories, which we will describe in the next part of this chapter.

Rationale for and Descriptions of Characteristics

Throughout several decades of modern work on creativity in psychology and education, much research has focused on identifying the traits, characteristics, and other personal attributes that distinguish eminently creative people from their less creative peers. These research efforts investigated their subjects' personal characteristics in three areas: (a) cognitive characteristics, (b) personality traits, and (c) biographical events.

Cognitive characteristics refer to the ways people think. They include the intellectual patterns, traits, and mechanisms that guide and direct the person's intellectual processes or activities. Researchers in this area look at creativity as a kind of thinking, reasoning, association-making, or problem solving. Some early researchers in this area include Guilford (1967), Mednick (1962), Parnes (1967), Torrance (1962), and Wallach and Kogan (1965). More recently, Baer (1993), Dacey (1989), Davis (1998), Runco (1991), and Treffinger, Isaksen, and Dorval (2000) conducted work in this area.

Research has shifted in recent years from an emphasis on one's *level* of creativity ("How creative are you?") to an emphasis on *style* of creativity ("How are you creative?"). Learning about style helps people to identify and recognize their creative strengths and nurture their creative productivity. Researchers in this area include Dunn, Dunn, and Price (1975), Kirton (1976), Myers and McCaulley (1985), and Selby, Treffinger, and Isaksen (2001).

Personality traits involve one's values, temperament, and motivational disposition. These characteristics influence the ends to which one chooses to apply their thinking. Prominent researchers associated with this area include Amabile (1983), Anderson (1959), Barron (1969), and MacKinnon (1978).

Biographical events include the things that happen or experiences one has during one's lifetime that lead to creative achievement. For example, Davis (1998) claims that based on his experience two biographical traits are 100% accurate as predictive of creativeness. They are participation in theater or having an imaginary playmate as a child. Gardner (1993) on the other hand provides a comprehensive biographical description of the exemplary creator. Some early researchers in this area of inquiry are MacKinnon (1978), Rimm and Davis (1976), and Taylor and Ellison (1966).

Csikszentmihalyi (1996), Simonton (1987), and Sternberg (2000) are more recent contributors to this area of inquiry.

Several commonalties about personal creativity characteristics emerge from three areas of research. The relationship among these areas is complex, however, and often the specific characteristics do not fit neatly into just one of the three areas. Characteristics vary within and among people and across disciplines. No one person possesses all the characteristics nor does anyone display them all the time. Furthermore, much of the research on creativity characteristics involved studies of adults, rather than school-age children. Many of these characteristics can be taught and nurtured. As a result it is difficult to predict which students may become creatively productive adults. We do not believe, however, that should prevent us from actively looking for and supporting creativity characteristics among students in the classroom setting, recognizing that those characteristics may still be developing and emerging over time.

Recognizing that creative behavior is influenced by motivational as well as situational factors, we clustered our final list of characteristics into four categories: Generating Ideas, Digging Deeper Into Ideas, Openness and Courage to Explore Ideas, and Listening to One's "Inner Voice." The characteristics encompass all three areas described above (cognitive, personality, biographical) and are documented in the research literature by notable scholars who study creativity. These categories have implications not only for the identification of creative potential among K-12 students but also implications for classroom practice (which we will discuss in Chapter V). The four categories are illustrated in the Figure 1. We will discuss each category separately and then present a table of the citations from the research literature for the characteristics included in that category.

Generating Ideas

The generating ideas category includes the cognitive characteristics commonly referred to as divergent thinking or creative thinking abilities and metaphorical thinking. In their pioneering work, Guilford identified them as divergent production abilities, while, Torrance expressed them as creative thinking dimensions. The characteristics in the category we refer to as *Generating Ideas* include Fluency, Flexibility, Originality, Elaboration, and Metaphorical Thinking.

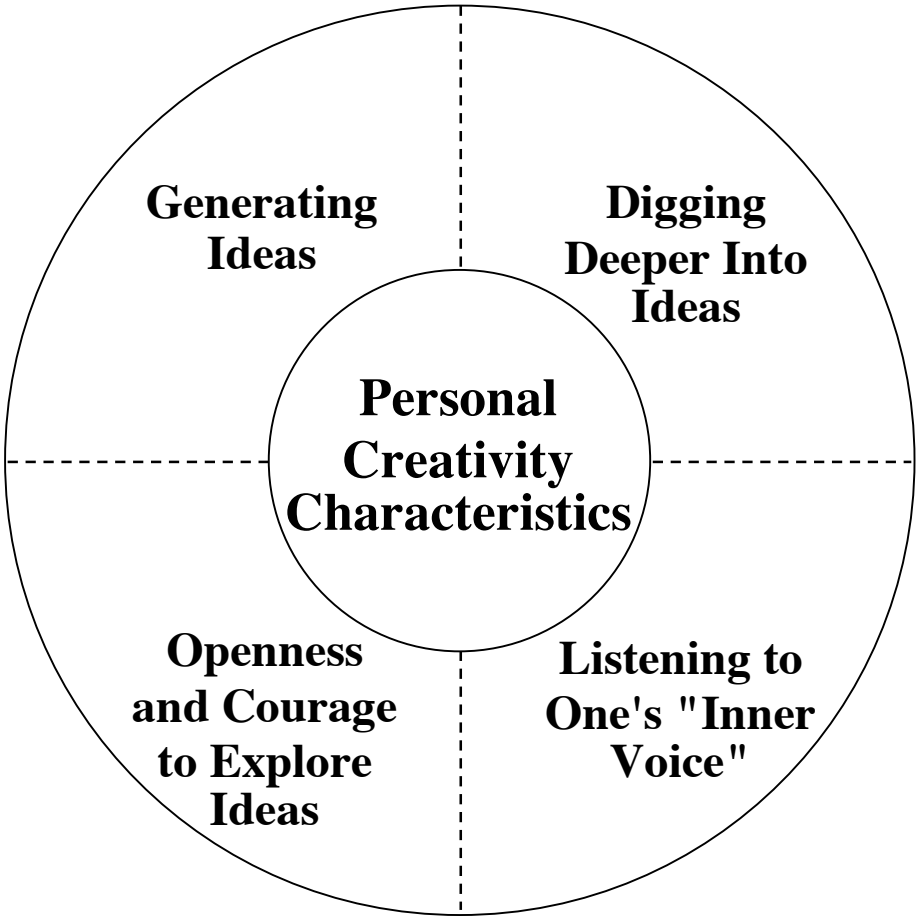

Figure 1. Four categories of personal creativity characteristics.

Fluency refers to quantity or the ability to generate a large number of ideas in response to an open-ended question or in reference to one's thinking process. Fluency builds on the premise that quantity of idea generation can stimulate the production of ideas that will be both novel and useful; quantity provides opportunity for quality. Flexibility refers to the ability to shift the direction of one's thinking or to change one's point of view. Flexibility involves an openness to examine ideas or experiences in unexpected or varied ways, and thereby, to discover surprising and promising possibilities. Originality refers to the ability to generate new and unusual ideas. Originality deals with generating options that are unusual or statistically infrequent (i.e., ideas that few people in any group might offer). Elaboration refers to the ability to add details and to expand ideas. Elaboration involves making ideas richer, more interesting, or more complete. Metaphorical thinking refers to the ability to use comparison or analogy to make new connections. Metaphorical thinking involves thinking about how different things are alike and different (or making the strange familiar or the familiar strange) and then transporting those connections to produce or discover new possibilities. Many breakthrough ideas were the result of metaphorical thinking such as the popular

invention of a "hook-and-loop" fabric fastener system by George de Mestral. Today, most of us know it by the brand name of VELCRO™. Mestral got his idea in 1948 through metaphorical thinking after returning home from a walk and finding some cockleburs clinging to his cloth jacket.

We often refer to people who are able to generate many, varied, and unusual possibilities as creative thinkers or creative people. People exhibit the characteristics associated with generating ideas by thinking of many possibilities, looking at things from many different angles, or producing novel ideas. You might observe them engaging in:

- Asking what if or just suppose questions and then playing with those ideas to see where they might lead.
- Predicting, speculating, and forecasting ("What will happen if . . .") and then testing out their ideas.
- Combining or changing parts to make new possibilities.
- Thinking about metaphors or analogies to help themselves to look at something differently.
- Deferring judgment and refraining from criticizing ideas when they are generating them.

Even though some people excel in these mental operations naturally, through instruction and practice all people can develop and improve their fluency, flexibility, originality, elaboration, and metaphorical thinking abilities. Table 2 presents a summary of the key characteristics related to generating ideas along with supporting citations from the research literature.

Digging Deeper Into Ideas

The digging deeper into ideas category includes some cognitive characteristics commonly referred to as convergent thinking or critical thinking. The characteristics in this category that we refer to as *Digging Deeper Into Ideas* include Analyzing, Synthesizing, Reorganizing or redefining, Evaluating, Seeing relationships, Desiring to resolve ambiguity or bringing order to disorder, and Preferring complexity or understanding complexity.

Table 2

Key Characteristics and Indicators of Creativity: Generating Ideas

Characteristics and Indicators	Citations
Fluency	Carroll, 1940; Guilford, 1959, 1987; Hollingworth, 1942; Kneller, 1965; Renzulli, Smith, White, Callahan, & Hartman, 1976; Smith, 1967; Starko, 1995; Torrance, 1962
Flexibility	Amabile, 1983; Davis, 1998; Guilford, 1987; Kneller, 1965; MacKinnon, 1978; Smith, 1967; Starko, 1995; Torrance, 1962
Originality	Carroll, 1940; Davis, 1998; Guilford, 1959, 1987; Hollingworth, 1942; Kneller, 1965; MacKinnon, 1978; Perkins, 1981; Renzulli et al., 1976; Smith, 1967; Starko, 1995; Torrance, 1962
Elaboration	Guilford, 1959; Kneller, 1965; Renzulli et al., 1976; Starko, 1995
Metaphorical thinking	Gordon, 1961; Gordon, Poze, & Reid,1966; Starko, 1995

This category is based on the notion that creative productive thinking also depends on analyzing and focusing ideas. Choosing the most promising ideas to work on and develop that will lead to a practical but novel outcome, involves sorting and evaluating or bringing promising ideas under the microscope for closer examination. It has been said that taming a wild idea is easier than thinking up a mediocre one. This kind of creative productive thinking involves building up ideas and not discarding them. We often refer to the characteristics associated with digging deeper into ideas as higher-level thinking abilities. People exhibit these characteristics by looking beyond the obvious to perceive gaps, paradoxes, needs, or missing elements. You might observe them engaging in:

- Refining, developing, and strengthening intriguing possibilities.
- Setting priorities, sorting, arranging, and categorizing ideas.
- Examining ideas using a constructive approach rather than a destructive approach.
- Focusing on how to strengthen or build up ideas by analyzing possibilities in balanced and forward thinking ways.

In other words, people with these characteristics are improvement motivated. Digging deeper into ideas allows them to decide, evaluate, choose, and develop

promising options into creatively productive outcomes. As is true with generating ideas, even though some people excel in these mental operations naturally, through instruction and practice all people can develop and improve their ability to think at these so-called higher levels of thinking. Table 3 presents a summary of the key characteristics related to digging deeper into ideas along with supporting citations from the research literature.

Table 3

Key Characteristics and Indicators of Creativity: Digging Deeper Into Ideas

Characteristics and Indicators	Citations
Analyzing	Dacey, 1989; Guilford, 1987; Sternberg, 2000
Synthesizing	Bloom, 1956; Dellas & Gaier, 1970; Guilford, 1987; Torrance, 1972
Reorganizing or redefining	Guilford, 1987; Koestler, 1964; Sternberg, 2000
Evaluating	Guilford, 1987; MacKinnon, 1978; Runco & Chand, 1994
Seeing relationships	Perkins, 1981; Starko, 1995; Torrance, 1962
Desiring to resolve ambiguity or bringing order to disorder	Guilford, 1987; Perkins, 1981; Starko, 1995; Stein, 1974
Preferring complexity or understanding complexity	Amabile, 1983; Clark, 1983; Davis, 1998; Dellas & Gaier, 1970; Guilford, 1987; Perkins, 1981; Starko, 1995; Torrance, 1962

Openness and Courage to Explore Ideas

The openness and courage to explore ideas category includes some personality traits that relate to one's interests, experiences, attitudes, and self-confidence. The characteristics in this category that we refer to as *Openness and Courage to Explore Ideas* include Problem sensitivity, Aesthetic sensitivity, Curiosity, Sense of humor, Playfulness, Fantasy and imagination, Risk-taking, Tolerance for ambiguity, Tenacity, Openness to experience, Emotional sensitivity, Adaptability, Intuition, Willingness to grow, Unwillingness to accept authoritarian assertions without critical examination, and Integration of dichotomies or opposites.

Creative people are naturally curious and open to new experiences and ideas. They usually identify problem areas before others become aware of them. As a result they are not afraid of the unknown and can tolerate ambiguity. Not knowing where an idea might lead, but nonetheless pursuing the idea wherever it might lead is important to

them. Torrance (1971) stated that the most essential characteristic of the creative person is courage. It takes a great deal of courage to pursue an idea that others do not see as important and may even express ridicule toward. It takes courage to withstand peer pressure. In school, children want to fit in and be accepted by their peers, especially at the middle school and high school levels. Students who do not fear being different and who feel free to express unpopular or unique ideas might be displaying some of the characteristics in this category.

We refer to many of the characteristics associated with openness and courage to explore ideas as personality traits and style dimensions. People exhibit these characteristics by stepping out from the crowd, taking a risk, and making do with what is at hand to reach their goals. You might observe them engaging in:

- Going beyond what is given by acquiring and using vast amounts of information.
- Gathering, organizing, and analyzing data from many sources and domains.
- Asking many, varied, and unusual questions.
- Challenging their own assumptions and those of others.
- Learning from their mistakes.
- Turning negatives into positives or obstacles into challenges.

Openness and courage to explore ideas requires the confidence to examine critically and challenge authoritarian pronouncements. People who posses these characteristics are not afraid to express their own beliefs and opinions. Their sense of humor and playfulness may be displayed or interpreted by others as immature and silly. Creative productive people have the confidence to stand up for their beliefs and follow their instincts.

Table 4 presents a summary of the key characteristics related to openness and courage to explore ideas along with supporting citations from the research literature.

Listening to One's "Inner Voice"

The listening to one's "inner voice" category includes traits that involve a personal understanding of who you are, a vision of where you want to go, and a commitment to do whatever it takes to get there. The characteristics for this category that we refer to as *Listening to One's "Inner Voice"* include Awareness of creativeness, Persistence or perseverance, Self-direction, Internal locus of control, Introspection, Freedom from stereotyping, Concentration, Energy, and Work ethic.

Table 4

Key Characteristics and Indicators of Creativity: Openness and Courage to Explore Ideas

Characteristics and Indicators	Citations
Problem sensitivity	Dacey, 1989; Davis, 1998; Gardner, 1993; Guilford, 1959, 1987; Perkins, 1981; Starko, 1995
Aesthetic sensitivity and/or interests	Clark, 1983; Davis, 1998; MacKinnon, 1978; Renzulli et al., 1976; Stein, 1974; Villars, 1957; Wilson, 1965; Witty, 1958
High levels of curiosity	Davis, 1998; Gardner, 1993; Goodhart & Schmidt, 1940; Guilford, 1987; MacKinnon, 1978; Renzulli et al., 1976; Starko, 1995; Stein, 1974; Torrance, 1962
Sense of humor and/or facility for producing humor	Clark, 1983; Davis, 1998; Getzels & Jackson, 1962; Gowan & Demos, 1964; Guilford, 1987; Kneller, 1965; Renzulli et al., 1976; Torrance, 1962
Playfulness (or childish, silly, sloppy, immature)	Csikszentmihalyi, 1996; Dacey, 1989; Davis, 1998; Getzels & Jackson, 1962; Gowan & Demos, 1964; Renzulli et al., 1976; Rogers, 1959
Capacity for fantasy or imagination	Csikszentmihalyi, 1996; Davis, 1998; Guilford, 1987; Renzulli et al., 1976; Smith & Faldt, 1999; Starko, 1995; Torrance, 1962
Risk-taking (or thrill seeking)	Amabile, 1983; Cramond, 1995; Csikszentmihalyi, 1996; Davis, 1998; Getzels & Jackson, 1962; Guilford, 1987; Renzulli et al., 1976; Starko, 1995; Sternberg, 2000; Torrance, 1962; Villars, 1957
Tolerance for ambiguity	Amabile, 1983; Clark, 1983; Davis, 1998; Guilford, 1987; Starko, 1995; Sternberg, 2000
Tenacity and lack of inhibition (often spontaneous) in expressing of opinion	Anderson, 1959; Getzels & Jackson, 1962; Gowan & Demos, 1964; Maslow, 1976; Renzulli et al., 1976; Torrance, 1962
Openness to experience and ideas and not frightened by the unknown	Amabile, 1983; Anderson, 1959; Csikszentmihalyi, 1996; Dacey, 1989; Davis, 1998; Dellas & Gaier, 1970; Guilford, 1959; MacKinnon, 1978; Maslow, 1976; Perkins, 1981; Rogers, 1959; Starko, 1995; Torrance, 1962
Open to feelings and emotions; Shows emotional sensitivity	Dacey, 1989; Davis, 1998; Renzulli et al., 1976; Starko, 1995; Stein, 1974
Adaptability; Making do with what is at hand to reach goals	Csikszentmihalyi, 1996; Davis, 1998; Torrance, 1980
Intuition	Anderson, 1959; Clark, 1983; Dacey, 1989; Dellas & Gaier, 1970; Starko, 1995; Stein, 1974
Willingness to grow	Maslow, 1976; May, 1959; Sternberg, 2000
Unwillingness to accept authoritarian assertions without critical examination	Martinson, 1963; Renzulli et al, 1976; Torrance, 1962; Ward, 1962
Integration of dichotomies (e.g., selfish and unselfish, extroverted and introverted)	Barron, 1969; Csikszentmihalyi, 1996; MacKinnon, 1978; Maslow, 1976

Creative people see themselves as creative, possess a desire to create, and have the self-confidence to work toward their sense of purpose in life. In other words, they are aware of their strengths, passions, and convictions. They work hard and intensely concentrate on a subject or problem of interest. It is common for the creative person to lose sight of time and place when working on a project. Others sometimes misinterpret such behaviors as absent-mindedness or anti-social tendencies.

We often refer to the characteristics associated with listening to one's "inner voice" as self-awareness and motivational dispositions. People exhibit these characteristics by not giving up in the face of adversity, taking responsibility for action, and actively seeking opportunities for applying their creative abilities. You might observe them engaging in:

- Showing initiative and taking ownership in problem solving.
- Persisting when things are not yet working.
- Reflecting on their goals and progress.
- Marching to a different drummer.

Creative people are committed to the vision that they have established for themselves about who they are, where they are going, and how they are going to get there. They trust their own judgment and are persistent in working toward their goals. Listening to one's "inner voice" involves not giving up in the face of ridicule or discouragement from others.

Table 5 presents a summary of the key characteristics related to listening to one's "inner voice," along with supporting citations from the research literature.

We drew our list of characteristics from the research literature about the creative person. It is a combination of characteristics from the four categories that leads to creative outcomes. To assess creative potentials, we not only need to know about students' competence to create and generate ideas but also about their confidence and commitment to translate novel ideas into useful outcomes.

What Is Important to Remember?

1. Characteristics include cognitive abilities, personality traits, and past experiences.
2. Characteristics vary among people and across disciplines.
3. No one person possesses all the characteristics or displays them all the time.
4. Characteristics are derived mostly from research about creative adults and may still be developing in K-12 students.
5. Characteristics can sometimes be manifested in negative ways.
6. Characteristics sometimes involve the integration of opposites.

Table 5

Key Characteristics and Indicators of Creativity: Listening to One's "Inner Voice"

Characteristics and Indicators	Citations
Awareness of creativeness; Sees himself/herself as creative; Sense of purpose; Self-confident	Davis, 1998; Gardner, 1993; Kneller, 1965; May, 1959; Perkins, 1981; Starko, 1995; Stein, 1974; Sternberg, 2000; Torrance & Safter, 1999
Persistence or Perseverance	Amabile, 1983; Dacey, 1989; Davis, 1998; Gardner, 1993; Guilford, 1987; Kneller, 1965; Starko, 1995; Stein, 1974; Sternberg, 2000; Torrance, 1962
Need for and/or demonstration of autonomy, self-discipline and self-direction; Self-initiated, task-oriented behaviors	Amabile, 1983; Anderson, 1959; Clark, 1983; Davis, 1998; Gardner, 1993; Guilford, 1987; Stein, 1974; Torrance, 1962
Independence of thought; Internal locus of control; Judgment and/or action; Courage; Non-conformity; Does not fear being different (or argumentative, stubborn, uncooperative, unconventional behaviors)	Amabile, 1983; Buhler & Guirl, 1963; Carroll, 1940; Clark, 1983; Cramond, 1995; Dacey, 1989; Davis, 1998; Dellas & Gaier, 1970; Gardner, 1993; Getzels & Jackson, 1962; Guilford, 1959, 1987; Kneller, 1965; MacKinnon, 1978; Maslow, 1976; Perkins, 1981; Renzulli et al., 1976; Smith & Faldt, 1999; Starko, 1995; Torrance, 1962; Torrance & Safter, 1999
Need for alone time; Interest in reflective thinking; Introspective (or low levels of sociability, deficient social skills)	Cramond, 1995; Csikszentmihalyi, 1996; Dacey, 1989; Davis, 1998; Guilford, 1987; Smith & Faldt, 1999; Stein, 1974
Rejects sex stereotyping in interests; Free from other stereotypes	Amabile, 1983; Clark, 1983; Csikszentmihalyi, 1996; Gowan & Demos, 1964; Guilford, 1987; Maslow, 1976; Renzulli et al., 1976; Rothney & Coopman, 1958; Stein, 1974; Torrance, 1962
Intense concentration and absorption in work (or absent-mindedness, inattentive, mind wanders)	Amabile, 1983; Cramond, 1995; Davis, 1998; May, 1959; Smith & Faldt, 1999; Starko, 1995; Sternberg, 2000; Torrance, 1962
Energetic (or hyperactive-overactive physically or mentally)	Amabile, 1983; Cramond, 1995; Csikszentmihalyi, 1996; Davis, 1998; May, 1959; Stein, 1974
Willing to work hard; Liking and capacity for thinking and work	Amabile, 1983; Gardner, 1993; Guilford, 1959; Starko, 1995; Stein, 1974; Torrance & Safter, 1999

Looking Beyond the "Creative Person"

It is important to mention that there are three other areas of research in regard to understanding the creative person, identifying those with creative potentials, and nurturing the development of creative productive behaviors among all people.

Rhodes (1961) identified four strands of inquiry, each with its own unique identity but yet intertwined and, when taken together, helps us to understand better the whole concept of creativity. His four strands, commonly referred to as the four P's, are person, process, product, and press. As we have already discussed, *person* includes the traits, attitudes, and behaviors of the creative individual. *Process* includes the stages or mental process that one goes through in thinking about a problem and a creative solution, including the tools and strategies one employs. *Product* includes the outcomes of creative thinking. Finally, *press* refers to the environment and the situation in which creative thinking takes place. These four P's have led to a number of theories that rely on a systems approach to the study of creativity. These theories hold that creativity entails complex interactions of the four P's. Some prominent writers who take this approach are Csikszentmihalyi (1988), Feldman (1988), Isaksen, Puccio, and Treffinger (1993), and Sternberg and Lubart (1991). Perkins (1981) also concluded that no one approach to creative ability wholly stands up to close examination. He proposed a combination-of-ingredients approach in which we think of creativity as a trait made up of five elements: abilities, style, values, beliefs, and tactics.

Gowan (1977) stated that we have "harvested creativity wild." Those recognized as creative have to overcome many barriers and resist pressures to conform to accomplish creative productive outcomes. He suggested that if we learn how to "domesticate" creativity or to enhance it in our culture, we could greatly increase the number of creative individuals in society. Ten years later, Isaksen (1987) observed that significant progress has been made in better understanding the four P's and that it now appears quite plausible that creativity, as a dynamic concept, can be impacted and nurtured by various means.

Treffinger (1988, 1991), recognizing the complex nature of creativity and the need not only to recognize creative potentials but also to enhance and develop creative productive thinking in classrooms, introduced the *COCO* model. He proposed that creative productivity arises from the dynamic interactions among four essential components: *Characteristics, Operations, Context,* and *Outcomes (COCO).*

Characteristics include the personal characteristics as discussed above. *Operations* involve the strategies and techniques people employ to generate and analyze ideas, solve problems, make decisions, and manage their thinking. *Context* includes the culture, the climate, the situational dynamics such as communication and collaboration, and the physical environment in which one is operating. *Outcomes* are the products and ideas that result from people's efforts. Creative productivity is best described as a dynamic, complex system, in which all four components are interdependent (see Figure 2). These components can either facilitate or inhibit one's expression of creativity in observable ways within any domain of human effort.

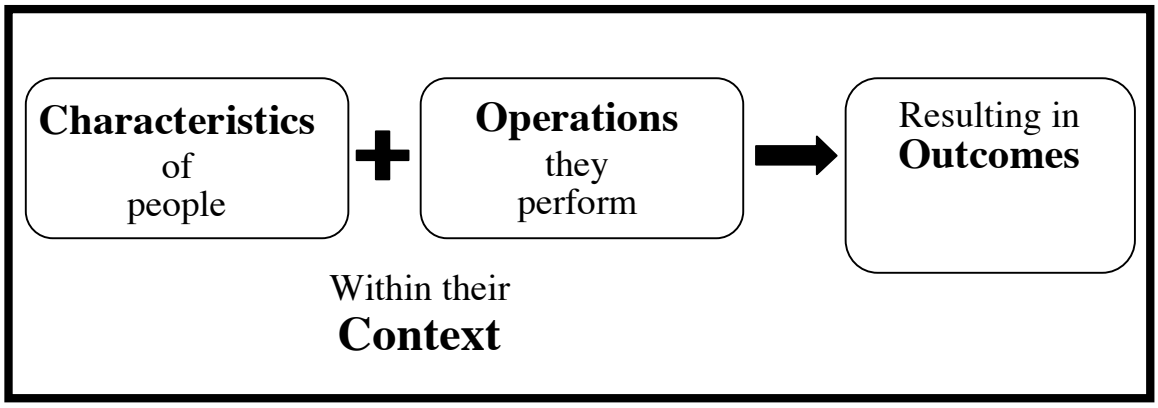

Figure 2. What contributes to creative productivity?

What Is Important to Remember?

1. Creative production involves more than characteristics.
2. The operations people use, and the context within which they work, are also important for obtaining creative outcomes.
3. Schools and teachers can make an important difference in all these areas to help students to become creative producers.

Summary

In this chapter, we examined the challenges of defining creativity. We described a research-based approach to explaining and categorizing the personal characteristics associated with creativity. We also presented a framework for understanding and organizing three additional influences on creative productivity. These topics establish a foundation for efforts to assess or identify creativity and for deliberate efforts to nurture creativity.

CHAPTER III: Evaluating, Selecting, and Using Creativity Assessment Instruments

Many resources have been developed over the past four decades to assess creativity and creative thinking across the life span. The purposes of this chapter are to review some basic considerations relating to testing, measurement, and assessment; identify several useful resources for evaluating instruments; provide a concise and practical set of criteria for evaluating and selecting those instruments; present an evaluation form that can be used to organize and summarize the information available for any instrument; and provide guidelines for using the instruments appropriately.

Basic Considerations

It will be helpful for us to begin with definitions of several common terms and with clear distinctions among *measurement, assessment,* and *test*. The term *measurement* refers to the use of any instrument or testing procedure through which quantitative data can be obtained and thus can be treated statistically. *Assessment* is a process of "taking stock" of an individual (or a group) by drawing together information from a number of sources and attempting to organize and synthesize those data in a meaningful way. Assessment draws upon many different kinds of data and frequently includes (but does not rely only upon) measurement sources. Assessment might be undertaken to identify and understand a person's (or a group's or team's) strengths and deficiencies or for more prescriptive reasons, such as for instructional planning or for placement in a specific experimental treatment or program. *Assessment* is, therefore, a broader and more inclusive term than *measurement*. *Test* refers to a particular kind of assessment that typically includes a standard set of items or questions that can be administered to individuals or groups under well-defined, controlled conditions.

In both creativity assessment (recognizing creativity in individuals or groups) and evaluation (determining whether creativity objectives have been attained), tests may be used, but they are not the only method of assessment that can be used, and measurement will often play an important role. *Creativity assessment might be regarded as an attempt to recognize or identify creative characteristics or abilities among people or to understand their creative strengths and potentials*. Measurement might play a specific role in creativity assessment to the extent that specific tests, inventories, or rating scales provide evidence to help answer such questions.

We would be dealing with creativity assessment in education, for example, if we were to pose such questions as:

- Who are the most (or least) creative students in this class?
- What characteristics suggest that a particular student is very creative?
- What are the creative strengths of the people in this group?

- How is creativity expressed differently among individuals of varying learning styles or preferences?
- How might we optimize a group's performance or design the most effective training experience for a team or work group?

Measurement commonly plays an important role in evaluating instructional or training efforts related to creativity. If a special program for students purported to enhance or stimulate students' creative thinking skills, for example, pre- and post-tests might be used as part of an evaluation design. The kinds of questions posed might include:

- Was the program effective in enhancing students' creative thinking and problem solving skills?
- What impact did the program have on participants?
- Were participants better able to recognize problems, generate ideas, and plan for creative action after the training than they were prior to it?
- Did participants in an experimental group demonstrate greater gains in creativity than students in a control group?

Assessment involves gathering, organizing, analyzing, and interpreting data. These data might be either *qualitative* or *quantitative*.

Qualitative refers to information based on observation, biographical information, anecdotal records, or other similar efforts to view the subjects. Qualitative data include descriptions and anecdotal records, which provide a basis for in-depth analysis and discussion, including consideration of relevant context issues, possible biases, and values. Analyzing qualitative data is a process concerned more with discerning the meaning of information than with formulating and testing statistical hypotheses. When trying to answer questions such as *when or why* some behavior is occurring, qualitative data analysis can often yield important, valuable, and original insights. An observer's description and analysis of a child's curiosity and creativity, as expressed in spontaneous exploratory behavior in a typical school setting, is an example of the use of qualitative data concerning creativity. Data might be gathered in classrooms, in the lunchroom, and on the playground, involving many instances and examples of the student's curiosity and exploration, gathered over a period of several weeks.

Quantitative data analysis draws upon resources that yield numerical scores or results, such as tests, rating scales, checklists, and self-report inventories. Quantitative procedures yield scores for variables based on clearly identified attributes, characteristics, or specific objectives; these specific scores or numerical data are used for statistical treatment. Thus, the results of quantitative data are expressed numerically (by using percentiles, averages, or means, for example). For quantitative analysis, an instrument's items are intended to be free of judgments based on values, and efforts are made to eliminate error or bias or to control error by statistical procedures. Quantitative measures are best used to answer such questions as, "How much… or how many . . . ? What is the relationship between . . . ?" "What are the effects of . . . ?" or "What are differences

between . . . ?" for one or more operationally defined variables. The number of items generated by a participant in response to an open-ended question on a test of divergent thinking is an example of *quantitative data* in creativity assessment. After asking students, for example, to "List as many things as possible that you might see inside an elementary school," counting the total number of responses (a measure of ideational fluency) for each student involves using *quantitative* data.

The complex and multidimensional nature of creativity cannot be captured effectively and comprehensively by any single instrument or analytical procedure. Systematic efforts to understand creativity require a well-planned process of studying individuals or groups, including *both* qualitative and quantitative data.

Linn and Gronlund (1995, pp. 6-8) proposed five general principles supporting effective assessment. Paraphrased, these are:

1. Specify clearly what is to be assessed.
2. Select an assessment procedure that is relevant to the characteristics or performance you intend to measure.
3. Use a variety of procedures to attain a comprehensive assessment.
4. Be aware of the limitations of assessment resources.
5. Remember that assessment is a means to an end, not an end in itself.

The use of tests in education has been criticized by many individuals and groups, often justifiably. However, let us keep in mind that, as Linn and Gronlund (1995) observed: "Although most of the criticisms of testing have some merit, most problems are not caused by the use of tests, but by the misuse of tests" (p. 496). We hope this report will guide professionals and policy-makers in gifted education to be wise in selecting, evaluating, and using creativity assessment resources and tools.

Resources for Evaluating and Selecting Instruments

Norris and Ennis (1989) offered seven guidelines for examining tests of critical thinking. Their suggestions were wise, and their guidelines apply equally well to the task of examining creativity tests. They suggested:

1. Pay close attention to the directions, the items, and the scoring guide.
2. Take the test yourself, and compare your answers with those of the guide.
3. Satisfy yourself that the scoring guide is reasonable, but do not expect to agree with it completely. . . .
4. Ask yourself often, "Does this really test for some aspect of critical [creative] thinking?"
5. For purported comprehensive critical [creative] thinking tasks, ask yourself, "Does this cover enough of critical [creative] thinking in a balanced manner to be called a comprehensive critical [creative] thinking test?"

6. For purported aspect-specific critical [creative] thinking tests, ask yourself, "Does this cover enough of the aspect?"
7. Read the test manual and note the statistical information, but remember that test publishers have a conflict of interest in deciding what information to include and exclude. . . . (p. 56)

We view the task of reviewing creativity assessment resources as a subtask of the larger topic of reviewing any psychological assessment instrument. In that sense, many of the criteria we propose are identical with the criteria that would apply to any review and evaluation of measures of ability, achievement, or personality. The generally accepted foundation for evaluating instruments in this broad domain is the *Standards for Educational and Psychological Testing* (1999), jointly developed and approved by the American Psychological Association, the American Educational Research Association, and the National Council on Measurement in Education. Many widely adopted texts in educational and psychological measurement offer checklists or rating scales based on the standards. We found the guide developed by Thorndike (1997, pp. 175-179) particularly useful and drew on it in creating our template.

Other Useful Resources

In developing our criteria and rating form, we found several other sources to be particularly helpful. The Joint Committee on Testing Practices, for example, developed a summary code of fair testing practices to guide test developers and test users. Since this document is not copyrighted, and its dissemination is encouraged, we have reproduced it in Appendix A of this report. The code is also available on-line at the following source: ericae.net/code.txt or by mail from the American Psychological Association. The ERIC clearinghouse on assessment and evaluation also includes a summary of suggestions and important considerations in evaluating tests (Rudner, 1993), which is available on-line at ericae.net/seltips.txt.

The most comprehensive source of rating criteria for assessment and evaluation instruments specific to gifted education was developed by The National Research Center on the Gifted and Talented (NRC/GT) at the University of Virginia (Callahan & Caldwell, 1993; Callahan, Lundberg, & Hunsaker, 1993). Unfortunately, their effort to refine the criteria they developed and to apply them to evaluation of specific instruments was not sustained and has not been updated for several years. We found the specific criteria developed by the NRC/GT researchers to be particularly useful in guiding our present efforts. The NAGC Creativity Division also provided comparative descriptions of a number of resources for assessing creativity in youth (Fishkin, 2001; Fishkin & Johnson, 1998).

Specific Considerations in Creativity Assessment

In several important ways, however, the topic of creativity presents some unique and complex challenges relating to assessment. Drawing on our professional experience and the literature on creativity in education, we found it important to consider those challenges in addition to the general testing and measurement considerations. They included:

1. The word *creativity* represents many different characteristics, processes, or products; there are more than 100 different definitions of creativity in the literature. In addition, "creative thinking," "creative potential," and "creativity" may not represent the same construct.
2. Creative thinking is an important element of giftedness in all areas, not a single, separate kind or category of giftedness or talent; it is a thread that runs through many expressions of giftedness and talent.
3. There is no one right or best way to be creative. People use their learning style preferences, personality differences, cognitive abilities, social and interpersonal skills, and content interests in many different ways to behave creatively (individually as well as in groups).
4. Providing different pathways of eligibility for gifted services is consistent with contemporary understandings of the complex and varied nature (or the multi-faceted nature) of gifts and talents. As we recognize the many and varied elements of intelligence, however, we must also be prepared to recognize that IQ and achievement (which may differ from each other more in relation to inferences we hope to make than in their operational nature) are not the only, the primary, or the most powerful indicators of students' gifts and talents.
5. Some elements of creative thinking can be observed, assessed, and documented across various talent or content areas. In addition, other elements may be unique or distinct to specific talent or content areas.
6. Creative thinking skills can be nurtured, and deliberate efforts to do so are important components of an excellent educational program. We believe that all healthy individuals have within them the potential for creativity. However, just as some athletes have the potential for greater speed than others, we believe that some students have the potential for developing their creativity far beyond the norm. Students vary in creative ability, development, and in expressing their creativity (at any time and across various contexts). Thus, we must be concerned both with *recognizing natural excellence* ("harvesting creativity wild") and with *nurturing creative skills* ("cultivating creativity").
7. Tests are not the primary way to understand and document superior skills in creative thinking, but they can provide helpful supporting information when used appropriately.
8. Creative thinking can be manifested in an almost infinite number of ways. Within any person, it may vary as a function of time, task, and context.

9. Our efforts to identify creative thinking strengths in students should be linked closely to the efforts we make to help students apply, express, and develop their talents.
10. We should use data to help locate strengths and potentials, recognizing that the instruments we use are formative and developmental. It is more readily possible to recognize and document strengths than to judge the absence of creativity. "Lack of evidence is not evidence of lack." As Gross, Green, and Gleser (1977) argued, "No test [of] creativity or intelligence embodies the entirety of the concept for all time or even at any given time. Furthermore, a person's value cannot be judged fairly in terms of any single quality" (p. 10).
11. It is important to exercise considerable caution in interpreting individual results. Any single indicator (and particularly, any test score) is not a comprehensive, permanent determination of a person's creative ability or potential; it doesn't tell everything about a person's creativity. Any one indicator does not generalize across all domains of creative performance or accomplishment, nor does it assess all the elements of creativity.
12. The basic and essential goals of gifted programming are to provide appropriate and challenging learning opportunities for students and to respond to the high-ability learner's unique characteristics and needs. No single kind of program or gifted service is suitable for every student. (We often argue that one important reason for gifted education is that high-ability students languish in regular classrooms where the same instruction is offered to every student. We should not be satisfied, then, with a view of gifted programming that simply offers "a different same thing" to every participating student.)

Development of Review and Evaluation Criteria

Based on our review of the literature in psychological and educational assessment, gifted education, and creative studies, we formulated criteria for our review and evaluation of specific assessment resources. These criteria were grouped into three broad categories: general information, technical information, and relevant literature.

General Information

This category represents basic, descriptive information that any prospective test user requires to locate and examine prospective instruments. The questions in this category are intended to respond to the broad question, "What is this instrument?"

We have included cost information where possible in our reviews, although we note that this information can and does change frequently. We decided to include reviews of resources that we know are now out-of-print, for two reasons. First, some of these resources may already exist within the assessment resources available to schools or school districts. Second, educators may find references to, or discussions of, some of

these instruments in the literature, so it may be helpful for them to have up-to-date and accurate information about the availability or accessibility of resources about which they may read or hear. The specific criteria we included in the General Information category are summarized in Figure 3. In most cases, we consider these criteria self-explanatory; we have included explanations only where necessary.

I. General Information

1. Title of Instrument
2. *Category* [Note. We describe these categories in detail in another chapter of this guide.]
   Test; Self-Report Inventory; Rating Scale; Performance or Behavioral
3. Ages or grade levels for which intended
4. Form(s) available/formats
5. Cost, as of (date)
6. Author/Developer
7. Copyright date
8. Publisher or Access Source (name, address, phone, fax, email/web)
9. Current Availability Status and Source
10. Limitations or restrictions for purchase (if any)
11. Definition of creativity (___ Stated ___ Implicit)
    [If explicitly stated definition, cite source]
12. Author/developer's purposes for the instrument (implicit or cite source)
13. *Keywords for creativity characteristics that this instrument purports to assess*
    [Note. We describe these characteristics in detail in another chapter of this guide.]

Figure 3. Specific criteria for general information category of review and evaluation of assessment resources.

Technical Information

This category deals with our independent evaluation of the adequacy or quality of the instrument, based on the fundamental dimensions and criteria for psychological and educational tests and measures.

The criteria in this set address the broad question, "What can we determine about the quality of the instrument?" While the technical criteria are generally viewed as holding considerable importance in the evaluation of any educational and psychological instrument, it is also essential to keep some caveats clearly in mind in approaching this topic. Treffinger, Feldhusen, and Renzulli (2001) expressed several cautions to keep in mind:

Although we often say, almost glibly, that any instruments we use in identification must be "valid and reliable," we need to use those terms with considerable caution. The terms *validity* and *reliability* represent important principles in testing and measurement, but they are not as absolute and fixed as some people seem to assume. In addition, in any domain of giftedness or talent, there will be many variations of productivity and accomplishment over time.

- Instruments are not simply put through a single, fixed, and standard procedure that leads to a final pronouncement that they are valid or invalid, reliable or unreliable. Determining validity and reliability are on-going processes, and there are several dimensions of both terms. Questions about an instrument ask about the extent and nature of the evidence that supports, or fails to support an instrument, for particular purposes and uses, for certain subjects, and under specific conditions or circumstances. As a result, it is always necessary to ask, "Given the evidence available, valid and reliable for what? In what respects? For whom? And, under what conditions?"
- The evidence for validity and reliability, and how we choose to interpret it, may also depend on assumptions we make about the underlying construct we are seeking to measure. For example, traditional indexes of reliability often rest on the assumption that the variable being measured is a relatively stable trait in a population. With complex human behavior, such as high-level talent in any specific domain, it is certainly necessary to raise questions about that assumption. Is it plausible to assume that every product of a gifted or talented writer reach the highest levels of quality, originality, or acclaim? What happens to traditional assumptions about stability of measurement when the behavior, by its very nature, is highly variable?
- The validity and reliability of an instrument are not necessarily universal across all ages, groups, and contexts of test use. There may be strong evidence supporting a test's validity for certain purposes or with certain ages, but not equally for other uses. In gifted education, we often seem driven to seek universals in domains that are rich particularly because of their variability! (pp. 3-4)

Albert Einstein once said, "Not everything that can be counted, counts; not everything that counts, can be counted." When we are dealing with the strongest, most inspiring aspects of all human behavior, we must exercise great caution to be fully respectful of our limitations and of the perils of seeking to apply a number, a category, or a label to the characteristics and needs of individuals.

Callahan et al., (1993) also presented several important cautions for test users. These included:

1. Do not rely solely on assessments of an instrument offered by its authors. Consider all available data and external reviews and evaluations whenever possible.
2. Remember that instruments which yield good reliability data on heterogeneous groups may not be reliable for homogeneous groups. . . .
3. Tests are never simply valid or invalid.
4. If predictive or construct validity evidence is not available but the instrument appears to have adequate content validity for use in your situation, consider using the instrument on a pilot basis to gather data. . . .

[5.] If you plan to use the norms from the manuals, be sure that the norming group included an adequate sample of the type of student . . . enrolled in your school. (p. 136)

Linn and Gronlund (1995) posed five important cautions when using the term *validity* in relation to testing and assessment. These were:

1. Validity refers to the appropriateness of the interpretation of the results of an assessment procedure for a given group of individuals, not to the procedure itself. . . .
2. Validity is a matter of degree; it does not exist on an all-or-none basis. . . .
3. Validity is always specific to some particular use or interpretation. . . .
4. Validity is a unitary concept [based on various kinds of evidence].
5. Validity involves an overall evaluative judgment. It requires an evaluation of the degree to which interpretations and uses of assessment results are justified by supporting evidence and in terms of the consequences of those interpretations and uses. (p. 49)

It is also important to remember that *no measurement is completely free of error,* and that, as Thorndike (1997) noted succinctly, "even with the best measures available, predictions in psychology and education are approximate. . . . healthy skepticism is required to keep from over-interpreting test scores, particularly when, as is usually the case, we are making predictions about individuals" (p. 155-156). These cautions are particularly important in the assessment of creative ability, which is arguably one of the most complex and multi-faceted aspects of all human performance. As a beginning step in the "healthy skepticism" advocated by Thorndike, test users must certainly be mindful of the *standard error of measurement* (an estimate of how much a person's score might change from one test administration to another, which can be determined by the test publisher) and the *standard error of estimate* (an index of the error that might be made in forecasting performance on one measure from performance on another, which is unique to the predictor criterion being considered) for any instrument, and not rely mindlessly on any single "cut-off" score as if it were absolute.

Norris and Ennis (1989) also cautioned readers about the challenges of interpreting and applying technical information concerning measures of critical thinking, and their observations are also pertinent to creativity assessment. They proposed:

> Reliabilities appear in test manuals as stark, apparently unambiguous numbers, quite different from the picture we have painted. . . . We have said that it is difficult to know what level of reported reliability is desirable in a technique for gathering information on critical thinking. To say otherwise would, in our view, be misleading. People gathering information on critical thinking must realize the primitive state of the art. Good sense is demanded in judging the level of reliability needed for the use to which the information will be put. Clearly, the more individual-specific and important the use for the information, the greater the reliability needed. However, . . . reliability in the sense of consistency is not enough. (pp. 48-49)

Mindful of these cautions, we completed an overall evaluation for each instrument we reviewed, based on our evaluation of the technical criteria. Following the useful rating guidelines offered by Callahan et al. (1993), we evaluated instruments as "excellent, good, fair, or poor" in each of six technical information dimensions. The criteria we used for assessing the technical information category are summarized in Figure 4. After listing the criteria, we will discuss the specific standards that we used to develop the overall evaluation form for any instrument and the criteria that we applied in reviewing instruments for the databases that accompany this guide.

A. Manual. The first dimension of our technical evaluation considered the availability and quality of the instrument's manual. We based the ratings of instruments on the following standards:

Excellent	There is a detailed, complete, and user-friendly manual.
Good	There is a manual that addresses the key technical issues and is useful for experienced, trained professional. There may be minor omissions, or the manual may have minor limitations in clarity, organization, or complexity.
Fair	There is a manual, but there are significant omissions of key issues, and/or it is poorly written and organized.
Poor	There is no manual or the manual contains serious omissions of essential topics.

II. Technical Criteria

A. Manual
1. Is there a published manual?
2. Is it user-friendly? (Thorough, Well-organized, Clearly-written)
3. Is the manual adequate in scope?

B. Validity
1. Summary of validity evidence (Content, Criterion-related, Predictive, Construct)

C. Reliability
1. Summary of reliability evidence (Stability or test/retest, Equivalence, Internal consistency,
   Scorer)

D. Utility and Appropriateness
1. Summary of usefulness/practicality considerations
   a. Administration: (Certified/training professional only, Any professional)
   b. Intended for group administration or individual administration
   c. Time for administration
   d. Scoring

E. Interpretation and Context
1. Norms available (Dates/scope)
2. Group differences (e.g., Age, Gender, Ethnic/cultural, LEP)
3. Support for interpretation and application to differentiated services

F. Propriety Standards
1. Ethical/professional standards
2. Obligations and disclosure

Figure 4. Specific criteria for technical information category of review and evaluation of assessment resources.

B. Validity. The next technical consideration was the validity of the instrument or the extent to which there is evidence verifying that the instrument can support certain interpretations and uses of the results and their consequences. The kinds of evidence that support the evaluation of validity include evidence based on the test's content, internal structure, relationships to other variables, and data concerning the consequences of testing (see *Standards for Educational and Psychological Testing*, American Educational Research Association, 1999). Keep in mind that validity is a complex topic and cannot be determined simply by examining a single numerical value, although validity coefficients provide valuable information. The standards for assessing validity were:

Excellent There is evidence supporting the appropriateness of the test's content in relation to creativity, the quality of the test's internal structure, its relationship with other variables (e.g., criterion-related and predictive),

and including studies conducted by researchers other than the test developer. Concurrent validity coefficients are greater than .70; predictive validity coefficients are greater than .50.

Good There is some supporting evidence for content and criterion-related validity (coefficients of at least .40). There may also be predictive validity coefficients of .25 to .40. The supporting evidence may come primarily from the developer.

Fair There is limited validity evidence (fewer studies and/or more limited results than for good/excellent).

Poor There is no supporting evidence or there is evidence suggesting the lack of adequate validity.

C. Reliability. This set of technical criteria addresses the extent to which evidence shows that an instrument measures with stability, consistency, and accuracy. The standards for this dimension were:

Excellent There is evidence of stability (test-retest r>.70 for a minimum of one month interval), internal consistency (r>.80), and data demonstrating adequate scorer reliability.

Good The evidence for stability (r>.50) or internal consistency (r>.60) is more limited; there is evidence of adequate scorer reliability.

Fair The evidence for stability or internal consistency is r>.30, and there is evidence of adequate scorer reliability.

Poor Poorer results, or no results reported, and/or unacceptable scorer reliability.

D. Utility and Appropriateness. This dimension considers the practicality, ease of use, and understandable nature of an instrument. The standards for this dimension were:

Excellent Conditions for appropriate use are described and explained thoroughly (qualifications, timing, administration, scoring).

Good Instructions are available for test administration, timing, and scoring, with at least some explanation of procedures.

Fair There are printed directions for use on the instrument.

Poor Instructions and information are missing, unclear, inconsistent, or difficult to understand.

E. Interpretation and Context. This dimension addresses the appropriateness of the content and results of an instrument for applications in identification of giftedness and talent among school-age students, the ease and appropriateness of interpretation and use of the results, and the quality of normative data. The standards are:

Excellent There is extensive and explicit guidance for understanding and applying the results. There is an explicit theoretical rationale and citations of the research; history and development of the instrument. There is specific documentation of norms, meaning of score results, group differences (age/grade, SES, ethnic/cultural, gender, disabilities, linguistic), and special populations (economically disadvantaged, rural/geographically isolated, dual exceptionality, handicapping conditions, appropriateness for students from various specific racial, ethnic, or cultural settings) to enable users to assess the appropriateness of the instrument for their setting and intended purposes.

Good There is a description of the meaning of scores and some material to support appropriate interpretation and use. There is a description of the normative or standardization sample and some evidence regarding the appropriateness of use with specific groups or special populations.

Fair There are limited norms, but there is some evidence of an appropriate standardization sample. There is a definition of the scores and a brief explanation of their meaning.

Poor There is no information about the standardization and norms (or the data are inadequate in size or scope) and/or no information to guide effective interpretation and use of the results.

F. Propriety. This dimension addresses the extent to which ethical issues, limitations, and appropriate professional use of instruments and their results are addressed for any instrument. The standards are:

Excellent There is a thorough discussion of appropriate (and inappropriate) uses of the instrument, explicit discussion of pertinent concerns or limitations of use, and explicit cautions regarding anticipated possible misuses.

Good There is basic information to provide guidance about effective and appropriate uses of the instrument.

Fair There is reference to the need for users to be fair and sensitive in using the instrument but no specifics about possible uses or misuses.

Poor The issues of ethical and appropriate use are not addressed or inappropriate uses are proposed.

To implement an evaluation of any instrument in relation to these general standards, it is essential to understand the specific criteria from which the evaluations are based. These criteria are based on generally accepted, fundamental principles of educational and psychological testing, a detailed presentation of which is beyond the scope of this guide. Even though our review did not include instruments that require advanced training in clinical, counseling, or school psychology, we always recommend that technical evaluations of any instrument should be conducted by a professional who has had formal training and experience in testing and measurement.

Related Literature

The criteria in this category involve examining the published literature regarding an assessment instrument. They address the broad question, "What have other researchers or practitioners had to say about this resource?" We believe that it is important and helpful for prospective users to be aware of the literature that supports (or does not support) the quality and usefulness of any assessment resource.

Although providing a comprehensive bibliography for every instrument was beyond the scope of our present review, we have identified reviews or critical evaluations in the literature that we found to be particularly comprehensive and insightful. We also noted reviews of instruments in the two most widely referenced test reference publications, the *Mental Measurements Yearbook* and *Tests in Print*. The most comprehensive resource for locating tests on-line is the ERIC Clearinghouse on Assessment and Evaluation (located at: ericae.net), although we found its catalog limited in relation specifically to creativity and critical thinking.

Implications for Practice: Behavior of Wise Test Users

In this guide, we outlined the rationale and criteria for reviewing and evaluating instruments for assessing creativity and creative thinking, with particular emphasis on instruments that can be used with children and adolescents. Given the time pressures and demands faced by educational practitioners, we understand that it may be tempting to say, "Yes, this sounds fine—in theory; but in the real world, it is not realistic to expect us to invest all this effort and energy. Just tell us what instrument we are supposed to use, and that's that." However justifiable that concern may be, effective educational practice depends on the ability and willingness of educational leaders to be thorough, accurate, sensitive, and cautious in making judgments that can have serious personal and academic consequences for students.

Thorndike (1997) offered these words of caution, which we believe deserve careful consideration by anyone concerned with creativity assessment:

> Two mistakes must be avoided in using test results. . . . One mistake is premature decision making. Individuals change, and present performance predicts the future imperfectly. . . . The other mistake is making a predominantly negative use of test

results. Test scores are more constructive if they are used to open doors rather than to close them. (p. 209)

Thorndike (1997) also identified six "maxims" to influence the use of tests in an appropriate and beneficial way. These were:

1. Examine and be clear about all values involved.
2. Recognize that test scores are only indicators or signs.
3. Recognize test results as only one type of descriptive information.
4. Relate test results to whatever else is known about the person or group.
5. Recognize the possibility of error in all types of descriptive information.
6. Acknowledge the limits of human wisdom, and maintain tentativeness about the basis for decisions. (pp. 439-441)

The *Standards for Educational and Psychological Testing* (American Educational Research Association, 1999) are very clear in their discussion of the responsibilities of test users that caution is essential in selecting, using, and interpreting tests:

> Test takers, parents and guardians, legislators, policymakers, the media, the courts and the public at large often yearn for unambiguous interpretations of test data. . . . These consumers of test data frequently press for explicit rationales for decisions that are based only in part on test scores. The wise test user helps all interested parties understand that sound decisions regarding test use and score interpretation involve an element of professional judgment. It is not always obvious to the consumers that the choice of various information-gathering procedures often involves experience that is not easily quantified or verbalized. The user can help them appreciate the fact that the weighing of quantitative data, educational. . . information, behavioral observations, anecdotal reports, and other relevant data often cannot be specified precisely.
>
> Because of the appearance of objectivity and numerical precision, test data are sometimes allowed to totally override other sources of evidence about test takers. . . . [In] educational and psychological settings, test users are well advised . . . to consider other relevant sources of information, not just test scores. (pp. 111-112)

The Standards recommend that, particularly for determining eligibility and designing intervention or programming, it is essential to use a comprehensive approach to assessment that may involve multiple procedures, multiple sources, and in-depth analyses and interpretation of evidence. Specifically:

> **Standard 13.7.** In educational settings, a decision or characterization that will have a major impact on a student should not be made on the basis of a single test score. Other relevant information should be taken into account if it will enhance the overall validity of the decision. . . .

> **Standard 13.9.** When test scores are intended to be used as part of the process for making decisions for educational placement, promotion, or implementation of prescribed educational plans, empirical evidence documenting the relationship among particular test scores, the instructional programs, and desired student outcomes should be provided. When adequate empirical evidence is not available, users should be cautioned to weigh the test results accordingly in light of other relevant information about the student. (pp. 146-147)

Given, then, the cautions and guidelines from test developers, authors, publishers, researchers, experienced professionals—and the widely accepted standards guiding appropriate and effective test use—caution is essential (especially in a complex, multi-dimensional domain such as giftedness and creativity). We believe the challenges of selecting and using assessment instruments wisely, using multiple sources of evidence, and linking characteristics, assessment, and programming are both realistic and essential considerations in effective programming. Appendix B of this report presents a summary of the important behaviors that give evidence of a wise approach to selecting and using tests.

Assessment Databases

Two databases, one providing information about creativity assessment instruments and one dealing with critical thinking instruments, correlated with this guide, can be accessed at the Center for Creative Learning website (www.creativelearning.com). The databases include information about nearly 100 tests, rating scales, checklists, self-report inventories, and other tools that have been prepared to assess the creativity characteristics and skills presented in this guide. (These were drawn from a pool of more than 150 instruments and resources that we located during our extended search for instruments.)

The databases include instruments that are currently available, as well as a number of instruments that are now out of print. We included out-of-print resources because interested readers may discover copies of them in various archival collections (e.g., test libraries or special test collections in school districts, colleges, or universities). Some of them are available in microfiche format from the Test Collection at Educational Testing Service (ETS) (www.ets.org), which does have a searchable, on-line database and links to the ERIC database.

Many of the instruments described in the databases are also on file in the Center for Creative Learning library in Sarasota, Florida. This is not a circulating collection, but we do provide access and support, within the guidelines of copyright laws and policies, to qualified professionals during our normal hours of operation or by special appointment. The Center for Creative Learning library and instrument collection also includes assessment information and resources on critical thinking, program evaluation for high-level thinking, group or organizational climate for creativity, leadership skills, general gifted/talented screening forms and systems, and learning styles. For the present

databases, we focused on resources for assessing individual characteristics and on tools that would be potentially useful in identifying needs for differentiation of instructional services for students.

We will attempt to update these databases regularly as new resources come to our attention or as we receive more complete information or updates about the existing resources. We are also developing an additional database on instruments for assessing style preferences.

CHAPTER IV: Systematic Assessment—A Design and Plan

As we have already shown, creativity is a complex construct, that can be expressed in many different ways. How, then, is it possible to identify creative abilities and potential creative strengths among children or adolescents in a fair and meaningful way? This chapter deals specifically with that challenge. Guided by the clear and strong admonitions throughout the educational and psychological assessment literature regarding effective and appropriate practices, we sought to design an assessment plan that would represent a practical and workable way for educators to use multiple assessment resources when assessing creativity. We are mindful of the many demands on educators today and of the limited resources with which schools operate. At the same time, we are aware that assessment decisions, and especially those that relate to determining eligibility for certain educational services, are relatively "high stakes" decisions that must be made with care and great respect for the students we serve. We tried to create a plan that keeps both of these sets of concerns balanced and responsible. This chapter presents the result of those efforts in the form of a structured matrix to guide systematic efforts to assess creativity in students. The chapter also identifies a set of specific recommendations regarding instruments that warrant consideration for use in school settings.

Such an effort must begin by choosing or constructing a definition of creativity. The definition provides a basis for specifying the characteristics that are relevant to the assessment. Specification of the relevant characteristics makes it possible to make informed decisions about an assessment strategy and about the sources of data and tools that will be useful in designing and carrying out the assessment process. Figure 5 shows the matrix we developed for the systematic assessment of creativity.

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
BEHAVIOR OR PERFORMANCE DATA				
SELF-REPORT DATA				
RATING SCALES				
TESTS				

Figure 5. Matrix for the systematic assessment of creativity.

Data Sources: Rows of the Figure

The four rows of the figure represent four different ways to gather information about a person's creative abilities, strengths, skills, or potentials. Each row represents one source of data that might contribute to the overall goal of assessing creativity. These data sources are:

Behavior or performance data. One important way to obtain information about people's creativity is through their actual behavior—their creative products, performances, or accomplishments. There are two general ways to obtain these kinds of data: through records or first-hand observations in natural ("real-life") settings, or through the person's performance in constructed tasks that simulate or approximate the real-life settings but can be arranged and observed under controlled conditions. It might be useful to think of the former set as documentation of real-life creativity and the latter as demonstration of creativity under realistic or simulated conditions. Several assessment tools can be useful for gathering and using data for this row of the figure; these are generally described as *portfolio data* for the real-life accomplishments, or *performance data* for the realistic tasks. These tools are generally designed for specific applications, and so there are relatively few "standard" instruments for them in the databases. A number of books are available to guide educators in planning and carrying out performance or portfolio assessment; we will list several of these in the bibliography for this chapter. The strength of the data that can be obtained in this category derives, of course, from its credibility in real-life or realistic accomplishments and products. From an assessment perspective, these data can be difficult to summarize and evaluate concisely and consistently and may make direct comparisons among individuals very difficult (especially given the variety of ways that creativity can be expressed in the real world). This may be a limitation related to what we seek to do with the data, rather than of the data per se, of course.

Self-report data. On some occasions, it is possible to obtain information about people's creativity from the responses they provide to questions about themselves and their behavior. Some writers in the creativity literature have argued, quite seriously, that the best way to determine whether or not people are creative is, in fact, simply to ask them! The second row in the matrix deals with resources in which people respond to questions about themselves and their own skills, abilities, activities, and behavior. Several of the assessment instruments and resources in the database accompanying this report are tools for this category of data, in the form of attitude inventories, personal checklists, or biographical inventories. One strength of data from this category may be that self-report inventories can be efficient to administer and score. There are also limitations, however, in relation to the completeness and accuracy of any self-description of abilities or skills, the comparability of data across settings, the stability of self-assessments over time, or the correlation between self-ratings and other external criteria of creativity.

Rating scales. The third row of the figure involves instruments that provide specific descriptions of qualities or behaviors that describe (or are associated with) creativity characteristics and ask people to rate the creativity of others. These might call for ratings by teachers, parents, mentors, or other adults who may be in a position to know and describe a person in relation to those questions; occasionally, instruments in this category might call for ratings by peers (such as sociometric devices). The usefulness of rating data depends on several factors, of course. These include the rater's understanding of the characteristics or behavior to be rated, the opportunity of the rater to know or observe the person in situations in which that behavior might occur, and the rater's willingness to limit judgments to the specific characteristics being rated. Under optimum conditions and use, ratings can provide helpful information efficiently; under other conditions, or if not properly used, ratings may also be quite suspect in validity or reliability.

Tests. The fourth row of the figure is test data. This refers to the person's responses to a structured set of tasks or questions, administered under controlled or standardized conditions, through which the person demonstrates his or ability to think or respond creatively. There is often a tendency among some people to trust test data because it is (or appears to be) objective, readily quantifiable, and comparable for all who respond by virtue of its standardized format. Other people argue that, especially in relation to creativity, the very concept of a standardized test that can be scored objectively is a contradiction in terms. If the items on a test call for performance that relates directly to essential elements of one's definition of creativity, then a case can be made that its results are relevant (if not necessarily comprehensive) indicators of creativity. Even under those circumstances, however, concerns may be raised in relation to the complexity and time required for accurate scoring and the breadth of the construct of creativity that can be tapped in a small set of tasks or activities.

Since each of these four data sources has both pluses and minuses, or advantages and limitations, it becomes evident why experts recommend caution in their use. For example, the literature on creativity and creativity assessment is very clear that it is not wise to rely on a single instrument or to use results as if they represent absolute, fixed classifications of a person's creative ability.

What Is Important to Remember?

1. Begin with a specific definition of creativity, which will guide you in specifying the characteristics you will see to assess.
2. The factors or characteristics that are most important in your understanding of creativity will influence the kinds of assessment procedures and tools you will seek, select, and use.
3. Use multiple sources of data to assess the relevant characteristics. No single assessment instrument or test provides evidence about all the possible meanings or elements associated with the construct of creativity.

4. Be aware of the advantages and limitations of any instrument or tool from any of the four sources of data.
5. Data about a student's apparent strengths can be used for inclusion or to document the appropriateness of services, but data should not be used for "strong exclusion," since what does not appear at one time, in one area, or with one assessment tool may appear at another time, in another context, or with other tools.
6. Use the results of all data gathering in a flexible way, rather than to establish rigid categorizations of students as "highly creative" or "not creative."

We can also link the four categories of characteristics presented in Chapter II with the four sources of data in Figure 5. In each of the Tables 6a to 6d, we present one characteristics category, describing the general implications of those characteristics for an assessment strategy, and summarizing the principal applications of each of the four data sources for that dimension. We will extend this analysis with recommendations regarding specific assessment instruments and tools later in this chapter.

Table 6a

Characteristics of Assessment Strategy: Generating Ideas

Characteristics and Indicators	Implications for Assessment	Tools for Assessment
Generating Ideas Fluency Flexibility Originality Elaboration Metaphorical Thinking	This category involves assessing divergent production abilities, skills, or preferences. These dimensions involve asking students to generate new and unusual ideas. Divergent productivity also involves the development of a large number of possibilities, many arrived at as the result of shifts in one's perception and thinking, and adding details and expanding ideas as the process continues. The category also involves the ability to use metaphor or analogy as a springboard for creative connections or new possibilities.	Testing, requiring students to demonstrate idea generation, is an efficient means of assessing a student's level of divergent productivity. Such measures may yield direct evidence of the student's proficiency in divergent production. Be aware, however, that some experts consider divergent production to be specific to content or talent domains; the literature is divided regarding the domain generality of these factors. Performance assessments centered on the creative problem solving process might also be useful in assessing the five indicators in column one. Originality, flexibility, and elaboration might be evaluated through an assessment of creative products produced by a student in an area of strength, although product does not always reveal the processes that preceded it. Rating scales completed by parents, teachers, or other evaluators for this category might include items describing the person's ability to generate new and unusual ideas. Product assessments in creative writing, art, and musical composition might reveal the use of Metaphorical Thinking or might demonstrate aspects of originality, flexibility, and elaboration.

Table 6b

Characteristics of Assessment Strategy: Digging Deeper Into Ideas

Characteristics and Indicators	**Implications for Assessment**	**Tools for Assessment**
Digging Deeper Into Ideas Analyzing Synthesizing Reorganizing or redefining Evaluating Seeing relationships Desiring to resolve ambiguity or bringing order to disorder Preferring complexity or understanding complexity	This category involves the thinking that leads to doing. The characteristics described by this category involve assessing higher-level thinking processes. These critical thinking abilities may also contribute to creativity and include the skills used to focus ideas, such as sorting, evaluating, or prioritizing options; developing and using criteria; strengthening or improving ideas; selecting the most promising ideas leading to outcomes that are both original and practical. This category also involves assessing one's response to ambiguous or paradoxical situations or tasks or one's proficiency in defining relationships or categories when given complex data or tasks.	Tests designed to measure critical thinking, higher-level thinking, or analytic reasoning would be appropriate choices. Assessment of these characteristics might also involve the collection of performance data evolving from structured tasks, as well as rating scales or portfolio evaluations. Self-reports that include items focused on the individual's ability to resolve ambiguity, motivation to bring order to disorder, or preference for complexity may also be useful. Rating scales completed by parents, teachers, or other evaluators for this category might include items describing the person's ability to make effective choices or decisions or to handle complex, ambiguous tasks.

Table 6c

Characteristics of Assessment Strategy: Openness and Courage to Explore Ideas

Characteristics and Indicators	**Implications for Assessment**	**Tools for Assessment**
Openness and Courage to Explore Ideas Problem sensitivity Aesthetic sensitivity and/or interests High levels of curiosity Sense of humor and/or facility for producing playfulness (or childish, silly, sloppy, immature) Capacity for fantasy and imagination Risk-taking (or thrill seeking) Tolerance for ambiguity Tenacity and lack of inhibition (often spontaneous) in expression of opinion Openness to experience and ideas and not frightened by the unknown Openness to feelings and emotions and emotional sensitivity Adaptability; Making do with what is at hand to reach goals Intuition Willingness to grow Unwillingness to accept authoritarian assertions without critical examination Integration of dichotomies (e.g., selfish and unselfish, extroverted and introverted)	Creating original products requires some comfort with the unknown; an ability to recognize problems where they exist, often before others become aware of them; and the desire both to analyze and play with problems and possible solutions. Creativity often requires an individual to step out from the crowd, take risks, be receptive to new ideas and information, to focus on the desired outcome, to view mistakes and failures as learning experiences, and to challenge one's own thinking and conclusions. These characteristics are often recognized by those who are in a position to observe an individual's behavior over time or by the individual answering for him or herself. Assessment strategies and tools for these characteristics often focus more on personality or on style dimensions than on abilities or cognitive factors.	Openness to new ideas and the courage to explore them might best be assessed through rating scales completed by teachers, parents, and others close to individual students. Self-report inventories and checklists may also be useful, especially when evaluating such characteristics as tolerance for ambiguity, openness to feelings and emotions, and the openness to dichotomies. Behavior and performance data gathered through the observation of real-life activities offer many opportunities to assess these characteristics. The instruments used to record these observations must be carefully constructed. Portfolios also offer opportunities to record indications that an individual's work exhibits the development of the characteristics.

Table 6d

Characteristics of Assessment Strategy: Listening to One's "Inner Voice"

Characteristics and Indicators	**Implications for Assessment**	**Tools for Assessment**
Listening to One's "Inner Voice" Awareness of creativeness; Sees self as creative; Sense of purpose; Self-confident Persistence or Perseverance Need for and/or demonstration of autonomy, self-direction; Self-initiated, task-oriented behaviors Independence of thought; Internal locus of control; Judgment, and/or action; Courage; Non-conformity; Does not fear being different (or, argumentative, stubborn, uncooperative, unconventional behaviors) Need for alone time; Interest in reflective thinking; Introspective (or low levels of sociability, deficient social skills) Rejects sex-role stereotyping in interests; Free from stereotypes Intense concentration and absorption in work (or absent-mindedness, inattentive mind wanders) Energetic (or hyperactive/ overactive physically or mentally) Willing to work hard; Liking and capacity for thinking and work	An individual's creative productivity is enhanced by possession of these traits. Assessment of these characteristics can be quite complex. Self-awareness, confidence, persistence, self-motivation, and task-orientation provide the foundation for those behaviors that lead to creative productivity. The personalities of creative productive individuals seem to balance opposite traits: the need to be alone and the need to draw ideas and strength from others; reflection with action; and the need to dream the impossible balanced with intense concentration on achieving the doable. These characteristics are usually best described by the individual or by those close to the individual.	In that this category tries to tap the "inner voice," self-report inventories seem to offer a rich source of data as to the level to which these characteristics have developed within the individual. Rating scales also can offer measurable data when completed by those in a position to observe: self-initiated, task-oriented behaviors; internal locus of control; independence of thought; persistence; intense concentration; and the willingness to work hard. Performance data, based on real-life activities and observations of individuals engaged in the problem solving process, can also be useful. While many tests do not lend themselves to providing information about this category, there may be a few instruments that can assist in identifying aspects of these characteristics.

Level of Present Performance: Columns of the Figure

The four columns of the matrix represent ways of classifying the level of development and expression of creativity—the creative strength—manifest in the person's behavior or performance at the present time, under particular circumstances or conditions (or within a particular talent area or domain), using the specific sources of data that are available. Once again, we emphasize that these characterizations are dynamic, not static. People change and grow. They respond differently in different areas and under changing circumstances, and assessment is always a dynamic process, not a single, "one-time, one-shot" event.

Not Yet Evident. This column suggests that, in relation to information from the data sources (rows), the person's present level of performance does not reveal characteristics or behaviors that are consistent with the selected definition of creativity. Notice two important qualifications in this statement. First, the category is not called "uncreative" or "not creative." The category does not suggest that creativity is unattainable for the person, but only that creativity characteristics are not presently evident or observable. The category is about performance, not about ability, aptitude, or potential. Second, the category relates only to characteristics of creativity as defined for the assessment; under a different definition of creativity, which might involve other characteristics, the person's level of performance might differ.

Emerging. This column indicates that there is limited evidence of creativity characteristics in the person's present performance. Creativity is beginning to emerge in ways that are consistent with the definition of creativity being assessed, although the creative behavior may be limited in quality, inconsistent, or tentative.

Expressing. When data indicate signs of creativity characteristics in the student's present behavior with regularity and occasional signs of high quality, we might characterize the student's present level of creativity as "expressing." This category suggests that the characteristics of creativity can often be observed in the student's typical behavior and products.

Excelling. When data indicate consistently the presence of creativity characteristics (as defined for the assessment), and those characteristics are accompanied by creative accomplishments, in one or more areas of performance or talent, with outstanding depth, quality, and originality, we categorize the student's present level of performance as "excelling."

It is important to keep in mind that these four columns in the matrix represent a continuum of performance, rather than separate, independent categories with rigid boundaries. As much as we might yearn for precise, objective categories, the reality of the complexity of creativity, its attendant characteristics, and our assessment tools remind us that such precision is seldom attainable at the highest levels of human behavior.

Using the Matrix: A Systematic Design for Assessment

The next step is to put the rows and columns together, constructing a systematic design for assessing creativity among people. Taking this step involves looking carefully at how each data source (or row of the matrix) yields evidence that clarifies a person's present level of performance (or column in the matrix). Figures 6a to 6d provide summaries of how the four levels of performance (columns) might be described for each of the four sources of data (rows).

If you have multiple sources of data that all point to the same column, you can be reasonably confident of that description of the person's present performance level. If you have some sources of data that suggest a certain present level of performance but other data that suggest a different level, additional analysis may be warranted, and additional data collection might also be helpful. In general, a plausible working hypothesis might well be to give greatest trust and weight in your analysis to the data *from at least two data sources* that support the highest level of present performance (i.e., the column at the right-most direction among all four columns for that person). That is, use the highest level of present performance that is supported by data from two or more data sources. There are two reasons for this recommendation: (a) if higher- level performance is indicated in any column, that level of behavior existed, by definition, even if only through a single source; and (b) the instructional consequences of a false positive (i.e., proposing a higher present level of performance than actually might be warranted) generally seem far less worrisome in this area than the consequences of a false negative (i.e., proposing a lower present level than might actually be warranted). Withholding services that would be appropriate and challenging for a student seems to hold greater risk for disservice to the student than does providing opportunities for the student. (Since it is well established that creativity can be nurtured, providing opportunities that "stretch" the student will not be likely to be stressful or harmful; denying students access to services from which they might profit is a waste of potential.)

When the relevant creativity characteristics are "not yet evident," it is reasonable to conclude that the instructional options or services associated with gifted/talented programming would not be appropriate for the student at the present time. However, if creativity is an important educational goal for all students, it is possible to define learning activities that would be appropriate for the student at this level. It would be important and appropriate to identify ways to provide such services for all students as elements of an effective, challenging regular education program.

When the relevant creativity characteristics are "emerging," it is reasonable to conclude that the instructional options or services associated with gifted/talented programming would not be appropriate for the student at the present time. Again, it is possible to define learning activities that would be appropriate for the student at this level, and it would be appropriate to adopt a "watch and wait" strategy, monitoring the student's on-going performance for indicators of increasing confidence and competence in creativity-related behavior.

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
BEHAVIOR OR PERFORMANCE DATA • **Portfolios and real-life activities** • **Structured performance tasks** • **Evidence of awards and/or recognitions in contests, competitions, or special programs** • **Product evaluation scales or ratings by judges**	In the student's projects, products, or performances, we do not see indications of fluent, flexible, or original thought or unprompted elaboration.	The student's work includes some evidence of fluency, flexibility, originality, or elaboration in thinking, when prompted by a teacher, supervisor, or peers in a team or group.	The student's products, projects, or performance include evidence of fluency, flexibility, originality, or elaboration that are consistently spontaneous (in individual work or as part of a team or group).	The student's products, projects, or performances include evidence of spontaneous fluency, flexibility, originality, or elaboration, recognized by others as high in quality and quantity (in individual work or as part of a team or group), with documentation of "real world" accomplishments and products.
	Student may be reluctant or hesitant to engage in creative challenges or may withdraw from participation.	Student participates in individual or team creative activities or challenges but may be tentative or indicate lack of confidence in his/her contributions.	Student participates actively in individual or group creative activities or challenges and makes consistent creative contributions to the activity.	Student initiates creative activities or challenges, and is looked upon by peers and/or adults as an "idea leader" in activities.
	Completes few or no original products or products judged as below average on creative product scales or by judges (individual or by consensus panel).	Completes products, evaluated consistently as average on creative product scales or by judges (individual or by consensus panel).	Completes products consistently evaluated as above average on creative product scales or by judges (individual or by consensus panel).	Completes products consistently evaluated as very high or excellent on creative product scales or by judges (individual or by consensus panel).

Figure 6a. Assessment of creativity based on behavior or performance data.

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
SELF-REPORT DATA • **Biography or interest inventories** • **Other self-rating forms or inventories**	Self-description(s) indicate few or no characteristics associated with creativity.	Self-description(s) indicate some characteristics associated with creativity.	Self-description(s) indicate several characteristics associated with creativity at an average to above average level.	Self-description(s) indicate awareness of many characteristics associated with creativity at a high level.
	Does not demonstrate attitudes or interests that are indicative of creativity characteristics; does not demonstrate motivation or interest in pursing creative activities or challenges.	Demonstrates attitudes or interests that are indicative of creativity characteristics but may be tentative or uncertain about motives or involvement in creative activities or challenges.	Demonstrates positive attitudes or interests that are indicative of creativity characteristics and motivation to engage in creative activities or challenges.	Demonstrates very high level of interests, energy, enthusiasm, and motivation to engage in creative activities or challenges. May seem to be "relentless" or "on one track" in pursuing areas of creative interests.

Figure 6b. Assessment of creativity based on self-report data.

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
RATING SCALES **Rating or checklists completed by external sources (teacher, parent, peer, or community member).**	The student's ratings on specific creative thinking criteria or behaviors— completed by a qualified rater— do not reflect evidence of creative thinking proficiency at the present time or in relation to the task, or the specific talent area or domain being rated.	Ratings of the student's creative thinking skills or behaviors completed by a qualified rater and for a specific task, talent area, or domain being rated demonstrate some indications of creative thinking but may be limited in breadth, depth, or quality as perceived by the rater. The student's ratings are at or near the average (in relation to local comparisons) and may be above average for a specific task or project.	Ratings of the student's creative thinking skills or behaviors completed by a qualified rater and for a specific task, talent area, or domain being rated demonstrate consistent indications of creative thinking in relations to that task or area. The student's ratings are average or better (in relation to local comparisons) and are above average in some of the indicators in relation to varied tasks within the student's rater(s) of strength.	Ratings of the student's creative thinking skills or behaviors completed by a qualified rater and for a specific task, talent area, or domain being rated demonstrate consistent indications of high levels of creative thinking in relation to that task or area. The student's ratings are above average to excellent (in relation to local comparisons), on several indicators, in relation to varied tasks within the student's area(s) of strength, and over a sustained period of time (several months or longer).

Figure 6c. Assessment of creativity based on rating scales.

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
TESTS **Direct measures of student's ability to produce many, varied, original, or elaborated responses.**	The student's scores on measures of creative thinking (verbal or figural) do not indicate proficiency in generating ideas with fluency, flexibility, originality, or elaboration at the present time (and in relation to the tasks and assessments context). Generally, this means standard scores that are below the mean of an appropriate comparison group (and taking error of estimate into account).	The student's scores on measures of creative thinking (verbal or figural) indicate average skills or proficiency in generating ideas with fluency, flexibility, originality, or elaboration, in relation to appropriate comparison groups. Generally, this means scores that are at or near the mean of an appropriate comparison group (and taking error of estimate into account).	The student's scores on measures of creative thinking (verbal or figural) indicate above average skills or proficiency in fluency, flexibility, originality, or elaboration in relation to appropriate comparison groups. Generally, this refers to scores that are consistently above the mean of an appropriate comparison group (when such data are available and taking error of estimate into account).	The student's scores on measures of creative thinking (verbal or figural) indicate strongly above average skills or proficiency in fluency, flexibility, originality, or elaboration in relation to appropriate comparison groups. Generally, this refers to scores that are consistently well above average for an appropriate comparison group (when such data are available and taking error of estimate into account).

Figure 6d. Assessment of creativity based on tests.

When the student's present level of performance is in the "expressing" column, certain kinds of services may be particularly appropriate. Students who are expressing creativity characteristics regularly in their performance certainly demonstrate a need for activities and services that are appropriate and challenging in relation to their creativity. Whether or not those are considered "gifted education services" may depend on the specific programming model the school uses as much as or more than it reflects a certain level of "creative ability" in the student. In many ways, the difference between the "expressing" and "excelling" levels may often be related to opportunities and instruction.

When there is evidence of creativity characteristics that are accompanied by high levels of performance (representing the "excelling" column in the figure) there is certainly documentation of the need for the high-level programming or services that can be offered through gifted education. Of course, it is also important that the services should be appropriate and challenging for the student and linked carefully and explicitly to the creative characteristics of the student. Students whose high-level creativity is evident in varied ways or in different talent areas will not all need the same programming activities or services. Effectively differentiated instruction is not a "one-size-fits-all" prescription of activities.

Defining the Level of Present Performance

The obvious question, of course, is "How do we determine the exact performance or score on any instrument, for any data source, that corresponds to the 'excelling' category of present performance?" Unfortunately, the assessment data and process cannot yield a precise, quantitative designation or "cut-off" for answering that question for several important reasons. These include:

1. We really do not have a rich, deep pool of data specifically from students in every state to make it possible to establish statewide norms for performance, with evidence of long-term predictive validity for any instrument or battery.
2. National norms for instruments involving creativity are seldom sufficient in size or scope, adequate in long-term validity documentation, or adequately inclusive of high-ability students, so that it is difficult to justify specific, pre-determined cutoff points for scores for individual students.
3. The determination of normative levels depends heavily on the purpose of the assessment, the definition of creativity, and the nature of the response that will be made. When programs and services may vary widely from one place to another, as is often the case in educational programs that relate to creativity, it is not feasible to designate a uniform score level for all contexts.
4. As much as we would like to believe that decisions are always made solely on the basis of the best available theory and research evidence about teaching and learning, the reality of public education is that many complex factors influence decisions. A number of very real political and economic considerations come into play, for example, that have significant influence

on the decisions that can be made about program participation and services.

Therefore, we conclude that no single recommendation about cutoff scores or quantitative ranges for any column of the assessment matrix can be justified solely on the basis of assessment research, psychometric theory and research, or the specific properties of any instrument itself. Rather than prescribing a specific, but highly arbitrary quantification of the matrix, we hope the matrix and the supporting information in this guide will stimulate informed discussion among parents, professionals, and policy-makers within local educational agencies or on a statewide basis.

We believe that this design and plan for systematic assessment can also serve two other valuable functions. First, it can guide schools in planning appropriate and challenging instructional programs and services that can be linked to assessment data. (We discuss several possible ways to do this in the next chapter of this guide.) Second, these procedures can serve as a valuable foundation for professional development. Effective assessment depends on the expertise and experience of educators in this area, as in any other.

What Is Important to Remember?

1. Students may demonstrate any of the four sets of creativity characteristics (from Chapter II) in varied ways, so it is important to use multiple sources of data.
2. The definition of creativity you select will influence the characteristics you look for and the instruments you might use to assess them.
3. When you observe creativity characteristics in a student, it is important to ask, "What programming activities or services would be appropriate for a student with these characteristics?"
4. When you do not observe creativity characteristics in a student, it does not mean that the student is uncreative. The results might change over time, in different talent areas, or using a different definition of creativity (and assessment tools for that definition).
5. Assessment of the student's present level of performance tells you more about how to respond to the student effectively than about whether or not to respond. (The appropriate responses may involve building a high-quality regular school program and may not all take place as a part of gifted education services.)
6. Judgments about the specific results for any data source or instrument that correspond to a specific level of present performance (e.g., "excelling") involve many important factors that extend beyond the data from the instrument itself. These include professional judgment, policy considerations, public and political influences, and economic considerations.

Selecting Instruments for Creativity Characteristics

The creativity assessment instrument database that accompanies this guide includes information about an extensive collection of tools or resources for assessing the four characteristics dimensions. The resources also represent all four data sources in the assessment matrix we presented in this chapter. For convenient examination of the instruments in the database, Figure 7 presents a cross-index of the instruments classified by characteristics dimensions and data source categories. The instruments in bold face type in each cell of the figure represent the instruments that we recommend as most promising for school use. (The numbers for each instrument refer to their record number in the databases described previously.)

Criteria for Selecting Recommended Instruments

In reviewing many tests, rating scales, checklists, and inventories, we applied the general and technical criteria from Chapter III of this report. In addition, when we developed our recommendations about tests for school use in assessing the need and eligibility for gifted programming services, we considered several additional factors. These were:

1. Current availability.
2. Appropriateness for use with a broad age range of K-12 students (although very few instruments span all age or grade ranges).
3. Positive support for the technical criteria pertaining to manual, validity, and reliability (recognizing that no instruments were "excellent" across all technical criteria) and evidence of attention to professional standards in test development and presentation.
4. Positive support for the technical criteria relating to norms (including adequate size of the norm group and appropriate sampling and distribution).

Several cautions are also important to state. These are:

1. The instruments are not interchangeable. Each instrument has its specific purposes, strengths, and limitations. The test user must review these carefully to determine their appropriateness in a particular setting.
2. Select instruments that link specifically to the characteristics that are relevant for the definition of creativity you are using.
3. Use multiple criteria and sources of data. Do not rely on the results of a single instrument, particularly to exclude students from services.
4. Instruments provide data to guide informed decisions and instructional planning. They do not yield fixed, permanent categorizations of a student as "creative" or "uncreative." Use them as helpful professional tools, not as blunt instruments.

Characteristics Data Source	Generating Ideas	Digging Deeper	Openness/Courage	Listening to One's Inner Voice
Performance Assessment	7 Assessing CPS Perform. 9 Berkeley Prob. Solv. Tests 18 Creative Product Scale	7 Assessing CPS Perform. *From the Critical Thinking Database* 7 Holistic Rubric	7 Assessing CPS Perform. 9 Berkeley Prob. Solv. Tests 65 Creative Dramatics	7 Assessing CPS Perform.
Self-Report	1 Childhood Attitude Inv. 2 ASSETS 3 Abedi 7 Assessing CPS Perform. 12 Biographical Inventory U 22 Creat. Attitude Survey **32 GIFFI** **33 GIFT** **35 Khatena-Morse** **36 KTCPI** 46 PACT 51 Preconscious Activ Scale 53 Process Skills Rating **61 STAR** 62 Creativity Self-Report	2 ASSETS 7 Assessing CPS Perform. 12 Biographical Inventory U 22 Creat. Attitude Survey **32 GIFFI** **33 GIFT** 34 IPGC **35 Khatena-Morse** **36 KTCPI** 38 Leadership Skills Inven. 46 PACT 53 Process Skills Rating **61 STAR** *From the Critical Thinking Database:* 2 California Critical Thinking Dispositions Inven.	1 Childhood Attitude Inv. 2 ASSETS 6 Alpha Biographical Inv. 7 Assessing CPS Perform 10 Biographical Invent. Creat. 11 Biographical-Siegel 12 Biographical Inventory U 22 Creat. Attitude Survey 29 Gifted/Talented Screen. **32 GIFFI** **33 GIFT** **36 KTCPI** 38 Leadership Skills Inven. 46 PACT 47 Personal Creat. Assess. 48 POD 49 POI 53 Process Rating Scales 58 16 PF **61 STAR** 68 Prob. Solving Inven.	1 Childhood Attitude Inv. 2 ASSETS 6 Alpha Biographical Inv. 12 Biographical Inventory U 15 Creative Activ. Checklist 16 Creat. Behavior Inven. 22 Creat. Attitude Survey 29 Gifted/Talented Screen. **32 GIFFI** **33 GIFT** 34 IPGC **35 Khatena-Morse** **36 KTCPI** 38 Leadership Skills Inven. 41 Miller Motivation Scale 46 PACT 47 Personal Creat. Assess. 48 POD 49 POI 53 Process Rating Scales 58 16 PF **61 STAR** 66 Creativity Self-Report 68 Prob. Solving Inven.

Figure 7. Matrix of creativity assessment instruments.

Characteristics Data Source	Generating Ideas	Digging Deeper	Openness/Courage	Listening to One's Inner Voice
Ratings	2 ASSETS 7 Assessing CPS Perform. 17 Kirschebaum CBI 21 Creat. Assess. Packet 23 Creativity Checklist **28 GATES** **30 GES-2** 43 Meeker Creativity Rating 42 Modes of Thinking 45 Parental Evaluation 52 PRIDE **55 SRBCSS**	2 ASSETS 7 Assessing CPS Perform. 13 Combined Efficacy Scale 17 Kirschenbaum CBI 23 Creativity Checklist **28 GATES** **30 GES-2** 40 Meeker Creativity Rating **55 SRBCSS**	2 ASSETS 7 Assessing CPS Perform. 13 Combined Efficacy Scale 17 Kirschebaum CBI 21 Creat. Assess. Packet 23 Creativity Checklist **28 GATES** **30 GES-2** 40 Meeker Creativity Rating 52 PRIDE **55 SRBCSS**	2 ASSETS 7 Assessing CPS Perform. 13 Combined Efficacy Scale 17 Kirschenbaum CBI 21 Creat. Assess. Packet 23 Creativity Checklist **28 GATES** **30 GES-2** 52 PRIDE **55 SRBCSS**

Figure 7. Matrix of creativity assessment instruments. (continued)

Characteristics Data Source	Generating Ideas	Digging Deeper	Openness/Courage	Listening to One's Inner Voice
Tests	4 AC Test 9 Berkeley Exper. P/S Tasks 12 Christensen-Guilford 14 Comprehensive Abil. Bat. 19 Creative Reasoning Test 20 Creative Thinking Tests 21 Creat. Assess. Packet 24 Guilford Creat Test/Chil. 25 Denny-Ives 26 Drawing Completion 27 Flanagan 31 Gross Geormetric 37 ETS Kit 39 Meas of Question. Skills 42 Modes of Thinking 43 Torrance: "Mother Goose" 44 Owens 50 Pikunas 54 Remote Associates 56 Selected Creativity Tasks 57 Similes 59 Starkweather 60 SOI-LAT 62 Urban-Jellen 63 Test of Creative Potential 64 Test of Creative Thinking 67 Gross Geometric-Children 69 PEPSI **70 TCAM** 71 TCSW **72 TTCT**	19 Creative Reasoning Test 25 Denny-Ives 26 Drawing Completion 27 Flanagan 31 Gross Geometric 37 ETS Kit 39 Measure of Questioning 43 Torrance "Mother Goose" 44 Owens 57 Similes 64 Test of Creative Thinking 67 Gross Geometric- Child. 69 PEPSI *From the Critical Thinking database:* 1 Cal. Critical Thinking 3 Cal. Reasoning Appraisal 4 Cornell Class Reasoning **5 Cornell Crit Thinking** 6 Ennis-Weir 8 In-View 9 New Jersey Test of Reasoning **10 Ross** 11 QuantQ **12 SEA Test** 13 Test of Everyday Reasoning 14 Valett 15 Watson-Glaser	**8 Barron-Welsh Art Scale** 9 Berkeley Exper. P/S Tasks 19 Creative Reasoning Test 20 Creative Thinking Tests 21 Creat. Assess. Packet 26 Drawing Completion Task 31 Gross Geometric Forms 43 Torrance, "Mother Goose" 64 Test of Creative Thinking 67 Gross Geometric- Children 69 PEPSI **70 TCAM** 71 TCSW **72 TTCT**	21 Creat. Assess. Packet 25 Denny-Ives 26 Drawing Completion Task 31 Gross Geometric Forms 67 Gross Geometric-Children **70 TCAM** **72 TTCT**

Figure 7. Matrix of creativity assessment instruments. (continued)

Recommended Instruments

These are the instruments that, based on our review, warrant consideration for school use.

Performance Assessment. We did not recommend any instruments for general use for this category. For this source of data, effective procedures involve the development and use of tools that are unique to each situation. Many articles and books are available that describe appropriate and effective procedures for authentic or performance-based assessment. These include:

Archbald, D., & Newmann, F. (1988). *Beyond standardized testing: Assessing authentic achievement in the secondary school*. Reston, VA: National Association of Secondary School Principals.

Association for Supervision and Curriculum Development. (1994, August). Making assessment meaningful. *ASCD Update,* pp. 1-4.

Association for Supervision and Curriculum Development. (1992). . . . *Redesigning assessment*. [video tape]. Alexandria, VA: Author.

Batzle, J. (1992). *Portfolio assessment and evaluation: Developing and using portfolios in the K-6 classroom*. Cypress, CA: Creative Teaching Press.

Burke, K. (Ed.). (1992). *Authentic assessment: A collection*. Palatine, IL: Skylight.

Graves, D. H., & Sunstein, B. S. (Eds.). (1992). *Portfolio portraits*. Portsmouth, NH: Heinemann Educational Books.

Hart, D. (1994). *Authentic assessment: A handbook for educators*. Reading, MA: Addison Wesley/Innovative Learning.

Herman, J. L., Aschbacher, P. R., & Winters, L. (1992). *A practical guide to authentic assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Pickering, D., & McTighe, J. (1993). *Assessing student outcomes: Performance assessment using the dimensions of learning model*. Alexandria, VA: Association for Supervision and Curriculum Development.

Meyer, C. (1992). What's the difference between authentic and performance assessment? *Educational Leadership, 49*(9), 39-40.

Mitchell, R. (1989). Authentic assessment. *Basic Education, 33*(10), 6-9.

Mitchell, R. (1992). *Testing for learning: How new approaches to evaluation can improve American schools*. New York: Free Press.

Perrone, V. (Ed.). (1991). *Expanding student assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.

Reis, S. M., & Renzulli, J. S. (1991). The assessment of creative products in programs for gifted and talented students. *Gifted Child Quarterly, 35,* 128-134.

Treffinger, D. J., & Cross, J. A., Jr. (1994). *Authentic assessment of productive thinking: A professional development module*. Sarasota, FL: Center for Creative Learning.

Wiggins, G. (1989). A true test: Toward more authentic and equitable assessment. *Phi Delta Kappan, 70,* 703-713.

Wiggins, G. (1993). Assessment: Authenticity, context, and validity. *Phi Delta Kappan, 75,* 200-214.

Rating Scales. In this category, we recommend three rating scales that we considered well-developed, professionally presented, and directly relevant to creativity characteristics. These are (in alphabetical order, with their corresponding record numbers in the Creativity Database): *GATES: Gifted and Talented Evaluation Scale* (#28); *GES-2, Gifted Evaluation Scale* (#30); and *SRBCSS: Scales for Rating Behavioral Characteristics of Superior Students* (#55). Note that a new edition of SRBCSS is available.

Self-Report Measures. We recommend five self-report instruments. These are (in alphabetical order, with their corresponding record numbers in the Creativity Database): *GIFFI: Group Inventory for Finding Interests* (#32), *GIFT: Group Inventory for Finding Talent* (#33), the *Khatena-Morse Multi-Talent Inventory* (#35), the *Khatena-Torrance Creative Perception Inventory* (#36), and *STAR: Student Talent and Risk Profile* (#61).

Tests. We recommend five tests, noting particularly that three of these are related specifically to the "Digging Deeper" characteristics category, which also addresses characteristics traditionally associated with critical thinking. Therefore, users should note that the recommendations in this category are not equivalent to each other or "interchangeable." The instruments are *TCAM: Thinking Creatively in Action and Movement* (#70), for young children only; *TTCT: Torrance Tests of Creative Thinking* (#72), for grades 4-adult; and from the critical thinking database, for the "digging deeper" characteristics: the *Cornell Critical Thinking* test (#5), for grades 7 and up, the *SEA Test* (#12), for upper elementary, and the *Ross Test* (#10), for middle grades. The *Barron Welsh Art Scale* (#8) may also be useful for qualified personnel who seek additional data for the "openness and courage to explore ideas" category.

Future Needs

The present "state of the art" in relation to creativity assessment can be promising—if one approaches the task in an inclusive and flexible way—or confusing and frustrating—if one approaches the task as a quest for a single, universal, quantitative measure. We believe that creative and critical thinking are sufficiently important variables in gifted education that the complex challenges of effective and appropriate assessment require continuing effort but that they also warrant carefully-planned development and research initiatives. Some of the specific future needs that we believe must be addressed in relation to creativity assessment in educational settings include the following:

1. There should be pilot studies in selected districts to gather data about the use and effects of various assessment tools and strategies, to test the assessment strategies offered in this guide in the school setting, and to build data-based guidelines and case studies to support effective practice at the local, state, or national level.
2. There should be a careful research and evaluation effort to determine the actual consequences (including both benefits and costs) of incorporating various creativity assessment strategies and tools in practice in the schools.
3. There should be a systematic national effort (or several statewide efforts) to build both state and national norms for promising assessment tools, so that on-going identification efforts will be able to draw on solid evidence.
4. Educators must also be aware that relatively brief or small-scale educational interventions should not be expected to result in significant effects of great magnitude on students' creativity.
5. Efforts to assess or document the effectiveness or impact of creativity development or instructional programs should involve experimental or quasi-experimental designs.

Summary

In this chapter, we presented a matrix to guide educational decision makers in using several different kinds or sources of data to assess students' present level of performance in relation to creativity. We defined four different sources of data and four levels of present performance. Then we identified specific assessment resources for our four creativity characteristics categories and provided specific recommendations concerning instruments to consider and ways to determine a student's present level of performance. Finally, we proposed five areas of work that we believe will strengthen educational policies and practices in relation to creativity assessment on a local, statewide, or national basis.

CHAPTER V: Linking Assessment and Instruction

We hold the view that the central purpose of assessment in gifted education is to prepare for appropriate, challenging, and developmental instruction. Therefore, assessing the student's creativity or determining the student's present level of performance is not an end or goal in itself. In this chapter, then, we will address the question: "What are the implications of information about the student's present level of creative performance for planning and providing appropriate and challenging learning opportunities?" We will illustrate ways to move from the assessment matrix to effective programming; the general design of our approach is illustrated in Figure 8. (Note that this is not intended as a comprehensive analysis or presentation of programs, instructional procedures, or curriculum resources for fostering creativity!)

Examining the lower part of the figure shows that, for each of the four levels of present performance, there are implications for an appropriate instructional response. These involve characteristics and styles, but they also involve other factors (from the *COCO* model: operations, context, and outcomes, as we proposed in Chapter II).

We will explore the lower half of the figure in greater detail in Figure 9. The first column identifies several key components of programming for recognizing, nurturing, and celebrating creative productivity. We also show specific implications for teaching and learning, resulting from creativity assessment as developmental stages across the rows of the figure. Examining these implications leads to a description of the appropriate instructional responses for each level of present performance.

If . . . the Present Level of Performance Is "Not Yet Evident"

If the student falls into the "Not Yet Evident" column, it does not mean the student is not creative and never will become creative. Instead, this is the teacher's cue that specific classroom strategies might be designed and implemented to help students to discover, develop and express their creative potentials.

At this level of development, the programming actions should focus on building some important foundations by helping students to discover their style preferences and strengths. The teachers' role involves deliberate planning of opportunities for students to become more aware of their personal characteristics, interests, and creative strengths. They will also provide direct instruction designed to help students discover, develop, and improve their competence in relation to the four categories of characteristics. Students may require some extrinsic motivation focused on their efforts to learn about and develop their personal creative abilities.

Assessing the Student's Present Level of Performance

Data Source	Not Yet Evident	Emerging	Expressing	Excelling
BEHAVIOR OR PERFORMANCE DATA				
SELF-REPORT				
RATING SCALES				
TESTS				

Determining an Appropriate Response to Each Performance Level

	"Discovering or Reluctance"	*"Discovering or Interested"*	*"Performing or Enthusiastic"*	*"Soaring or Passionate"*
Characteristics and Styles				Identifying and applying creativity tools and skills to a variety or real problems and challenges, individually and with a group or team; demonstrating self-initiated and self-directed creativity
Operations	Building the necessary foundation for creative learning	Developing and practicing tools and creativity skills	Applying tools and skills to realistic problems and challenges and to some manageable real-life challenges	
Context				
Outcomes				

Figure 8. Assessment of student's present level of creative performance and provision of appropriate and challenging learning opportunities.

Implications of Assessment for Teaching and Learning				
	Not Yet Evident: *Discovering Style Preferences and Strengths*	**Emerging:** *Building Strengths*	**Expressing:** *Applying Strengths in Personal Ways*	**Excelling:** *Extending to Reach New Levels*
Task Focus	The foundations ◄——► Realistic ◄——► Real/Authentic			
Teacher Role/Style	Directing (Teacher directed)	Coaching (Guided inquiry)	Supporting (Co-directed inquiry)	Delegating (Self-initiated, Self-directed inquiry)
Motivation	EXTRINSIC ◄——————————► INTRINSIC			
Characteristics	Exploring and Beginning to Develop Competence • Generating Ideas • Digging Deeper Into Ideas • Openness and Courage to Explore • Listening to One's "Inner Voice"	Building Up Confidence and Refining Competence • Generating Ideas • Digging Deeper Into Ideas • Openness and Courage to Explore • Listening to One's "Inner Voice"	Focusing, Personalizing, and Building Commitment • Openess and Courage to Explore • Listenning to One's "Inner Voice" • Generating Ideas • Digging Deeper Into Ideas	Owning and Celebrating Creative Outcomes • Openness and Courage to Explore • Listening to One's "Inner Voice" • Generating Ideas • Digging Deeper Into Ideas
Operations	Awareness and introduction to productive thinking tools	Guided practice Problem solving Metacognition	Recognizing relevant and appropriate ways to use tools independently, and expanding the toolbox	Customizing and personalizing the authentic use of tools for optimum impact
Context	Creating a climate safe and open for creativity to emerge	"Safe Practice"	Rich and varied opportunities for application	Freedom to act
Outcomes	Exploring products and methods of creative expression Learning about various product types used to document learning and to present creative solutions or ideas and important standards of quality (i.e., criteria) used to evaluate those products	Exposure to and development of various creative outlets of interest Providing opportunities for product development, product sharing, and product assessment Expanding "product" repertoire	Applying personal strengths in creative expression and product development to selected performance area Providing opportunities for product presentation and "authentic assessment" in realistic situations	Integration of personal expression (product performance) and productive tools to authentic problem solving situations Authentic products, produced for authentic purposes are presented to real audiences and assessed in that context

Figure 9. Implications of assessment for teaching and learning.

The place to begin with operations is primarily concerned with teaching students about a variety of tools for generating ideas and digging deeper into ideas. This will involve training students in the use of specific tools such as brainstorming, SCAMPER, evaluation matrix, and ALoU [Advantages, Limitations (and how to Overcome them), and Unique potentials] (e.g., Treffinger & Nassab, 1998).

It is essential to create a climate or environment in which students feel safe and are encouraged to express their ideas. The characteristics of creativity are more likely to develop and become evident, especially those in categories three and four, in an atmosphere that supports such behaviors. The climate must be one that is open and values new and different ideas; allows and promotes playfulness and humor; offers challenge and encourages involvement; builds trust; provides both idea time and idea support; promotes freedom and risk-taking (Treffinger, Isaksen, & Dorval, 1996).

Finally, the teacher must place and communicate a significant value on creative outcomes. They must provide opportunities for students to explore and experience directly many, varied and unusual methods and products for reporting and sharing their learning. Examples of products for creative expression include persuasive speech, sculpture, role play/drama, video advertising, travel brochures, and billboards. Students should begin to identify the area in which their creative passions may lie.

If . . . the Present Level of Performance Is "Emerging"

Students who fall into the "Emerging" column demonstrated some key foundation skills and/or attitudes but may need to refine, polish and practice those skills. The focus of programming actions should be on helping students to build up their emerging characteristics, strengthen their competence, and gain confidence in using their creative abilities.

The teacher's role might be considered "coaching," as he or she is assisting in identifying and building creative strengths and guiding the student's inquiry into more realistic endeavors. As the student's work moves into areas more closely tied to personal styles and interests, intrinsic motivation will begin to replace the need for extrinsic motivation.

Students at this level will benefit from continued refinement of the creativity tools as well as group problem solving activities where they can begin to apply learned tools and processes to situations that are meaningful to them. In addition, metacognitive skills and processes are important for helping students to learn how to monitor their own thinking. Reflecting on their instructional experiences during debriefing sessions will help them to better understand and develop all creativity characteristics but especially those in the categories of "openness and courage. . ." and "listening to one's inner voice."

A continuing non-judgmental climate is essential for students to feel safe during guided practice and inquiry. Additional exposure to and extension of the ways and

means of creative expression, specifically in tune with expressed interests and abilities, is appropriate here as well.

If . . . the Present Level of Performance Is "Expressing"

Students whose present level of performance can be located in the "Expressing" column have already demonstrated competence and are growing in confidence about their creative abilities. A strong foundation for creative productivity is in place, and they are ready to deal with realistic problems and situations. The focus for programming actions should be on helping students to apply their strengths and interests in their own way. At this level they start to build commitment for a lifetime of creative accomplishments.

The teacher's role is one of supporting students' continued development by helping them to initiate their own ideas and to identify realistic and meaningful situations in which their creative skills and attitudes can be applied. Even though intrinsic motivation is in place, they will need reassurance as they work through the problems identified.

The environment should encourage initiative and action toward identifying real problems. Outcomes will be assessed through appropriate and creative performances. Although it still continues to be the ultimate responsibility of the teacher to maintain the climate that supports these students' efforts, the students themselves will also need to develop skills, attitudes, and procedures that will be supportive to themselves and others as well.

If . . . the Present Level of Performance Is "Excelling"

Students whose present level of performance is in the "Excelling" column have already demonstrated highly significant levels of creative thinking skill. Programming at this level will focus on extending their competence, confidence, and commitment to stimulate and enable them to reach new levels of creative productivity in real or authentic tasks.

The teacher's role is to delegate many of the process decisions and actions to the students, but also to be there to answer questions, cut red tape, and support them as they struggle through inevitable bumps in the road, and then to celebrate their successes. As the students move into areas of sustained personal interest or passion for learning, intrinsic motivation is in full force.

They will continue to customize, personalize and add to their repertoire of tools and strategies for working successfully on the real problems they choose for their work. They need a context that allows them the freedom to act on ideas and topics based on their personal interests. They are engaged in creating products to share with authentic

audiences, and they are having real-life opportunities to express themselves creatively. Creative productivity is in action!

Implementing planning and instructional procedures in the classroom based on these implications takes time and conscientious effort on the part of teachers and gifted education specialists.

Summary: Essential Steps in Creativity Assessment

1. Adopt a specific definition of creativity and be clear about its implications for the characteristics you plan to assess.
2. Examine and review carefully assessment tools, representing several different sources of data, that may be appropriate for the definition and characteristics, for your setting, and for the students you will be assessing. Use only resources that meet professional standards for practice.
3. After gathering data, determine the student's present level of performance. Do not exclude students from consideration for services on the basis of any single score or result. Seek two or more sources of data that enable you to understand the student's current level of performance as accurately as possible.
4. Be aware that students can change and grow, and that no assessment is entirely free of error and so remain flexible in making decisions (especially avoiding labeling students as "creative" or "uncreative").
5. Remember that the purpose of the assessment is to understand the student's needs for appropriate and challenging educational experience. Think beyond the question of what the student "is" or "is not;" instead, ask: "What do these data tell us about the student's need for services?"
6. Consider the best way to provide the services that seem necessary for the student. Is it through your gifted/talented program? Is it through other ways of responding that might be open to you?
7. Carry out programming that is appropriate and challenging for the student. Monitor all students' performance to see if there may be changing evidence regarding their needs, strengths, or talents.

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Internet Resources Related to Instruments

The Educational Testing Service (ETS) test collection. This extensive database of tests in many areas is located at: www.ets.org/testcoll/index.html

The ERIC Clearinghouse on Assessment and Evaluation, a searchable database of test information, test reviews, and test publishers. Located at: ericae.net

There are several pathways to the full ERIC system database; one easy-to-access site is "Ask ERIC," at ericir.syr.edu

Appendix A
Code of Fair Testing Practices in Education

Code of Fair Testing Practices in Education

Prepared by the Joint Committee on Testing Practices
Source: ericae.net/code.txt

The Code of Fair Testing Practices in Education describes the major obligations of test takers or professionals who develop or use educational tests. The Code is meant to apply broadly to the use of tests in education (admissions, educational assessment, educational diagnosis, and student placement). The Code is not designed to cover employment testing, licensure or certification testing, or other types of testing. Although the Code has relevance to many types of educational tests, it is directed primarily at professionally developed tests such as those sold by commercial test publishers or used in formally administered testing programs. The Code is not intended to cover tests made by individual teachers for use in their own classrooms.

The Code addresses the roles of test developers and test users separately. Test users are people who select tests, commission test development services, or make decisions on the basis of test scores. Test developers are people who actually construct tests as well as those who set policies for particular testing programs. The roles may, of course, overlap as when a state education agency commissions test development services, sets policies that control the test development process, and makes decisions on the basis of the test scores.

The Code has been developed by the Joint Committee on Testing Practices, a cooperative effort of several professional organizations that has as its aim the advancement, in the public interest, of the quality of testing practices. The Joint Committee was initiated by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. In addition to these three groups, the American Association for Counseling and Development/Association for Measurement and Evaluation in Counseling and Development, and the American Speech-Language-Hearing Association are now also sponsors of the Joint Committee.

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The Code presents standards for educational test developers and users in four areas:

A. Developing/Selecting Tests
B. Interpreting Scores
C. Striving for Fairness
D. Informing Test Takers

Organizations, institutions, and individual professionals who endorse the Code commit themselves to safeguarding the rights of test takers by following the principles listed. The Code is intended to be consistent with the relevant parts of the Standards for Educational and Psychological Testing (AERA, APA, NCME, 1985). However, the Code differs from the Standards in both audience and purpose. The Code is meant to be understood by the general public, it is limited to educational tests, and the primary focus is on those issues that affect the proper use of tests. The Code is not meant to add new principles over and above those in the Standards or to change the meaning of the Standards. The goal is rather to represent the spirit of a selected portion of the Standards in a way that is meaningful to test takers and/or their parents or guardians. It is the hope of the Joint Committee that the Code will also be judged to be consistent with existing codes of conduct and standards of other professional groups who use educational tests.

A. Developing/Selecting Appropriate Tests*

[*Many of the statements in the Code refer to the selection of existing tests. However, in customized testing programs test developers are engaged to construct new tests. In those situations, the test development process should be designed to help ensure that the completed tests will be in compliance with the Code.]

Test developers should provide the information that test users need to select appropriate tests.

TEST DEVELOPERS SHOULD

1. Define what each test measures and what the test should be used for. Describe the population(s) for which the test is appropriate.
2. Accurately represent the characteristics, usefulness, and limitations of tests for their intended purposes.
3. Explain relevant measurement concepts as necessary for clarity at the level of detail that is appropriate for the intended audience(s).
4. Describe the process of test development. Explain how the content and skills to be tested were selected.
5. Provide evidence that the test meets its intended purpose(s).
6. Provide either representative samples or complete copies of test questions, directions, answer sheets, manuals, and score reports to qualified users.
7. Indicate the nature of the evidence obtained concerning the appropriateness of each test for groups of different racial, ethnic, or linguistic backgrounds who are likely to be tested.
8. Identify and publish any specialized skills needed to administer each test and to interpret scores correctly.

Test users should select tests that meet the purpose for which they are to be used and that are appropriate for the intended test-taking populations.

TEST USERS SHOULD

1. First define the purpose for testing and the population to be tested. Then, select a test for that purpose and that population based on a thorough review of the available information.
2. Investigate potentially useful sources of information, in addition to test scores, to corroborate the information provided by tests.
3. Read the materials provided by test developers and avoid using tests for which unclear or incomplete information is provided.
4. Become familiar with how and when the test was developed and tried out.
5. Read independent evaluations of a test and of possible alternative measures. Look for evidence required to support the claims of test developers.
6. Examine specimen sets, disclosed tests or samples of questions, directions, answer sheets, manuals, and score reports before selecting a test.
7. Ascertain whether the test content and norm group(s) or comparison group(s) are appropriate for the intended test takers.
8. Select and use only those tests for which the skills needed to administer the test and interpret scores correctly are available.

B. Interpreting Scores

Test developers should help users interpret scores correctly

Test users should interpret scores correctly.

TEST DEVELOPERS SHOULD	TEST USERS SHOULD
9. Provide timely and easily understood score reports that describe test performance clearly and accurately. Also, explain the meaning and limitations of reported scores.	9. Obtain information about the scale used for reporting scores, the characteristics of any norms or comparison group(s), and the limitations of the scores.
10. Describe the population(s) represented by any norms or comparison group(s), the dates the data were gathered, and the process used to select the samples of test takers.	10. Interpret scores taking into account any major differences between the norms or comparison groups and the actual test takers. Also take into account any differences in test administration practices or familiarity with the specific questions in the test.
11. Warn users to avoid specific, reasonably anticipated misuses of test scores.	11. Avoid using tests for purposes not specifically recommended by the test developer unless evidence is obtained to support the intended use.
12. Provide information that will help users follow reasonable procedures for setting passing scores when it is appropriate to use such scores with the test.	12. Explain how any passing scores were set and gather evidence to support the appropriateness of the scores.
13. Provide information that will help users gather evidence to show that the test is meeting its intended purpose(s).	13. Obtain evidence to help show that the test is meeting its intended purpose(s).

C. Striving for Fairness

Test developers should strive to make tests that are as fair as possible for test takers of different races, gender, ethnic backgrounds, or different handicapping conditions.

Test users should select tests that have been developed in ways that attempt to make them as fair as possible for test takers of different races, gender, ethnic backgrounds, or handicapping conditions.

TEST DEVELOPERS SHOULD

14. Review and revise test questions and related materials to avoid potentially insensitive content or language.
15. Investigate the performance of test takers of different races, gender, and ethnic backgrounds when samples of sufficient size are available. Enact procedures that help to ensure that differences in performance are related primarily to the skills under assessment rather than to irrelevant factors.
16. When feasible, make appropriately modified forms of tests or administration procedures available for test takers with handicapping conditions. Warn test users of potential problems in using standard norms with modified tests or administration procedures that result in non-comparable scores.

TEST USERS SHOULD

14. Evaluate the procedures used by test developers to avoid potentially insensitive content or language.
15. Review the performance of test takers of different races, gender, and ethnic backgrounds when samples of sufficient size are available. Evaluate the extent to which performance differences may have been caused by the test.
16. When necessary and feasible, use appropriately modified forms or administration procedures for test takers with handicapping conditions. Interpret standard norms with care in the light of the modifications that were made.

D. Informing Test Takers

Under some circumstances, test developers have direct communication with test takers. Under other circumstances, test users communicate directly with test takers. Whichever group communicates directly with test takers should provide the information described below.

Test Developers or Test Users Should:

17. When a test is optional, provide test takers or their parents/guardians with information to help them judge whether the test should be taken or if an available alternative to the test should be used.

18. Provide test takers the information they need to be familiar with the coverage of the test, the types of question formats, the directions, and appropriate test-taking strategies. Strive to make such information equally available to all test takers.

Under some circumstances, test developers have direct control of tests and test scores. Under other circumstances, test users have such control. Whichever group has direct control of tests and test scores should take the steps described below.

Test Developers or Test Users Should:

19. Provide test takers or their parents/guardians with information about rights that test takers may have to obtain copies of tests and completed answer sheets, retake tests, have tests rescored, or cancel scores.

20. Tell test takers or their parents/guardians how long scores will be kept on file, and indicate to whom and under what circumstances test scores will or will not be released.

21. Describe the procedures that test takers or their parents/guardians may use to register complaints and have problems resolved.

Additional copies of the Code may be obtained from the National Council on Measurement in Education, 1230 Seventeenth Street, NW, Washington, DC 20036. Single copies are free.

Appendix B
Practices of the Wise Test User

Practices of the Wise Test User

Test Selection

- You have a clear definition of creativity and creative thinking.
- You understand the limitations of all test instruments and the importance of using multiple sources of data to assess students' outstanding creative strengths.
- You know how to locate various instruments and how to select appropriate instruments that measure what you need to measure.
- You are aware of appropriate sources of reviews and evaluations of instruments and consult those sources before selecting an instrument.
- You obtain, read, and evaluate an instrument, its manual, and appropriate supporting documentation and literature before selecting and using an instrument.
- You determine whether the available norms are appropriate for your purpose and for the students with whom you will be using the instrument.

Administration and Context

- You understand the appropriate procedures for test administration.
- You understand that the validity of your results may be jeopardized by not following the administration directions carefully and precisely.
- You understand the importance of establishing and maintaining an appropriate environment for administering tests.
- You are aware that the physical environment and the interpersonal context in which you conduct the testing can influence the results of testing.
- You understand the limitations of any testing environment in relation to the complex real-world environment in which creative behavior takes place.

Scoring

- You understand how to score any instrument accurately.
- You check to ensure that all scores are accurate before reporting or using the results. You understand the difference between raw scores and derived scores such as standard scores or percentiles.

Validity and Reliability

- You understand the concepts of reliability and validity.
- You are able to locate and interpret information about the validity and reliability of any instrument you use.
- You understand the implications of validity and reliability in relation to the application and interpretation of the results obtained by using an instrument.

Measurement Error

- You understand that no measurement is free of error.
- You know how to use the standard error of measurement to estimate the degree of measurement error in an observed score.

Interpretation and Use of Results

- You are aware that other variables, such as gender, age, cultural or ethnic background, or limited English proficiency, may affect the test results or comparisons with norm groups.
- You understand how to interpret the instrument properly, including how to integrate test results with other information about the student.
- You understand the potential harm that may result from misclassifying an individual on the basis of test results.
- You understand that a test score represents only a sample of an individual's performance at a certain time and place and under certain conditions, and you do not over-generalize the nature or meaning of the results. Specifically, you recognize that a person who attains a high score may not be creative productive in all domains and at all times, and that a person with a low score is not necessarily "uncreative."
- You are aware of the need to consider information beyond the scores to determine an appropriate classification.

Responsible Testing Practices

- You are willing to accept the responsibility in your organization for using instruments properly.
- You ensure that only qualified individuals have access to instruments.
- You maintain the security of item content and scoring procedures.
- You respect and honor the copyright of all materials.
- You maintain appropriate student confidentiality at all times.
- You are aware of the limits of your own competence in testing and refer the administration or interpretation of instruments to qualified persons when appropriate.

Research Monograph

The National Research Center on the Gifted and Talented
University of Connecticut
2131 Hillside Road Unit 3007
Storrs, CT 06269-3007
www.gifted.uconn.edu

Also of Interest

State Policies Regarding Education of the Gifted as Reflected in Legislation and Regulation
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