

NURTURING CREATIVITY IN THE CLASSROOM

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Definition of Creativity, Creative Thinking & Critical Thinking

- A commonly accepted and well-published definition of creative thinking is: thought that results in an idea that is novel and useful. If the idea is not novel, it is banal; if it is not useful, it may just be bizarre
- Critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do.
- The key component of creative thought is the generation of ideas.
- The key component of critical thought is the judgment of ideas.
- As early as 1950, Guilford theorized that creativity is a process that involves reasoning and other thinking factors including:
 - problem finding (ability to recognize problems),
 - fluency (ability to produce many ideas),
 - originality, (ability to produce novel ideas),
 - flexibility (ability to produce varied ideas),
 - categorizing ability (ability to group ideas together or to separate them) and
 - evaluation ability (the ability to delay selection of an idea until appropriate evaluation has been made).
- Gubbins' matrix of thinking skills
 - Problem Solving
 - Identifying general problem
 - Clarifying problem
 - Formulating hypothesis
 - Formulating appropriate questions
 - Generating related ideas
 - Formulating alternative solutions
 - Choosing best solutions
 - Applying the solution
 - Monitoring acceptance of the solution
 - Drawing conclusions
 - Decision Making
 - Stating desired goal/condition
 - Stating obstacles to goal
 - Identifying alternatives
 - Examining alternatives
 - Ranking alternatives
 - Choosing best alternatives
 - Evaluating actions
 - Inferences (Inductive and deductive)
 - Inductive
 - Determining cause and effect
 - Analyzing open-ended problems
 - Reasoning by analogy
 - Making inferences
 - Determining relevant information
 - Recognizing relationships
 - Solving insight problems
 - Deductive
 - Using logic
 - Spotting contradictory statements
 - Analyzing syllogisms
 - Solving spatial problems
 - Divergent Thinking Skills
 - Listing attributes of objects/situations
 - Generating multiple ideas (fluency)
 - Generating different ideas (flexibility)
 - Generating unique ideas (originality)
 - Generating detailed ideas (elaboration)
 - Synthesizing information
 - Evaluative Thinking Skills
 - Distinguishing between facts and opinions
 - Judging credibility of a source
 - Observing and judging observation reports
 - Identifying central issues and problems
 - Recognizing underlying assumptions
 - Detecting bias, stereotypes, clichés
 - Recognizing loaded language
 - Evaluating hypotheses
 - Clarifying data
 - Predicting consequences
 - Demonstrating sequential synthesis of information
 - Planning alternative strategies
 - Recognizing alternative strategies
 - Recognizing inconsistencies in information
 - Identifying stated and unstated reasons
 - Comparing similarities and differences
 - Evaluating arguments
 - Philosophy and Reasoning
 - Using dialogical/dialectical approaches

- Creative Problem Solving
 - Mess finding
 - Fact finding
 - Problem finding
 - Idea finding
 - Solution finding
 - Acceptance finding
- Creative strategies, such as making analogies, attribute listing, visual imagery, and role-playing, involve the use of critical thinking or complement critical thinking skills in the formulation of a product or meeting an objective. On the other hand, the production of a creative product requires solving many problems that require critical thinking, as for example, in the evaluation of the product.
- Whereas creative thinking is divergent, critical thinking is convergent; whereas creative thinking tries to create something new, critical thinking seeks to assess worth or validity in something that exists; whereas creative thinking is carried on by violating accepted principles, critical thinking is carried on by applying accepted principles. Although creative and critical thinking may very well be different sides of the same coin, they are not identical. B.K. Beyer
- Creativity is not the same thing as originality. Originality requires novelty, uniqueness, unconventionality, or at least unusualness. The more unusual something is, the more original it is. Creativity certainly requires originality but it requires something else as well – a kind of effectiveness or fit. Originality is necessary but not sufficient for creativity. Creative things are not maximally original but are optimally original. Creativity is not always a kind of problem solving. Sometimes creativity occurs in advance of problem solving and is involved in problem finding, problem identification, or problem definition.
- Robert Sternberg proposed a theory of intelligence that explicitly incorporates creativity as one of the three main abilities that make up intelligence. This theory of intelligence, called the theory of successful intelligence (or triarchic theory of successful intelligence), combines three sub-theories that address the meta-components, performance components, and knowledge acquisition components of conventional intelligence (i.e. analytical intelligence), an experiential component of intelligence (i.e. creative intelligence), and a contextual component of intelligence (i.e. practical intelligence). Summed up, the theory puts forth that intelligence is the ability to achieve one's goals in life, whatever one's context, by adapting to, shaping of, or selecting of one's environment, through a balance in the use of one's analytical, creative, and practical abilities.
- Virtually all definitions of creativity include two necessary components – that the product of creative thinking be unusual and appropriate. There is also considerable overlap in most definitions of critical thinking...a broad term that describes reasoning in an open-ended manner and with an unlimited number of solutions. It involves constructing a situation and supporting the reasoning that went into a conclusion.
- Critical thinking is the use of those cognitive skills or strategies that increase the probability of desirable outcomes. It is used to describe thinking that is purposeful, reasoned, and goal directed – the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions, when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task.
- The end product of both types of thinking has to be appropriate. The only distinction between these terms is that the response or product needs to be novel for the thinking to be defined as creative. The response or product of critical thinking may be novel, but it is not a necessary part of the definition. Thus, given these commonly agreed-on definitions, it seems that creative thinking is a subset of critical thinking.

Attitudes and Beliefs

- Fear is recognized as a major determinant of conformity of behavior, if not of thought. Even if fear does not ensure conformity of thought, it lessens the likelihood that unconventional ideas will be expressed.
- There is little risk having unconventional ideas if no one knows about them, but in a group, there is a chance that others will react in an unfavorable manner. This is one reason brainstorming often leads to a large quantity of ideas, but few highly original ideas.
- The belief that intelligence is a genetically determined and unchanging property of an individual, can de-motivate children from making an effort to excel at intellectually demanding tasks.
- A closely related and equally destructive belief is that if one is sufficiently gifted, one need not learn a lot about a domain to be creative in that domain, and if one is not gifted, any effort to be creative in that domain will be futile.
- Creativity is determined to a large degree by commitment and hard work.
- Creative thinking actually requires significant content knowledge. Thinking creatively about a topic helps deepen one's knowledge of that topic.
- Creativity is not just about divergent thinking; it also requires evaluative and convergent thinking, as well as a great deal of domain knowledge and skills.
- There is a consensus among creativity researchers and theorists that creative genius in particular requires extensive content knowledge. There is much evidence to support what has come to be known as the "ten-year rule," which claims that it generally takes at least ten years of extensive work and/or study in a field before truly creative work is even possible.
- Characteristics of the learner that support the development of creativity: moral courage, optimism, vision, charisma, hope, engagement, tolerance for ambiguity, risk taking, and perseverance.
- Traits of a creative individual: autonomous, courageous, wide interests, openness, tolerance, authenticity, risk taking.
- Personal attributes that support creativity are: willingness to overcome obstacles, willingness to take sensible risks, willingness to tolerate ambiguity, and self-efficacy.
- Three intellectual skills are particularly important to creativity:
 - The synthetic ability to see problems in new ways and to escape the bounds of conventional thinking.
 - The analytical ability to recognize which of one's ideas are worth pursuing and which are not.
 - The practical-contextual ability to know how to persuade others of the value of one's ideas.
 - The confluence of these three abilities is also important. Analytical ability used in the absence of the other two abilities results in powerful critical, but not creative thinking. Synthetic ability in the absence of the other two abilities results in new ideas that are not subjected to the scrutiny required to make them work. And practical contextual ability in the absence of the other two abilities may result in the transmittal of ideas not because the ideas are good but because the ideas have been well and powerfully presented.
- Years of training teachers of the gifted have led us to believe that certain personality characteristics are necessary for highly effective teaching of creative students. These characteristics, which are generally found in confident but non-authoritative persons, include flexibility, openness to experience and new ideas, a high energy level, optimism, commitment to excellence, and enthusiasm for living.
- Three major components constitute the ideal teacher for the development of creative productivity: knowledge of the discipline, instructional technique, and a teachers' romance with the discipline.
- The kinds of teachers who promote high levels of creative productivity in their students tend to allow students greater choice in the selection of topics, welcome unorthodox views, reward divergent thinking, express enthusiasm for teaching, interact with their students outside of class and generally conduct classes in an informal manner. They establish positive relationships with their students by always working in close proximity with them; they engage in frequent verbal interaction of high-

quality with their students, including verbal motivation, higher-level questioning skills, and a reciprocal sense of humor; are flexible about their use of time and scheduling, spending more time with as it becomes necessary and recognize that their students' creative productivity is an ultimate goal.

- Gifted, talented and creative people are known to be energetic, enthusiastic, intensely absorbed in their pursuits, and endowed with vivid imagination, but they are also often emotionally vulnerable. They tend to react strongly to aesthetic, intellectual, emotional, sensual and other stimuli. Because of this intensity, creative people may be perceived as particularly difficult or challenging. At the same time, this intensity provides the energy behind the drive to create.
- Traits describing teachers' favorite students were negatively correlated with the creative traits; as expected, the least favorite students were positively correlated with the creativity prototype. But more telling was the finding that teachers only agreed with 45% of the adjectives defining creative/uncreative characteristics in previous literature. Several of the traits (i.e. good-natured, reliable, and sincere) unique to teachers' perception of creative students were also socially desirable characteristics. Also, teachers rated "nonconformist" as one of the least creative traits, in contrast to almost every expert definition of creativity. Thus, although teachers may support the idea of creativity in the classroom, they appear to prefer students who exhibit socially desirable traits, which they then label as creative.
- It seems to be true that although divergent thinking can facilitate creative problem solving, too much divergence is not good for creativity. Wild and weird ideas will result and they will not have the effectiveness, fit or aesthetic appeal that is necessary for something to be truly creative. Divergence should be optimal.
- People rarely do truly creative work in an area unless they really love what they are doing and focus on the work rather than the potential rewards. Motivation is not something inherent in a person: One decides to be motivated by one thing or another.
- Rhetoric that underpin approaches to creativity in English classrooms:
 - Creative genius rhetoric – With its roots in the European Enlightenment, this post-Romantic perspective emphasizes the fostering of extraordinary creativity in a range of domains
 - Democratic and political rhetoric – With its roots in the Romantic era, this perspective views creativity as offering empowerment
 - The notion of creativity as ubiquitous – This idea views creativity as pervasive
 - Creativity as a social good – This concept emphasizes social and individual regeneration, with a focus on inclusion and multiculturalism
 - Emphasis on the economic imperative – this rhetoric emphasizes the neo-liberal discourse regarding the economic program thus developing a rationale of fostering creativity in the classroom as necessary to developing economic competitiveness
 - Approaches that emphasize play – With roots again in Romantic thought, this perspective sees childhood play as the origin of adult creative thought
 - Approaches focusing on creativity and cognition – these stem from 20th-century Piagetian and Vygotskian work. This perspective emphasizes cognitive processing.
 - A discourse around creativity and new technologies – This emphasizes the affordances of these in relation to creativity
 - The creative classroom – this discourse in particular draws connections between spirituality, knowledge, skills and pedagogy
- Doll (1993) argued that our curriculum is based on an outmoded factory system whereby curriculum is seen as discrete bits of information that must be taught in a linear manner and mastered by the student. He posited that the traditional three Rs of Reading, writing and Arithmetic be replaced by the new four Rs of Richness, Recursion, Relations, and Rigor. Instead of mastering content, students would be led to critically examine knowledge and regard it as transitory. There would be emphasis on larger ideas and the interconnections among them.

Instructional Strategies

- Thinking depends quite heavily on knowledge. Mistakes in everyday critical thinking are more often the result of faulty premises (i.e. incorrect factual knowledge) than a lack of general problem-solving skills, and that teaching for transfer requires a great deal of context-specific training or practice in any domain to which transfer is desired.
- Teaching content-free thinking skills is not possible, that higher-level thinking requires the automatization of lower-level skills, and that to improve students' thinking in a given domain, students must acquire an understanding of much factual content about that domain as well as a variety of domain-specific cognitive skills.
- When teachers simply teach the most efficient method for solving a problem, they may actually short-circuit the creative process necessary for the development of meaningful understanding. This is not to say that students should never be taught the most efficient methods, but rather they should be given opportunities to work through the problems in their own way such that they develop an accurate yet personally meaningful understanding.
- The cluster of diverse procedures that surround the acquisition of knowledge – that dimension of learning commonly referred to as “process” or thinking skills – should themselves be viewed as a form of content. It is these more enduring skills that form the cognitive structures and problem-solving strategies that have the greatest transfer value.
- The purpose of Type III enrichment is to create situations in which young people are thinking, feeling, and doing what practicing professionals do in the delivery of products and services.
- A large part of the facilitating teacher's effort must be focused on helping students find appropriate outlets and audiences for their most creative efforts.
- Creativity skills that can be taught to children
 - Fluency: The ability to produce a large number of ideas
 - Flexibility: the ability to make connections between unrelated concepts
 - Originality: the ability to make unique ideas
 - Elaboration: the ability to manipulate an idea and work on it until it is well formed
- Scamper (Strategy for encouraging creativity)
 - S = Substitute something
 - C – Combine your subject with something else
 - A = Adapt something to your subject
 - M = Magnify or modify – add to it or change it in some fashion
 - P = Put it to some other use
 - E = Eliminate something from it
 - R = Rearrange or reverse it
- Actions for stimulating creative thinking
 - Input: bring interesting and unusual things to class to keep students involved
 - Humor: one great resource of linguistic ingenuity is humor
 - Random input: Here the emphasis is on choosing something randomly and responding to it, such as a page from a magazine, dictionary, encyclopedia, classic novel, etc.
 - Metaphors and similes: Thinking in metaphors and similes is great for improving thinking skills. Metaphors encourage making connections between two very different things
 - Opposites challenge: Get students to think of the opposite of a word, a thing, or a situation.
 - Different perspectives: Tell students to think about things from several different points of view
 - Imagine: Students can close their eyes and enter a fantasy world
 - Maps and diagrams: Mind mapping, Venn diagrams, and fishbone diagrams are just a few examples of how students can organize their thoughts on paper.
 - Combinations: Students can combine ideas, images, or words to produce new creations

- Brainstorming: This well-known activity has students working in a group, thinking of ideas or solutions based on a problem statement.
- Morphological Forced Connections
 - List the attributes of the situation
 - Below each attribute, place as many alternates as you can think of
 - When completed, make many random runs through the alternates, picking up a different one from each column and assembling the combinations into entirely new forms of your original subject.
- Creativity is only possible with incompletely defined, ill-structured problems. Ill-structured means that some of the information needed to solve the problem is missing.
- In common usage, constraints are seen as one-sided, defined solely as limitations or restrictions. In problem solving, they are dually defined, two-sided paired. One of the pair retains its restrictive function, precluding search in some parts of the problem space, while the other directs search in other, often opposite parts.
- Five kinds of constraints are found in the classroom:
 - Cognitive constraints, which determine how many things a child's brain can process and how quickly
 - Talent constraints, which direct interest in the area of a gift
 - Curricular constraints, which involve standards and standardized testing
 - Domain constraints which define areas of expertise; and
 - Variability constraints, which specify how differently something must be done.
- Paradoxically, a profusion of projects can produce low variability levels. One reason is that children vary by switching between tasks instead of between strategies on the same task.
- The Japanese (math) curriculum precludes switching between tasks and promotes switching between strategies. Teachers focus on one problem or topic per class. Children are expected to come up with different solutions based on their already acquired knowledge. That is, they are not expected to "discover" a set of algorithms, but to apply and combine or recombine (this is where creativity is possible) material already mastered into novel solution paths.
- Understanding and expertise are domain-specific: One learns by doing; the doing should be domain centered.
- High variability should be required earlier than later: This means that early problems should be difficult enough to require trying several things to solve them. This will promote and reward both high variability and persistence.
- The variability requirements should be very clear. Reliability is rewarded far more often than creativity in a classroom context. As a result, low variability must be specifically precluded in order to promote higher levels.
- The evidence from expert-novice studies in psychology reinforces the notion that experts spend more time analyzing a problem before beginning to solve it, whereas, novices are more likely to jump in and start the trial and error process. Teaching students how to recognize the common structural properties of problem types enables them to recognize new problems as variations of problems they have solved before and to systematically choose the most appropriate method for attempting a solution.
- Tactics for promoting creativity: question assumptions, consider the opposite
- There are several proposed models for teaching creativity in the classroom, and these tend to incorporate the development of personality factors (e.g. tolerance of ambiguity, flexibility, risk-taking, persistence, and motivation) and cognitive skills (e.g. problem defining, original thinking, elaboration, finding new connections) with process.
- Renzulli Enrichment Triad Model: presents three progressive stages of activities or exercises that can develop creative thinking processes. Type I activities involve general exploratory exercises which

may be field trips or other open-ended experiences that invite exploration. Type II activities emphasize training in particular thinking skills, such as reflective thinking, divergent thinking, and problem solving. They involve such specific activities as brainstorming, elaboration, the practice of flexibility, fluency, and originality. Type III activities involve work with real problems.

- Treffinger Creative Problem Solving Model: Model describes three levels of instruction toward building creative problem-solving skills. Level 1 teaches the basic tools for creative and critical thinking. Level 2 promotes extending the basic tools to learning and practicing systematic approaches to problem solving. Level 3 involves applying creative problem-solving processes to real-life problems. In this model, the learning process and the application of systematic efforts toward creative solutions and ideas (the products) are emphasized.
- According to Amabile, three major components are necessary and sufficient for individuals to produce creative productions in any domain. These components include: domain-relevant skills (i.e. factual knowledge about the domain, technical skills, and special domain-relevant talents); creativity related processes (i.e. cognitive styles, personality characteristics, implicit and explicit knowledge of heuristics for generating novel ideas, and conducive working styles); and task motivation (i.e. attitude toward the task and perceptions of one's own motivation for undertaking the task).
- Lin's Five Traits of Thinking model includes instruction that promotes depth (i.e. analysis and synthesis of relationships), flexibility (i.e. divergent thinking), creativity (i.e. creating unique solutions to existing problems), self-criticism (i.e. evaluating arguments), and fluency (i.e. speed and accuracy in using the most efficient problem solutions).
- Mission Hill's Five Habits of Mind
 - Evidence: How do we know what is true and false? What evidence counts? How sure can we be? What makes it credible to us? This includes using the scientific method and more
 - Viewpoint: How might this look if we stepped into other shoes? If we were looking at it from a different direction? If we had a different history or expectation? This requires the exercise of informed "empathy" and imagination. It requires flexibility of mind.
 - Connections/Cause and Effect: Is there a pattern? Have we seen something like this before? What are the possible consequences?
 - Conjecture: Could it have been otherwise? Supposing that...? What if...? this habit requires use of the imagination as well as knowledge of alternative possibilities. It includes the habits described above
 - Relevance: Does it matter? Who cares? Knowing "how-to" is no substitute for having good habits. Who cares if you could drive well, if you are not in the habit of doing so? Who cares if you could be on time, if you never are? The Mission Hill Habits of Mind are supplemented by Habit of Work: Habits that include meeting deadlines, being on time, sticking to a task, not getting frustrated quickly, and really in hearing out what other have to say.
- The myth that creativity is enhanced within a group has grown from the belief that quantity of ideas equates to greater creativity. Thus, the more people working together, the more ideas will be produced, and the greater will be the creativity. However, this myth does not take into account group dynamics that can hinder creative potential, such as fear of negative evaluation from other group members or the tendency to fall prey to group think.
- Brainstorming or generating lists of ideas for a given problem or situation will result in more ideas if completed in solitude followed by pooling the ideas.
- Time on task is almost always a critical variable in determining whether a problem solver will come up with a creative (or even noncreative) solution. The incubation effect is a well-documented extension of this principle. It seems that sometimes, at least when problem solvers are "stuck" they continue to return to the same dead-end path in their hunt for a solution. By taking time away from the task, they are able to move from the "thinking rut" and thus can explore other and better paths for success.

- Teaching creatively means encourage students to create, invent, discover, imagine if, suppose that, and predict.
- Twelve keys for developing the creativity habit in students
 - Redefine problems
 - Question and analyze assumptions: It is more important for students to learn what questions to ask and how to ask them than it is to learn the answers.
 - Do not assume that creative ideas sell themselves
 - Encourage idea generation
 - Recognize that knowledge is a double-edged sword and act accordingly (have knowledge, but do not fall prey to tunnel vision, entrenchment)
 - Encourage students to identify and surmount obstacles
 - Encourage sensible risk-taking
 - Encourage tolerance of ambiguity: Students need to be taught that uncertainty and discomfort are a part of living a creative life.
 - Help students build self-efficacy. I have found that probably the best predictor of success among my students is not their ability but rather their belief in their ability to succeed.
 - Help students find what they love to do
 - Teach students the importance of delaying gratification
 - Provide an environment that fosters creativity (model creativity, cross-fertilize their thinking across subjects and disciplines)
 - For the teacher who wants to make a difference, exploring mistakes can be an opportunity for learning and growing. Another aspect of teaching students to be creative is teaching them to take responsibility for both successes and failures. Teaching students how to take responsibility means teaching students to understand their creative process, criticize themselves, and take pride in their best creative work. Unfortunately, many teachers and parents look for or allow students to look for an outside enemy responsible for failures.
 - Students need to learn how to imagine things from other viewpoints.

Feedback& Assessment

- For better or worse, some of the same things that we know tend to diminish creativity are the very things that tend to increase competencies. Students need feedback (a.k.a. evaluation) on their performance if they are to improve their skills, and they sometimes need some kind of extrinsic motivation – rewards – to keep working when they would otherwise simply stop.
- Work carried out using a Type III enrichment approach should be evaluated in an authentic manner. Type III products should never be graded or scored. A guide can be used to provide students with categorical feedback, but even this instrument should only be used to help students refine and improve their work.
- I found research evidence showing that intrinsic motivation leads to better problem solving and a deeper level of conceptual understanding and learned that, in the classroom, extrinsic motivation will consistently lead to better performance only on tasks requiring rote recitation, precise performance under strong time pressure and the completion of familiar, repetitive procedures.
- A test that captures the full range of creativity components has yet to be developed. Instead, we ask participants in our studies to produce some sort of real-world product.
- Consensual Assessment Technique is based on the assumption that a panel of independent expert raters, persons who have not had the opportunity to talk with one another or with the researcher about possible hallmarks of product creativity, are best able to make such judgments. Research conducted over the past twenty years has, in fact, clearly established that product creativity can be reliably and validly assessed based on the consensus of experts. Moreover, this approach has proved to be especially well suited to investigations of classroom environmental influences on creativity.

- As is the case with the reward literature, studies of the impact of expected evaluation have also become increasingly finely tuned over the years. Researchers now have a much more sophisticated understanding of evaluation effects and are quick to point out that not all evaluative contingencies can be expected to have the same deleterious impact. Theorists now understand that the type of task presented to study participants can, in large part, drive their experimental results; and recent studies reveal that under certain specific conditions, both the delivery of a competence-affirming evaluation and the expectation of an impending evaluation can sometimes increase levels of extrinsic motivation without having any negative impact on intrinsic motivation or performance. In fact, some forms of evaluation expectation can actually enhance creativity of performance.
- In a study of commissioned and noncommissioned works done by professional artists, the extrinsic incentive of a commission was seen by some artists as a highly controlling constraint, and the creativity of their work plummeted. Yet for those who looked at the commission as an opportunity to achieve recognition or a confirmation of their competence by respected others, creativity was enhanced.
- It may not be the expectation of reward per se that undermines intrinsic motivation, rather it may be the individual's interpretation of that reward and his or her role in the reward process that in large part determines whether task motivation will be undermined, enhanced, or remain unchanged.
- Intrinsic motivation must be made a regular focus of class discussion because when left to their own devices, students engage in such conversations far too infrequently. Students must be helped to recognize their own excitement for learning. Rather than relying on the feedback of teachers, they must be taught to monitor their own progress; and whenever possible, they must be given choices about what they will do and how they will accomplish their goals. They must be encouraged to become active, independent learners, confident in their ability to take control of their own learning process.
- When students are given a choice of problems to be solved or learning and performance goals to be reached, intrinsically motivated learners are likely to take risks and explore solutions to problems that represent for them a moderate level of difficulty and challenge. Extrinsically motivated students, on the other hand, will tend to choose the easiest possible problems.

Taxonomy of Type II Process Skills

Deborah E. Burns, 1994

<http://www.gifted.uconn.edu/sem/typeiips.html>

COGNITIVE TRAINING

Analysis Skills

- Identifying characteristics
- Recognizing attributes
- Making an observation
- Discriminating between same and different
- Comparing and contrasting
- Categorizing
- Classifying
- Criteria setting
- Ranking, prioritizing, and sequencing
- Seeing relationships
- Determining cause and effect
- Pattern finding
- Predicting
- Making analogies

Organization Skills

- Memorizing
- Summarizing
- Metacognition
- Goal setting
- Formulating questions
- Developing hypotheses
- Generalizing
- Problem solving
- Decision making
- Planning

Critical Thinking Skills

- Inductive thinking
- Deductive thinking
- Determining reality and fantasy
- Determining benefits and drawbacks
- Identifying value statements
- Identifying points of view
- Determining bias
- Identifying fact and opinion
- Determining the accuracy of presented information
- Judging essential and incidental evidence
- Determining relevance
- Identifying missing information
- Judging the credibility of a source
- Determining warranted and unwarranted claims
- Recognizing assumptions
- Recognizing fallacies
- Detecting inconsistencies in an argument
- Identifying ambiguity
- Identifying exaggeration
- Determining the strength of an argument

Creativity Skills

- Fluent thinking
- Flexible thinking
- Original thinking
- Elaborational thinking
- Developing imagery
- SCAMPER modification techniques
- Attribute Listing
- Random Input
- Brainstorming
- Creative problem solving
- Synectics

AFFECTIVE TRAINING

Intrapersonal Skills

- Analyzing strengths
- Clarifying values
- Developing a personal framework for activism
- Developing a sense of humor
- Developing an ethical framework
- Developing moral reasoning
- Developing resiliency
- Developing responsibility
- Developing self-efficacy
- Developing self-esteem
- Developing self-reliance
- Developing task commitment
- Understanding integrity
- Understanding self-management
- Understanding image management
- Understanding learning styles

Interpersonal Skills

- Developing environmental awareness
- Developing etiquette and courtesy
- Developing multicultural awareness
- Developing social skills
- Understanding assertiveness
- Understanding and developing leadership skills
- Understanding conflict resolution
- Understanding cooperation and collaboration
- Understanding nonverbal communication
- Understanding stereotypes
- Understanding tolerance, empathy, and compassion

Dealing With Critical Life Incidents

- Coping with loss
- Dealing with change
- Dealing with dependency
- Dealing with failure
- Dealing with stress
- Dealing with success
- Making choices
- Planning for the future
- Understanding perfectionism
- Understanding risk-taking

LEARNING HOW-TO-LEARN SKILLS

Listening, Observing, and Perceiving Skills

- Following directions
- Noting specific details
- Understanding main points, themes, and sequences
- Separating relevant from irrelevant information
- Paying attention to whole-part relationships
- Scanning for the "big picture"
- Focusing on specifics
- Asking for clarification
- Asking appropriate questions
- Making inferences
- Noting subtleties
- Predicting outcomes
- Evaluating a speaker's point of view

Notetaking and Outlining Skills

- *Notetaking Skills*
- Selecting key terms, concepts, and ideas
- Disregarding unimportant information
- Noting what needs to be remembered
- Recording words, dates and figures to aid in recall
- Reviewing notes and highlighting the most important items
- Categorizing notes in a logical order
- Organizing notes so that information from various sources can be added later
- *Outlining and webbing*
- Using outlining skills to write material that has unity and coherence
- Selecting and using a system of notation (e.g., Roman numerals)
- Deciding whether to write topic outlines or sentence outlines
- Stating each topic or point clearly
- Developing each topic sufficiently

Interviewing and Surveying—Developing and Practicing the Use of:

- Identifying information being sought
- Deciding on appropriate instruments
- Identifying sources of existing instruments
- Designing instruments (e.g., check-lists, rating scales, interview schedules)
- Developing question wording skills (e.g., factual, attitudinal, probing, follow-up)
- Sequencing questions
- Identifying representative samples
- Field testing and revising instruments
- Developing rapport with subjects
- Preparing a data-gathering matrix and schedule
- Using follow-up techniques

Analyzing and Organizing Data—Developing and Practicing the Use of:

- Identifying types and sources of data
- Identifying and developing data gathering instruments and techniques
- Identifying appropriate sampling techniques
- Developing data-recording and coding techniques
- Classifying and tabulating data
- Preparing descriptive (statistical) summaries of data (e.g., percentages, means, modes, etc.)
- Analyzing data with inferential statistics
- Preparing tables, graphs, and diagrams
- Drawing conclusions and making generalizations
- Writing up and reporting results

USING ADVANCED RESEARCH AND REFERENCE MATERIALS

Preparing for Type III Investigations:

- Developing problem finding and focusing skills
- Identifying variables
- Stating hypotheses and research questions
- Identifying human and material resources
- Developing a management plan
- Developing time management skills
- Selecting appropriate product formats
- Obtaining feedback and making revisions
- Identifying appropriate outlets and audiences
- Developing an assessment plan

Library Skills:

- Understanding library organizational systems
- Using information retrieval systems
- Using interlibrary loan procedures
- Understanding specialized types of information in reference books, such as:
 - abstracts
 - almanacs
 - annuals
 - anthologies
 - atlases
 - bibliographies
 - books of quotations, proverbs, maxims, and familiar phrases
 - concordances
 - data tables
 - diaries
 - dictionaries and glossaries
 - digests
 - directories and registers
 - encyclopedias
 - handbooks
 - histories and chronicles of particular fields, organizations
 - indexes
 - manuals
 - periodicals
 - reader's guides
 - reviews
 - source books
 - surveys
 - yearbooks

- Understanding the specific types of information in non-book reference materials, such as:
 - art prints
 - audio tapes
 - charts
 - data tapes
 - CDs
 - film loops
 - films
 - filmstrips
 - filmstrips with sound
 - flashcards
 - globes
 - maps
 - microforms
 - models
 - pictures
 - realia
 - records
 - slides
 - study prints
 - talking books
 - transparencies
 - video tapes, discs

Community Resources:

- Identifying community resources, such as:
 - art and theater groups
 - clubs, hobby, and special interest groups
 - college and university services and persons
 - governmental and social service agencies
 - museums, galleries, science centers, places of special interest or function
 - private and community colleges
 - private business and individuals
 - private individuals
 - professional societies and associations
 - senior citizen groups
 - service clubs
 - universities