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INTRODUCTION TO CREATIVITY: PROCESS, PRODUCT, PERSONALITY, ENVIRONMENT & TECHNOLOGY

Nationally and internationally, integration of creativity theories and research within academic and corporate settings is accelerating. Creativity and innovation in thinking, problem solving, and enhancing life in general is evidenced in books (Tanner & Reisman, in press; Pink, 2005; Florida, 2002, 2010; Torrance and Reisman, 2004a, 2004b; Reisman and Torrance, 2005), the media, and corporate environments. A 2010 IBM study, based on face-to-face conversations with more than 1,500 chief executive officers worldwide, identified creativity as the most important leadership quality of the future. “Creative leaders invite disruptive innovation, encourage others to drop outdated approaches and take balanced risks. They are open-minded and inventive in expanding their management and communication styles...” (IBM Institute for Business Value, 2010). The 2013 Knowledge, Innovation & Enterprise global conference that crosses disciplines and “strengthens the links in the knowledge, creativity, innovation and enterprise chain” (conference url) is unlike any other as described next from the conference communication:

There has been a number of annual international conferences on innovation, entrepreneurship (not enterprise) and knowledge transfer in recent years, but none has really attempted to provide a common, fertile global platform for practitioners and subject experts in the fields to cross-fertilise ideas and provide insights into emerging issues and challenges. The International Conference on Knowledge, Innovation and Enterprise (KIE Conference) fills this gap.

Creativity: Process, Product, Personality, Environment & Technology

The *Creativity: Process, Product, Personality, Environment & Technology* section of the conference has yielded an eclectic group of papers that are reflective of Knowledge, Innovation and Enterprise. Sandra Kay presents six characteristics of an Elegant Problem followed by Brown and Wilson’s discussion of the interactive power

of synthesizing music and art to enhance creative expression. Chimae Cupschalk focuses on nontraditional learners applying the Metiri rubric as a centerpiece of this heavily qualitative research. Margaret Murphy presents an excellent review of literature on entrepreneurship with young folk, while Nathan Sachritz presents both business and nonbusiness settings for risk as a creative strategy. Leitch and Keiser use creativity to bridge corporate and educational Knowledge, Innovation and Enterprise, while describing an international creativity organization as the vehicle for corporate-academic friction. Wilson and Brown pose the following questions about creativity, technology and artistry that form the structure of this paper: As creative practitioners and artists, how should we approach the use of technology? In what way is technology mediating or inhibiting creativity? And, how might technology and the arts help to inform our understanding of what it is to create and to be creative? The authors incorporate historical words of wisdom from great artists (Picasso), philosophers (Plato, Aldous Huxley) and the Greeks and Romans. The tension among art, technologies and play is an added bonus. Coste and Coste discuss the fit between individuals and their surroundings; the interplay between creativity and person, culture, and environment. Terri Zobel presents an impressive list of steps for building teams and ground rules/activities. She also incorporates many of the leading creativity researchers into her paper. Dennie Smith presents a kaleidoscope as a metaphor for his 5-step problem-solving model. He suggests that the physical presence of the objects, models, and/or photos will also impact the overall utility of the metaphor in serving as direct or indirect influence on creativity and problem solving. Keibler's study investigated the process used by individuals to identify potential fields in which to be creative and personal self-realization of the emergence of unique creative activity. She creates the ME-Zone Theory, which resulted from the grounded theory methodology of her qualitative research. The main purpose of Kuan Chen Tsai's article was to survey related literature and promote creative teaching in the classroom. The author focuses on three topics. First, the perspective of creative teaching is outlined. Second, modeling creative behavior is described. Third, practical guides for creative teaching are suggested. Finally, Diane Rosen states: *Domain-knowledge supplies necessary raw material but is not sufficient for creativity, which depends heavily on heuristics or the way knowledge is combined. If creativity is about surprise, not predictability, and is fueled by its very indeterminacy, how might we develop those conditions that allow creative capacities to flourish?* Rosen presents interactive approaches that use uncertainty to increase creative potential.

Introduction to Creativity as a Venue for Research and Study

Contrary to some belief, *Creativity* and *Innovation* are not interchangeable. Creativity generates novel ideas and innovation implements these ideas. Creativity is the

ability to come up with a new idea, process, or product. The people and companies that are innovative are able to harness those creative ideas and bring them to market in a profitable manner. However, many well paid innovation consultants and organizations focus initially on innovation (e.g., 2010 World Innovation Forum held in New York City with headquarters in New York, London, Manchester and Singapore) demonstrating the need for “consultant education.” These consultants are supposed to be leading, coaching and creating what Florida refers to as the “Creative class.”

According to Richard Florida, Professor of Business and Creativity at the Rotman School of Management, University of Toronto., a visiting fellow at the Brookings Institution and a columnist for *Information Week*, there is a rise in the creative class in America, a class he defined as “a fast-growing, highly educated, and well-paid segment of the workforce on whose efforts corporate profits and economic growth increasingly depend. Florida asserts that the creative class includes “creative professionals who work in a wide range of knowledge-intensive industries such as high-tech sectors, financial services, the legal and healthcare professions, and business management. These people engage in creative problem-solving, drawing on complex bodies of knowledge to solve specific problems.”

On the other hand, in an interview for a Newsweek article entitled “The Creativity Crisis,” Kyung Hee Kim at the College of William & Mary, after analyzing almost 300,000 scores of children and adults on the Torrance Tests of Creative Thinking, asserted that since 1990, creativity scores have consistently inched downward (Bronson and Merryman, 2010).

For years there has been an interest by universities to offer, at least, one course dealing with creativity (e.g., a course in creativity studies offered at universities in North America, Europe, Japan, and China that occur in a variety of disciplines). However, only one other university offers a masters degree in creative studies; namely, Buffalo State. The Drexel University online Masters of Science degree in Creativity and Innovation expands master’s level work from the idea-generating phase to the implementation phase (the innovation phase), and prepares participating students to think and act as creative professionals.

J. P. Guilford’s 1950 presidential address to the American Psychological Association inspired resurgence in the field of creativity research. It is now 63 years since that call for creativity research in which Guilford’s delineation of creativity attributes moved the field from vague notions of creativity to distinct constructs that describe creative thinking. These constructs included fluency, flexibility, novelty, synthesis, analysis, reorganization and redefinition, complexity, and elaboration. Guilford’s address provided the vague concept of creativity with scope, depth, and breadth that could be measured and studied, and led to exploration of Personal Creativity Characteristics shown in Table 1. Although we have come a long way, the path is still open to new and challenging research studies and applica-

tions.

Table 1: Four Categories of Personal Creativity Characteristics and Examples

| Creativity Characteristic | Example |
|--|---|
| Divergent Thinking | fluency, flexibility, originality, elaboration, and metaphorical thinking |
| Convergent or Critical Thinking | analyzing, synthesizing, reorganizing or redefining, evaluating, seeing relationships, desiring to resolve ambiguity or bringing order to disorder, and preferring complexity or understanding complexity |
| Personality traits that relate to one's interests, experiences, attitudes, and self-confidence | 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. |
| 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 | Awareness of creativeness, persistence or perseverance, self-direction, internal locus of control, introspective, freedom from stereotyping, concentration, energy, and work ethic |

Adapted from: *Assessing Creativity: A Guide for Educators* (www.gifted.uconn.edu)

Many definitions of creativity reflect its complexity and multi-faceted nature. Table 2 illustrates the diversity of creativity definitions from the literature.

Table 2a: Creativity Theorists and Their View of Creativity

| Theorist | Creativity Definition |
|-----------------------------|--|
| Amabile | Involves an interaction of three components: domain-relevant skills, creativity-relevant skills, and task motivation. <i>Domain-Relevant Skills</i> include knowledge about the domain, technical skills, and special domain-related talent. <i>Creativity-Relevant Skills</i> include working styles, thinking styles, and personality traits. The <i>Task Motivation</i> 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. |
| Erich Fromm | 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. |
| Howard Gardner | One 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. |
| William J. J. Gordon | Emphasizes the use of metaphor and analogy for "connection-making," coining the Greek word <i>synectics</i> , which refers to the joining together of different and apparently irrelevant elements. |
| J. P. Guilford | Emphasized that "problem solving and creative thinking are closely related in that 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 creativity has usually been associated with the mental operation described as divergent production. |

Table 2b: Creativity Theorists and Their View of Creativity

| | |
|-----------------------------|---|
| Joe Khatena | The co-developer (with E. P. Torrance) of several creativity assessment instruments, defined <i>creativity</i> 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). |
| Donald W. MacKinnon, | Emphasized that creative responses must be both novel and adaptive to reality (i.e. useful) and 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. |
| Abraham H. Maslow | Concerned with people and the way they deal with their daily lives as it is with impressive products e.g., hierarchy of needs. |
| 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. |
| Mel Rhodes | Proposed that it is essential to consider four factors in a multifaceted conception of creativity: <i>person</i> (personality characteristics or traits of creative people); <i>process</i> (elements of motivation, perception, learning, thinking, and communicating); <i>product</i> (ideas translated into tangible forms); and <i>press</i> (the relationship between human beings and their environment). |
| Carl R. Rogers | Emphasized 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. |

Table 2c: Creativity Theorists and Their View of Creativity

| | |
|---|--|
| 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). |
| Donald J. Treffinger, Scott G. Isaksen and Brian K. Dorval | Emphasized the importance of harmony or balance between creative and critical thinking during effective problem solving and decision-making. In their definition, <i>creative thinking</i> involves, "encountering gaps, paradoxes, opportunities, challenges, or concerns, and then searching for meaningful new connections by <i>generating</i> many possibilities, varied possibilities (from different viewpoints or perspectives), unusual or original possibilities, and details to expand or enrich possibilities." <i>Critical thinking</i> involves "examining possibilities carefully, fairly, and constructively, and then <i>focusing</i> 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). |
| Graham Wallas | Author of one of the early classic studies in the field (1926), defined four major stages in the creative process: <i>preparation</i> (detecting a problem and gathering data), <i>incubation</i> (stepping away from the problem for a period of time), <i>illumination</i> (a new idea or solution emerges, often unexpectedly), and <i>verification</i> (the new idea or solution is examined or tested). |

Table 3: Assessing Creativity Data Sources

| Data Source | Example |
|------------------------------|---|
| Behavior or performance data | Creative products, performances, or accomplishments from real-life creativity or demonstration of creativity under simulated conditions. |
| Self-report data | Respond to questions about oneself and their own skills, abilities, activities and behavior via attitude inventories, personal checklists, or biographical inventories. |
| Rating scales | Descriptions of qualities or behaviors that are associated with creativity characteristics that ask people to rate the creativity of others. |
| Tests | 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. |
| Neuroimaging methods | Focus is on human memory, problem solving, intelligence, & creativity; specialization in electrophysiological methods (EEG, ERP), & other behavioral & neuroimaging methods (e.g., fMRI). |
| Psychophysiological methods | Studies of creativity are considered a higher level of research into brain and mentality, its further progress and evolution. Due to the integration of cognitive psychology, neuropsychology and cognitive neurophysiology achieved during the last decade, it has become possible to attack this problem. The latest advancements in technology, especially rCBF investigations using PET and fMRI, play a particularly important role here. As a science, the psychophysiology of creative thinking is still in its infancy. |

Adapted from: Assessing Creativity: A Guide for Educators (www.gifted.uconn.edu)

Teresa Amabile, Edsel Bryant Ford Professor of Business Administration at Harvard believes that exploration of team-level creativity can deepen our understanding of both creativity and teamwork. These include internal motivation, broad interests, and attraction to complexity, intuition, aesthetic sensitivity, toleration of ambiguity, risk taking, perseverance, and self-confidence (Amabile,1983; Oldham

& Cummings, 1996; Sternberg & Lubart, 1993).

Another research direction was proposed by Csikszentmihalyi (1988) who argued that any creative idea is affected by three forces: *the field, the domain, and the individual*. The field is the set of social institutions that selects only those creative products worth preserving—the gatekeeper function. The domain is the knowledge base and culture that will carry the new ideas or forms forward for the next generation; ideas must be accepted by a larger context before being considered creative. The individual is the one who brings about some change in the domain that the field will consider to be creative.

Can creativity be taught is still another research area. Guilford argued that creativity is a continuous trait in all people, and that those individuals with recognized creative talent simply have “more of what all of us have” (Guilford, 1950, p. 446). This is the position taken by the Drexel Torrance Center for Creativity and Innovation with a goal of enhancing creative and innovative thinking.

Assessment is still another research focus and 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. *Quantitative* data analysis draws upon resources that yield numerical scores or results, such as tests, rating scales, checklists, and self-report inventories.

Teachers, program coordinators, administrators, counselors, talent managers 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 employees?” or “How might we evaluate and compare various ways of assessing creativity?” are often posed, especially by those interested in studying creativity and concerned with identifying creative talent or evaluating the effectiveness of program goals involving creativity. Table 3 provides creativity assessment data sources and examples of each.

Industry Positions

The diverse companies that carry the job positions of either “chief innovation officer” or “chief creative officer” reflect the multidisciplinary nature of this discipline, and also point out the variety of career options.

Chief Innovation Officers

1. PepsiCo (NYSE: PEP)—beverages, food
2. Textron (NYSE: TXT)—aerospace and defense
3. Humana (NYSE: HUM)—healthcare
4. Computer Sciences Corporation (NYSE: CSC)—information technology

CREATIVITY: PRODUCT, PROCESS, PERSONALITY, ENVIRONMENT AND TECHNOLOGY

5. BF Goodrich (NYSE: GR)—aerospace and defense
6. Grub & Ellis Company —commercial real estate
7. Mitsubishi Corporation—auto manufacturers
8. Alegen Health—healthcare
9. Taiwan Semiconductor Manufacturing Company—semiconductor manufacturing
10. Coca-Cola (NYSE: CCE)—beverages, food
11. Publicis Group Media (NYSE: PUB)— advertising
12. WPP Group (Nasdaq: WPPGY)—advertising
13. MusicStrands—audio technology
14. Health Sciences Center—healthcare consulting
15. HealthDialog—healthcare
16. Hitachi (NYSE: HIT/TSE)—electronics
17. Intuit—Quicken products

Chief Creative Officers

1. Ford Motor Company (NYSE: F)—auto manufacturers
2. Walt Disney Company (NYSE: DIS)—entertainment
3. Electronic Arts (Nasdaq: ERTS)— multimedia & graphics software
4. Time Warner (NYSE: TWX)—entertainment
5. Kmart (Nasdaq: SHLD)—department stores
6. Warnaco (Nasdaq: WNRC)—apparel
7. John Wieland Homes—home builders
8. Atari (Nasdaq: ATAR)—interactive entertainment
9. Victoria's Secret—apparel
10. Apago, Inc.—technology
11. Sears—department stores

The Future

Creativity and innovation are strategic tools that allow us to overcome the many difficulties in preparing for the future. In *The New Division of Labor: How Computers are Creating the Next Job Market*, the authors (Levy & Murnane, 2004) argue that computers are:

... better at deriving solutions than people when the problems can be described in a rules-based logic that provides a procedure for any imaginable contingency. What a rules-based system cannot do, however, is deal with new problems that come up, problems unanticipated by the program of rules; that is to say, problems of the future. Most importantly, computers cannot capture the remarkable store of how-to or tacit knowledge that we all use daily but would have a lot of trouble

articulating.

Levy and Murnane go on to say, “In the absence of predictability, the number of contingencies explodes as does the knowledge required to deal with them.” As smarter and faster computers increasingly replace service-oriented jobs, the most creative problem solvers will emerge as leaders. The chief export of post-industrial economies will be the creativity and innovation of its companies and organizations, government agencies, and academic centers. We are moving from the information age to the conceptual age, and workers and organizations that can continuously innovate and apply principles of creativity to their work will be in the best position to succeed (Pink, 2005).

Increasingly, capacities such as cognitive flexibility, knowledge transfers, and adaptability – the core characteristics of creativity – are emerging as the new basic skills of an educated generation. In its 2003 report, The Business-Higher Education Forum urged higher education to adopt new approaches to learning with emphasis on: leadership, teamwork, problem solving, time management, self-management, adaptability, analytical thinking, global consciousness, and strong communication skills. The message is clear: it matters not only what we know but also how we know it, how we use what we know, how we work with others who have different expertise than our own, and how well we respond to unexpected challenges that we encounter (AAC&U, 2002).

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References

- Aleinikov, A., Kackmeister, S., & Koenig, R. (Eds.). (2000). *Creating creativity: 101 definitions*. Midland, MI: Alden B. Dow Creativity Center, Northwoods University.
- Amabile, T. M. (1983). *The social psychology of creativity*. New York: Springer-Verlag.
- American Educational Research Association. (1999). *Standards for educational and psychological testing*. Washington, DC: Author.
- Anderson, H. H. (1959). Creativity as personality development. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 119-141). New York: Harper & Row.
- Baer, J. (1993). *Creativity and divergent thinking*. Hillsdale, NJ: Lawrence Erlbaum.
- Barron, F. (1969). *Creative person and creative process*. New York: Holt, Rinehart, and Winston.
- Bloom, B. S. (Ed.). (1956). *Taxonomy of educational objectives: Cognitive domain*. New York: David McKay.
- Buhler, E. O., & Guirl, E. N. (1963). The more able student: Described and rated. In L. D. Crow & A. Crow (Eds.), *Educating the academically able* (pp. 47-52). New York: David McKay.
- Callahan, C. M., & Caldwell, M. S. (1993). Establishment of a national data bank on identification and evaluation instruments. *Journal for the Education of the Gifted*, 16, 201-219.
- Callahan, C. M., Lundberg, A. C., & Hunsaker, S. L. (1993). The development of the Scale for the Evaluation of Gifted Identification Instruments (SEGII). *Gifted Child Quarterly*, 37, 133-137.
- Carroll, H. (1940). *Genius in the making*. New York: McGraw-Hill.
- Clark, B. (1983). *Growing up gifted*. Columbus, OH: Charles E. Merrill.
- Cramond, B. (1995). *The coincidence of attention deficit hyperactivity disorder and creativity* (RBDM 9508). Storrs, CT: The National Research Center on the

Gifted and Talented, University of Connecticut.

Csikszentmihalyi, M. (1988). Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 325-339). New York: Cambridge University Press.

Csikszentmihalyi, M. (1996). The creative personality. *Psychology Today*, 29(4), 36-40.

Dacey, J. S. (1989). *Fundamentals of creative thinking*. Lexington, MA: D. C. Heath.

Davis, G. A. (1998). *Creativity is forever* (4th ed.). Dubuque, IA: Kendall-Hunt.

Dellas, M., & Gaier, E. L. (1970). Identification of creativity: The individual. *Psychological Bulletin*, 73(1), 55-73.

Dunn, R., Dunn, K., & Price, G. E. (1975). *Learning style inventory*. Lawrence, KS: Price Systems.

Feldman, D. H. (1988). Creativity: Dreams, insights, and transformations. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 271-291). New York: Cambridge University Press.

Fishkin, A. S. (2001). Ideas for selecting measures to assess creativity in youth. *Celebrate: NAGC Creativity Division Newsletter*, 12(1), 6.

Fishkin, A. S., & Johnson, A. S. (1998). Who is creative? Identifying children's creative abilities. *Roeper Review*, 21, 40-46.

Fromm, E. (1959). The creative attitude. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 44-54). New York: Harper & Row.

Gardner, H. (1993). *Creating minds*. New York: Basic Books.

Getzels, J. W., & Jackson, P. W. (1962). *Creativity and intelligence: Explorations with gifted children*. New York: John Wiley.

Goodhart, B. F., & Schmidt, S. D. (1940). Educational characteristics of superior children. *Baltimore Bulletin of Education*, 18, 14-17.

Gordon, W. J. J. (1961). *Synectics*. New York: Harper & Row.

Gordon, W. J. J., Poze, T., & Reid, M. (1966). *The metaphorical way of learning and knowing*. Cambridge, MA: Porpoise Books.

Gowan, J. C. (1977). Some new thoughts on the development of creativity. *Journal of Creative Behavior*, 11(2), 77-90.

Gowan, J. C., & Demos, G. D. (1964). *The education and guidance of the ablest*. Springfield, IL: Charles C. Thomas. 73

Gross, R. B., Green, B. L., & Gleser, G. C. (1977). *Manual for the Gross Geometric Forms Creativity Test for Children* (Preliminary Ed.). Cincinnati, OH: University of Cincinnati Medical Center.

Guilford, J. P. (1950). Creativity. *American Psychologist*, 5, 444-454.

Guilford, J. P. (1959). Traits of creativity. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 142-151). New York: Harper & Row.

Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.

Guilford, J. P. (1977). *Way beyond the IQ*. Buffalo, NY: Bearly.

Guilford, J. P. (1987). Creativity research: Past, present and future. In S. G. Isaksen (Ed.), *Frontiers of creativity research: Beyond the basics* (pp. 33-65). Buffalo, NY: Bearly.

IBM Institute for Business Value, "Capitalizing on Complexity: Insights from the Global Chief Executive Officer Study" May, 2010.

Hollingworth, L. S. (1942). *Children above 180 IQ*. Yonkers, NY: World Book.

Isaksen, S. G. (Ed.). (1987). *Frontiers of creativity research: Beyond the basics*. Buffalo, NY: Bearly.

Isaksen, S. G., Puccio, G. J., & Treffinger, D. T. (1993). An ecological approach to creativity research: Profiling for creative problem solving. *Journal of Creative Behavior*, 27(3), 149-170.

Khatena, J., & Torrance, E. P. (1973). *Thinking creatively with sounds and words: Technical Manual* (Research Ed.). Lexington, MA: Personnel Press.

KIE 2013 Conference. <http://skcie.org.uk/index.html>

Kirton, M. J. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology*, 61, 622-629.

Kneller, G. F. (1965). *The art and science of creativity*. New York: Holt, Rinehart & Winston.

Koestler, A. (1964). *The act of creation*. New York: Dell.

Linn, R. L., & Gronlund, N. E. (1995). *Measurement and assessment in teaching* (7th ed.). Columbus, OH: Charles E. Merrill.

MacKinnon, D. W. (1978). *In search of human effectiveness: Identifying and developing creativity*. Buffalo, NY: Creative Education Foundation.

Martinson, R. A. (1963). Guidance of the gifted. In L. D. Crow & A. Crow (Eds.), *Educating the academically able* (pp. 176-182). New York: David McKay. 74

Maslow, A. H. (1976). Creativity in self-actualizing people. In A. Rothenberg & C. Hausman (Eds.), *The creativity question* (pp. 86-92). Durham, NC: Duke University Press.

May, R. (1959). The nature of creativity. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 55-68). New York: Harper & Row.

Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review*, 69, 220-232.

Myers, I. B., & McCaulley, M. H. (1985). *A guide to the development and use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

Norris, S. P., & Ennis, R. H. (1989). *Evaluating critical thinking*. Pacific Palisades, CA: Critical Thinking Press and Software.

Parnes, S. J. (1967). *Creative behavior guidebook*. New York: Scribners.

Perkins, D. N. (1981). *The mind's best work*. Cambridge, MA: Harvard University Press.

- Renzulli, J. S., Smith, L., White, A., Callahan, C., & Hartman, R. (1976). *Scales for rating the behavioral characteristics of superior students*. Mansfield Center, CT: Creative Learning Press.
- Rhodes, M. (1961). An analysis of creativity, *Phi Delta Kappan*, 42, 305-310.
- Rimm, S. M., & Davis, G. A. (1976). GIFT: An instrument for the identification of creativity. *Journal of Creative Behavior*, 10, 178-182.
- Rogers, C. (1959). Toward a theory of creativity. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 69-82). New York: Harper & Row.
- Rothney, J. W., & Koopman, N. E. (1958). Guidance of the gifted. In N. D. Henry (Ed.), *Education for the gifted. Yearbook of the National Society for the Study of Education* (Part II, pp. 346-361). Chicago: University of Chicago Press.
- Rudner L. M. (1993). *Test evaluation*. Available on-line from the ERIC Clearinghouse on Assessment and Evaluation at <http://ericae.net/seltips.txt>
- Runco, M. A. (1991). *Divergent thinking*. Norwood, NJ: Ablex.
- Runco, M. A., & Chand, I. (1994). Problem finding, evaluative thinking, and creativity. In M. A. Runco (Ed.), *Problem finding, problem solving, and creativity* (pp. 40-76). Norwood, NJ: Ablex. 75
- Simonton, D. K. (1987). Genius: The lessons of historiometry. In S. G. Isaksen (Ed.), *Frontiers of creativity research: Beyond the basics* (pp. 66-87). Buffalo, NY: Bearly.
- Selby, E. C., Treffinger, D. J., & Isaksen, S. G. (2001). *VIEW: A measure of problem solving style*. Sarasota, FL: Center for Creative Learning.
- Smith, G. J. W., & Faldt, E. (1999). Self-description or projection: Comparison of two methods to estimate creativity. *Creativity Research Journal*, 12(4), 297-301.
- Smith, J. A. (1967). *Creative teaching of the social studies in the elementary school*. Boston: Allyn and Bacon.
- Starko, A. J. (1995). *Developing creativity in the classroom: Schools of curious delight*. White Plains, NY: Longman.

- Stein, M. I. (1974). *Stimulating creativity: Volume 1, Individual procedures*. New York: Academic Press.
- Sternberg, R. J. (2000). Identifying and developing creative giftedness. *Roeper Review*, 23, 60-65.
- Sternberg, R. J., & Lubart, T. I. (1991). Creating creative minds. *Phi Delta Kappan*, 72, 608-14.
- Tanner, D. & Reisman, F. (in press). *Total Creativity Management: Empowering Innovation in Industry and Education*. Bensenville, IL: Scholastic Testing Service.
- Taylor, C. W., & Ellison, R. L. (1966). *Alpha biographical inventory*. Salt Lake City, UT: Institute for Behavioral Research in Creativity.
- Thorndike, R. M. (1997). *Measurement and evaluation in psychology and education* (6th ed.). Columbus, OH: Charles E. Merrill.
- Torrance, E. P. (1962). *Guiding creative talent*. Englewood Cliffs, NJ: Prentice-Hall.
- Torrance, E. P. (1971). The courage to be creative. *Inspection news*, 56(4), 8-11.
- Torrance, E. P. (1972). Predictive validity of bonus scoring for combinations on repeated figure tests of creative thinking. *Journal of Psychology*, 81, 161-171.
- Torrance, E. P. (1974). *Torrance Tests of Creative Thinking: Norms and technical manual*. Bensenville, IL: Scholastic Testing Press.
- Torrance, E. P. (1980). Assessing the further reaches of creative potential. *Journal of Creative Behavior*, 14(1), 1-19.
- Torrance, E. P., & Safter, H. T. (1999). *Making the creative leap beyond. . .*. Buffalo, NY: Creative Education Foundation.76
- Treffinger, D. J. (1988). Components of creativity: Another look. *Creative Learning Today*, 2(5), 1-4.
- Treffinger, D. J. (1991). Creative productivity: Understanding its sources and nurture. *Illinois Council for Gifted Journal*, 10, 6-8.

Treffinger, D. J. (1996). *Creativity, creative thinking, and critical thinking: In search of definitions*. Sarasota, FL: Center for Creative Learning.

Treffinger, D. J., Feldhusen, J. F., & Renzulli, J. S. (2001, April 18). *Statement for the public workshop on the Florida draft gifted rule*. Unpublished manuscript.

Treffinger, D. J., Isaksen, S. G., & Dorval, B. K. (2000). *Creative problem solving: An introduction* (3rd ed.). Waco, TX: Prufrock Press.

Treffinger, D. J., Isaksen, S. G., & Dorval, K. B. (1996). *Climate for creativity and innovation: Educational implications*. Sarasota, FL: Center for Creative Learning.

Treffinger, D. J., & Nassab, C. A. (1998). *Thinking tool guides*. Sarasota, FL: Center for Creative Learning.

Villars, G. (Ed). (1957). *Educating the gifted in Minnesota schools*. St. Paul, MN: Commissioner of Education, State of Minnesota, Department of Education.

Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children*. New York: Holt, Rinehart & Winston.

Wallas, G. (1926). *The art of thought*. New York: Harcourt-Brace.

Ward, V. S. (1962). *The gifted student: A manual for regional improvement*. Atlanta, GA: Southern Regional Education Board.

Wilson, F. T. (1965). Some special ability test scores of gifted children. In W. B. Barbe (Ed.), *Psychology and education of gifted* (pp. 103-113). New York: Appleton-Century-Crofts.

Witty, P. (1958). Who are the gifted? In N. D. Henry (Ed.), *Education for the gifted. Yearbook of the National Society for the Study of Education* (Part II, pp. 41-63). Chicago: University of Chicago Press.

Personality Disorders Personality traits are enduring patterns of: "Perceiving "Relating to "Thinking about environment. Documents. Creativity and Self-Determination in .Creativity and Self-Determination in Personality Creativity. Documents. Constructing a 3D Collaborative Virtual Environment for Creativity Support. Education. Target Skills Adding Creativity and Personality to a Paper. Documents. UNIVERSITI PUTRA MALAYSIA SEXUAL HARASSMENT AND .empowerment and personality, and office environment. Documents. Changes in the work environment for creativity during ..." Changes in the work envi... Information technology can support inventive and creative practices in the arts, design, science, engineering, education, and business, and it can enable entirely new types of creative production. The scope of IT-enabled creative practices is suggested (but by no" Unquestionably, information technology (IT) now helps one to perform many routine tasks with greater speed and accuracy, with fewer errors, and at lower cost. So computers and software products are marketed as productivity tools, investments in IT are justified in terms of productivity gains, and economists try (sometimes without success) to measure those gains. In this role, IT is a servant. An additional claim, which can be justified in certain contexts, is that IT enhances the quality of results. Some expected results of the creativity process are: " innovation through new product and process ideas " continuous improvement of products or services " productivity increase " efficiency " rapidity " flexibility " quality of products or services " high performance. 1.5 Characteristics of providers. The implementation of creative techniques within work groups, requires the assistance and advise of external consultants." In case where the company focus is to increase group creativity and to create environments where a collaborating team work creatively together, the firm must have at least 20 employees, including 3 members as management staff. 2.3 Implementation cost. The application of creativity techniques is a continuum process. Start studying Introduction To Creativity Exam. Learn vocabulary, terms and more with flashcards, games and other study tools." In a high-challenge environment, we are motivated to contribute to the success of the company, you want to invest energy and personal time because the companies success feels like your own personal success. In a low-challenge environment, it is just a job. Goran Ekvall 10 Dimensions: Freedom." The product is very important to the creative process because if a creative process had no product, then there would be no tangible result of the idea. Without a tangible product of the idea, there is no way to test, develop, implement, or even display the creative work.