Creativity and Critical Thinking

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The Five Senses

- SIGHT
- HEARING
- SMELL
- TASTE
- TOUCH

"Our sense of self, memories, values, beliefs and neural programming all act as filters that manipulate sensory input. It is our mind that converts this sensory data into feelings and perceptions. Thus, in effect, it is our thoughts that create the "reality" we see around us."

Global Economy

LONG AGO..

- Agriculture and Labour Intensive
- Decisive Factors for a Stable Job and Income;
  - Knowledge of a trade
  - Obedience to orders
  - Hardwork

21ST CENTURY

- Information and Knowledge driven
- Decisive Factors for a Stable Job and Income;
  - Working effectively within a team
  - Self motivation
  - Effective communication
  - Ability to rise above the job defenitions

21st Century Skills

- Learning Skills
  - Critical & Creative Thinking
  - Collaborating and Communicating
- Literacy Skills
  - Information Literacy
  - Technology & Media Literacy
- Life Skills
  - Flexibility, Initiative
  - Productivity & Leadership

What is Critical Thinking

- “The word ‘critical’ when applied to persons who judge and to their judgments, not only *may*, but in very precise use *does*, imply an effort to see a thing clearly and truly so that not only the good in it may be distinguished from the bad and the perfect from the imperfect, but also that it as a whole may be fairly judged and valued.”

  - *Webster’s Dictionary of Synonyms*

Critical Thinking

- Critical thinking is clear, rational and disciplined
- The thinker is open to reorganizing and raising the efficiency of his thought process by reflecting on them
- Recognizes the errors and biases that may be present
- Critical thinkers use a group of interconnected skills to analyze, unify and evaluate what is heard, seen or read

Critical Thinking Skills

- Ability to identify the central issue or the unifying theme and the possible assumptions of an argument
- Ability to pull together the disparate elements in a situation
- Ability to make bias-free inferences from available data
- Ability to evaluate the veracity and authenticity of claims

Barry K. Beyer in his book *Critical Thinking (1995),* summarizes the essential skills required for effective critical thinking.

The Essential Skills

1. Distinguish between variable facts and claims of value
2. Distiguishing relevant data from irrelevant information
3. Determine whether a statement is factually correct
4. Identifying whether a source is credible
5. Spotting ambiguous claims or aurguments
6. Identifying assumptions which are not stated explicity
7. Detecting bias
8. Identifying logical inconsistancies
9. Recognizing errors in the line of reasoning
10. Assesing the strength of an argument or claim

Critical Thinking Models

- Two main models for Critical Thinking
  - Fayetteville State University (FSU) Quality Enhancement Programme Model
  - Paul Elder Model & Collegiate Learning Assessment (CLA)

Paul Elder Model (PE Model)

- Most generalized model and covers a wider range of critical thinking process
- According to this model the thought process of a critical thinker involves three components. These pertain both to problem at hand and to the individual himself.

  - Intellectual Standards
  - Elements of Reasoning
  - Intellectual Traits

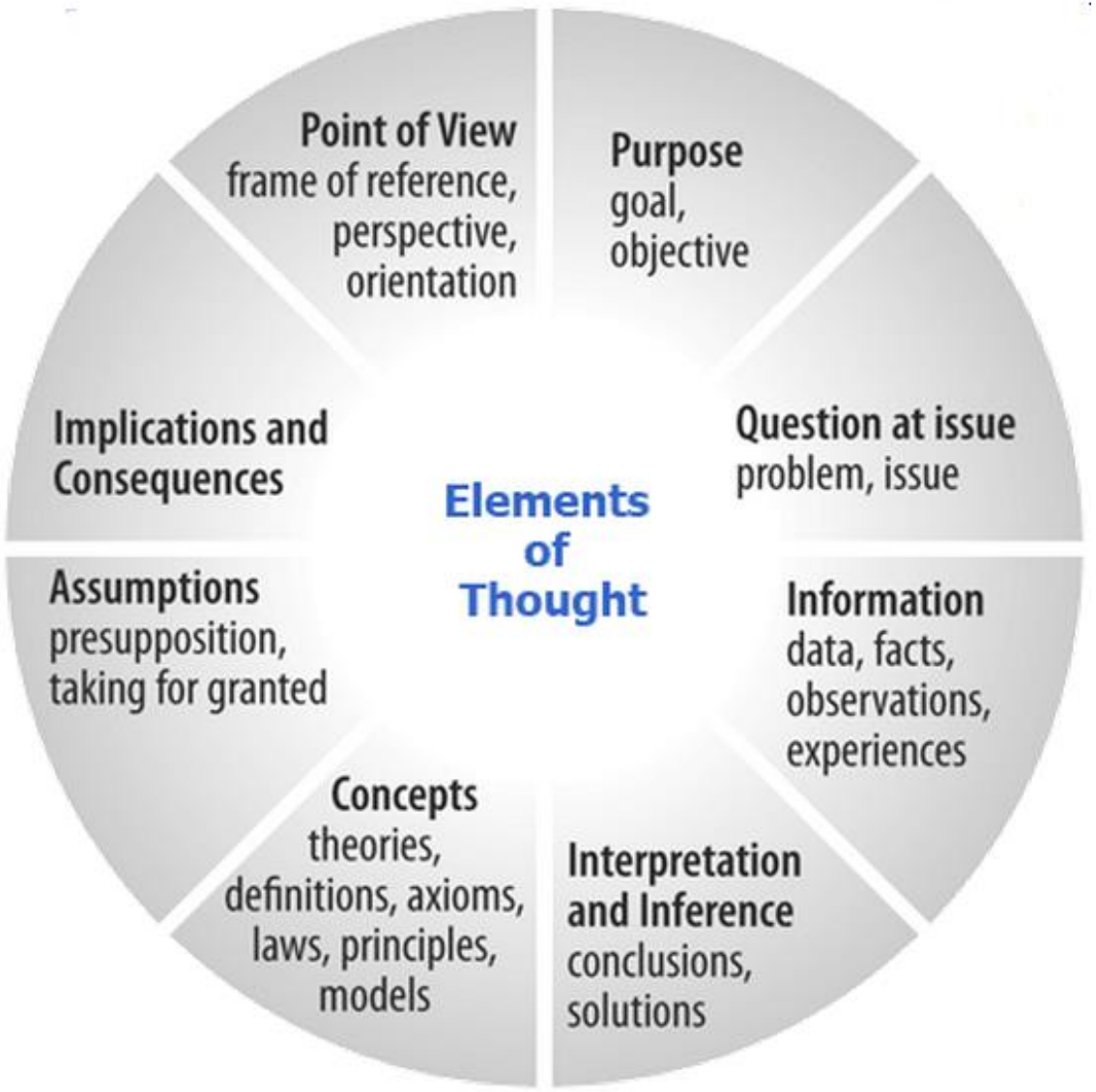
Intellectual Standards

- Standards against which we can compare the thinking process.
- Alignment to these standards determines whether our thinking process can be considered critical thinking.

Clarity	To what extent is my point easily understood by myself and others?
Accuracy	To what extent is my information at hand true or correct without distortion?
Precision	To what extent is my information exact and specific to the necessary level of detail?
Relevance	To what extent does my information and input relate to the issue at hand?
Depth	To what extent am I engaging with the complexities of the issue?
Breadth	To what extent am I considering the issue at hand within the necessary contexts and relationships?
Logic	To what extent do my conclusions follow from the evidence?
Significance	To what extent can I identify and focus on the most important aspects of the issue at hand?
Fairness	To what extent am I able to avoid privileging my own biases?

Elements of Reasoning

- Building blocks of reasoning
  - The various aspects that a critical thinker has to work with
  - The resource which he may eventually transmute into a solution.

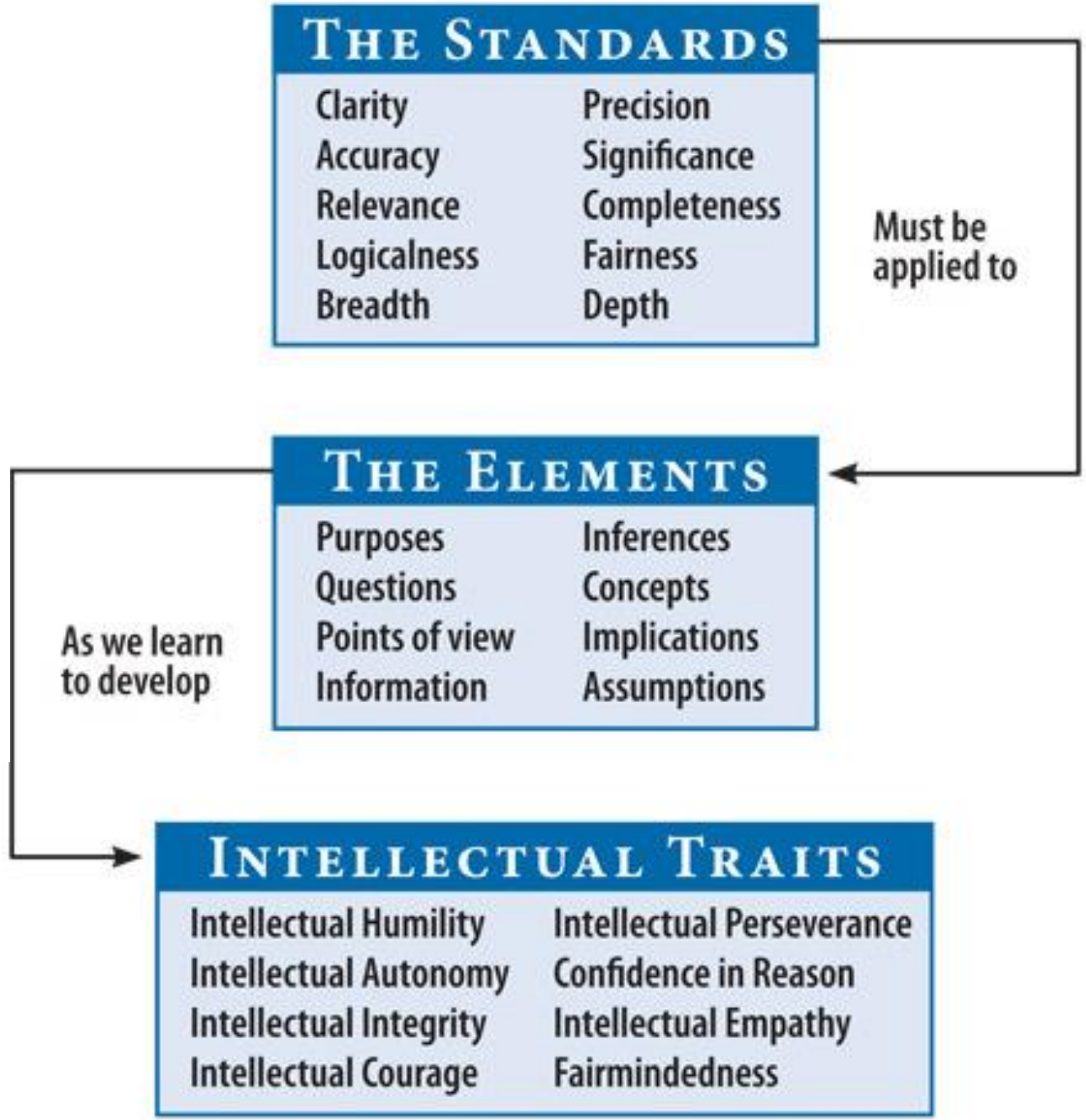


Intellectual Traits

- Expected of a good critical thinker
- Must develop by consistent application of the *intellectual standards* to the *elements of reasoning*
- Called as *Virtues of Mind*

Intellectual Integrity	I hold myself to the same rigorous standards of thinking and behavior to which I hold others.
Intellectual Fair-mindedness	I strive to treat every viewpoint in an unbiased way without reference to my own vested interests.
Intellectual Courage	I dare to question and challenge popular or long-held beliefs in the face of new information or evidence.
Confidence in Reasoning	I rely on the critical thinking process and trust its results.
Intellectual Perseverance	I continue to struggle with confusion, frustration and uncertainty to gain understanding.
Intellectual Humility	I acknowledge my biases and the limits of my knowledge.
Intellectual Autonomy	I independently think through questions and problems.
Intellectual Empathy	I consider others' perspectives in order to accurately reconstruct their viewpoints.

Critical Thinkers Routinely Apply Intellectual Standards To The Elements Of Reasoning In Order To Develop Intellectual Traits



Creativity

- **Creativity** – a mental process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts.

“breaking out of established patterns to look at things in a different way.”

“the skill of being able to produce something new which having some value”

Creativity

- It involves the ability to acquire knowledge, break it down and rearrange it in an altogether different manner to generate something new and valuable.

"it arises out of skilful restructuring of our thoughts to allow novel points of view about a given subject or situation."

What makes a creative person different/special?

- Sensitivity to the existance of problems, opportunities, gaps in knowledge, inconsistencies, and lack of harmony
- Ability to use existing knowledge in new ways to search for solutions
- Make guesses and test their validity

> “since knowledge is not always gained through language alone, creative feelings also cannot always be expressed in words.”

Three Levels of Creativity

According to psychologist Abraham Maslow, creativity is a facet of the highest human need – self actualization. He proposes three levels of creativity

- Primary Creativity
- Secondary Creativity
- Integrated Creativity

Primary Creativity

- The level from which new and fundamental ideas arises
- Radically differs from what exists
- Often expressed in arts and literature
- Most spontaneous and child-like
- Not always concerned with the utility of the work
- The stress is on self-expression

Secondary Creativity

- Ideas that are based on an existing concept, which take already existing work further
- The product of collective effort and synergy
- The level of thought and planning is higher

Integrated Creativity

- Level of creativity that often brings out great achievements be it in art, literature, science, or business
- It combines the elements of *primary* and *secondary* levels of creativity
- The spontaneity of *primary creativity* is channeled using extensive thought about the required outcome

Another Defenition

Margeret Boden, another influential researcher, stresses that creativity is a fundamental feature of our intelligence and it is present in everyone. He says that it is a skill which can be learnt by anyone using systematic procedures.

Boden also defines three kinds of creativity:

- Combinatorial Creativity
- Exploratory Creativity
- Transformational Creativity

Combinatorial Creativity

- Known ideas are combined in new and different ways to form new ideas and concepts
- Familiar ideas are connected in unfamiliar ways
  - Eg: making a collage, a poetry

Exploratory Creativity

- New ideas are generated by exploring structured concepts which currently exists
- It happens often within a domain
- Often incremental but useful and steady
- It contributes greatly by improving and refining existing structures and redefining boundaries
  - Eg: Creation and use of new words like *laptop, palmtop* by combining parts of already exisiting words

Transformational Creativity

- The deepest kind of creativity where new ideas emerge by radically changing the structured concepts themselves
- Forces a substantial restructuring of an artist's thoughts
- Associated with a great leap of imagination and challenge the existing frameworks of ideas
  - Eg: Pablo Picasso changed the conceptual space of artistic expression through *Cubism*

  Einstein's *Theory of Relativity* put an unlikey spin on the study of Physics

Creativity..

IS

- A basic capability of the human brain
- A skill – which can be learned and improved
- The product of disciplined thinking
- The result of being open to experiences and thinking about them
- A process that involves trials and errors

NOT

- A mystical ability that comes only to a few
- Inspired or path-breaking ideas all the time
- A matter of waiting for inspiration to come

The Creative Process

- Several other models have been proposed, but one common theme is that the creative process involves:
  - Analysis (breaking down the problem/issue into smaller more easily understandable parts)
  - Evaluation (determining whether an item or activity meets specified criteria)
  - Imagination (forming images and ideas in the mind)
  - Synthesis (combining existing ideas/concepts into something new)

Critical and Creative Thinking Process

- Both creative and critical thinking involve the use of high order thinking skills
- In the creative process one uses:
  - creative thinking skills (synthesis and imagination) in the preparation and verification phases
  - critical thinking skills (analysis and evaluation) in the incubation and illumination phases

Creative vs Critical Thinking

Creative thinking is described as:

- making and communicating connections to think of many possibilities;
- thinking and experiencing in various ways and use different points of view;
- thinking of new and unusual possibilities; and
- giving guidance in generating and selecting alternatives.

Critical thinking is described as:

- analyzing and developing possibilities to compare and contrast many ideas
- improve and refine ideas
- make effective decisions and judgments, and
- provide a sound foundation for effective action.

Creative vs Critical Thinking

Creative Thinking

- Divergent
- Right brain (global, parallel, emotional, subjective)
- Synthesis

Critical Thinking

- Convergent
- Left brain (analytic, serial, logical, objective)
- Evaluation

Convergent and Divergent Thinking

CONVERGENT

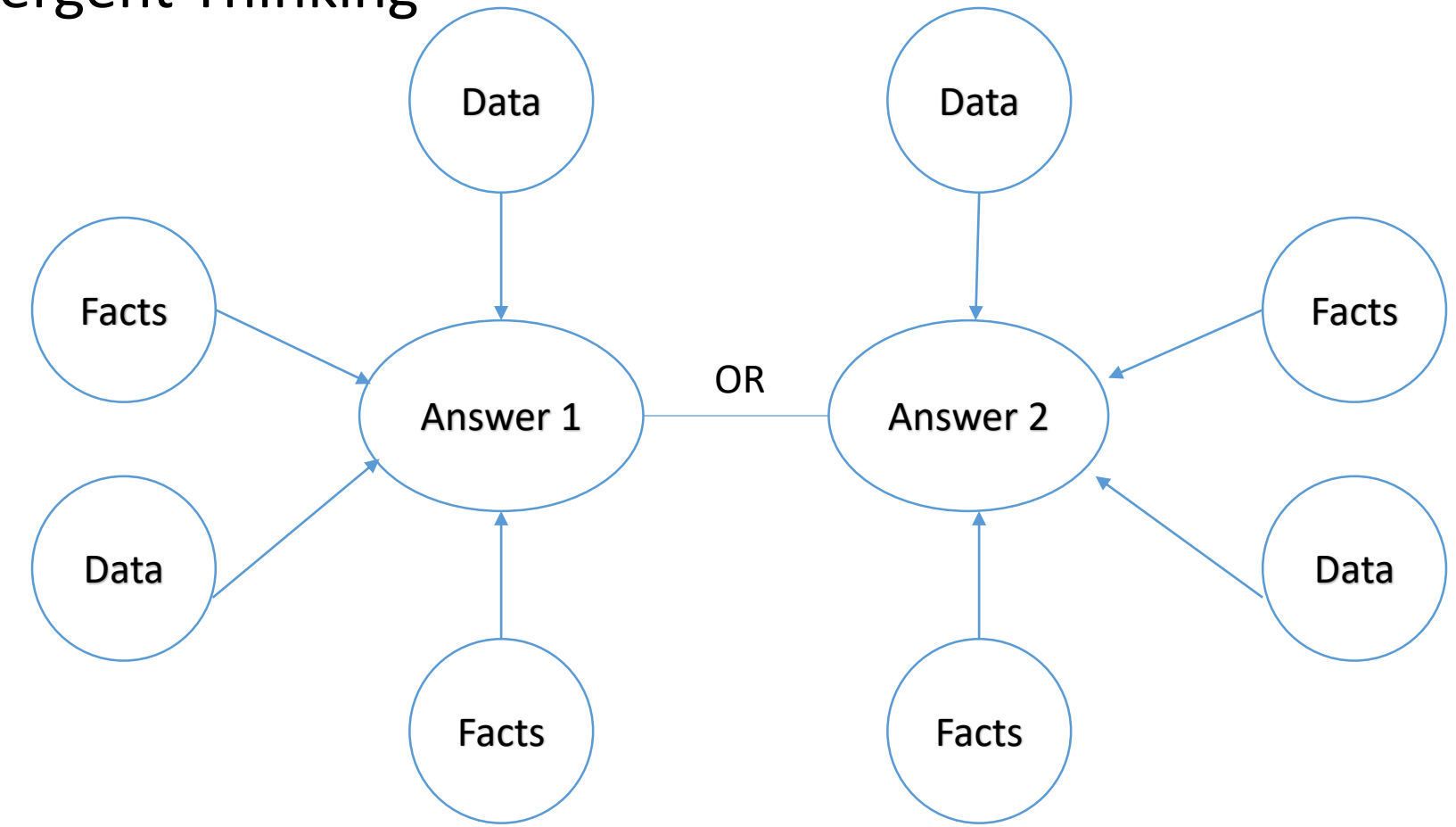
- Ability to arrive at single, most appropriate and often correct answer
- Well defined questions
- Emphsis is on speed, accuracy, logic, recognition of familiar patterns
- Eg: What is an OLED?

DIVERGENT

- Thought process works by generating and analysing different solutions for single problem
- Spontaneous and nonlinear thought pattern
- Associated with curiosity, persistence and openness to risks
- Eg: What do you think colleges will be like in the year 2100?

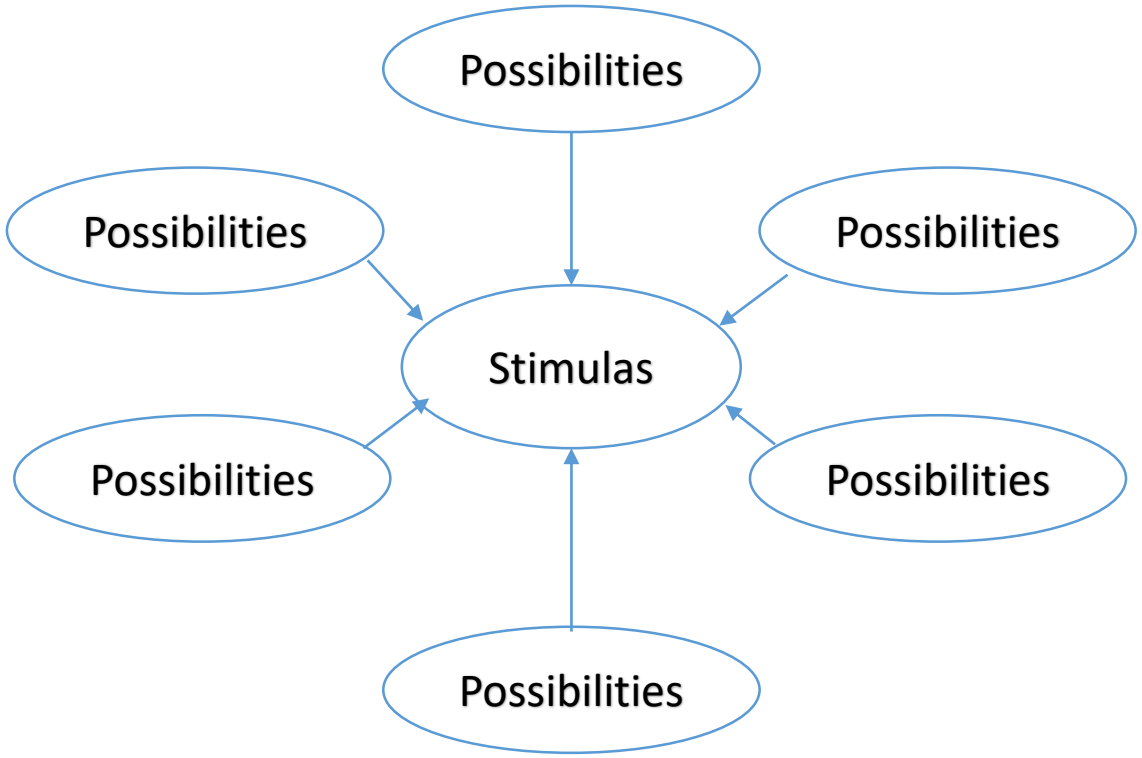
Convergent and Divergent Thinking

- Convergent Thinking



Convergent and Divergent Thinking

- Divergent Thinking



Myths of Creativity

Myth

- A widely held but false belief or idea that evolved as means to explain phenomena that were difficult to understand.

- In his book *Myths of Creativity:The Truth About How Innovative Companies and People Generate Great Ideas*, David Burkus has summarized different myths about creativity.

- The Eureka Myth
- The Breed Myth
- The Originality Myth
- The Expert Myth
- The Incentive Myth
- The Lone Creator Myth
- The Brainstorming Myth
- The Cohesive Myth
- The Constraints Myth
- The Mousetrap Myth

Lateral Thinking

- Represents problem solving by an indirect, non-sequential method using reasoning that is not necessarily obvious
- A process that starts with the generation of new ideas
- There are two main aspects for *lateral thinking*
  - Freeing our thought process from old ideas
  - Stimulating the creation of new ideas
- It diverges from the traditional vertical thinking strategies
- It helps in handling problems which has less rigidly defined steps

Vertical Thinking

- A conclusion is reached by following a series of defined steps
- It is necessary that each step must be correct in itself
- This way, it in itself limits progress to known paths

Differences Between *Vertical* and *Lateral Thinking*

Vertical Thinking

- Selective
- Moves only if a direction to move
- Analytical
- Sequential
- Path dependent
- Discounts some approaches as wrong
- Concentrate on what is relevant
- Rigid categories and classifications
- Finite

Lateral Thinking

- Generative
- Moves in order to generate direction
- Provocative
- Can make jumps
- Does not depend on soundness of path
- No approach is wrong
- Welcomes outside intrusion
- Allows fliud classifications
- probabilistic

“The Critical and Creative functions of the mind are so interwoven that neither can be separated from the other without an essential loss to both.”

- anonymous

Thank You