

CREATIVITY IN CLASSROOMS

- By G. Balasubramanian

1. Defining Creativity

The assembly of language

Any attempt to define creativity is like scaling the canvas of the sky. As one looks at the sky and wonders, as one extends his vision to as farthest point as possible to accomplish a reach, as one bends his neck and the body with a fantasy that it would help a farther accomplishment of one's vision, we have been manipulating with the word creativity. The perfect definition is possibly beyond all that is cognized, possibly beyond all that is experienced. As certain absolutes cannot be summarized in the dictionary of the known words of a language, the idea of creativity cannot be imprisoned in the formats of a language. Yet, the human curiosity to roll it into certain definitions and pocket it has been a continuous exercise.

The world of creativity

In his book *Creative Teachers, Creative students* (1997), John Baer states "Creativity refers to anything someone does in a way that is original to the creator and that is appropriate to the purpose or goal of the creator." The above definition is a very broad-based attempt to encapsulate all human endeavours into the parameters of creativity put in the context of the individual and his own environment. While enlarging the definition of creativity, this appears a too simplistic approach to creativity. It possibly fails to distinguish actions that are unique, productive, aesthetic and constructive from those common actions that would fall into a routine.

Murphy, a well known educational psychologist observes: " desire to create must be almost universal; and that almost everyone has some measure of originality which stems from his fresh perception of life and experiences, and the uniqueness of his own fantasy when he is free to share it." This definition while acknowledging the universality of the process of creativity, frames it into select vocabularies of originality, freshness, perception, experiences, uniqueness, fantasy, freedom and ability to share.

Characteristics of creative persons

This leads to following characteristics of creative persons:

- They have an innate desire to create
- The creative process stems from the latent originality
- The creative persons have a fresh perception of life
- They tend to seek new experiences
- They yield to fantasies of mind
- They tend to convert the fantasies into unique communications.
- They live in a world of freedom
- They are keen to share their perceptions and experiences with others

There have been serious debates on the behavioural and thought patterns of creative individuals. While some claim that creative persons tend to be highly focused on their target, others claim that they are highly flexible and pick the opportunities that knock at the doors of their mind.

Receiving the right signal

Goleman, Kaufman & Ray in their book “The creative Spirit” comment: “Most of the information people get about a problem is of little or no use, while some is absolutely crucial; the key to creative problem-solving is being able to detect the relevant “signal” amid the irrelevant “noise”

This opens yet another dimension of the creative personalities – their ability to detect “signals” amid “noise”. This calls for powerful observation, deep insight, power of discrimination and the ability to focus.

Versatility of the creative individual

In contrast to the above views, Dean Simonton observes: “Most of history’s great creators didn’t just have their hands in one basket. They would have lots of different things going on. If they ran into obstacles in one area, they put aside for a while and moved on to something else. By having multiple projects, you’re more likely to have a breakthrough somewhere... you’re always moving along.”

It may be quite difficult to agree with the above proposition in totality. While this observation reflects the innate freedom experienced by the creative persons, their versatility, their perseverance and their ability to breakthrough amidst failures, it appears to picture them more like nomads in the universe of creativity. This may deprive the creators of the much-needed respectability they deserve for all their efforts.

The mystery of creativity

The question, therefore, is: what is the mystery about creativity?

In finding an answer to this question Dr. Jack Oliver, a geo-physicist in the Inving Porter Church, Professor of Engineering at Cornell University in his book Creative Thinking observes:

“There is something mysterious about creativity. We can describe it, admire it, strive for it and experience it, but we can never understand how or why a certain innovative idea springs up at a particular time in the mind of a particular individual. Indeed, most people never expect to understand or master the process.”

Though many psychologists may not tend to agree or compromise with a situation with this kind, they may also claim that this does not settle the scientific pursuit of a mental process. They would rather seek aggressively processes that would remain embedded in the universe of the neurons in human brain.

The issue of the pursuit of creativity as a formal process trained through abilities to restructure mental frames has also been the advocacy of many recent thinkers on creativity. As opposed to this many educational psychologists have believed that genuine ignorance has possibly opened the doors for creativity when it has been supported by the curiosity to seek the unknown.

Dewey's perception

John Dewey, the famous educational psychologist and advocate of pragmatism, states: "Genuine ignorance is..... profitable because it is likely to be accompanied by humility, curiosity, and open-mindedness; whereas ability to repeat catch-phrases, can't terms, familiar propositions, gives the conceit of learning and coats the mind with varnish waterproof to new ideas,"

While there could be no argument on the validity of Dewey's contention on imitation as a threat new ideas, in a world flooded by information the influence of the environment on the mental processes are so strong and evident that it may be extremely difficult for an individual to remain uninfluenced by them. The environment could be a potential threat to the creative faculties of the individual as it has the power to corrupt the silence and reflective possibilities of a stable mind.

Further human interactions are so strong that such collaborations might impact the individual's creativity. While there is a strong argument that a team could synergize their creative potentialities and could maximize creativity, there are arguments to the contrary.

A case for lonely mind

John Steinback argues: "Nothing was ever created by two men. There are no good collaborations, whether in music, in art, in poetry, in mathematics, in philosophy. Once the miracle of creation has taken place, the group can build and extend it, but the group never invents anything. The preciousness lies in the lonely mind of a man."

The power of this argument cannot be taken too far in a composite world which has become too complex and too interdependent. History is evidence to the contrary. Many innovations appear to be collateral in terms of the origin of their thought, the dynamics of their development and reflect synergy of the wisdom of difference.

Understanding creativity

Given the above approaches to defining creativity and others, it is important to understand that there exists an opportunity for every individual to be potentially creative either by oneself or in the context of a team or a system. What seems to be more relevant is the appropriacy of attitudes, the commitment to the purpose, the freedom to exercise the faculties of mind and a deep appreciation of the call of the soul.

2. ARE WE ALL CREATIVE?

The nature of the human being

Every human being is born with a creative instinct. From the time of birth, he or she encounters a series of opportunities to interact with the surroundings and the environment. In all such encounters he or she experiences a sense of awe, wonder, surprise, or fear. The human mind responds to these experiences and the individual interprets all these experiences in one's own way. These interpretations, meanings and constructs of mind are characteristic of the creative urge latent in the being. The expression of these experiences, their communication to the external environment, the form and shape through which they are carved, the aesthetic nuances with which they are decorated to suit to the mood and mind of the receptor are all tender manifestations of the creativity of the human being.

Martin Buber says "Creation happens to us, burns into us, we tremble and swoon, we submit. Creation – we participate in it. We encounter the creator, offer ourselves to him."

The dynamics of growth

The dynamics of growth of every individual is most often ordained with challenges. Each challenge provides an opportunity to face the unknown or the unreal. The interfaces of such challenges may provide either courage or fear. Courage is a positive feeling and enables the mind of the individual to stand up to the difficulties, to allow them to pass over or to seek alternate pathways so that these challenges do not really impact. Fear is a negative feeling and causes withdrawal symptoms in the mind sometimes leading to loss of self-confidence, depression and sometimes leading to self-pity. Nevertheless, challenges do provide opportunities to the individual to explore the creative domains of mind in one way or the other.

"This fundamental truth of the self can be realized only if the individual is willing and courageous enough to follow to some natural conclusion this moment of experience, this facing the unknown and participating with the total commitment of the self. Such expression, such passion for life may emerge in written, spoken, graphic or aesthetic forms in relation or in isolation, in I – Thou encounters; and in silent inner experience." Says, Clark Moustakas.

The latent creative urge

Every individual lives with a passion for life, a passion that is unique to his or her own existence. The existence reveals through this passion and the revelation manifests in various forms through the process of life – at home, at workplace, at leisure, in relationships and in most forms of communication. Thus, the creative urge of the individual exhibits at all places – sometimes visible, most often invisible; sometimes tangible to others, many a time intangible to others; sometimes in discreet expressions and quite often in silent solitudes.

The truth is – all of us creative! The difficulty is – we cannot prove or convince others always that we are creative. Thomas Jefferson, the architect of the freedom of United States, says, “Do you want to know who you are? Don’t ask- Act! Action will delineate and define you.”

Traits of creativity

Though every individual exhibits traits of creativity, it surfaces in some perceivable form in some individuals. What are the personality traits of such creative individuals?

Dr. Gary A. Davis, Professor of educational psychology at the university of Wisconsin and author of “Creativity is forever” identifies the following as some important traits:

- Ability for Visualization
- Ability for Imagination
- Ability to make mental transformation

He adds “Creativity is not just a collection of intellectual abilities. It is also a personality type, a way of thinking and living. Although creative people tend to be unconventional, they share some common traits. For example, creative thinkers are confident, independent, and risk taking. They are perceptive and have good intuition. They display flexible, original thinking. They dare to differ, make waves, challenge traditions and bend a few rules.”

Types of creative personalities

Abraham Maslow identifies two different types of creative personalities – Self-actualized creative person and Special-talent creative person.

Describing the profiles of both types, he says of the self-actualized “He or she is well adjusted, mentally healthy, democratic minded and forward growing.” He is energetic and productive in all the areas. In contrast the special-talent creative person “has a great ability in a particular area but may not be psychologically adjusted.”

Freedom and creative individuals

John G. Young discussing Psychic Freedom in Creative Persons observes “Conceptual creativity requires psychic freedom.” He adds “Creative persons are freer than noncreative persons.” Thus, the creative persons enjoy an element of freedom in their thought patterns and hence have their mental frames open to external stimuli.

Confirming the above premise, Jessica Whiteside of University of Tronato observes in her article “Biological basis for creativity linked to mental illness” in the Journal of personality and social psychology, “the brains of creative people appear to be more open to incoming stimuli from the surrounding environment. Other people’s brains might shut out this same information through a process called – “latent inhibition”.

The Extra Information

Further interpreting the above observation Jordan Peterson of the same university says, “the creative individuals remain in contact with the extra information constantly streaming in from the environment.”

Reflecting on this extra information streaming into life from outside and bridging itself with the soul of the individual, Romain Rolland points out “The more we create, the more we love and lose those whom we love, the more we escape from death. With every new work we round and finish, we escape into the work we have created, the soul we have loved, the soul that has left us. When all is told, Rome is not Rome; the best of a man lies outside himself!”

The umbilical bridge

Thus, the creative urge acts as an umbilical bridge between the inner element and the outside elements. Once this is understood, every individual would be looking for that beautiful external world within oneself, and the manifestation of the self in the beautiful external world. It is a bridge of love between the known and the unknown, the conscious and sub-conscious, the material and the abstract.

This bridge of love is unique to every living and vibrant individual. If an individual is unable to construct this bridge, he lives more in the world of others than his or her own self. He or she lives the life of others than one’s own life.

Finding oneself

Dr. George Sheehan details this beautiful outfit of human existence in the following words: “The key then is to find your own mountain; otherwise you will be competing with people who are not even in your event - and running up against the ‘shoulds’ and ‘oughts’ of that world; and the inevitable frustration and depression and feelings of failure. A person can be complete or incomplete, but one thing is sure, he cannot be someone else.”

The first step to creativity, therefore, is to – identify our own mountain and be a complete being and always be our own selves.

3. Characteristics of Creative persons

Henri Bergson states “To exist is to change, to change is to mature, to mature is to go on creating oneself endlessly.” Creative persons are those who always look for changes and thus are in the process of discovering themselves. Affirming this view, Pablo Picasso observes: “I am always doing that which I cannot do, in order that I may learn how to do it.”

The observation of Picasso outlines the characteristics of courage, persistence, willingness to learn, seeking to venture on new domains.

Broadly we may indicate the characteristics of creative persons as follows:

- Curiosity
- Original thinking
- High level of motivation
- Passionate interest
- Self-confidence
- Independent thinking
- Unconventional approach
- Sense of enthusiasm
- Sense of enterprise

Curiosity is an innate virtue of a creative person. He or she is looking at their environment and workplace with a sense of awe and surprise. This infuses a sense of curiosity in them. It manifests in the following forms:

- **Curiosity to know**
- **Curiosity to explore**
- **Curiosity to experiment**
- **Curiosity to challenge**
- **Curiosity to change**

Many of those who have made landmarks in the field of creativity and innovation have been haunted by curiosity.

Curiosity to know

“No one has ever had an idea in a dress suit.” says Sir Frederick Banting. The curiosity to know is nothing but the call of the inner voice to expand the domain of one’s existence. The process of acquisition of knowledge enables greater and deeper dissolution of the knowledge of the self or the knowledge of the known with those of the unknown. The mind of the creator is always open to ideas, open to suggestions and open to differing opinions. The domain of knowledge calls for continuous food for its hunger and operates as the identity or a visiting card of the creator to a universe to which he seeks an entry.

Curiosity to explore

Curiosity to explore is a powerful trait of a creative being. Like a child trying to make a meaning out of the toys around him or her, the creative individual is in a process of continuous exploration

of the world around him. This may be task-specific or situation-specific. In the process of exploring, he often displays a childlike behaviour, a sense of innocence or foolishness.

The curiosity to explore sometimes emerges as a fire from within and does not stop till the creator's urge is reasonably satisfied. Roadblocks or failures in the process do not stop or wither him. Most often the failures or roadblocks act as motivators or catalysts to accelerate him to the achievement of the goal. Mike Berridge claims that most scientific discoveries are like battles fought. "It is extremely difficult because you are up against nature. very much like a battle. You are like a general marshalling his forces to try and unlock some of the secrets."

Harry Crews observes "the artist lies in an atmosphere of perpetual failure."

The most important of my discoveries have been suggested to me by my failures
- Sir Humphry Davy

I think and think for months and years. Ninety-nine times, the conclusion is false.
The hundredth time I am right
- Albert Einstein

Curiosity to experiment

Curiosity to experiment is born out of the inner urge of the creator. Whenever the creator finds a problem, whenever he finds something that seeks to provoke his thinking, whenever he finds something which indulges one in fantasies, he seeks to experiment with them. The creator becomes restless. The mind and body of the creator remains in constant communication with the subject to be experimented till he finds an answer.

History has evidence of many of the creators and innovators who have sacrificed all they had just in quench of their thirst for knowledge.

I saw an angel in the marble and carved until I set him free
- Michaelangelo

The best parachute jumpers are those who jump themselves
- Anonymous

Curiosity to challenge

Explorers and persons with creative indulgence are known often as dare devils. They challenge the most difficult situations and problems. Quite often, they seek solutions at the cost of a great risk. They enjoy risk taking. Curiosity to face challenges infuses in them the necessary life-spirit and they pursue their task with a strong conviction and courage.

The history of science and technology is abundant with the episodes of persons who have displayed unparalleled courage in the pursuit of their tasks.

Every act of creation is first of all an act of destruction.

- Pablo Picasso Spanish painter, sculptor

No daring is fatal. The whole logic of the universe is contained in daring, in creating from the flimsiest, slanderous support.

- Rene Crevel

If a man is to shed the light of the Sun upon other men, he must first of all have it within himself.

- Romain Rolland

Facing it, always facing it, that's the way to get through. Face it

- Joseph Conrad

Curiosity to change

Any act of creation is associated with a change. Hence a creator visualizes a change, formulates a change and designs the process of change. Very often, a change calls for destruction of the old and reconstruction. The creator is therefore called upon to deviate from the path of the known and the established. He is not deterred by the opinions of others or by the acceptability of what has been created. He finds joy in execution of what he has visualized.

Removing the faults in a stage-coach may produce a perfect stage-coach, but it is unlikely to produce the first motor car.

- Edward de Bono

Limitations aren't a problem; they are a value. The danger is getting into situations that lack limitations. If you don't create boundaries, you don't create definitions. You get involved in generalisms.

Original thinking

Creative people always tend to be different. They seek to approach problems with a sense of uniqueness characteristic of their own. They shun conditioned thinking. They do not want to follow beaten paths. They have more "why?"s and "Why not?"s in their mind than their contemporaries. They hesitate to accept things as they are and look for a context and meaning for what they see and what they experience.

Who will give me a good thought for a tonne of gold?

– Khalil Gibran

Some of the qualities of creative persons are:

- Challenging statements and concepts
- Visualizing differently
- Seeking new meanings
- Unconventional thinking
- Divergent thinking
- Challenging complexities
- Tending to be flexible
- Seeking fluency in ideas and experiments
- Looking for richness of details

Most discoveries have been made by the ability of people to question. They do not necessarily exhibit a high sense of intellectual competencies, but they look at concepts from a differing perception. This is born out of the freedom they enjoy thinking. Their mind resists limitations and seeks to identify new avenues for answering a problem. Lateral thinking, analytical thinking and critical thinking are some common traits of such individuals.

Very often it has been debated whether these are genetic traits or trainable? Experiments have shown that while many do have these qualities as generic qualities, it is quite possible to train learners as lateral, analytical, critical and divergent thinkers. Given an appropriate environment in the learning rooms, the students can pick up some of these traits and can get tuned to the new ways of thinking.

It must however be clearly understood that the faculties of mind involved in creative thinking are entirely different from those of lateral, analytical and critical thinking. While many of the faculties of mind involved in these processes may contribute to develop the process of creative thinking they are not essentially supplementary

Robert Harris in his article on Introduction to creative thinking differentiates the attributes of critical thinking with those of creative thinking in the following manner:

Critical thinking	Creative thinking
Analytic	Generative
Convergent	Divergent
Vertical	Lateral
Probability	Possibility
Judgment	Suspended Judgment
Focused	Diffuse
Objective	Subjective
Left brain	Right brain
Verbal	Visual
Linear	Associative
Reasoning	Richness & Novelty

It may be seen from the above that creative thinking calls for an entirely different dimension of mental faculties than other types of thinking. As such, creative thinking is more a stress-free thinking as compared to other forms of thinking. It is supported by greater fluidity, flexibility, space and time.

I want to know the mind of God, rest are details.

– Albert Einstein

Visualization of things in entirely a different manner is a trait of creative persons.

Here is a story:

A truck driver had stopped his truck just ahead of a bridge as he had topped the truck with heavy materials. The truck could not go under the bridge as the height of the truck was a few inches higher than that of the passage below the bridge. He could not unload the materials for reasons of safety. He started trying several methods and nothing would work. A young shepherd boy was sitting in a corner and watching the scene. After some time he started smiling at the truck driver who was terribly upset. The driver asked him "Why do you laugh?" The shepherd boy said in a timid tone: "Can I help you?"

The truck driver looked at him with a sense of contempt. After some time, he asked the shepherd boy "What would you do?"

The boy moved near the truck and released a part of the air in the tyres. The height of the truck came down slightly. The boy smiled at the driver and said: "Now, move on." The driver moved the truck under the bridge.

It is important that we should give our learners adequate opportunities to think differently and approach a problem with newer perspectives. Most often they are led to conditioned thinking. "As people grow older, they become prisoners of familiarity" says Roger Von Oech. Providing a learner with repetition of the same learning opportunities conditions the way their mind operates and as Herman Kahn observes such experiences lead to building "educated incapacity"

Here is another episode:

In one of the schools in Britain, in the early part of the nineteenth century, a physics teacher gave a test to the students. One of the questions he had raised in the paper was: "How would you measure the height of a building using a barometer?"

When the test papers were evaluated and distributed to the students, one of the students

approached the teacher stating that he has been marked wrong and given a zero out of 5 marks though he had written the answer correctly. The teacher, after perusing the answer book said "Your answer may be right, but it is not scientific. That is not what I want."

The matter was referred to an arbiter. The arbiter called the boy and said that he should write the correct answer again and will be given six minutes. After six minutes, the boy gave a blank paper and the arbiter was shocked at the way the student conducted himself.

The arbiter said: "That means you don't know the answer."

The student replied: "Sir, I know many answers. But I don't know which answer you want."

The arbiter was shocked and quipped: "Many answers? Can you say?"

The boy said: "Sir, you go to the top of the building and hold the barometer, tie a thread and allow that to fall to the ground. Measure the height of the thread and that's the height of the building."

"Sir," he continued "Take the barometer to the top of the building and attach a pendulum to that. Allow the pendulum to oscillate. From the amplitude, you can calculate the height of the building."

"Sir, you can take the barometer to the ground, find the value of g and then find the same from the top of the building. From that you can calculate the height of the building."

The arbiter was surprised. The boy continued, "Sir, Hold the barometer on the sunshine. Calculate the height of the shadow caused by the barometer. Find the height of the shadow caused by the building at the same time. From the ratio and proportion, you can calculate the height of the building."

He continued with his answers. Finally, the arbiter asked him: "Even now, you are not telling the correct answer."

The boy replied: "Sir, I do not want to think the way the teacher has taught me to think"

The boy became a great scientist later. He was Neils Bohr, who came with postulates on the quantum theory. The arbiter was Lord Rutherford who was known for his nuclear model of atom.

The two episodes clearly indicate how creative persons visualized a problem through different perspectives. They tend to conceptualize and envision the problem in their own way which helps them to approach it with a new perspective and thus to find a solution.

Motivation

A person may be motivated towards a task for various reasons. Normally motivation towards something is born out of love and affection towards a particular subject or a task. Sometimes exterior reasons like material considerations, fame, power, position or social recognition could be the source of motivation. But the motivation for a subject or a task decreases abruptly when the exterior considerations are no more valid or non attainable. But tasks to which an individual

remains motivated due to an interior urge or a calling of the soul remains a permanent source of motivation and the affinity for the subject continues even after the completion of the task.

If you have built castles in the air, your work need not be lost. That is where they should be.
Now put the foundation under them.

- Henry David Thoreau

Motivation, in true sense comes from within. It attains the form of self-actualization. One gets motivated for the simple love of doing a particular thing. Most creative persons have pursued their goal for they had a passion to fulfill. They had a passion to answer the call of their soul.

Motivation leads to commitment. They remain wedded to the task against all odds. They exhibit an extraordinary sense of bravery which they had themselves not been aware of.

Marie Curie was highly motivated to the pursuit of science. No number of roadblocks to her pursuit could stop her achieving the goal. Her success was not designed in a laboratory of highly technical infrastructure. It was on a cowshed.

Sir C.V. Raman was selected for Indian Audit and Accounts Services. His longing for science was so intense that he ventured to leave the lucrative position and pursue his ambition in science. Again, Raman's discoveries were not formulated in a laboratory of excellent infrastructure. What mattered was his motivation, his commitment and his passion for pursuit of excellence, an urge to be creative.

Creative geniuses who exhibited high level of motivation were not exclusively from the field of science and technology. People like Beethoven, Picasso, Oliver Goldsmith and several others stand testimony to the process of self-actualization.

Passionate interest

There are many individuals who have a high level of motivation. But they have no wherewithal of attaining the goals. They do not exhibit adequate interest or passion for the subject or the task they had undertaken. It is important that the motivation should manifest itself to a passionate interest with a do or die attitude. This passion should manifest into action and sustained interest in achievement of the goal.

Motivation is like food for the brain. You cannot get enough in one sitting. It needs continual and regular top ups.

- Peter Davies

To fight a bull when you are not scared is nothing. And to not fight a bull when you are scared is nothing. But to fight a bull when you are scared – that is something.

- Anonymous Bullfighter

Here is a story:

At Cambridge, many a time Newton forgot to eat his dinner and often went to bed with all his clothes on. Once when the dinner was served, he completely forgot about it and got engrossed in some problem. Dr. Stukely, a friend who was waiting for him, grew hungrier and looking at the untouched dinner of Newton helped himself. When Newton returned and saw the empty plate, he remarked "Dear me! I really thought I have not dined, but I see I have."

The passionate interest Newton had for his work was the source of his genius.

A life of passionate interest

Born as the son of a poor blacksmith and driven by poverty, Faraday (1791-1867) started his career as an errand boy and later became a book-binding apprentice with a book seller. Attracted by the lectures of Sir Humphry Davy, he persisted on a job in his laboratory. He was given the job of a bottle washer. His continued interest in science made him write the book **Historical sketch of Electromagnetism** in 1821. The success story of Michael Faraday is history. His life is a typical example of the pursuit of passionate interest in a subject he loved.

Says Edelman, the noted scientist who worked on antibodies about his adventure: "People thought I was crazy. and although didn't shy away from me at the lunch table, they thought my work was pretty preposterous." However, his passionate interest for his field of research so much all criticisms didn't deter his continuation of the work.

Self-confidence

As any creative task is a journey to unknown vistas of knowledge, unless the seeker has a high degree of self-confidence, he may possibly get disheartened and leave the task before achieving the goal. Self-confidence is born out of the conviction, courage, clarity of vision, commitment and the will to perform. As all these qualities are not extrinsic, it has to be a part of the psyche of the seeker of knowledge. Failures do not defeat these persons and they convert adversity into an opportunity. They exhibit a sense of ownership to the task they have undertaken and hence remain as an integral part of the process.

Kites rise highest against the wind, not with it.

- Sir Winston Churchill

If you have built castles in the air, your work need not be lost. That is where they should be. Now put the foundation under them.

- Henry David Thoreau

Independent thinking

Creative persons are not influenced by the thoughts of others. They exercise their own mind and develop their own ideas. They are not a part of the masses. They tend to provide leadership by the uniqueness of their thought. They have the courage to disagree with others.

History has recorded in golden letters the names and actions of those persons who have sacrificed their lives because of their independent thinking.

Aristotle had to consume a cup of hemlock to end his life.

Lavoisier was beheaded in 1794 as a punishment to his scientific research and strong views on the status of science.

Charles Darwin faced a mammoth opposition for his independent thinking expressed through Origin of Species.

Priestley was chased out by the people of Birmingham and later he took refuge in the newly formed USA. He lived in exile

Thus persons with independent thinking have always faced a rough weather in the journey of their life. Yet they had stuck to their pursuit of truth. They have always provided the leadership for the future.

Unconventional approach

Creativity has always been associated with breaking of borders. The creative geniuses have always looked at the problems in an entirely unconventional manner. The history of alchemy is proof to the fact. Though none of the alchemists could either turn a baser metal into gold, or prepare Elixir de life, they had many victories in their journey – many of them which they had never thought of. Various unconventional approaches they made to solve their problem got them newer perspectives to issues, newer products and newer innovations.

The discovery of rabies vaccine by Louis Pasteur was totally an unconventional approach to the established methods of scientific pursuit.

While praying at a cathedral, Galileo was attracted by the uniform swinging of a hanging chandelier. Galileo's brain could immediately gauge the immense possibility of the discovery about the pendulum.

It was initially thought that all organic compounds occurred in nature and they cannot be made in laboratory. It was left to the German scientist Wohler who could convert an inorganic compound Ammonium Thio-cyanate to Urea which was an organic compound.

Ronald B. Standler claims "Being creative is extraordinarily difficult work that is essential to progress! Any society seems to delight in making it more difficult by denying resources to creative people who need them. The way to succeed in spite of these artificially created burdens is to have some combination of the following character traits:

- Persistent
- Tenacious
- Uncompromising
- Stubborn
- Arrogant

Most people would characterize these traits as negative or undesirable qualities, yet I believe they are essential to innovation. By arrogant, I mean trusting one's own judgment and ignoring other people's adverse opinion."

Prof. Stenberg of Yale University had identified the following traits as essentials to creativity. He believes that lack of even one item in the list precludes creativity.

- Intelligence
- Knowledge
- Thinking Styles
- Personality
- Motivation
- Environmental context

Detailing the different types of intelligences as – Synthetic intelligence, Analytic intelligence and practical intelligence – he argues that "without practical intelligence the creative persons will not be allocated with resources to develop their ideas, and the creative person may achieve recognition only posthumously."

Throwing light on the type of knowledge required, Stenberg says “too much of knowledge may block creativity, by immediately providing reasons why a new idea is not worth pursuing and by encouraging a person to rigid thinking.”

Focusing on the thinking styles of the creative persons, he observes: “creative people question conventional wisdom, instead of passively accepting that wisdom. Creative people question common assumption and rules, instead of mindlessly following them.”

Describing the personality of the creative people, the author states: “ Creative people have the courage to persist, even when the people around them to provide objections, criticism, ridicule and other obstacles”

Differentiating the two type of motivation – intrinsic and extrinsic – he believes that most creative people are intrinsic rather than extrinsic. While intrinsically motivated persons enjoy their work and set their own goal, extrinsic motivation plays an insignificant role in making them creative.

He believes that a good environment is a vital input to creativity.

It can be observed from the above discussions that to outline a single formula for the profile of the creative persons would not be wise, rather they would never fit into them.

4. EARLY CHILDHOOD AND CREATIVITY

Child is the father of the Man

It is generally argued that creative abilities of individuals develop from their early childhood. The axiom “child is the father of the Man” is often used as a potential statement to indicate the developmental traits of the young children. Scientists and social researchers have argued on the critical importance of the first few months as well as the early years of a child’s life. Neuropsychological studies have shown the strong networking of the synaptic bases and neurons in the human brain consequent to early experiences in life. They believe that provision of adequate stimulation to the brain cells in the early years of life prepares the way for later growth and development. On the contrary, absence of such stimulations also seems to make such growth development a difficult process in the later years of life.

It is also important that the creative abilities in early years need to be distinguished from strong cognitive abilities. Ward (1974) has expressed on concern on the possibilities of such differentiations. Later studies by Moran and others have shown that creative abilities can indeed be distinguished from cognitive abilities.

Creativity and gifted children

It is also argued that most often the competencies of “gifted” children are confused with those of creative children. “Gifted” children need not have creative talents. They may only exhibit a high degree of cognitive abilities or intellectual quotient. Creative competencies do not necessarily go with either high degree of intellectual quotient or cognitive abilities. Studies have shown that many gifted children are not necessarily creative, and many creative learners do not necessarily have intellectual quotient. This takes us to a new paradigm of identifying the competencies of the creative learners and differentiating them from learners with a higher I.Q.

It must also be understood that exhibition of some specific talents in music, arts or theatre are not necessarily indicators of the creative potential of the learners always. They might be picked up by the students due to strong motivational factors and development of affinity towards a subject. Such passions or interests may vanish after a period of time due to various reasons.

Focus on desirable behaviours

Physicist Gordon Shaw of the University of California, Irvine, based on his research on the effect of piano training on three and four-year olds concluded that “music training produces long-term modifications in neural circuitry.” Similar relationships could be established with other forms of learning. This leads to the understanding that early childhood education could be influenced to modify the desirable behaviour of the child by appropriate tools of learning.

Theory of Multiple Intelligences

In 1984, Gardner and others established a platform for early school education as Project Spectrum spanning the preschool to early grades of schooling. Their studies indicated “even students as young as four years old present quite distinctive sets and configurations of intelligences.”

Thinking skills

It is also claimed by several educationists that it is important to focus on thinking skills in early years. Arguing that not all children are creative, they support the view that focusing on thinking skills would take care of the entire gamut of learners including those who tend to exhibit creative talents.

Reflecting on the above, Norris (1985) observes “Having a critical spirit is as important as thinking critically. The critical spirit requires one to think critically about all aspects of life, to think critically about one’s own thinking, and to act on the basis of what one considered when using critical thinking skills.”

Validating the above view Beyth-Marom et al. (1987) states “Thinking skills are necessary tools in a society characterized by rapid change, many alternatives of actions, and numerous individual and collective choices and decisions.”

While educational psychologists have tried to define thinking skills in various terms and define the types and parameters of these skills, it is also seen that teaching higher order thinking skills is relevant and more important. They tend to impact the thought patterns of learners of early age and facilitate in developing specific attitudes to problem solving.

Commenting on the above, Robinson observes: “While the importance of cognitive development has become widespread, students’ performance on measures of higher order thinking ability has displayed a critical need for students to develop the skills and attitudes of effective thinking.” Such higher order thinking skills may lead to them to take up creative pursuits.

Confirming the above point of view, Ristow admits “However a great deal of research currently being reported indicates that the direct teaching of creative skills can produce better and more creative thinkers.”

Curriculum for different learning pursuits

All these point to development of a curriculum that is holistic and would facilitate all types of learners not only to achieve their goals but to maximize their learning to become creative individuals. Focusing on this view, the National Association for the Education of Young children in United states observed in its position paper “that children demonstrate different modes of knowing and learning and different ways of representing what they know.” This position is supportive of the stand taken by the Howard Gardner’s Multiple Intelligence Theory.

The facets of MI theory

It is relevant at this stage to focus on certain facets of the MI theory of Howard Gardner.

Gardner argues that every learner has an “intelligence profile” which acts as a gateway for his knowing the world. This intelligence profile of the learner is unique and is a distinctive combination of certain intelligences.

Gardner details various intelligences as follows:

- Linguistic intelligence
- Logical-mathematical intelligence
- Spatial intelligence
- Musical intelligence
- Kinesthetic intelligence
- Inter-personal intelligence
- Intrapersonal intelligence

While it is not intended to discuss these intelligences in their detail, it is evident from the above that the classrooms should provide a wide range of positive experiences so that learners get not only opportunities but also ambience for their effective learning.

Process oriented learning

Advocating a “process-oriented” approach to learning, Wider and Greenspan suggest the following guidelines to teachers:

- Ensure that children have access to a rich environment that encourages exploration and choices
- Provide children enough time to get fully involved in an activity and benefit from it
- Consider play as an opportunity to integrate all learning experiences and skills
- Make learning interactive and fun
- Identify and make goals for the specific learning tasks for each stage of emotional development

James D. Moran argues in his paper on Creativity for Young children that “Ideational fluency is generally considered to be a critical feature of the creative process. Children’s responses may either be popular or original, with the latter considered as the evidence of creative potential.”

It is important that children be given the opportunity to express divergent thought and to find more than one route to the solution.

Where all think alike, no one thinks very much

– Walter Lippman

Non evaluative atmosphere

This would necessitate a right atmosphere for profile development. Treffinger (1984) urges on the need for a non-evaluative atmosphere for the young children as a critical factor to development of creativity. He calls for avoiding ‘the right answer fixation’ syndrome from the classroom environment.

A case against rewards

It is also observed that the practice of awards and rewards often act as negative inputs to development of creativity. Focus on rewards often distorts the finer objectives of the thought process and leads to a significant drop in the ideational fluency.

Atmosphere for creativity

Creativity happens when the mind is usually in a stable and calm state. Joshua Freedman observes in his article “Creativity for Emotional intelligence: Ideas and Activities” – “When we most need creativity, we tend to be in an emotional state where creativity is least accessible. Fear and distress activate the limbic system at the base of our brains. This shuts off the cerebral cortex, where creativity and problem-solving live. Love is the antidote to fear and the wellspring of creativity.”

He adds “Creativity requires informality because its essence is “breaking rules.” The result is that creativity is sometimes tied to strong emotions which both give it power and make it challenging.”

Focusing on the need for developing the inner strength which could usher creativity in classrooms, Reggio Emilia a specialist in early school education in Italy comments: “What appears to be important is to teach “what is inside” and “how things work”

Significant contributors to creative environment:

Edward and Heiler (1993) identifying some basic parameters that manifest creativity list the following as significant contributors to the development of an ambience for creativity:

1. Developmentally capable of classroom experiences which call for higher level thinking skills, including analysis, synthesis and evaluation
2. Need to express ideas and messages – form mental images – integration across formats including words, gestures, drawings, paintings, construction, music, play etc.,
3. Through sharing and gaining other perspectives move to new levels of awareness
4. Learn through meaningful activities – Open ended discussions and long-term activities – development of interrelationship between things
5. Need for integration of curriculum
6. In depth-exploration

Snowflake model developed by David Perkins of Harvard University identifies the following attributes as the traits of creative persons:

1. Strong commitment to personal aesthetic
2. Ability to excel in finding problems
3. Mental mobility
4. Willingness to take risks
5. Objectivity
6. Inner motivation

5. Unleashing Creativity in early childhood

Learning is a joyful activity. It starts at the womb. Knowledge is an output of a learning process and not the end of it. Learning continues through out life. Creativity is genetically linked to learning as both have a common denominator of curiosity. No effective learning takes place without curiosity and no creativity is possible in a mind which is not curious. Previous knowledge is often a facilitator as well as a threat to creativity. It is a facilitator to the extent that it makes us understand that one doesn't have to reinvent a wheel. It is a threat when it assumes the role of a conditioner of mind. It is important how we teach children to handle the previous knowledge.

Most often parents use previous knowledge and related experiences to create a psychic threat or fear in the minds of the children to provide them a safe and secure environment. Such usages have a limiting value. Knowledge has to be used for progressive empowerment rather than as a deterrent. This would help the children to unleash their creativity.

The classical theory of Pavlov has been extensively used in classrooms for conditioning of mind through creating repeated stimuli-response systems. This might help in training the mind but not in ushering the creative faculties. As learning happens from birth onwards informally, children do come to school with some previous learning experiences. Sometimes schools have to create an environment for unlearning some of the established structures so that the child is having a positive repository of experience to continue further learning.

School entrance behaviours

Torrence E. Paul and Kathy Goff in their book *Fostering Academic creativity in gifted students* observe "Young children are naturally curious. They wonder about people and the world. By the time they enter preschool, they already have a variety of learning skills acquired."

Some of the skills identified in children entering a pre-school are:

- Questioning
- Inquiring
- Searching
- Manipulating
- Experimenting
- Playing

Some of the behavioral patterns of such children are:

- Watching from a distance
- Taking a close look
- Touching and feeling
- Irresistible tendency to explore

➤ Vivid imagination

As early childhood activities are supported both by parents and teachers, they have to create a right environment both at home and at school for nurturing creativity.

How can parents help in nurturing creativity?

As most creative abilities are learnt informally, parents can facilitate the following at home:

- Singing
- Dancing
- Painting
- Story telling
- Playing

It is believed that humor is a strong facilitator of creativity. Therefore, parents can create many opportunities for the children to feel happy, relaxed and humorous.

Parents should also ensure that the following negative inputs are not present in the ambience provided to the children:

- Fear
- Threat
- Contempt
- Punishment
- Comparison
- Bullying
- Failure

Enabling environment should be provided at home for constructive relationships. All elements that would cause stress should be removed from the learning environment of the child.

Some of the following incidents at home de-motivate the child from creative pursuits:

- Serious differences between parents
- Comparison with siblings
- Inadequate economic support
- Conditioning thinking and behaviour

How can teachers facilitate creativity?

Teachers should provide an enabling environment in the classroom for attainment of a creative atmosphere. The following things need to be kept in mind:

1. Children need Time

Teachers should understand that creativity is not a package that could be developed in a scheduled period of time. Creativity does not follow the clock. Children need freedom and their own time to follow their instincts. They need time to dream, time to conceive an idea, time to plan and time to execute. Structuring a time schedule would handicap the process of creativity. Hence teachers should provide the freedom of time to the learners to exhibit their latent potentials.

2. Creativity needs Space

You cannot cause creativity at a given place. It may not be possible for any child to think the way the teachers want them to think or to think in the way they are expected to think at a given place. The place and space are sometimes threat to a creative environment unless otherwise accepted by the child as conducive to them. A barren drab environment is not conducive to work. That is why evaluating the creative indulgence of the child within the framework of a classroom in an informal mode is deemed as an incorrect mode of assessment of the profile of the learner. Teachers should understand that creativity does not happen within the four walls of the classroom. Nor does it necessarily happen within the precincts of the school building.

3. Creative children select their own materials

Provision of select materials need not subscribe to creative inputs. Textbooks, support materials, Lab materials, appliances, technological support systems are useful instruments. But they neither decide the creative profile of the learner, nor do they necessarily add any value. The materials for creativity are unique to every creative individual and depend on the space and time selected by the learner. Materials are used most productively and imaginatively by children when they themselves have helped to select, organize, sort and arrange. Hence an expensive and exhaustive infrastructure is not the only input to creativity, though it might provide extended opportunities for the same.

4. Provide the right climate

Creativity demands a fear and threat free climate. The creative individuals tend to experiment and most often fail in their experiments. They love to work in a climate where they can accept their mistakes without any remorse or regret and are in a position to convert their failures as steppingstones to further endeavours of discovery. The creative persons are always prone to risk taking and look forward to challenges with willingness and the climate in which they are working should facilitate such risks. They are always unique in their thought and actions. Quite often, their actions reflect their idiosyncrasies. The climate in which they work should help in accepting this uniqueness rather than marginalizing them for their uniqueness. The role of teachers in providing this climate is very important. They need to understand selectively the needs of each student in their class and provide appropriate climate to them than dwelling in certain commonalities.

5. Encourage provocative thinking

Very often the latent creative urge in the children manifests through their abilities to question, their capacity to differ, their abilities to perceive and experience through their senses, their unique insight and an encounter their nourish with their own inner world. Given an atmosphere that empowers the above; the creative urge gets manifested powerfully and is exhibited. The role of the teachers is to encourage such provocative occasions wherein the children would seek answers for questions rather than get tamed through conditioned stimuli revealing monitored responses.

6. Encourage diversity

The teachers should understand that there is no one right way of doing a thing. This perception is quite relative and is anti-developmental. Ronald B. Standler in "his article on " Creativity in Science and Engineering" (1998) observes " My observation is that many instructors, from elementary school through undergraduate college courses have a standard, orthodox , only one right way" approach to the material. A student who does differently from the instructor is labeled wrong. I believe that such an approach is often the result of the limited intellectual ability of the instructor who only knows one reliable technique." All creative works are manifestations of unique perceptions and the outcome of such persons who had displayed exemplary courage to differ and show to the world that there is more than one way of doing a thing. Encouraging diversity enhances aesthetic pursuits, entrepreneurial attitudes and provides platform for innovation.

Constructivist curriculum

In the context of the above, it is relevant to focus on constructivist approach to curriculum where the learner is free to construct his learning and curricular structures depending on one's own aptitude and pace. This also facilitates multiple disciplines of learning cutting across barriers. Developed as a branch of cognitive psychology by Ornstein and Hunkins in 1998, it was regarded as a philosophy that cuts across multiple disciplines of learning by Brunner (1996)

The method concerns with how personal understanding or knowledge is formed. The focus of the method is on knowledge construction.

The salient features include:

- Viewing knowledge as content to be transmitted
- Knowledge is conceptualized as a cognitive state
- Knowledge is perceived as constructed meanings
- Knowledge is embraced as an adoption of a culture

The constructivist approach to learning is user-friendly and removes all roadblocks to creativity. Teachers would do well to understand the basic tenets of this branch of cognitive psychology.

What are the features of a constructivist classroom?

The characteristics of a constructivist classroom are:

- The students take responsibility of one's own learning
- Construct their own resources and knowledge
- Reconstruct and develop knowledge
- Share the constructs with other learners
- Develop conceptualization of the constructs

Thus, the paradigm of learning of a constructivist classroom shifts to the individual learner, his aptitudes, attitudes, environment and resources. It enhances the comfort level of learning and empowers the learner to be in continuous interaction with his learning environment.

What would the teachers do in a constructivist classroom?

The role of teachers in a constructivist classroom would focus on the following:

- They have a facilitative role rather than those of information dispensers
- They would help students understand their constructs
- Share their constructs with a larger community of experts

Defining a constructivist environment, Wilson (1996) observes:

“A place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities” (Wilson 1996)

There is an increasing opinion among global educators that a constructivist environment is more suited to the pursuit of creative faculties of the learners. It would be advisable if the teachers learn to use some of the major aspects of constructivist learning in their pedagogical pursuits to create an ambience for creativity

6. Theories on Creativity

From the time of advent of educational psychology, efforts have been made to define creativity and to put forth theories on creativity. Each of the theories have been based on the study of cognitive competencies, insights, intuition, curiosity and several other versatile patterns exhibited by creative scientists, writers, technologists and artists. Every theory has tried to focus on certain essential elements which manifest creativity, but none of them have been able to define the inner core of the creative urge experienced by the creative persons.

Studying the role of Intuition as a vital input to a creative process, Dr. Daniel Cappon, Professor of Environmental studies at York University, Ontario, Canada observes in his book "INTUITON FROM INSTINCT :

"Intuition is the oldest, most vital part of human intelligence. It is in daily use and accounts for human survival as well as for the secret of most successes.

I think intuition has been reduced to a myth and allowed to sink into the province of mystics and fringe groups because its operation is unconscious. In the course of evolution of human intelligence, intuition had to become unconscious for the sake of the brain's economic effectiveness.

"And techno-intelligence, stimulated by the evolution of the human eye, the prehensile hand, and the rapid growth of billion celled new brain (neo-cortex) began to bend the environment to suit man. Thus, logical speech-promoted intelligence took over at the expense of the instinct.

Homo-sapiens did this adaptive jumping by compelling the environment to adapt to it, rather than adapting itself to the environment. The inventive and creative aspect of the techno-intelligence had to be built on the experiential basis of those instincts. Hence, there is a slower-than-survival oriented emergence of the institution. This kind of slow track intuition accounts for human successes in science and technology as much as in the arts and indeed in all human endeavours.

Yet the largest function of intuition necessarily rests with social intelligence rather than techno-intelligence.... To wit, it took less intelligence to land a man on the moon than it does to resolve the conflict of a married couple.

Most people today don't think at all. They are too busy being hungry. Nor are they well enough informed or trained for logical, deductive reasoning. Their work and their daily lives are set by habit and their upbringing and culture."

The Snowflake model associates creative results with Type T personalities and says "By working at the edge of their competence, where the possibility of failure lurks, mental risk-takers are more likely to produce creative results."

Further it associates the following elements as instruments for successful creativity –

- constant seeking of excitement and stimulation
- acceptance of failure as a part of the creative quest
- ability to learn from failure

One of the earliest theories formulated by Freud based on his psycho-analytical approach views "that works of art result from sublimation, the repression of unacceptable drives followed by their

conversion at the unconscious level to an acceptable one, making full and powerful expression possible. Thus, rage or even murderous impulses toward a sibling can be acted out unconsciously to produce beautiful paintings.”

Lawrence Kubie, emphasized the significance of “the preconscious, that aspect of the psyche where unconscious material is bound into form so that it can be dealt with consciously.”

Susan Deri, addressed creating as “exercise of the human capacity to symbolize, with the prerequisite for this being a gap and the creative product itself being a symbol made to bridge it.”
