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Education and Creativity

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ABSTRACT: J. P. Guilford (1950) asked in his inaugural address to the American Psychological Association why schools were not producing more creative persons. He also asked, "Why is there so little apparent correlation between education and creative productiveness" (p. 444)? This article presents a review of past and current research on the relation of education to creativity in students of preschool age through age 16 in U.S. public schools. Several models of creative thinking are presented (e.g., Guilford, 1985; Renzulli, 1992; Runco & Chand, 1995), as well as techniques for developing creativity (e.g., Davis, 1982; Sternberg & Williams, 1996). Some research presented indicates a relation between creativity and learning (e.g., Karnes et al., 1961; Torrance, 1981). Implications for research and practice also are discussed.

In J. P. Guilford's 1950 presidential address to the American Psychological Association (APA), he asked, "Why is there so little apparent correlation between education and creative productiveness" (p. 444)? Another question derived from his speech addressed current "enlightened" educational practices, and he asked why schools were not producing more creative persons. This article is an attempt to answer these questions.

Further, in the inaugural issue of the *Journal of Creative Behavior,* Guilford (1967a) stated that "The problems of creativity in the educational setting are endless, and the scope of research in this area is rapidly spreading" (p. 10). However, since the publication of this article, statistical methods of analysis have become more sophisticated, in turn expanding our understanding of the creative process. For example, Guilford (1972) used factor analytic methods to develop his Structure of Intellect (SI) model of 120 abilities, in which creative performance was included in the content categories (Guilford, 1975). He later expanded these abilities to 150 in this model (Guilford, 1985).

What follows is a review of the literature in somewhat of a historical perspective. A review of the progression of thinking and research in the field of creativity may assist readers in understanding the development of creativity in students of preschool age through age 16 (P–16).

Learning and Creativity

Guilford (1950) stated that "a creative act is an instance of learning … [and that] a comprehensive learning theory must take into account both insight and creative activity" (p. 446). In this regard, Guilford (1967a) suggested that transformations of information are a key to understanding insight. These transformations are found in the content categories of Guilford's (1975) SI model and can occur in both convergent and divergent productions. At that time, the relation between information and insight still needed to be addressed. There have been attempts in the past 20 years to expand our understanding of insight.

Insight

Jacobs and Dominowski (1981) and Martinsen (1995) suggested that when students solve insight problems, which require students to "use an object in

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some … unusual way to solve a problem" (Jacobs & Dominowski, 1981, p. 171), problem restructuring is required to some extent. These researchers also questioned whether there is a specific or a general transfer of skills after solving these types of problems. Martinsen suggested that cognitive styles might explain the transfer problem as well as the restructuring process involved in solving insight problems. Martinsen differentiated between two cognitive styles, assimilators and explorers, where assimilators "give priority to upholding cognitive economy" and explorers "seek new types of solutions and new ways of solving problems" (p. 292). He also speculated that explorers would perform better than assimilators when "there is a high level of novelty … in the task" and that assimilators would perform better "when they have a high level of relevant experience" (p. 292). Martinsen subsequently found that assimilators performed better on insight problems in the high-level-of-experience condition (i.e., experience in problem-solving activities) and that explorers performed better in the low-level-of-experience condition. These results suggest that good problem solving occurs "when there is an optimal match between strategic disposition and the task condition" (Martinsen, 1995, p. 296). He also believed that the assimilator and explorer cognitive styles were related to creativity in that "creativity is associated with the ability to handle high task novelty" (p. 297).

Metacognition

Perhaps, however, one's metacognitive abilities are related to creative thinking. In fact, Guilford (1975) asserted that "the student be taught about the nature of his own intellectual resources, so that he may gain more control over them" (p. 120). Davis (1991) stated that "it is … important to help students metacognitively understand the topic of *creativity*" (p. 240). In turn, this increased understanding of creativity would increase creativity consciousness, demystify creativity, and increase creative ideas and products (Davis, 1991). In addition, Runco and Chand (1995) stated that thinking is creative "if it leads to original and adaptive ideas, solutions, or insights" (p. 244) and posited that there are informational and process components that may be pertinent.

Runco and Chand (1995) presented a model of creative thinking to explain the components and interactions of processes (see Figure 1). It is beyond the scope of this article to explain this model in detail (see Runco & Chand, 1995, for more explicit details of their model). The model depicts the complex structure of creativity and creative thinking. Runco and Chand also emphasized the importance of knowledge and motivation for creative thinking. Knowledge can be differentiated into declarative and procedural knowledge, where declarative knowledge can enhance creative thinking by simply providing factual information. Procedural knowledge provides instructions for strategic thinking, which Runco and Chand described as metacognitive ability.

Runco and Nemiro's study (cited in Runco & Chand, 1995) suggested that motivation is important for creative thinking and that, in their model, problem finding would facilitate intrinsic motivation in individuals. In other words, students will be more motivated when they choose their own tasks. This would make the task meaningful to the individual. They further suggested that educators devote more time to problem-finding skills to communicate to students that this ability is as important as problem solving. Often, though, extrinsic motivators must be used to foster intrinsic motivation. Of importance is Runco and Chand's (1995) argument that "motivation is depend-

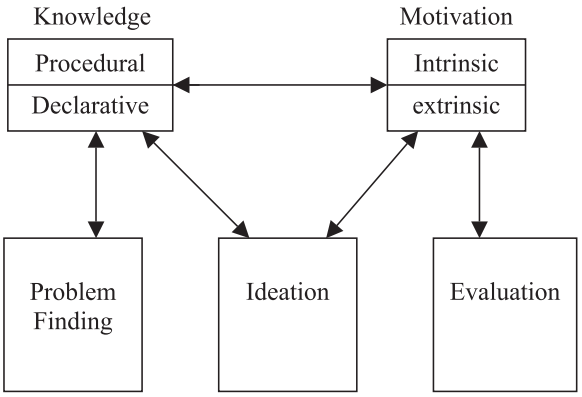

Figure 1. *Two-tier model of creative thinking. The three boxes on the primary tier each represent sets of skills. Problem finding represents problem identification, problem definition, and so on. Ideation represents ideational fluency, originality, and flexibility. Evaluation represents valuation and critical evaluation. Additional components and details are given in the text. Reprinted from "Cognition and Creativity" by M. A. Runco & I. Chand, 1995,* Educational Psychology Review, 7, *243–267. Copyright © 1995 by Kluwer Academic. Reprinted with permission.*

ent on cognitive processes" (p. 260), such as recognition. Thus, in this brief presentation of Runco and Chand's model, one can see the complexity of creative thinking.

Learning Theory

Other cognitive theories of learning, which began in the early 1960s (Neisser, 1967), have influenced our understanding of creativity. These theories generally view thinking as a "constructive process" (Houtz & Krug, 1995). That is, as individuals think, they construct their knowledge base. Houtz and Krug reported that creativity has been "considered both a cognitive and affective endeavor" (p. 284). In addition, they reported that according to generally accepted approaches to cognitive theory, "the mind is continuously creating" (p. 288; e.g., memory).

Treffinger (1980) and Treffinger, Isaksen, and Firestein (1983) developed a model of creative learning that is composed of three levels: divergent functions, complex thinking and feeling processes, and involvement in real challenges. (A figure of this model can be seen in either of the works cited here.) Cognitive and affective factors are involved at each level of creative learning. Some methods that may influence functions are brainstorming, idea checklists, and attribute listing. Methods to influence complex thinking and feeling processes include values clarification, role playing, and creative problem solving. In addition, methods such as independent study and creative problem solving influence involvement in real challenges (Davis, 1991; Treffinger, 1980). Houtz and Krug's (1995) views are similar to those of Treffinger et al. (1983).

Recently, the APA (1993) "Learner-Centered Psychological Principles" also suggested the importance of creative behaviors. In fact, Principles 4, 5, and 8 include aspects of creativity and creative thinking. For example, Principle 4, Strategic Thinking, states that "Successful learners use strategic thinking in … problem solving." Principle 5, Thinking About Thinking, states that "Higher-order strategies for 'thinking about thinking and learning' … facilitate creative and critical thinking." In addition, Principle 8, Intrinsic Motivation to Learn, states that "Intrinsic motivation, creativity, and higher-order thinking are stimulated by … authentic learning tasks … and novelty"(Woolfolk, 1998, pp. 511–514). Thus, one can see the connection between learner-centered teaching and facilitating creativity and creative thinking.

Motivation

With regard to cognitive and affective factors of creativity, Hennessey and Amabile (1987) proposed an "intrinsic motivation principle of creativity" (p. 6), which states that intrinsic motivation is conducive to creativity and that extrinsic motivation undermines creativity. They also asserted that this intrinsic motivation is influenced greatly by situational or "state" factors (p. 11). Thus, situational events in one's environment (e.g., school) may affect one's motivation on a task (e.g., problem solving). In fact, Hennessey and Amabile found that "extrinsic constraints," which are factors external to the specific task, could decrease intrinsic motivation and thus decrease creativity (p. 11). Other affective factors of creativity are discussed later in this article.

Relation to Academic Achievement

According to Torrance (1981), the purpose of creative teaching is to create a "responsible environment" through high teacher enthusiasm, appreciation of individual differences, and so on. Feldhusen and Treffinger (1980) and Davis (1991) also believed establishing a "creative climate" was important to stimulate creative thinking. Feldhusen and Treffinger (1980) provided several recommendations for establishing a classroom environment conducive to creative thinking:

1. Support and reinforce unusual ideas and responses of students.
2. Use failure as a positive to help students realize errors and meet acceptable standards in a supportive atmosphere.
3. Adapt to student interests and ideas in the classroom whenever possible.
4. Allow time for students to think about and develop their creative ideas. Not all creativity occurs immediately and spontaneously.
5. Create a climate of mutual respect and acceptance between students and between students and teachers, so that students can share, de-

velop, and learn together and from one another as well as independently.
6. Be aware of the many facets of creativity besides arts and crafts: verbal responses, written responses both in prose and poetic style, fiction and nonfiction form. Creativity enters all curricular areas and disciplines.
7. Encourage divergent learning activities. Be a resource provider and director.
8. Listen and laugh with students. A warm, supportive atmosphere provides freedom and security in exploratory thinking.
9. Allow students to have choices and be a part of the decision-making process. Let them have a part in the control of their education and learning experiences.
10. Let everyone get involved, and demonstrate the value of involvement by supporting student ideas and solutions to problems and projects. (p. 32)

Torrance (1981) also noted several signs that indicate when creative learning occurs, such as improved motivation, alertness, curiosity, concentration, and achievement. Thus, creative teaching can enhance learning.

In a study of underachieving (UA) and overachieving (OA) elementary school students who were assessed as being gifted, Karnes et al. (1961) found that creativity was related significantly to educational achievement. In addition, OA students had higher creative ability than did UA students. Although there were some methodological problems with the study, the results are noteworthy in that this was one of the first studies to compare UA and OA students. McCabe's (1991) study generally supported Karnes et al.'s findings. That is, in a sample of 126 seventh- and ninth-grade girls, there was a relation between high verbal and math IQ scores and high creativity, as measured by the Torrance Test of Creative Thinking (TTCT; Torrance, 1966). McCabe also found that students with high creative scores had higher English achievement scores. This was not the case for math and art achievement. Thus, educational programs for gifted elementary and secondary school students should emphasize creative programs in their curriculum, such as Feldhusen's Three-Stage Enrichment Model (Feldhusen & Kolloff, 1981), or any of the others discussed in the following section. (See Feldhusen & Kolloff, 1981, for further details of their model.) The following is a discussion of how we can develop creativity in our schools, which also was questioned by Guilford (1950).

Developing Creativity

There are many suggestions in the literature as to how to develop creative abilities from childhood to adulthood in our P–16 schools (e.g., Davis & Rimm, 1985; Guilford, 1967b; Karnes et al., 1961; Olmo, 1977; Parnes & Noller, 1972; Renzulli, 1992; Sternberg & Lubart, 1991; Torrance, 1972; Williams, 1969). For example, Guilford (1967b) and Torrance (1963) observed that creative thinking abilities could be developed through direct instruction. Karnes et al. (1961) suggested that educational programs should be organized flexibly to provide better services, such as enrichment programs, to students. Teaching techniques that stimulate both convergent and divergent thinking are important for stimulating creative thinking and are more challenging to creative students (Karnes et al., 1961). Individual assignments based on problem solving and problem finding also would stimulate creativity (e.g., Davis & Rimm, 1985; Karnes et al., 1961; Subotnik, 1988). Teachers who are amenable to change and who model divergent thinking themselves seem the most effective in stimulating creativity in students (Karnes et al., 1961). Besides using individual assignments to stimulate creativity, teachers should provide situations for students to participate in group activities (Davis, 1991; Davis & Rimm, 1985). These group activities, in addition to enhancing creative thinking and academic performance, should provide students with opportunities for developing peer acceptance (Karnes et al., 1961).

Another technique for developing creativity is the inquiry–discovery or problem-solving approach, which is an indirect teaching method (Feldhusen & Treffinger, 1980). Treffinger (1980) suggested that creativity is related to the discovery process. They stated that "experience with discovery learning enhances creative performance by forcing the learner to manipulate the environment and produce new ideas" (p. 34). Feldhusen and Treffinger (1980) also reported that the creative processes of fluency, flexibility, elaboration, and originality were incorporated in the inquiry–discovery

approach to teaching. The following are suggestions for an inquiry–discovery learning experience:

1. Provide the initial experience to interest students in inquiring about a problem, concept, situation, or idea.
2. Provide the students with manipulative situations and materials to begin avenues of exploration.
3. Supply information sources for students' questions.
4. Provide materials and equipment that will spark and encourage student experimentation and production.
5. Provide time for students to manipulate, discuss, experiment, fail, and succeed.
6. Provide guidance, reassurance, and reinforcement for student ideas and hypotheses.
7. Reward and encourage acceptable solution strategies. A supportive positive climate will spawn the best results.

Cognitive-affective models for encouraging creativity in children also have been developed (Williams, 1969). The cognitive domain consists of knowledge, reasoning skills, and what Williams termed *algorithmic truths* (p. 8; i.e., what truly is), as well as technical skills and special talents. This domain is incorporated generally into teachers' instructional objectives, and is dependent on experience and innate abilities of the learner (Hennessey & Amabile, 1987). The affective domain consists of aesthetic concerns, one's feelings, emotions, and so on. Williams believed that it was this domain that facilitated a student's appreciation of his or her own creative productions, as well as those of others. In this regard, Davis and Rimm (1985) suggested that stimulating creative thinking should be aimed at "strengthening *attitudes* conducive to creativity" (p. 231). Thus, the affective domain would seem to be as important as the cognitive domain in stimulating creativity. In fact, Davis and Rimm indicated that "creative *attitudes*" are taught in all creativity programs. However, Williams noted those classroom practices in 1969, and I believe that those presently implemented infrequently promote affective behaviors. Williams also noted that teachers had difficulty evaluating affective behaviors.

Two other issues besides creative attitudes for stimulating creative thinking were mentioned by Davis and Rimm (1985). That is, they believed as Feldhusen and Treffinger (1980) did, that creative *abilities* could be strengthened through practice in creative thinking exercises, such as those that promote divergent thinking (e.g., brainstorming). Davis and Rimm also believed that creative thinking *techniques,* which were divided into personal and standard techniques, could be developed. Personal creative techniques are unique, whereas standard techniques (e.g., brainstorming) are taught in creativity courses. (See Davis & Rimm, 1985, for other personal and standard techniques and creativity activities.)

Davis (1982) developed a four-step model of creativity development: awareness, understanding, techniques, and self-actualization (AUTA). In general, the model suggests that to become a creative person one must (a) increase one's creativity consciousness (i.e., one's readiness to think creatively), (b) understand the topic of creativity, (c) use personal and standard creative thinking techniques, and (d) be self-actualized (i.e., reach one's potential; Davis & Rimm, 1985). (See Davis, 1982, and Davis & Rimm, 1985, for more specific details on the model.)

In a survey conducted over 25 years ago of approaches and programs used to teach children creative thinking, Torrance (1972) found that the Osborn–Parnes Creative Problem-Solving Program (Osborn, 1963; Parnes, 1967) was used frequently. In addition, Torrance found that the Osborn–Parnes approach had better results than other approaches, such as using creative arts, in developing creativity (e.g., divergent thinking production). However, using the creative arts (e.g., theater) was effective in teaching children to think creatively, too. According to Torrance, the most effective techniques for stimulating creativity involved both cognitive and affective factors, as well as provided extrinsic motivation and active learning opportunities. Torrance noted that programs that used extrinsic motivation resulted in a lack of transfer of creative performance. He also cautioned that most of the studies he reviewed used the TTCT (Torrance, 1966). However, Sternberg and Lubart (1991) indicated that they were not enthusiastic about many creativity training programs because they used trivial problems. It would appear that using realistic problems would be beneficial in these types of programs. This also would increase the likelihood of transfer of these problem-solving skills (Sternberg & Lubart, 1991).

Guilford (1972) reported that, in the schools, most training for creativity was aimed at enhancing diver-

gent thinking and production abilities. However, he suggested that improvement of transformation abilities (i.e., revising one's experiences and producing new patterns; Guilford, 1967a) also was important. To Guilford, transformation abilities would increase students' flexibility in thinking, which would lead to the production of more novel and creative ideas. In addition, developing students' memory capabilities is essential because creative persons need a good store of information to work from.

Guilford (1985) also believed that his SI model could be used to guide curriculum development and teaching. For example, he stated that the SI could "serve as the 'periodic table' of the educator" (p. 255). This periodic table would include 150 intellectual abilities with which teachers might assist students. These include convergent and divergent thinking, which are both aspects of creative thinking. Guilford suggested that teachers could use the SI in the preparation of their lesson plans, in making assignments, and in assessing classroom performance.

A developmental theory of creativity proposed by Renzulli (1992) suggests that students should be provided with opportunities to engage in "ideal acts of learning" (p. 171). The learner, teacher, and curriculum must all be involved for these ideal acts of learning to occur. Renzulli's major concern was in how educators can promote a disposition for creative productivity.

One variable that may facilitate one's creative production disposition is one's interests (Renzulli, 1992). These interests can be of tasks or objects. Renzulli reported that the more consistent and intense the interests, the more creative were the students.

The curriculum also should emphasize the structure of a discipline, which will facilitate the students' thinking in that discipline (Renzulli, 1992). However, Renzulli noted that the curriculum should be appropriately flexible to students' "unique abilities, interests, and learning styles" (p. 176). In addition, classroom activities should place the student in the role of a "professional … inquirer" (p. 177) in a field of study. According to Renzulli, this role encourages students to "engage in the kinds of thinking, feeling, and doing that characterize the work of the practicing professional" (p. 178). An example of Renzulli's model in action is the schoolwide enrichment model (SEM; Renzulli & Reis, 1985). In general, research on the SEM suggests that the model (a) stimulates creativity and task commitment in students selected for the program, and (b) facilitates the development of more diverse and sophisticated student creative products (Renzulli & Reis, 1994). In addition, Renzulli and Reis (1994) reported that the SEM may improve students' self-concept and their attitudes toward learning.

Renzulli's (1992) model also emphasizes the role of the teacher, as a mentor and role model, in developing creativity. In fact, Chambers (1973) found that the following behaviors of college teachers fostered creativity in students: (a) conducting classes in an informal manner, (b) being well prepared, (c) welcoming unorthodox views and rewarding originality and creativity; and (d) encouraging student participation. Chambers also reported that students viewed these teachers as being more accessible to them, committed to their field, enthusiastic, and intellectually challenging. Chambers, however, cautioned that in his study, these professors who facilitated the development of creativity in their students were more researchers than teachers, with national reputations, and were more interested in a few "select" students. Perhaps this research orientation and attention fostered creativity? Another caution reported by Chambers was that the students surveyed were men, which may introduce factors that bias the results reported earlier.

Six resources have been identified as facilitating creativity in children and adults (Sternberg & Lubart, 1991): (a) intelligence, (b) knowledge, (c) intellectual style, (d) personality, (e) motivation, and (f) environmental context. According to Sternberg and Lubart (1991), there are two aspects of intelligence that are relevant to creativity: problem definition and redefinition, and insight skills. (See Sternberg, 1985, for a more detailed description of his theory of intelligence.) They reported that creative people not only solve problems, but also pose the right problems. In this regard, Sternberg and Lubart suggested that students should be responsible for the problems they choose to solve. Thus, teachers need to provide these types of problem-finding opportunities for their students.

With regard to thinking insightfully, Sternberg and Lubart (1991) stated that these skills are "involved when people perceive a high-quality solution to an ill-structured problem" (p. 609). They suggested that teachers should use more ill-structured problems to promote insightful thinking. This suggestion is supported by the findings of Jacobs and Dominowski (1981) and Martinsen (1995).

The second resource, knowledge, is important because an individual must have knowledge of a specific field of study to engage in problem solution and make a creative contribution to that field (Sternberg & Lubart, 1991). Sternberg and Lubart noted that the knowledge one gains in schooling experiences should not undermine their flexibility in thinking.

In addition, Sternberg and Lubart (1991) stated that intellectual styles are "the ways in which people choose to use or exploit their intelligence, as well as their knowledge" (p. 611). They identified three styles that affect creativity: (a) legislative, (b) executive, and (c) judicial.

There are also several personality attributes that have been shown to be traits of persons considered to be creative: (a) tolerance for ambiguity, (b) willingness to surmount obstacles and persevere, (c) willingness to grow, (d) willingness to take risks, and (e) courage of one's convictions and belief in oneself (Sternberg & Lubart, 1991). Sternberg and Lubart suggested that teachers should give more long-term assignments to develop students' tolerance for ambiguity. Schools typically do provide a fertile ground for students to learn to overcome obstacles. Schools, and specifically teachers, need to encourage students more to take risks with their newly acquired skills. Taking risks is difficult for creative students because creativity is not always rewarded with good grades (Sternberg & Lubart, 1991). Perhaps this is due to the negative attitudes teachers hold toward creative students, which is supported by the findings of Westby and Dawson (1995). Thus, educators must be more aware of this potential negative outcome of their grading.

Sternberg and Lubart (1991) also indicated that there are two types of motivation important to creativity: intrinsic motivation and the motivation to excel. Intrinsic motivation was mentioned previously (see Hennessey & Amabile, 1987). Basically, creative people are intrinsically motivated to complete a task. The major difficulty is with the grading system in schools, which is a form of extrinsic motivation. It was reported previously (Hennessey & Amabile, 1987) that extrinsic rewards hinder intrinsic motivation. Thus, schools will need to improve their capacity for improving students' intrinsic motivation.

Finally, Sternberg and Lubart (1991), as did Torrance (1981), suggested that the environmental context is important in stimulating creativity in three ways: (a) "sparking" creative ideas, (b) encouraging follow-up of creative ideas, and (c) evaluating and rewarding creative ideas. These authors reported that schools do poorly in providing environments that spark creativity. They also reported that schools rarely allow students to "pursue projects that encourage them to develop their creative thinking" (Sternberg & Lubart, 1991, p. 613). Finally, they reported that teachers rarely rewarded creativity in their classes. Thus, it appears that educators could improve their environmental context in these areas.

Educators can teach creative thinking P–16, and schools can change. In this regard, Sternberg and Williams (1996) developed 25 strategies to teach creative thinking (see Figure 2). Even though these strategies are presented to help develop creativity in all students, Sternberg and Williams noted that it is still a difficult task to enhance creativity. In fact, there are many ways that educators can "kill" creativity. Hennessey and Amabile (1987) listed five methods for "killing" creativity: (a) have children work for an expected reward, (b) set up competitive situations, (c) have children focus on expected evaluation, (d) use plenty of surveillance, and (e) set up restricted-choice situations.

As mentioned previously, Hennessey and Amabile (1987) reported that extrinsic rewards undermine intrinsic motivation and creative production. In addition, when students expect an evaluation, their focus switches from intrinsic motivation to extrinsic motivation, especially if they are being observed. Hennessey and Amabile cautioned that when convergent thinking is a teacher's goal, then extrinsic rewards can improve performance on a task. However, when students understand that their teachers "value" creativity, then this message has a positive effect on creativity. Schools also should have a continuing evaluation program to determine the effectiveness of their educational programs in developing creative abilities in their students.

Evaluation of Creativity and Education

Unfortunately, Miller (1986) noted that, at least at the college level, educators do not take creativity courses seriously. However, Miller argued that the creative process provides a basis for a "modern liberal education" (p. 248) in colleges and, in turn, should improve student performance.

In a longitudinal study, Parnes and Noller (1972) evaluated for 2 years the performance of college fresh-

25 Ways to Develop Creativity

THE PREREQUISITES
1. Modeling Creativity
2. Building Self-Efficacy

BASIC TECHNIQUES
3. Questioning Assumptions
4. Defining and Redefining Problems
5. Encouraging Idea Generation
6. Cross-Fertilizing Ideas

TIPS FOR TEACHING
7. Allowing Time for Creative Thinking
8. Instructing and Assessing Creativity
9. Rewarding Creative Ideas and Products

AVOID ROADBLOCKS
10. Encouraging Sensible Risks
11. Tolerating Ambiguity
12. Allowing Mistakes
13. Identifying and Surmounting Obstacles

ADD COMPLEX TECHNIQUES
14. Teaching Self-Responsibility
15. Promoting Self-Regulation
16. Delaying Gratification

USE ROLE MODELS
17. Using Profiles of Creative People
18. Encouraging Creative Collaboration
19. Imagining Other Viewpoints

EXPLORE THE ENVIRONMENT
20. Recognizing Environmental Fit
21. Finding Excitement
22. Seeking Stimulating Environments
23. Playing to Strengths

THE LONG-TERM PERSPECTIVE
24. Growing Creatively
25. Proselytizing for Creativity [a]

Figure 2. *25 ways to develop creativity. a = spreading the word. From* How to Develop Student Creativity, *by R. J. Sternberg & W. M. Williams, 1996, Alexandria, VA: Association for Supervision & Curriculum Development (p. 5). Copyright © 1996 by the Association for Supervision & Curriculum Development. Reprinted by permission. All rights reserved.*

men in semester-long credit-earning courses in "creative studies." The courses focused on awareness development, creative problem solving, synectics ("the joining of different and apparently irrelevant elements"; e.g., using analogies to develop original ideas; Treffinger, 1980, p. 66), and creative analysis processes. Unfortunately, there was an attrition rate of almost 40% at the end of each succeeding semester of the program. Parnes and Noller also reported that approximately one fourth of the students who chose to take the sequence of courses completed the full 2-year program (the experimental group $n = 150$, and the control group $n = 150$). Parts of measures assessing 58 components from Guilford's (1985) SI model (e.g., content areas, divergent production) were used in the study to determine if they would be affected by creativity training. Parnes and Noller found that students who completed the sequence of creativity courses significantly outperformed comparable control students on the following assessments: (a) utility (fluency and flexibility), (b) problems in college, (c) problem prevention, (d) multiple social problems, (e) evaluating ideas, and (f) improving research testing. That is, experimental condition students (a) demonstrated better ability to cope with real-life situational tests, (b) applied their creative abilities better in English courses, (c) performed better on the semantic and behavioral parts of Guilford's (1985) SI model, (d) reported that the program helped in other courses, (e) showed year-to-year improvement, and (f) were more productive in their nonacademic achievement where creative performance was required (Parnes & Noller, 1972, pp. 164–165).

The question also arises as to whether there should be a need for courses in creativity in teacher education programs, especially with current calls for teacher education reform. Over 25 years ago, Mohan (1973) believed that there was a need for a creativity course for pre- and in-service teachers. He surveyed 180 graduate students and seniors in teacher education to determine if they believed there was a need for such a course. He found that (a) 94% of the respondents said there was a need for such a course, (b) 93% considered the course a useful addition, (c) 83% thought teachers with training in creativity would be more effective in the classroom, (d) 90% would prefer to take this course, and (e) 68% would actually take the course. Mohan also presented a listing of creativity courses taught in teacher education programs. Thus, it would appear from these data that there is a need for creativity courses in teacher education programs.

In a later study, Mack (1987) attempted to determine (a) how important teacher educators and student teachers believed it was to include teaching methods of

enhancing creativity in a teacher training program, and (b) how thoroughly teacher educators and student teachers believed the methods of enhancing creativity had been taught in their undergraduate teacher education programs in 10 colleges and universities. Mack found that students and teachers in the 10 institutions surveyed felt that it was important to enhance creativity in children.

In addition, teacher educators and student teachers who were surveyed ranked "methods of enhancing creativity in children" at the 85% and 90% level, respectively. Forty-eight percent of teacher educators and 52% of student teachers felt that it was included in their teacher preservice instruction. It is interesting that teacher educators ranked "methods of enhancing creativity" 5th out of 20 in importance, but only 10th out of 20 in how well it was taught at their institution. Student teachers ranked this item 2nd out of 20 in importance, but 7th out of 20 in how well it was taught (Mack, 1987). Mack concluded that both groups valued enhancing creativity but that this goal was not met as well as the teachers had hoped.

To understand this discrepancy better, Mack (1987) assessed these same respondents' knowledge of creativity. He found that 63% of teacher educators answered the knowledge questions (e.g., concepts of creativity) correctly, whereas only 47% of the student teachers answered them correctly. Thus, both groups had a limited knowledge base of the field of creativity. This was supported by results indicating that 23 of 62 teacher educators surveyed said that none of their courses taught the "concepts of creativity" and that 29 of 62 said that none of their courses included "methods of enhancing creativity" (Mack, 1987). One hundred fifty-eight out of 388 student teachers also said that they had not taken any classes that taught "concepts of creativity," whereas 185 out of 388 said that they had not taken any classes that taught "methods of enhancing creativity" (Mack, 1987). Finally, Mack reported that student teachers "did not perceive creative teaching being modeled or taught to any great extent" (p. 28), whereas only 11% of teacher educators reported that they learned about creativity in their undergraduate programs. Based on these results, teacher education programs were not adequately addressing the knowledge base and methods of enhancing creativity in children. Future research should be directed to this issue.

A more extensive survey of 1,504 four-year colleges and universities was conducted to identify those colleges that conduct creativity courses (McDonough & McDonough, 1987). Of 1,188 responding, 961 indicated that they did not offer a course in creativity. Seventy-six of the remaining 227 institutions met the criteria for conducting courses in creativity, which is approximately 6% of the total. (See McDonough & McDonough, 1987, for the listing of colleges that conducted creativity courses.) Although McDonough and McDonough cautioned that some schools that conducted creativity courses may have been omitted from the survey, it appeared that, as of about 10 years ago, only a small number of colleges and universities in the United States conducted courses in creativity. For those of us involved in the field of creativity, this is an unfortunate circumstance.

To determine what was being taught in creativity courses, Bull, Montgomery, and Baloche (1995) surveyed 103 college faculty who participated in the first creativity conference at the Alden B. Dow Creativity Center of Northwood University in Midland, Michigan, and who taught these types of courses. This faculty represented junior colleges, 4-year institutions, and master's- and doctoral-granting institutions. They reported that these faculty recommended that (a) a safe climate should be established in the classroom whereby the students feel free to explore their creative potential, (b) this exploration should lead to an openness to creative experiences, and (c) this openness should promote curiosity, which should lead to insight and innovation (p. 89).

It is interesting that, in a survey of 16 female elementary teachers regarding the characteristics of creative students, Westby and Dawson (1995) reported that these teachers held negative views about characteristics that are associated with creativity (e.g., nonconformity, autonomy). This suggests that schools may not provide a safe environment for creative students as Bull et al. (1995) recommended. Thus, teachers' attitudes toward creativity actually may promote the extinction of those behaviors (Westby & Dawson, 1995). It is hoped that creative students will be able to adapt to these negative teacher attitudes. If not, then they will need to develop better coping strategies. Westby and Dawson suggested that "designers of programs to enhance creativity will have to consider the practical needs of the teacher" (p. 9). They also cautioned that their study only included female teachers. Thus, one must guard against overgeneralization from these results.

Conclusions

Where do we go from here? The research reviewed in this article suggests several implications for research and practice.

Implications for Research

Several authors (e.g., Feldhusen & Goh, 1995; Martinsen, 1995) discussed the relation of one's cognitive and learning styles to creativity. Can we consider cognitive and learning styles with the demands in our schools, especially to problem-solving tasks and so on? The issues of transfer of creative thinking skills across domains and the use of authentic tasks also were discussed (e.g., Guilford, 1950, 1967a) and need further study. That is, the transfer of creativity skills problem may be facilitated through the use of more authentic tasks in our schools. No definitive answers were provided with regard to the issue of how students' interests affect creativity (e.g., Renzulli, 1992). Teacher attitudes are also of concern (e.g., Westby & Dawson, 1995). That is, how can teachers' negative attitudes toward creative students be changed? Last, the new research and models of metacognition (e.g., Runco & Chand, 1995) and their relation to creativity need further investigation.

Implications for Practice

Several implications for educational practice can be gleaned from the research reviewed in this article. For example, the issue of intrinsic versus extrinsic motivators and their effects on creativity (e.g., Hennessey & Amabile, 1987) can be applied to any classroom at any grade level. That is, creative people are intrinsically motivated to complete a task. Thus, educators must be aware that, if they implement an extrinsic reward structure with these students, this will undermine their intrinsic motivation. A related issue, then, is teachers' adequate assessment of creative talent in their classes.

Guilford (1985) suggested that his SI model could be used as a model from which to develop lesson plans and assessments to evaluate student creative production. However, this model of 150 abilities is too complex to the novice or many experienced educators and requires training to implement it well.

The APA's (1993) "Learner-Centered Psychological Principles" have implications for creativity education, too. For example, Principles 4, 5, and 8 include aspects of creativity and creative thinking (e.g., Woolfolk, 1998). With the current push for more student-centered teaching and learning in our schools, these principles provide a sound basis from which to begin stimulating creative thinking.

Finally, it appears from several sources (e.g., Mack, 1987; Mohan, 1973) that we need to increase the teaching of creativity in our P–16 schools, especially in teacher education. In addition, as suggested in this article, there are many excellent programs to stimulate creativity and creative thinking. Each program or model has something to offer our students. There also are data to support these models. As with many areas of education, there appears to be no one program or model that outshines the others in stimulating creativity in all our students. As Davis and Rimm (1985) suggested, educators should choose the programs that appear to best meet the needs of their students in their school. Thus, as Rhodes (1961) stated more than 35 years ago, "Now is the time for every teacher to become more creative" (p. 310)! In conclusion, it may well be that Guilford's (1967a) statement that "creativity is the key to education in its fullest sense and to the solution of mankind's most serious problems" (p. 13) is still relevant today.

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